T.C.
GALATASARAY UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
DEPARTMENT OF RADIO, TELEVISION AND CINEMA

UNDERSTANDING THE SOCIAL PRODUCTION OF VIRTUAL SPACE: USER-ENVIRONMENT RELATIONS IN IMMERSIVE SOCIAL VIRTUAL REALITY FROM A POSTPHENOMENOLOGICAL PERSPECTIVE

DOCTORAL DISSERTATION

Mine Bertan YILMAZ

Supervisor: Prof. Dr. Kerem RIZVANOĞLU

DECEMBER, 2024

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DECEMBER, 2024

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"Words are flowing out like endless rain into a paper cup
They slither wildly as they slip away across the universe
Pools of sorrow, waves of joy are drifting through my opened mind
Possessing and caressing me…
Nothing's gonna change my world"

The Beatles, Across the Universe, 1969

This thesis is more than a research; it is the product of a long and transformative journey. It reflects lessons learned, unlearned, and relearned, with each step unveiling new layers of understanding and growth. It stands as a tribute to the complexities of exploration, shaped by the voices and experiences that have illuminated the path forward, guiding me in crafting a reflection of what it means to exist, create, and connect in the world. As the virtual worlds continue to evolve, reshaping the ways we live and engage with each other, this work is dedicated to those who dreamt of living across the universe- pioneers of a limitless future.

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ABBREVIATIONS

ADHD : Attention-Deficit and Hyperactivity Disorder
AI : Artificial Intelligence
AR : Augmented Reality
BCI : Brain-Computer Interface
CEO : Chief Executive Officer
CMC : Computer-Mediated Communication
CSV : Comma Separated Value
HCI : Human-Computer Interaction
HMD : Head-Mounted Display
ID : Identification
IP : Internet Protocol
LGBTQ+ : Lesbian, Gay, Bisexual, Transgender, and Queer, and more
MMORPG: Massively Multiplayer Online Role-Playing Game
MR : Mixed Reality
MRE : Mixed Reality Extension
NFT : Non-Fungible Token
NPC : Non-Player Character
PBC : Public Benefit Corporation
PC : Personal Computer
RSVP : *Répondez s'il vous plaît* (Please Respond)
SDK : System Development Kit
SNS : Social Networking sites
US : United States
UTC : Coordinated Universal Time
VE : Virtual Environment
VPN : Virtual Private Network
VR : Virtual Reality
WELL : Whole Earth 'Lectronic Link
2D : Two Dimensional
3D : Three Dimensional
XR : Extended Reality

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RÉSUMÉ

Les plateformes immersives de réalité virtuelle sociale (VR) offrent aux utilisateurs des espaces tridimensionnels pour créer, communiquer et socialiser à travers des avatars incorporés. Ces plateformes facilitent des pratiques sociales qui redéfinissent les interactions d'une manière unique à la VR. Afin de dévoiler les dimensions multifacettes de l'évolution des interactions sociales virtuelles, cette étude cherche à comprendre la production sociale de l'espace virtuel dans les plateformes immersives de VR sociale, en adoptant une perspective postphénoménologique. La recherche souligne le lien entre la production de l'espace virtuel dans les plateformes sociales de VR et le développement des relations et pratiques sociales. En adoptant une approche qui conçoit la production de l'espace en VR sociale comme la création de relations sociales au sein de cet espace, l'étude contribue non seulement à la littérature existante en positionnant les plateformes immersives de VR sociale comme des espaces sociaux émergents, mais les explore également comme des environnements sociaux entièrement nouveaux.

L'étude avance que les expériences des utilisateurs ne peuvent être dissociées de leur incorporation dans l'espace virtuel, et que leurs pratiques sociales incarnées structurent l'espace virtuel en tant qu'espace social, ou espace socialement produit, dans lequel les utilisateurs se produisent eux-mêmes tout en produisant cet espace. Les plateformes sociales de VR sont perçues comme un ensemble d'espaces sociaux relatifs, interactifs, créatifs et collaboratifs, émergeant d'un ensemble de pratiques et de relations sociales particulièrement incorporées, constituées par l'interaction entre la pratique (perçue), la conceptualisation (conçue) et la représentation (vécue). Dans cette perspective, l'étude s'appuie sur un cadre postphénoménologique axé sur les relations Utilisateur-Environnement (Vindenes et Wasson, 2021a) pour explorer les expériences des utilisateurs dans la réalité virtuelle immersive. Elle adopte la théorie de la production de l'espace de Lefebvre (1991) et sa triade spatiale comme point d'ancrage conceptuel afin d'examiner les interactions entre les espaces perçus, conçus et vécus, et incorpore le cadre de la production sociale de l'espace numérique de Proctor (2021). A travers ce prisme, l'étude analyse la production sociale de l'espace virtuel selon trois dimensions: l'espace perçu des affordances, l'espace conçu de la programmation, et l'espace vécu de la virtualité.

L'espace perçu englobe les affordances disponibles pour les utilisateurs dans l'environnement virtuel, reflétant les possibilités immédiates d'interaction et de créativité. L'espace conçu renvoie aux éléments de programmation et de conception qui structurent et orientent l'expérience utilisateur, traduisant l'intentionnalité des développeurs dans la manière dont les utilisateurs interagissent avec l'environnement virtuel. L'espace vécu de la virtualité représente les pratiques, expériences et expressions réelles des utilisateurs dans l'environnement virtuel. C'est là que les

interactions, normes sociales, rituels et récits partagés sont activement créés et performés, illustrant comment les utilisateurs habitent et donnent sens à l'espace. Cette dimension met en évidence les dynamiques émotionnelles, sociales et culturelles qui émergent à travers la présence incarnée et les expériences collectives, donnant vie à l'environnement virtuel en tant qu'espace socialement construit et expérimenté. L'étude soutient que la relationnalité et l'intentionnalité entre les utilisateurs et l'environnement sont à la fois influencées par et constitutives de ces trois dimensions dans les plateformes de VR sociale.

Cette recherche repose sur un design qualitatif mené dans *AltspaceVR*, une plateforme ouverte et événementielle de réalité virtuelle sociale pour des expériences en réalité mixte (MR). Le processus de fermeture d'*AltspaceVR* pendant l'étude a constitué un contexte unique pour comprendre comment les utilisateurs s'adaptent et migrent vers d'autres mondes virtuels tout en maintenant une continuité dans leurs interactions sociales virtuelles. En intégrant les théories spatiales de production et reproduction de Lefebvre (1991) avec les concepts de migration médiatique et de diaspora virtuelle, l'étude explore également l'interplay entre les pratiques spatiales, les liens communautaires et la continuité face aux perturbations numériques comme la fermeture de plateformes.

Cette étude examine les espaces virtuels immersifs à travers un cadre méthodologique mixte combinant une ethnographie multi-plateforme, une approche centrée sur l'utilisateur, ainsi que des analyses phénoménologiques et postphénoménologiques, offrant une compréhension approfondie de ces environnements en évolution. Le travail de terrain s'étale sur deux ans d'observation participante et comprend 41 entretiens semi-directifs menés avec des utilisateurs d'*AltspaceVR*, des créateurs de mondes et des organisateurs d'événements.Les entretiens ont été réalisés sous deux formats: (1) des entretiens *go-along* dans *AltspaceVR*, où les participants partagent leurs expériences en naviguant dans l'environnement virtuel, et (2) des entretiens en ligne via des plateformes de visioconférence comme *Zoom* et *Discord*. Une analyse thématique, soutenue par le logiciel *Atlas.ti*, a été employée pour identifier les motifs et thèmes récurrents dans les données d'entretiens.

Cette étude propose un cadre complet pour comprendre la nature en évolution des espaces virtuels, soulignant le rôle central des utilisateurs dans leur production et reproduction sociales. En identifiant trois dimensions clés- espaces perçus, conçus et vécus- elle démontre comment ces éléments s'entrecroisent pour créer des environnements virtuels dynamiques et riches socialement. La recherche fournit des perspectives théoriques, méthodologiques et pratiques sur la création, l'évolution et la durabilité des espaces virtuels en tant qu'environnements socialement produits. Elle explore également les défis auxquels font face les utilisateurs et créateurs lors de la migration de communautés virtuelles consécutive à la fermeture de plateformes et propose des stratégies pratiques pour maintenir une continuité face aux perturbations numériques. En illustrant comment les utilisateurs co-créent des espaces virtuels et préservent les liens sociaux, l'étude révèle le potentiel transformateur de la VR sociale immersive en tant qu'arène dynamique d'innovation, de créativité et de connexion humaine significative.

ABSTRACT

Immersive social virtual reality (VR) platforms offer users three-dimensional spaces to create, communicate, and socialize through embodied avatars. These platforms facilitate social practices that redefine interaction in ways unique to VR. Aiming to explore multifaceted dimensions of the evolving landscape of virtual social interaction, this study aims to understand the social production of virtual space in immersive social virtual reality (VR) platforms from a postphenomenological perspective. The research underscores the connection between the production of virtual space in social VR platforms and the development of social relations and practices. By adopting an approach that views the production of space in social VR as the creation of social relations within that space, the study not only contributes to the existing literature by positioning immersive social VR platforms as emergent social spaces but also explores them as entirely new social environments. The study argues that users' experiences cannot be separated from their embodiment in the virtual space, and their embodied social practices form the virtual space as a social space or a socially produced space, in which users produce themselves in space and at the same time produce that space. It sees social VR platforms as a series of relative, interactive, creative, and collaborative social spaces arising from a set of particularly embodied social practices and relations constituted via the interactions among practice (perceived), conceptualization (conceived), and representation (lived).

In this regard, the study builds on a postphenomenological framework focused on User-Environment Relations (Vindenes and Wasson, 2021a) to explore user experiences in immersive virtual reality. It adopts Lefebvre's (1991) Production of Space Theory and spatial triad as a conceptual anchor to examine the interplay between perceived, conceived, and lived spaces, and incorporates Proctor's (2021) Social Production of Internet Space framework. Through this lens, the study examines the social production of virtual space across three dimensions: The perceived space of affordances, the conceived space of programming, and the lived space of virtuality. The perceived space encompasses the affordances available to users within the virtual environment, reflecting the immediate possibilities for interaction and creativity. The conceived space refers to the programming and design elements that structure and guide the user experience, reflecting the intentionality of developers and designers in shaping how users interact with the virtual environment. The lived space of virtuality represents the users' lived practices, experiences, and expressions within the virtual environment. It is where interactions, social norms, rituals, and shared narratives are actively created and performed, reflecting how users inhabit and make meaning of the virtual space. This dimension highlights the emotional, social, and cultural dynamics that emerge through embodied presence and collective experiences, bringing the virtual environment to life as a socially constructed and experienced space. The study

contends that the relationality and intentionality between users and the environment are both shaped by and constitutive of these three dimensions in social VR platforms.

The study employs a qualitative research design conducted in *AltspaceVR*, an open event-based social virtual reality platform for live mixed reality (MR) experiences that not only encapsulated the principles of social production but has undergone its own closure. The closure of *AltspaceVR* during the field study served as a unique opportunity for understanding how users adapt and transition to different virtual worlds while maintaining a sense of continuity in their virtual social interactions. By integrating Lefebvre's (1991) spatial theories of social production and reproduction with concepts of media migration and virtual diaspora, the study also explores the interplay between spatial practices, community bonds, and continuity in navigating digital disruptions such as platform closures.

This study explores immersive virtual spaces through a mixed-method framework that combines multi-platform ethnography, a user-centered approach, and phenomenological and postphenomenological analyses. The fieldwork spans two years of participant observation and includes 41 semi-structured interviews with *AltspaceVR* users, world creators, and event creators. Interviews were conducted in two formats: (1) Go-along interviews within *AltspaceVR*, where participants shared experiences while navigating the virtual environment, and (2) online interviews via video conferencing platforms like *Zoom* and *Discord*. The interviews were analyzed using thematic analysis with the support of *Atlas.ti* qualitative data analysis software.

This study offers a comprehensive framework for understanding the evolving nature of virtual spaces and highlights the pivotal role of users in their social production and reproduction. By examining three spatial dimensions- perceived, conceived, and lived spaces- it demonstrates how these intersect to create vibrant and socially rich virtual environments. The research provides theoretical, methodological, and practical insights into the creation, evolution, and sustainability of virtual spaces as socially produced spaces. It further explores the challenges users and creators face when virtual communities migrate following platform closures and proposes practical strategies to maintain continuity in face of digital disruptions. By illustrating how users co-create virtual spaces and preserve social bonds, the study reveals the transformative potential of immersive social VR as a dynamic arena for innovation, creativity, and meaningful human connection.

ÖZET

Sürükleyici sosyal sanal gerçeklik (VR) platformları, bireylerin iletişim ve sosyalleşme biçimlerini köklü bir şekilde dönüştürerek sanal sosyal yaşamın yeni ve hızla gelişen bir fenomeni haline gelmektedir. Sosyal VR platformları, kullanıcılara bedenleşmiş avatarlar aracılığıyla üç boyutlu sanal mekânlarda yeni dünyalar ve nesneler yaratma, etkinlikler düzenleme, oyunlar oynama ve diğer kullanıcılarla etkileşimde bulunarak sosyalleşme imkânı sunmaktadır. Bu çalışma, sosyal VR platformlarındaki etkileşimlerin çok boyutlu yapısını anlamayı ve sanal mekânların toplumsal üretim süreçlerine dair kapsamlı bir anlayış geliştirmeyi amaçlamaktadır. Araştırma, kullanıcıların sanal mekânları nasıl ürettiklerini, deneyimlediklerini, dönüştürdüklerini ve bu süreçlerin toplumsal dinamiklerle nasıl ilişkilendiğini incelemektedir. Ayrıca, bu süreçlerin platformların mekânsal organizasyonlarını ve toplumsal yapılarını nasıl şekillendirdiğini ele almaktadır.

Çalışma, kullanıcıların sanal mekândaki deneyimlerinin bedenleşmiş pratiklerden bağımsız düşünülemeyeceğini vurgulamaktadır. İfade gücü yüksek avatarlar aracılığıyla sanal mekânla bütünleşen kullanıcılar, bu ortamları kimliklerini ifade ettikleri ve toplumsal bağlar kurdukları dinamik alanlara dönüştürmektedir. Kullanıcıların bedenleşmiş sosyal pratikleri, sanal mekânları toplumsal olarak üretilmiş alanlara dönüştürürken, aynı zamanda hem kullanıcılar hem de deneyimleri bu süreçte mekânla birlikte yeniden şekillenmektedir. Sosyal VR platformları, yalnızca dijital araçlar olmanın ötesinde, kullanıcıların sosyal bağlar kurduğu ve mekânı kolektif olarak ürettiği alanlar olarak öne çıkmaktadır. Bu bağlamda, sanal mekânlar yalnızca bir etkileşim ortamı değil, aynı zamanda toplumsal pratiklerin şekillendiği ve yeniden üretildiği yerlerdir.

Çalışma, sosyal VR'ın teknolojik, toplumsal ve mekânsal dinamiklerini anlamak amacıyla kapsamlı bir teorik çerçeve sunmaktadır. Kullanıcı deneyimlerini analiz etmek için Vindenes ve Wasson'un (2021a) önerdiği post-fenomenolojik "Kullanıcı-Çevre İlişkileri" çerçevesi temel alınmıştır. Bu çerçeve, sosyal VR platformlarında kullanıcıların sanal çevreyle kurduğu dinamik, etkileşimli ve bedenleşmiş ilişkileri kapsayıcı bir şekilde ele almaktadır. Lefebvre'in (1991) "Mekânın Üretimi" teorisi ve mekânsal üçlüsü, bu etkileşimlerin analizine üç boyutta yaklaşmayı mümkün kılmaktadır: Algılanan mekân, tasarlanan mekân ve yaşanan mekân. Bu boyutlar, sanal mekânların toplumsal üretim süreçlerini anlamak için önemli bir temel sunmaktadır. Proctor'un (2021) "İnternet Mekânının Toplumsal Üretimi" çerçevesi ise Lefebvre'in mekânsal üçlüsünü dijital ortamlara uyarlayarak dijital mekânların toplumsal üretimine derinlemesine bir bakış açısı kazandırmaktadır. Bu teorik temeller doğrultusunda, çalışma, sürükleyici sanal gerçeklik platformlarında sanal mekânın toplumsal üretimini üç boyutta analiz etmektedir: Algılanan olanaklar mekânı, tasarlanan programlama mekânı ve yaşanan sanallık mekânı.

Bu araştırma, sosyal VR platformlarının kimler tarafından, hangi amaçlarla ve nasıl kullanıldığını incelerken, kullanıcıların geliştirdiği yeni etkileşim biçimlerini ve dünya geliştirme ve etkinlik oluşturma gibi yaratıcı faaliyetleri anlamayı hedeflemektedir. Kullanıcıların sanal gerçeklik teknolojisinin sunduğu olanakları kullanarak geliştirdiği bedenleşmiş etkileşim biçimleri ve mekânsal ilişkiler, bu platformların toplumsal mekânlar olarak nasıl oluştuğunu anlamak için kritik bir perspektif sunmaktadır. Araştırma, sosyal VR platformlarının kullanıcıların mekân algısını, sosyal bağlarını ve topluluk pratiklerini nasıl şekillendirdiğini ve bu unsurlarla nasıl bir etkileşim içinde olduğunu incelemektedir. Kullanıcıların sanal mekânı algılama, şekillendirme ve temsil etme biçimleri, bu platformların dinamik yapısını anlamada önemli bir rol oynarken, tasarım kararları ve kullanıcı-çevre etkileşimleri, sanal mekânların toplumsal üretimini şekillendirmektedir.

Bu bağlamda, platformların sunduğu algılanan olanaklar, kullanıcıların mekân anlayışını şekillendirirken onların sosyal pratiklerine zemin oluşturmakta ve sanal mekânların üretim sürecine katkı sağlamaktadır. Kullanıcıların bu olanakları nasıl algıladığı ve uyguladığı, sanal mekânların sınırlarının genişletilmesini ve yeniden tanımlanmasını mümkün kılmaktadır. Böylece sosyal VR platformları, kullanıcıların ihtiyaç ve isteklerine göre yeniden şekillendirilen dinamik alanlar olarak toplumsal mekânsal yapının dönüşümünde kritik bir rol üstlenmektedir. Sosyal VR platformlarının tasarımı ve organizasyonu, kullanıcı deneyimlerini ve sosyal etkileşimleri biçimlendirmektedir. Bu araştırma, platformların tasarım süreçlerini yönlendiren stratejileri ve değerleri inceleyerek, tasarımcıların, programcıların ve geliştiricilerin sosyal etkileşim ve tasarım tercihlerini nasıl şekillendirdiğini analiz etmektedir. Aynı zamanda, kullanıcıların tasarım süreçlerine katkısı ve kullanıcı tabanlı içerik üretimi, sanal mekânların toplumsal bağlamda yeniden tanımlanmasında önemli bir rol oynamaktadır. Bu çalışma, tasarım kararlarının kullanıcılar tarafından nasıl şekillendirildiğini ve bu süreçte ortaya çıkan yeni kullanım dinamiklerini ele alarak, sosyal VR platformlarının tasarım ve kullanımına ilişkin çok boyutlu bir analiz sunmayı amaçlamaktadır. Kullanıcıların sanal mekânlarda nasıl bir yaşam sürdükleri, nasıl davrandıkları, etkileşimde bulundukları ve hissettikleri, bu çalışmanın temel odak noktalarından bir diğeridir. Araştırma, kullanıcı deneyimlerinin toplumsal normlar ve ilişkilerle nasıl şekillendiğini ve bu normların nasıl dönüştürüldüğünü ele almaktadır. Sosyal VR platformlarında kullanıcılar tarafından geliştirilen yeni kimlikler, sosyal olanaklar, ritüeller, normlar ve taktikler, sanal mekânların toplumsal üretimine dair önemli içgörüler sunmaktadır. Bu dinamikler, sanal dünyalarda benimsenen yaşam tarzlarını ve bu süreçlerin toplumsal bağlamını anlamak için uygun bir perspektif sağlamaktadır.

Araştırma, *AltspaceVR* platformunda iki yıl süren niteliksel bir saha çalışmasıyla yürütülmüştür. Saha araştırması sırasında *AltspaceVR* platformunun kapatılması ve kullanıcılar ve üreticilerin farklı platformlara geçiş yapması, sanal toplulukların medya göçü ve sanal diaspora kavramları bağlamında nasıl yeniden yapılandığını anlamak için önemli bir fırsat sunmuştur. Bu durum, sosyal VR platformları bağlamında meydana gelen toplumsal üretim ve yeniden üretim süreçlerini anlamak için çalışmaya tamamlayıcı bir perspektif sağlamıştır. Bu bağlamda, medya göçü süreçlerinde sanal toplulukların platform kapanmalarını nasıl karşıladığı, sürece nasıl adapte olduğu, sürekliliği nasıl sağladığı ve topluluk bağlarını nasıl koruduğu incelenmiştir. Kullanıcıların platformların kapanması sürecinde karşılaştığı zorluklar ve bu zorlukların üstesinden gelmek için geliştirdikleri taktikler, sanal toplulukların dayanıklılığı ve adaptasyon süreçleri hakkında önemli içgörüler sunmaktadır. Ayrıca,

sosyal VR platformlarının tasarım ve organizasyon süreçlerinin, toplulukların bu geçiş sürecindeki rolü, çalışmanın öne çıkan bulguları arasında yer almaktadır.

Bu çalışma, çok platformlu etnografi, kullanıcı merkezli yaklaşım ve fenomenolojik ile post-fenomenolojik analizleri bir araya getiren karma yöntem bir araştırma yaklaşımını benimsemektedir. Veri toplama sürecinde katılımcı gözlem yöntemi kullanılmış ve 41 yarı yapılandırılmış görüşme gerçekleştirilmiştir. Görüşmelerin katılımcıları üç gruptan oluşmaktadır: Dünya geliştiriciler (örneğin, tasarımcılar ve programcılar), etkinlik geliştiriciler (örneğin, etkinlik sahipleri, moderatörler, organizatörler, performans sanatçıları) ve normal kullanıcılar. Bu kapsamda, 17 dünya geliştirici, 16 etkinlik geliştirici, 7 kullanıcı ve platformun kurucularından biriyle görüşülmüştür. Bu geniş katılımcı profili, sosyal VR'da yaratıcı üretim süreçleri, sosyal etkileşimler, topluluk bağları ve kullanıcı deneyimlerinin çok boyutlu bir perspektifle ele alınmasına olanak sağlamıştır.

Yarı yapılandırılmış görüşmeler, iki farklı formatta gerçekleştirilmiştir: *AltspaceVR*'da yapılan *go-along* (eşlikli) görüşmeler ve *Zoom* ile *Discord* gibi çevrimiçi araçlar üzerinden yapılan video konferans görüşmeleri. Görüşmelerin çoğu (24 tanesi) *AltspaceVR*'da araştırmacının sanal dünyada katılımcıya eşlik ettiği *go-along* formatında gerçekleştirilmiştir. Tüm katılımcı gözlemler ve eşlikli (*go-along*) görüşmeler, bir *Meta Quest 2* model VR başlık kullanılarak gerçekleştirilmiştir. Bu cihaz, araştırmacının sanal ortamı doğrudan deneyimlemesini ve gözlemlerini sürükleyici (*immersive*) bir şekilde yapmasını sağlamıştır. Aynı zamanda, cihazın kullanımı, görüşmeler sırasında katılımcılarla daha doğal ve etkileşimli bir iletişim kurulmasına katkıda bulunmuştur. Katılımcı gözlem, sanal etnografi çalışmalarında temel bir yöntem olarak öne çıkmaktadır. Bu yöntem, sosyal VR platformlarındaki kullanıcıların mekânla ve diğer kullanıcılarla kurduğu ilişkiler hakkında derinlemesine bilgi edinmeyi sağlamış ve platformdaki kullanım pratiklerini, mekânsal düzenlemeleri ve sözlü ve sözlü olmayan bedensel etkileşimleri anlamak için kapsayıcı bir bağlam sunmuştur. Araştırmacı bu süreçte kendi avatarı ile platforma girerek hem bir gözlemci hem de katılımcı rolünü üstlenmiştir. Kullanıcıların mekânsal pratikleri, gündelik aktiviteleri ve bedenleşmiş etkileşimleri, *AltspaceVR*'ın toplumsal bir mekân olarak nasıl üretildiğini anlamada kritik bir perspektif sunmuştur. Örneğin, bir etkinlik sırasında kullanıcıların avatarlarının duruşları, jestleri, etkileşimleri ve mekâna yerleşimleri gibi detaylar, platformdaki sosyal dinamikleri anlamada önemli bilgiler sağlamıştır. Bunun yanı sıra, avatarların ses tonları, konuşma içerikleri ve katıldıkları etkinliklerin bağlamsal özellikleri, katılımcıların sosyal VR deneyimlerini algılama biçimlerini ve bu deneyimlerin toplumsal mekânın üretimine nasıl katkıda bulunduğunu daha ayrıntılı bir şekilde ortaya koymuştur.

Eşlikli görüşme yöntemi ise gözlem ve görüşmeyi üç boyutlu bir ortamda birleştirerek, katılımcıları söz konusu bağlamdan uzaklaştırmak yerine, çevreyle etkileşimde bulundukları anlarda doğrudan deneyimlerine erişmeye olanak sağlamıştır (Vindenes ve Wasson, 2021b, s.190). Bu yöntem, katılımcıların yaşamlarını dinamik ve gerçek zamanlı bir şekilde gözlemlemeyi ve bunlara yönelik sorular sormayı mümkün kılarak, genellikle geleneksel görüşme yöntemleriyle elde edilemeyen içgörüler sunmaktadır. Çalışmada benimsenen bu karma yöntem yaklaşımı, sosyal VR platformlarındaki sanal etkileşimlerin çok katmanlı yapısını ve kullanıcıların deneyimlerini daha iyi anlamaya olanak tanımış, sanal yaşamın örtük anlamlarını çözümlemede önemli bir rol oynamıştır. Görüşmelerden elde edilen veriler, tematik analiz yöntemiyle incelenmiş ve analiz sürecinde *Atlas.ti* niteliksel analiz programı

kullanılmıştır. Tematik analiz, verilerdeki örüntüleri ve öne çıkan temaları belirleyerek bu bulguları teorik çerçeveyle ilişkilendirmek ve sosyal VR platformlarındaki kullanıcı pratiklerini derinlemesine incelemek amacıyla uygulanmıştır. Bu yöntem, sosyal VR platformlarında mekânın üretimi ile toplumsal pratikler arasındaki bağlantıları kapsamlı bir şekilde incelemeyi sağlamış ve verilerin anlamlandırılmasında yapılandırılmış bir yaklaşım sunmuştur.

Araştırma bulguları, algılanan olanaklar mekânı, tasarlanan programlama mekânı ve yaşanan sanallık mekânı olmak üzere üç ana boyutta analiz edilmiştir. Bu boyutlar, sanal mekânların nasıl üretildiğini, dönüştürüldüğünü ve toplumsal olarak üretilmiş ortamlar olarak nasıl sürdürüldüğünü anlamak için kapsamlı bir çerçeve sunmaktadır. Bulgular, sanal mekânların dinamik ve ilişkisel toplumsal üretim süreçlerine dayandığını göstermektedir. Kullanıcıların sanal dünyalarla olan etkileşimleri ve platformlarda gerçekleştirdikleri yaratıcı faaliyetler, bu mekânların oluşumunda kritik bir rol oynamaktadır. Ayrıca, platform kapanışları ve kullanıcıların farklı platformlara geçiş süreçleri, toplumsal yeniden üretim mekanizmalarının önemini vurgulamaktadır. Bu süreçler, sanal toplulukların dayanıklılık ve adaptasyon dinamiklerine ışık tutarak, sanal mekânların toplumsal boyutuna dair bir anlayış sunmaktadır. Algılanan olanaklar mekânı bağlamında, kullanıcıların sanal ortamlardaki olanakları algılama ve bunları kendi istek ve ihtiyaçlarına göre uyarlama süreçleri, bireyler ve gruplar tarafından gerçekleştirilen, tekrar eden ve anlam taşıyan sosyal pratikler ile detaylı bir şekilde ele alınmıştır. *AltspaceVR*'daki profesyonel gelişim fırsatları ve eğitici etkinlikler, platformun kullanıcıları cezbetme ve topluluk inşa etme kapasitesini artıran temel unsurlar olarak öne çıkmaktadır. Bu unsurlar, kullanıcıların başlangıç motivasyonlarını şekillendirmenin ötesinde, platformların öğrenme, üretme, iş birliği yapma ve profesyonel büyüme alanları olarak konumlanmasına da katkı sağlamaktadır. Bununla birlikte, VR'ın sunduğu varlık (*presence*) hissi ve sürükleyicilik (*immersion*), kullanıcıların fiziksel sınırların ötesine geçerek daha derin sosyal etkileşimler geliştirmesine olanak tanımaktadır. Böylece kullanıcılar, yalnızca etkileşim kurmakla kalmayıp kimliklerini ifade ettikleri, yeni ilişkiler inşa ettikleri ve toplumsal normlar, değerler ile kültürel yapıların şekillendiği ve aynı zamanda bu yapıların yeniden üretilmesine katkıda bulunduğu bir ortamın temellerini oluşturmaktadır.

Tasarlanan programlama mekânı, platformların ve sanal dünyaların tasarım ve işleyişinin kullanıcı deneyimi üzerindeki rolünü detaylı bir şekilde ele almaktadır. Bulgular, kullanıcıların sanal mekânlarla etkileşim kurarak ve yaratıcı faaliyetlerde bulunarak, hem kendi sosyal gerçekliklerini hem de platformların mekânsal yapılarını aktif bir şekilde ürettiğini ve dönüştürdüğünü göstermektedir. Üreticilerin sanal dünyaların tasarımında sıklıkla benimsediği yaklaşımlardan birinin "aşinalık" (*familiarity*) unsuru olduğu tespit edilmiştir. Fiziksel çevrelerden aşina olunan tasarım öğeleri, kullanıcıların girdikleri sanal dünyalarda daha rahat hissetmesini ve ortamlara hızlı adapte olmasını sağlarken, aynı zamanda yaratıcılıklarını geliştirmelerine olanak tanımaktadır. Özellikle etkinlik yönetimi gibi alanlarda bu tasarım stratejilerinin başarılı sonuçlar doğurduğu bulunmuştur. Bu bulgular, tasarımın yalnızca estetik bir unsur olmadığını, aynı zamanda kullanıcı deneyimini ve toplumsal bağların oluşumunu destekleyen kritik bir bileşen olduğunu ortaya koymaktadır. Ayrıca, *AltspaceVR*'ın etkinlik odaklı tasarımı, topluluk bağlarının oluşumunu destekleyen kritik bir bileşen olduğunu ortaya koymaktadır. Öte yandan, *AltspaceVR*'ın etkinlik odaklı bir platform tasarımına sahip olması, topluluk bağlarının geliştirilmesini kolaylaştıran önemli bir unsur olarak öne çıkmıştır. Topluluk geliştirme ve

moderasyon stratejileri, kullanıcıların sosyal uyum geliştirmesine ve güvenli bir sanal ortam yaratmasına katkıda bulunurken, etkinlik odaklı tasarımlar, kullanıcıların platform içindeki bağlarını ve topluluk etkileşimlerini güçlendirmektedir.

Yaşanan sanallık mekânı boyutunda, kullanıcıların platformdaki yaşam pratikleri, etkileşim biçimleri ve duygusal deneyimleri incelenmiştir. Bireysel deneyimlerin topluluk içinde paylaşılarak kolektif bir mekân algısı oluşturması, sanal mekânların toplumsal mekânlar olarak üretimini anlamada kritik bir bağlam sunmaktadır. Kullanıcıların yaratıcı faaliyetleri, kimliklerini ifade etmelerine ve topluluk içinde aidiyet kazanmalarına olanak tanımaktadır. Platformdaki topluluk sinerjisi ve sosyal destek mekanizmaları, kullanıcılar arasındaki dayanıklılığı artırırken aynı zamanda sosyal bağların güçlenmesini sağlamaktadır. Bulgular, kullanıcıların yenilikçi ve yaratıcı kullanım biçimlerinin, platformlarda yeni sosyal olanaklar geliştirilmesine katkı sağladığını ortaya koymaktadır. Sanal mekânlarda ortak anlamlar, normlar ve ritüeller yaratarak bu alanları yeniden üreten kullanıcılar, sosyal VR platformlarının toplumsal potansiyelini ve dinamik yapısını gözler önüne sermektedir.

AltspaceVR'ın kapanışı, kullanıcıların topluluklarını ve dijital varlıklarını (avatarlar, sanal dünyalar, nesneler, etkinlikler) koruma amacıyla zorunlu olarak yeni platformlara göç ederken geliştirdikleri taktiklerin ve adaptasyon süreçlerinin önemli bir parçasını oluşturmaktadır. Bu süreç, toplumsal yeniden üretim ve dayanıklılık mekanizmalarının önemini ortaya koyarken, topluluk ilişkilerinin ve destek ağlarının güçlenmesine de katkı sağlamıştır. Özellikle *Discord* gibi platformlar, kullanıcıların bağlarını sürdürmesinde kritik bir rol oynamış, ancak göç edilen platformların teknik ve sosyal farklılıkları adaptasyon sürecini zorlaştırmıştır. Buna rağmen, toplulukların gösterdiği dayanıklılık, sanal mekânların toplumsal olarak nasıl yeniden üretildiğini ve kullanıcıların kolektif bağlılığını sürdürme kapasitesini gözler önüne sermektedir.

Sonuç olarak, bu çalışma, sosyal VR platformlarının toplumsal olarak nasıl üretildiğini, dönüştürüldüğünü ve sürdürüldüğünü anlamaya yönelik kapsamlı bir çerçeve sunmaktadır. Teorik olarak, çalışma, sosyal VR platformlarının toplumsal mekânların üretim ve yeniden üretim süreçlerindeki rolüne dair önemli içgörüler sunmaktadır. Kullanıcıların avatar kişiselleştirme, kimlik inşası, ritüel oluşturma ve topluluk etkileşimleri gibi pratikleri, sanal mekânların nasıl anlamlı ve kültürel olarak zenginleşmiş alanlara dönüştüğünü ortaya koymaktadır. Bu süreç, sosyal VR'ın yalnızca teknolojik bir araç olmadığını, aynı zamanda toplumsal normların, değerlerin ve sosyal yapının yeniden üretildiği bir kültürel pratik alanı olduğunu göstermektedir. Metodolojik olarak, çalışma, kullanıcı merkezli yaklaşımlar, çok platformlu etnografi ve fenomenolojik/post-fenomenolojik analizler aracılığıyla sanal mekânların dinamiklerini anlamada etkili bir yol haritası sunmaktadır. Bu yöntemler, kullanıcıların sanal mekânlarla kurdukları ilişkisel dinamikleri ortaya çıkararak, platformların tasarımına ve yönetimine dair kapsamlı içgörüler sağlamaktadır. Pratik düzeyde, erişilebilir ve kullanıcı dostu tasarım, güçlü moderasyon araçları ve geliştirilen yaratıcı olanaklar, kullanıcıların platformları daha etkili ve sürdürülebilir biçimde kullanmalarını desteklemektedir. Özellikle topluluk odaklı stratejiler ve platform yönetiminde katılımcı yaklaşımlar, kullanıcıların bağlılığını artırmakta ve sanal mekânlardaki topluluk oluşumuna katkıda bulunmaktadır. Sonuç olarak, bu çalışma, sosyal VR platformlarının toplulukları bir araya getiren, anlamlı sosyal bağlar kurmalarını sağlayan ve dolayısıyla dijital kültürü yeniden şekillendiren ortamlar olarak potansiyelini ortaya koymaktadır.

1. INTRODUCTION

1.1.Purpose and Scope of the Study

Technological advancements in virtual reality (VR) hardware, software, and game engines have fueled a renewed interest in the social applications of virtual worlds (Oh et al., 2018, p.1). These developments have given rise to social virtual reality, a growing category of multi-user applications that enable interaction through VR head-mounted displays (HMDs) (Schultz et al., 2019, p.1). Although the majority of social VR platforms are governed by profit-oriented companies, some operate under alternative governance models. Regardless, these platforms are driven by user-generated content and represent novel spaces where users engage with each other through three-dimensional (3D) avatars in immersive, technologically mediated environments (Jordan, 2010).

This study investigates immersive social VR platforms as socially produced spaces, emphasizing the dynamic interplay between users and virtual environments[1]. Drawing on a postphenomenological perspective, it utilizes the User-Environment Relation framework proposed by Vindenes and Wasson (2021a) to explore user experiences in immersive virtual reality. This approach is integrated with Lefebvre's (1991) Production of Space theory and spatial triad, alongside Proctor's (2021) framework on the Social Production of Internet Space. Together, these perspectives provide a comprehensive conceptual foundation for analyzing the social production of virtual space within social VR platforms.

The study argues that social VR platforms enable users to experience virtual environments as socially-produced spaces through technological mediation, particularly via VR HMDs. The user-environment relation, established through the

[1] The Glossary in *Appendix D* provides definitions for the terminology used in this study.

interaction between users, devices, and virtual environments, facilitates the feeling of presence, where users feel immersed, embodied, and connected to the world. This experience extends beyond the technological medium, as users not only interact with the environment but also participate in the active creation of virtual spaces.

Lefebvre's (1991, pp.27-30) argument that *"(social) space is a (social) product,"* is central to this analysis. Lefebvre emphasizes that the body's relationship with space is fundamental: *"Each living body is space and has its space: it produces itself in space and it also produces that space"* (Lefebvre, 1991, p.170). Lefebvre (1991) offers a multidimensional approach to the understanding of space. *"For Lefebvre, the dialectic of society is one between subjects and objects that are mediated by activities of social production"* (Fuchs, 2019, p.140). This dialectic produces and is conditioned by social space in the form of spatial practices (perceived space), representations of space (conceived space), and representational space (lived space). Lefebvre (1991) states that (social) space represents an interplay between these three dimensions, called the spatial triad. Proctor (2021) extends this triad to digital environments, framing the Social Production of Internet Space in terms of the space of affordance, the space of programming, and the space of virtuality.

Building on Proctor's (2021) adaptation, this study conceptualizes social VR platforms as interactive, creative, and collaborative spaces, constituted by embodied social practices and relations that emerge from the interplay of practice, conceptualization, and representation. Lefebvre's (1991) spatial triad serves as the conceptual anchor for examining these dynamics, adapted into three dimensions for social VR: The perceived space of affordances, the conceived space of programming, and the lived space of virtuality.

The production of space in social VR reflects Lefebvre's (1991) argument that space is a product of social relations and simultaneously shapes those relations. Following Lefebvre, I argue that we cannot separate users' experiences from their embodiment in virtual space. Their embodied social practices, design choices, and interactions form the virtual space as a social space or a socially produced space, in which users produce themselves in space and, at the same time, produce that space. The central argument is that social VR platforms are more than tools for information

exchange; they are socially produced spaces where users actively create, inhabit, and experience social realities.

The study extends Lefebvre's spatial theories to address migration within the Metaverse, focusing on the shutdown of *AltspaceVR*, the platform where the field study was conducted. The platform's shutdown revealed the challenges of media migration (Lange, 2022) and the emergence of virtual diaspora (Boelstroff, 2018) in social VR platforms. By exploring the shutdown process and community transitions, the research emphasizes the processes of social reproduction in the face of digital disruptions and focuses on the preservation and resilience of virtual communities.

This research investigates how virtual spaces are socially produced in immersive social VR platforms through user-environment relations and what this reveals about the social production of space in new digital contexts. The study explores the following sub-questions:

- Why are social VR platforms emerging as a new phenomenon of social life?
- What defines user-environment relations in social VR platforms?
- How are virtual spaces inhabited, by whom, and for what purposes?
- How do users produce, experience, and shape virtual space?
- How do platform affordances shape users' perceptions and practices?
- What strategies and values guide creators, programmers, and designers in shaping social VR platforms, and how do the design and organization of virtual spaces influence social interactions and relationships?
- What are the ways of life in social VR, and how do users act, engage, and feel in these spaces?
- What new social affordances, norms, rituals, and tactics emerge?
- How do virtual communities experience migration in the Metaverse, and how do they adapt during platform shutdowns and transitions?

The study employs a qualitative research design, using a mixed-method approach to explore social interactions in the online setting of the *AltspaceVR* platform. Data collection included two years of participant observation on *AltspaceVR* and 41 semi-structured interviews with users, world creators (e.g., developers, builders, designers, programmers), and event creators (e.g., hosts, moderators,

community leaders). Interviews were conducted in two formats: Go-along interviews in *AltspaceVR* and online interviews via video conferencing platforms such as *Zoom* and *Discord*.

Following this chapter, Chapter Two presents the theoretical framework of the study, exploring paradigm shifts in Human-Computer Interaction (HCI), phenomenological and postphenomenological approaches to virtual spaces, technological mediation, User-Environment Relation framework (Vindenes and Wasson, 2021a), Lefebvre's (1991) Production of Space theory and spatial triad, and Proctor's (2021) framework. It discusses spatiality, embodiment, and the social production of space, integrating these concepts with media migration theories and virtual diaspora. Chapter Three builds on this framework to present the conceptual model for analyzing the social production of virtual space. It details the perceived, conceived, and lived spaces of virtuality and explores media migration as a process of social reproduction. Chapter Four describes the research methodology, data collection through participant observation and interviews, and analytical processes.

Chapter Five presents the results and discussion, which are organized around the perceived space of affordances, the conceived space of programming, the lived space of virtuality, and the social reproduction of space in media migration process. It examines social practices, design choices, community dynamics, and virtual diaspora narratives. Finally, Chapter Six presents the study's theoretical, methodological, and practical contributions and implications and offers a comprehensive reflection on the interplay between users and virtual environments. It contributes to the broader understanding of immersive social VR platforms as evolving, dynamic, and socially produced virtual spaces. Additionally, this chapter discusses the challenges, limitations, and suggestions for conducting ethnographic research in VR environments, offering critical insights into the methodological complexities of studying immersive virtual spaces.

1.1.The Evolving Landscape of Social Virtual Reality and the Metaverse

The potential of virtual reality (VR) technology as a communication medium was first highlighted by Biocca in 1992, and later expanded in 2013 when Biocca and Levy conceptualized VR as a social medium enabling individuals to coexist and

interact. More recently, Lanier (2017) argued that VR would introduce entirely new forms of communication. Most early VR research focused on HMDs that were not available outside of laboratory settings. In more recent years, VR has transitioned from laboratory to home with various standalone headsets (e.g., *Meta Quest*) and PC-powered HMDs (e.g., *HTC Vive*). Enhanced graphics and display quality have enabled platforms to deliver superior content and highly immersive experiences. This led to an increasing fueling interest in key concepts such as presence (i.e., the sense of being there), embodiment, and immersion- qualities largely unique to VR compared to other digital media.

In recent years, VR has become closely associated with the Metaverse, a concept that hailed as the "next Internet." The Metaverse envisions a fully immersive and interconnected network of virtual worlds where much of human life, labor, and leisure might eventually take place (Ball, 2022). The rebranding of *Facebook* to *Meta* in October 2021 marked a significant moment in the mainstreaming of the Metaverse concept, with the launch of *Meta*'s social VR project, *Horizon Worlds*, amplifying public and academic attention (Lang, 2021). Since *Meta* also owns *Meta Quest* headset and has various social VR platforms on its app store, social VR platforms gained attention in late 2021. Social VR platforms like *Horizon Worlds*, *VRChat*, and others have since emerged as central elements of the Metaverse, offering spaces for synchronous, embodied interaction.

While VR technologies serve as a foundation for the Metaverse, the two are not synonymous (Frank, 2021). The term "Metaverse" is a blend of "meta" (meaning beyond or transcending) and "universe" (Lee et al., 2021). In Snow Crash, Neal Stephenson (1992, p.22) introduces the Metaverse as a computer-generated world where the protagonist, Hiro, spends much of his time: *"Hiro's not actually there at all. He is in a computer-generated universe that his computer is drawing onto his goggles and pumping into his earphones. In the Lingo, this imaginary place is known as the Metaverse."* This early description of virtual worlds reflects most of the key themes explored in social VR research, especially the interplay between physical and virtual realities.

Ball (2022) describes the Metaverse as *"a persistent and interconnected network of 3D virtual worlds that will eventually serve as the gateway to most online experiences, and also underpin much of the physical world."* He emphasizes its potential to revolutionize industries and societal functions, from education and city planning to entertainment and healthcare. For Frank (2021), *"the Metaverse is the Internet, but also a spatial (and often 3D), game engine-driven collection of virtual environments."* The Metaverse is the culmination of many technological advancements, including Web 3.0, spatial computing (and the evolution of computing interfaces), game engines (such as *Unity* and *Unreal Engine*, used to build digital and virtual worlds), virtual environments (and the history of virtual worlds), and virtual economies (including blockchains and non-fungible tokens (NFTs)) (Frank, 2021; Ball, 2022).

Interacting with computer and mobile interfaces has become easier and more accessible year by year. However, each new technology has brought its technical difficulties and social dilemmas. Just like old computer and mobile interfaces were new once, VR, augmented reality (AR), mixed reality (MR), or extended reality (XR) technologies in general are the next computing interfaces that attract tech enthusiasts' attention. These technologies utilize 3D technology, and the use of 3D technology in technological mediation creates a distinguishing factor because it dramatically changes how users perceive and experience content. These new interfaces are associated with spatial computing (Frank, 2021). As Frank (2021) stated, *"we are born into 3D space. We grow up living in 3D space. It would make sense that our brains and bodies are built to interact in 3D space."* Especially VR experiences demand a more embodied user activity. Thanks to its immersive and interactive features, it lets users inhabit a 3D virtual space, not simply displaying a virtual environment (VE) to "look at" in front of a screen (Gladden, 2018, p.2). In VR, users feel "present" within a computer-generated 3D virtual space (Riva et al., 2015, p.536).

Social VR is the collection of virtual platforms that require the use of immersive technologies such as VR HMDs, hand controllers, and sensors to deliver a mediated form of embodied communication and interaction through 3D avatars where users can have synchronous dialogue in real-time through spatialized audio features, non-verbal cues, gestures, and emojis. It differs from typical computer-mediated communication (CMC) in several aspects (Dzardanova et al., 2018, p.2). These platforms rely on

immersive VR technology, which induces a strong sense of presence inside the virtual world with others (i.e., social presence). Early forms of text-based CMC offered a limited amount of verbal and non-verbal information, which subsequently reduced the sense of social presence. In VR, the feeling of being somewhere with other people offers an experience different from all other typical CMC, because users on the other sides of the world can feel like they are together in a shared VE. Visual fidelity and spatial audio play an important role in this process. Even though it is not in its best version yet, the visual fidelity and software can mask other things that require natural interaction (Fridman, 2022). In social VR, users utilize avatars to deliver verbal and non-verbal social interaction in real-time and get closer to social presence; they can perceive each other's behavioral cues, such as body language and gestures. Moreover, *"they can also infer that someone is paying attention and, by the subtlest of head movements, appreciate social norms that we see in the real world"* (Howard, 2019). Therefore, social VR platforms can offer a wide range of social cues through sensory information (Oh et al., 2018, p.2).

Social VR platforms have attracted a growing number of users over the past decade, and their user numbers are increasing rapidly, especially since 2020 (Metaverse Universe Report, 2023). This growth can be attributed to the widespread impact of the COVID-19 pandemic since 2020 and the popularity of the accessible standalone VR headset *Meta Quest 2*, released in October 2020. According to the recent Q4 2023 Metaverse Universe report of the *Metaverse Consulting Company* (2023), there are 606.4 million monthly active users (MAUs) in the Metaverse, encompassing a total of 170 Web2 and Web3 virtual worlds. As of Q4 2023, Web2 platforms continue to dominate the market with 597.6 million MAUs, while Web3 platforms, though still emerging, have shown notable growth, increasing from 1.8 million MAUs in Q1 2021 to 8.8 million by the end of 2023.

According to the report (2023), *"moving into the fourth quarter, there was a substantial increase in MAUs accessing the Metaverse through virtual reality (VR) headsets. The predominant contributor in this category is VRChat, which achieved a notable milestone with 20 million MAUs during this period."* These numbers show that social VR is transforming into a new social realm, where users spend hours in activities such as creating, connecting with friends, meeting new people, socializing, dating, collaborating, working, studying, playing, and finding entertainment in various

forms, including parties, attending performances, engaging in philosophical, religious, and spiritual discussions, hosting large-scale events, and even celebrating weddings.

The ultimate vision of the Metaverse is to connect all experiences in different virtual worlds to become an interconnected and interoperable network, where users can travel between them. Currently, there are many debates around the Metaverse idea, and we are still far from knowing what it will evolve into in the future. In his interview with Lex Fridman (2022), Mark Zuckerberg mentions that the Metaverse is not only about going to a place, *"it is about a time when basically immersive digital worlds become the primary way that we live our lives and spend our time."* In our daily lives, we go to different places for different purposes (e.g., work, leisure, home). However, we have already blended our everyday life with digital technologies. We perform many practices that are intertwined with our daily lives on the Internet. For example, we hold business meetings on *Zoom*, meet our needs through online shopping, video chat with our friends, socialize on social media, and play games through computers, smartphones, *PlayStation*, and XR devices. In VR, games were the first applications that attracted people to virtual worlds. There are still popular game apps like R*esident Evil 4, Population: One, Fortnite,* and *Roblox*. However, with *Quest* and other compatible VR devices, social VR platforms have become the top apps. Therefore, although the ultimate interoperable virtual world vision of the Metaverse has not yet arrived, *"we can imagine a future of social VR interleaved with nuanced social connection and communication"* (McVeigh-Schultz and Isbister, 2021).

1.2. Originality of the Study

The growing body of research on social VR reflects the dynamic and multifaceted nature of these platforms, addressing a range of topics including design practices (Schultz et al., 2019; Kolesnichenko et al., 2019; Maloney and Freeman, 2020; Liu and Steed, 2021; Jonas et al., 2019; Sra et al., 2018; Abramczuk et al., 2023; Zamanifard and Robb, 2023; Zhang et al., 2023; Zytko and Chan, 2023; Schulenberg et al., 2023a), communication and interaction modes (Baker et al., 2019; Schultz et al., 2018; Moustafa and Steed, 2018; Freeman et al., 2020; Freeman and Maloney, 2020; Maloney et al., 2020a; Maloney et al., 2020b; Maloney et al., 2020c; Maloney et al., 2021; Tanenbaum et al., 2020; Williamson et al., 2021; Vindenes and Wasson, 2021b; Fang et al., 2021; Dzardanova et al., 2022; Schulenberg et al., 2023b; Sarupuri et al.,

2023; Fu et al., 2023; Brakel et al., 2023; Suh, 2023; Han et al., 2023; Bonfert et al., 2023; Sabri et al., 2023; Alcala et al., 2023; Li et al., 2023; Deighan et al., 2023), and the social consequences of interaction within these platforms (Zamanifard and Freeman, 2019; Freeman and Acena, 2021; Acena and Freeman, 2021). Additional research has examined how social VR platforms were leveraged during the COVID-19 pandemic, underscoring their significance as spaces for maintaining social connection in times of physical distancing (Evans and Rzeszewski, 2020).

Methodologically, social VR research often involves remote studies. Some researchers develop standalone VR applications and distribute them through platforms like *Steam*, while others embed their studies within existing social VR platforms with the tools and application programming interfaces (APIs) provided by these environments (Radiah et al., 2021). These approaches have significantly advanced my understanding of specific user groups, applications, and use cases.

However, much of the existing research focuses on practical applications or narrow case studies, leaving broader social science questions about the implications of these virtual environments needing to be explored. In social science research, there is a need to expand analytical frameworks to understand the complexity of user experiences in social VR. This study addresses the need for a deeper theoretical examination of social VR as a phenomenon of contemporary digital life. Questions such as why these platforms are central to new forms of social life, what drives individuals to build and create in these spaces, and how social activities foster community still need to be addressed in current literature. This research contributes to existing literature by exploring these dimensions while opening avenues for more comprehensive theoretical discussions about virtual social spaces.

To frame these questions, this study adopts the perspective of the "spatial turn," which represents a paradigm shift that emphasizes the importance of space in understanding human-environment interactions (Warf and Arias, 2008). Rooted in Lefebvre's (1991) Production of Space theory, the spatial turn highlights the critical role of spatial practices, representations, and experiences in shaping social realities (Daradkeh, 2023). By applying Lefebvre's spatial triad to social VR platforms, this study examines how virtual spaces are produced, inhabited, and experienced as social

spaces. This approach provides a comprehensive understanding on the evolving dynamics of digital culture in the context of immersive virtual interactions.

The originality of this study lies in its integration of Lefebvre's (1991) theoretical insights with postphenomenological perspectives to analyze the production of virtual spaces in social VR. While previous research examined interaction styles, design practices, and community-building as isolated dimensions, this study situates them within the broader theoretical context of spatial production. By doing so, it offers a new lens to understand how users not only interact with but also shape these virtual environments. Furthermore, this research contributes to media migration (Lange, 2022) and virtual diaspora (Boelstroff, 2018) concepts through exploring how communities adapt and preserve social bonds during platform transitions, as demonstrated by the shutdown of *AltspaceVR*.

This perspective addresses socio-technical and cultural dimensions of social VR platforms through examining affordances, social practices, spatial dynamics, and cultural meanings. Through this perspective, the study fills gaps in social VR research and provides a comprehensive understanding of these platforms as an emergent phenomenon of contemporary digital life. Furthermore, it underscores how virtual worlds mirror and influence real-world social structures. This, in turn, provides a critical understanding in the integration of these spaces into everyday human life and sheds light on the evolving role of virtual worlds in shaping human behavior, communication, and community. Therefore, it offers critical insights into how these platforms might redefine the boundaries between physical and virtual life.

2. THEORETICAL FRAMEWORK

This study's theoretical framework builds upon key paradigms and concepts to analyze the social production of virtual space in social VR platforms. It begins with a discussion of the paradigm shift in Human-Computer Interaction (HCI), transitioning from the third-wave HCI, which emphasizes human experience and context, to the emerging fourth-wave HCI, which integrates phenomenology to address embodied, situated experiences. These paradigms are foundational to understanding virtual reality, as they foreground embodiment and lived experience as central to designing, analyzing, and evaluating interactive systems like social VR platforms. Embodiment in VR is intricately tied to spatiality, where the sense of presence is both a design objective and a lens for understanding user interaction. Embodied interaction and presence collectively provide a foundation for exploring the social production of virtual space in VR environments.

Building on this, the theoretical framework incorporates phenomenological and postphenomenological perspectives to examine the user-environment relations in immersive virtual spaces. While phenomenological approaches explore users' subjective experiences in virtual worlds, postphenomenology focuses on the mediating role of technology in shaping these experiences. These two perspectives are combined into the postphenomenological framework of Vindenes and Wasson (2021a), which examines the relational and intentional dynamics of user experiences in VR and offers a nuanced approach to analyzing how users engage with and inhabit virtual environments.

These phenomenological and postphenomenological perspectives also resonate with Lefebvre's (1991) Production of Space theory, which is central to this study. Lefebvre's spatial triad, comprising perceived space (spatial practices), conceived

space (representations of space), and lived space (representational space), is rooted in phenomenological traditions, as it underscores the embodied, lived nature of space and its production through social relations. Postphenomenology enriches this perspective by integrating the mediatory role of technology. Thus, it provides a bridge between Lefebvre's analysis of physical spaces and the dynamics of virtual environments.

Lefebvre's insights are adapted to the digital realm through Proctor's (2021) framework, which introduces the concepts of the space of affordance, the space of programming, and the space of virtuality. This adaptation includes the phenomenological and postphenomenological roots of Lefebvre's theory while extending its application to digital spaces. Together, these theoretical approaches offer a comprehensive framework for understanding how virtual spaces are socially produced, inhabited, and experienced.

Finally, the theoretical framework incorporates media migration (Lange, 2022) and virtual diaspora (Boelstroff, 2018) theories to examine the processes of social reproduction in virtual spaces, particularly in the context of platform transitions. It explores how migrations occur when users adapt to new platforms following disruptions like the shutdown of *AltspaceVR*. These migrations are understood as processes of preserving and transforming virtual communities, with a focus on identity, belonging, and continuity within the Metaverse.

2.1.A Paradigm Shift in HCI

HCI is a dynamic and interdisciplinary field, and the research community is composed of diverse areas such as Industrial Design, Engineering, Computing, Psychology, Arts, and Communication. Each approach has different centers and margins *"about what phenomena constitute important descriptive qualities of interactions, what questions are interesting to ask about interaction, what methods are appropriate for studying and designing interaction and what validation procedures are required to establish knowledge claims about interaction"* (Duarte and Baranauskas, 2016). This plurality in the HCI field supports the synthesis of concepts and theories that may seem unrelated but are related (Duarte and Baranauskas, 2016).

According to Harrison et al. (2007; 2011), HCI has two foundational research fields: Engineering and cognitive science.

The first-wave HCI stems from the early engineering roots of HCI. In this approach, the focus is on human factors and ergonomics, favoring concrete problems, performance metrics, and concrete results. Interaction is perceived as a form of man-machine coupling, which can be improved by solving ergonomic issues and interaction problems (Harrison et al., 2007). The second-wave HCI stems from cognitive science. In this approach, the emphasis is on theory; it focuses on what happens in the human mind in terms of information processing. Interaction is perceived as a metaphor of the *"mind and computer as coupled information processors"* (Harrison et al., 2007, p.3).

The development of new technologies calls for different approaches in HCI research across various contexts and use scenarios. In 1997, Winograd had argued that we had started to move from the design of interfaces between people and machines to the designing "interspaces" inhabited by *"multiple people, workstations, servers, and other devices"* in a complex web of interactions (Bannon, 2011, pp.52-53). With this approach, the focus has shifted to designing spaces where people can communicate rather than computing machinery. However, we still need to consider interaction design and combine the practical aspects learned from engineering, the human concerns that guide design, and social science perspectives on our world (Bannon, 2011, pp.52-53). Today, technology has become a part of our lifestyle and something we live with, not simply something we use (Hallnäs and Redström, 2002; Bannon, 2011, p.53), and this expansion has opened up new forms of inquiry, new questions, and new investigation methods. Pervasive technologies like VR and AR are challenging the standards in HCI. These technologies provide new modalities where the context and situatedness for understanding user experience become more important. Therefore, while such "margins" were considered as unimportant cases or as future work, the third-wave took them into account (Bødker, 2006, 2015; Harrison et al., 2011, p.386), and Harrison et al. (2007, pp.1-3) reported the emergence of a new paradigm shift, "third paradigm HCI" with different roots.

Studies on interactive systems like VR are conducted from HCI and user experience (UX) perspectives. HCI researchers and developers have long been

challenged with improving the usability of products. VR systems require usability research in three main aspects: Improving the interoperability of various system components, strengthening the illusional performance of the system like inducing presence and enhancing embodiment, and reducing side-effects like motion sickness (Kim et al., 2020, p.894). Besides, accessibility of the system for all users who have motor disabilities is a hot research topic in the field. While laboratory-based experiments and usability tests are still needed, searching for the social dimensions of these new technologies is emerging as a new research field. Preece (2001, p.349) argues that *"just designing for usability is not enough; we need to understand how technology can support social interaction and design for sociability."* Similarly, Biocca (2002, p.118) states the need to examine the property of sociability, as it is the key defining feature of interactive systems. In line with these views, HCI scholars call for a paradigm shift in HCI research, which focuses on more phenomenological, interpretative, and qualitative measurements of "technology as experience" (Dourish, 2001; McCarthy and Wright, 2004), rather than statistical and constructed quantitative measurements.

This paradigm shift in HCI has first echoed in the third-wave and then in the fourth-wave understandings. In the third-wave, the dominance of the cognitivist approach in HCI is questioned, phenomenological approaches are explored, and the focus of research shifted towards the analysis of the experience (Dourish, 2001; McCarthy and Wright, 2004). In this approach, attention to the human body in space (i.e., embodiment) and to the environment (i.e., virtual space) in which activities performed with others (i.e., social presence) become more pronounced.

The fourth-wave HCI takes this step further by focusing on relational ontologies and the mediation between human beings, technologies, and the world. The fourth-wave approach calls for a relational understanding and a postphenomenological move in HCI. It focuses on the intentional relationships between the human, technology, and the world, rather than focusing on the essences and the subject's mere experience like classical phenomenology does. These new directions in HCI *"aims at understanding the design, methods, and applications of emerging forms of interaction with new technologies [e.g., VR], and the rich varieties of human knowledge and experiences"*

(Filimowicz and Tzankova, 2018, p.1). This study aims to contribute to this range of studies in the HCI literature.

2.1.1. The Third-Wave HCI

The third-wave HCI focuses on embodied and lived experiences in their situated contexts from a qualitative perspective (Vindenes and Wasson, 2021b, p.191). It is *"characterized by a growing interest in design that takes into account the full 'messy' context which introduces humanistic and social science considerations into design research under the heading of the 'phenomenological matrix' due to the highlighting of the embodied and socially situated interactor where more than simply efficiency of operation or information transfer is at stake"* (Filimowicz and Tzankova, 2018, p.2). It prioritizes phenomenological methods, and embodied interaction plays a key role in this process (Dourish, 2001). *"Drawing on phenomenology, it takes as central that the way in which we come to understand the world, ourselves, and interaction derives crucially from our location in a physical [or virtual] and social world as embodied actors"* (Harrison et al., 2011, p.387).

In this approach, *"all action, interaction, and knowledge are seen as embodied in situated human actors"* (Harrison et al., 2011, p.388; Suchman, 1987). This focus on embodied interaction sees meaning construction as a central and suggests a move from *"statistical analysis, classification and collaboration, often under controlled conditions, to a focus on multiple, participatorily generated interpretations in concrete, real-world situations"* (Harrison et al., 2011, pp.388-390). Therefore, the third-wave contains a variety of perspectives and approaches which focus on interaction and its study as phenomenologically situated and takes ethnographic methods to its center (Harrison et al., 2011, p.389; Emerson et al., 1995).

2.1.2. The Fourth-Wave HCI

The paradigm shift that started with the third-wave approaches continues to evolve with the fourth-wave. According to Fraeunberger (2019, p.4), embodiment is central to the third-wave HCI, and the fourth-wave "entanglement theories" take this line one step further *"by questioning the locus of agency, asking which active*

contributions tools make to what humans do." Entanglement theories argue that technologies have become blended with our bodies and everyday lives, and it has resulted in complex lived experiences (Homewood et al., 2020). As mentioned above, the development of new digital technologies like VR and AR is challenging the current HCI research and practices (Frauenberger, 2019, p.2). Therefore, empirically observing the complex relationships between people and technologies has become difficult (Homewood et al., 2020; Fraeunberger, 2019).

The fourth-wave argues that to understand and explain these relationships, we need to adapt entanglement theories. The entanglement theories include posthumanism, relational ontologies, and postphenomenology. Frauenberger (2019, p.2) argues that these theories should be adopted and applied to theoretical, methodological, and practical contexts in HCI research. Verbeek (2015) also argues the need for a postphenomenological move in HCI that *"shifts our focus away from designing interactions with technologies towards designing human relationships with their world, in which technologies play a mediating role"* (Fraunberger, 2019, p.3). Hauser et. al. (2018) argues that *"postphenomenology enables us to grasp the extent to which both, the human and the material world, existentially depend on the relation to each other… This allows HCI to move beyond the concept of interaction and appreciate a much more holistic view over our socio-material being in the world"* (Fraunberger, 2019, p.7). Homewood et al., (2020) also state that this wave acknowledges *"relations between humans and objects as producing realities through their intra-actions."* As a result, a new understanding is developing in HCI that understands technologies not in isolation but in their interrelated dimensions. This view comes to the fore, especially in the understanding of embodied social practices. Because of the notions they emphasize, the third-wave and the fourth-wave paradigms of HCI provide us with more convenient methodological and theoretical approaches to study user experiences in virtual spaces.

2.2.Spatiality in Virtual Reality: Embodiment, Presence, and Space

The third-wave and the fourth-wave HCI theories *"reject a positivist, Cartesian understanding that there is an external reality that can be conquered by the inquiring, cognitive mind"* (Homewood, 2020). As mentioned above, the third-wave and the fourth-wave approaches are grounded in the embodiment as a phenomenological

viewpoint. Embodiment, in this sense, substantially changes what we take as central to interaction. Many in HCI have been introduced to aspects of embodiment through Dourish's (2001) approach, emphasizing that embodied interaction does not involve a shift in what we build but a more fundamental shift in how we understand interaction: *"Embodiment is not a property of systems, technologies, or artifacts; it is a property of interaction. In contrast to Cartesian approaches that separate mind from body and thought from action, embodied interaction emphasizes their duality*[2]*… a disembodied brain could not experience the world in the same ways that we do, because our experience of the world is intimately tied to the ways in which we act in it."* Therefore, for Dourish (2001, p.18), *"embodiment is about the fact that things are embedded in the world, and the ways in which their reality depends on being embedded."*

Embodiment is a multidisciplinary concept (Kilteni et al. 2012, p.374), and it can be divided into three main research streams: Personal embodiment, social embodiment, and environmental embodiment. Personal embodiment refers to how one defines, represents (i.e., self-representation) or experiences oneself. Social embodiment refers to what Barsalou et al. (2003, p.43) describe as the *"states of the body, such as postures, arm movements, and facial expressions, arise during social interaction and play central roles in social information processing."* Environmental embodiment, on the other hand, refers to *"the various ways, both sensuously and movement-wise, that the body in its pre-reflective perceptual awareness engages and coordinates with the world at hand, especially its architectural and environmental aspects"* (Seamon, 2013, p.205).

The phenomenological perspective of Merleau-Ponty (2012) is important to understand environmental embodiment. In his conceptualization of "body-subject," Merleau-Ponty (2012) emphasizes *"the pre-reflective but intelligent awareness of the body manifested through action and typically entwined and in sync with the environment in which the action unfolds"* (Seamon, 2013, p.205). Similarly, departing

[2] *"The positivist, Cartesian 'naive cognitivism' approach makes a strong separation between, on the one hand, the mind as the seat of consciousness and rational decision making, with an abstract model of the world that can be operated upon to form plans of action; and, on the other, the objective, external world as a largely stable collection of objects and events to be observed and manipulated according to the internal mental states of the individual. From this perspective, a disembodied brain could think about the world just as we do, although it might lack the ability to affect it by acting in it"* (Dourish, 2001, p.18).

from Barsalou (2008) and Gibson (1979), O'Connor (2016, p.10) states that *"body and environment are synergistic rather than opposing frameworks: Situated approaches to embodiment maintain that acknowledging the body necessarily requires acknowledging the environment in which it is grounded."* Low (2009) also emphasizes that spatial analyzes often neglect the body and its experience in space. Relying on this view, Low (2009) puts forward the concept of "embodied space" as an experience center of the body and underlies its importance as a physical and biological entity to act on the world. Therefore, the body always becomes embodied in a space (Mascia-Less, 2011). As Dourish (2001, p.18) mentioned, *"physically, our experiences cannot be separated from the reality of our bodily presence in the world; and socially, too, the same relationship holds because our nature as social beings are based on the ways in which we act and interact, in real time, all the time."* Building on this perspective, Dourish (2006, p.301) asserts that space emerges as a product of embodied social practice.

Spatial theory examines how space is produced, structured, and utilized, and how these spaces influence human behavior, activities, and social interactions (Harvey, 1974; Lefebvre, 1991; Soja, 1996; Massey, 2005; Foucault, 2008). Spatial theory's central idea is that space is socially produced and significantly shapes human experiences (Lefebvre, 1991). This perspective reflects a shift in academic thinking across various disciplines, highlighting space as a critical dimension in understanding different phenomena, a shift described by Warf and Arias (2008) as the "spatial turn." This paradigm shift has prompted scholars to reassess traditional frameworks and develop new methodologies for analyzing the interplay between space, society, and the built environment, as well as the intricate spatial relationships and processes that operate on a global scale (Warf and Arias, 2008; Daradkeh, 2023). As a result, interdisciplinary approaches have emerged that view space not merely as a physical dimension but as a social and cultural construct shaped by human actions and experiences (Daradkeh, 2023).

Harvey (1974) has contributed to the understanding of space and time in the context of social and economic processes. The concept of "re-production of space" refers to the idea that space is actively produced and reproduced through social, economic, and political processes. Harvey (1974) argues that space is a product of

human actions and interactions, influenced by the dynamics of capitalism, urban development, and social relations. Like Harvey, Lefebvre (1991) explores the connection between human practices and spatiality, positioning practice as a fundamental creator of space. Similarly, Jonasson (2000) argues that practice and place are inseparable, with practice both shaping and embodying the place. Places come into being through the actions, identity performances, and various forms of work that occur within them. In contrast to absolute concepts of space, *"which conceive space as an immaterial container… relational theories suggest that (social) spaces are constituted by their elements and the relationships between them, which are the products of human agency"* (Berger, 2020). In this study, I argue that the same is relevant for social virtual spaces.[3]

According to Lefebvre (1991), every society has a specific space, based on a dialectical, multi-element production process (Berger, 2020). Based on Lefebvre's approach, Proctor (2021, p.596) contends that "*the Internet is both social space and socially produced space,"* by which he means that *"it only exists as a product of our inhabitation and constant re-creation through everyday practice."* Proctor (2021) argues that our existence within the Internet and our interaction with it and each other is what continually makes and re-makes the space. Like Proctor (2021), I see virtual spaces in social VR as social spaces that have unique production processes with their actors, objects, activities, practices, cultures, social relations, affordances, and features. Therefore, I argue that users' experiences cannot be separated from their embodiment in the virtual space and their embodied social practices form the virtual space as a (social) space or a socially produced space.

At this point, it can be questioned whether virtual spaces can be understood in terms of space. When it comes to computer-generated content, we often use spatial metaphors (Mennecke et al., 2011, p.416; Holischka, 2018, p.245). *"We open files, exit programs, enter windows, surf websites, log in and out, etc."* (Holischka, 2018, p.245). Löw and Weidenhaus (2017, p.656) state that although the Internet may be analyzed via spatial metaphors, it does not constitute spaces because it does not address to a location (i.e., where in the world) (Berger, 2020). For Löw and Weidenhaus (2017,

[3] When necessary, terms such as "Internet space," "online space," and "cyberspace" are used interchangeably to refer to digital environments. However, when I mention "virtual space," I refer to computer-generated 3D virtual environments facilitated by VR, rather than other forms of CMC.

p.656), the Internet is not a space, but it is *"a communication system that embeds spatial metaphors."* Contrary to this view, Berger (2020) argues that to understand how actors produce space, we should focus on the actors' perspectives and assess how they produce, perceive, and modify their spaces. For Berger (2020), *"if actors are in the instant interaction of distant others, if they are in presence of objects and living beings to which they can take a position, which they can manipulate and which they synthesize through perception, feelings and thoughts, a space is constituted for them. In this respect, it does not matter whether these objects and living beings are concrete or virtual."* Here, Berger (2020) argues that we should consider the concepts of presence, spacing, and synthesis in this context: *"The concept of virtual presence - along with its different forms and levels- suggests that spacing and synthesis, the very acts of constituting space, are not only possible in material spaces, but also in virtual environments. If actors have a sense of space while utilizing advanced means of communications, then a relational theory of space has to reconstruct the logic of how these online spaces are constituted."*

As stated by Berger (2020), the sense of presence is crucial for the production of virtual spaces as spaces. According to Oh et al. (2018, p.2), presence can be divided into three: Telepresence, self-presence, and social presence (Lee, 2004). Telepresence can be defined as *"the extent to which one feels present in the mediated environment"* (Steuer, 1992, p.75). It demonstrates how vividly and interactively a user experiences the environmental and spatial properties of the mediated environment. Telepresence is also referred to as spatial presence or physical presence (Biocca et al., 2003, p.459). Self-presence, on the other hand, is the extent to which *"the virtual self is experienced as the actual self"* (Aymerich-Franch et al., 2012, p.1). It refers to how connected one feels his/her virtual body, emotions, or identity (Ratan and Hasler, 2009).

Social presence was first introduced as a theoretical framework by Short et al. in 1976. It refers to the subjective experience of being present with a "real" person and having access to his/her thoughts and emotions (Biocca, 1997). Social presence is dependent on the ease with which one perceives to have *"the access to the intelligence, intentions, and sensory impressions of another"* (Biocca, 1997, p.22). It differs from both telepresence and self-presence because it requires a co-present entity in a shared virtual environment (Oh et al., 2018, p.2). Lindemann and Schünemann (2020) argue

that while we are emphasizing presence and embodiment, we cannot marginalize space. Social presence is associated with the idea that the user is present with someone else in a space; therefore, space is relevant to the sense of presence and to the understanding of how we respond to virtual spaces (Bowman and McMahan, 2008; Mennecke et al., 2011, p.416).

Space frames a context for shared activities, and spatial abilities in virtual spaces are like physical spaces in terms of spatial visualization, spatial audio, spatial orientation, and spatial rotation (Lin and Suh, 2021, p.95). Virtual spaces realistically simulate physical spaces in their visual elements, physical proximity, perceptual speed, and six degrees of freedom of movement (forward/backward, up/down, left/right). This notion refers to what Saunders et al. (2011, pp.1079-1082) state that our actions in virtual spaces have a spatial aspect both perceptually and cognitively. However, the emphasis on human cognition generally understands spaces as a container in mathematical concepts. Departing from Lefebvre (1991), Saunders et al. (2011, p.1081) states that *"there is also a nonmathematical spatial characteristic that describes how bodies exist and experience space."* For Lefebvre (1991), *"space does not exist in any such absolute, a priori form; it is not something that human activity fills up, but rather something that human activity produces"* (Cohen, 2007, p.233).

This leads Cohen (2007, p.213) to argue that *"to say that humans reason spatially is not to say that we are placebound, or property-bound, but simply to say that we are embodied, situated beings, who comprehend even disembodied communications through the filter of embodied, situated experience."* Here, Cohen (2007, p.213, p.230) asserts that we don't simply use spatial metaphors to mention "cyberspace" as a "space" in the Cartesian sense. In Lefebvre's (1991, p.27) own words, *"social space is constituted neither by a collection of things or an aggregate of (sensory) data, nor by a void packed like a parcel with various contents, and that it is irreducible to a 'form' imposed upon phenomena, upon things, upon physical materiality." "Since every social relation is embedded in spatiality… social forms are getting more contingent or fluid than before"* (Berger, 2020; Bauman, 2000). There is a *"tendency towards experiencing sociality in an ever more indirect and mediated manner"* (Berger, 2020; Giddens, 1990), and this is why I attempted to investigate new socialities in virtual spaces.

In VR, *"looking at a screen is like looking through a window into another world, and, after a few minutes, it feels like being there in a way"* (Holischka, 2018, p.245). VR as a media at its most vivid and interactive features is changing how we think and act in virtual spaces through specific persuasive affordances and features (Ulrich, 2012, p.5). According to Riva et al. (2015, p.536), *"we can describe VR as an 'embodied technology' for its ability to modify the feeling of presence: The human operator can experience the synthetic environment as if it were 'his/her surrounding world' or can experience the synthetic avatar as if it were 'his/her own body.'"* For Lombard and Ditton (2002), presence is *"the perceptual illusion of non-mediation."* By this, they refer to a phenomenon in which *"a person fails to perceive or acknowledge the existence of a medium in his or her communication environment and responds as he or she would if the medium were not there."* Since advanced VR systems can offer fully immersive bodily experiences, they can mediate embodiment in virtual spaces. Bailey et. al. (2016) states that in a virtual embodiment, *"memories and mental representations may be extended out from the physical body onto technology, blurring the physical and the mediated"* (Moura et al., 2021). Li et al. (2001, p.14) also state that although it is mediated, VR resembles direct experience characteristics.

According to postphenomenologist philosopher Ihde (2002, p.7), *"the relations of embodiment occur in a context of use, in which it is possible to perceive the world through the instrument [i.e., VR systems]. This technology's effects are revealed in the alteration of human perception; it must be technically (physically) transparent, integrating with the bodily sensorium"* (Moura et al., 2021). Since most of the interactions are carried out in an embodied context in VR (Mennecke et al., 2009), *"this embodied state of interactions includes the perceptions of presence and a deep sense of engagement (i.e., immersion) with objects"* (Saunders et al., 2011, p.1086). To induce embodiment and the sense of presence in VR, the system's capacity to immerse the user in the content plays an important role. Through immersive devices and contents, *"virtuality obtains and offers a new way of embodiment, a new understanding of participation, a new interpretation of experience"* (Aczél, 2016, p.3).

Chief Executive Officer (CEO) of *Meta*, Mark Zuckerberg, in his interview with Lex Fridman (2022), states that as humans, we are visual beings compared to other

animals, and most parts of people's brains focus on reading facial cues and expressions in a conversation. Since VR primarily relies on visual feedback, the visual capabilities of the device and virtual environment are key in persuading users to feel a sense of presence (Aczél, 2016, p.3; Ulrich, 201, p.6). Virtual spaces bolster the sense of presence via visual elements that are highly immersive (Aczél, 2016, p.7). In this context, design plays a crucial role in manifesting *"the persuasive intent of its [the content's] creator by which attitudes and behaviors of recipients can be modified"* (Aczél, 2016, p.8), because it can influence users to act or behave in specific ways. From this perspective, media design is a social rather than a technological action, proving that *"HCI is like a persuasive speech"* (Boyarsky and Buchanan, 1994, p.34; Selber, 2004, p.145). The persuasive power of VR is powered by the intensity of the sensory experience, level of immersion, presence, and concept of "dwelling." Rickert (2013) states that the persuasive elements induce users to dwell, where dwelling represents how people come together in a shared space or in the continual making of a space, disclosing their dwelling practices.

As stated above, the sense of presence, entailing the use of vivid and interactive features, grounds the user's experience in virtual spaces. According to Ulrich (2012, p.6), *"the vividness of virtual reality can give an audience a sense of immersion, enhance the emotional impact of a message, and bypass analytical arguments."* Similarly, according to Steuer (1992), one variable property of VR that influences its ability to induce a sense of presence is "vividness," which means *"the representational richness of a mediated environment as defined by its formal features; that is, the way in which an environment presents information to the senses."* According to Aczél (2016, p.13) and Ulrich (2012, p.6), it is important to interpret persuasive mechanisms' inherent capabilities with which spaces and relations can be built, attitudes can be formed, and decisions can be made.

In "The Psychology of Rhetorical Images," Hill (2004, p.30) attempts to explain the results of numerous psychological studies indicating that *"images tend to elicit more emotional responses while print media messages tend to elicit more analytic responses."* According to Hill (2004), the more vivid a medium is, the more likely the audience is to have a strong emotional response and become persuaded. Hill (2004, p.31) classifies images as distinct from text through their defining feature of

"vividness." In this classification (the continuum of vividness from most vivid information to least vivid information), VR has the capacity to provide strong vivid information because it prompts the audience to *"make a relatively quick decision, largely ignoring the more analytical, abstract information available in verbal form"* (Hill, 2004, p.33). Because of their vivid nature, images are *"comprehended wholistically and almost instantaneously"* (Hill, 2004, p.33). Therefore, design choices regarding the visual properties of VR content play an important role in VR experiences, particularly in shaping embodied interaction and users' sense of presence. These concepts provide us with ways of understanding how they work and create a basis for the production of virtual spaces from a phenomenological perspective.

2.3.Phenomenology, Postphenomenology, and Virtual Reality

2.3.1. Phenomenological Approaches to Virtual Worlds

Virtual reality platforms offer users to experience a sense of presence and embodiment in various virtual worlds that have realistic spatial features, while phenomenology offers a range of philosophical approaches that attempt to understand human experience in the world and the manner of interacting with that world (Gladden, 2018, p.6; Sokolowski, 2000). It is why phenomenological approaches have been found relevant when analyzing user experience in virtual worlds. Some studies have examined but are not limited to the following topics: phenomenological approaches to the design of virtual spaces (Gladden, 2018; Gladden 2020); postphenomenological investigations focusing on mediation in VR (Vindenes and Wasson, 2021a; Evans and Rzeszewski, 2020; Voordijk and Vahdatikhaki, 2020); phenomenological approaches to the sense of presence in virtual spaces and places (Turner and Turner, 2004; Turner and Turner, 2006); embodiment and intentionality in VR (Fuentes, 2016; McBlane, 2013; Bailey, 2016; Moura et al., 2021); lifeworld and VR (Butnaru, 2015; Gladden, 2017) and more general phenomenological analyses of VR (Murray, 2000; Asanowicz, 2014; Schroeder, 2003; Heinzel and Heinzel, 2010).

For Murray (2000), *"phenomenology, as a descriptive technique of subjective experience, and with a fundamental concern with perception and bodily activity (Ihde, 1990), enables us to explore phenomena as they are lived and experienced."* This

emphasis echoes in Heidegger's (1962) "Dasein," which asserts that human existence inherently connected to the world, with space being an essential component of this existence. Heidegger (1962) suggests that a person's experience of space is closely linked to their perception of their surroundings and is continuously shaped and transformed by their actions, which, in turn, influence their experience and connection with the world.

Instead of the two finite essences of Cartesianism, Heidegger's (1962) phenomenological approach conceives three ways of being. The first is the way of being of substances or represented objects. This way of being is called "present-at-hand." Heidegger's (1962) second way of being, called "existenz," is the way of being of humans. Heidegger's (1962) "existenz" symbolizes the concept of "Dasein," which means "being there." Heidegger's third way of being is called "readiness-to-hand," and corresponds to the way of being of "equipment" (i.e., any tool for humans to act on the world in which they were "thrown") (Heidegger, 1962). Such equipment can be one's own hand or a cane as well. When equipment is "ready-to-hand," it works well as a tool for a person to act on the world. For Heidegger, a tool must "withdraw" to be ready-to-hand (Murray, 2000). Merleau-Ponty (2012) invokes the example of how the blind person's cane achieves such a high level of directionality between his/her body and the cane that the person has the feeling of "seeing" through the cane. Merleau Ponty (2012) uses this example to show that human beings can use artifacts/tools to stretch the spatiality of their bodies (Verbeek, 2001, p.126). It is only if the cane breaks or falls from its user's hand that it will be recognized as an external object, and in such case, the cane becomes a "present-at-hand" (Houliez and Gamble, 2013, pp.266-268).

Like Heidegger (1962), Verbeek, (2001, p.120) argues that according to phenomenological approach, *"human beings and world cannot be thought independently of each other, but only as always already related. Humans cannot be conceived apart from their relations to the world, and the world cannot be conceived apart from people's relations to it… this connectedness of humans and world is called 'intentionality'. That said, human consciousness can never be adequately understood or described in isolation as consciousness-in-itself. It never exists by itself, but only as consciousness-of-something."* For example, we don't just see, hear or think, but we always see, hear or think "about" something. The same is true for perception:

Perception is always the perception of something. *"Hence, for phenomenology, equipments cannot be objectified via a scientific reduction isolating them from the rest of the world [as seen in third-wave and fourth-wave HCI approaches]: Their existence as phenomena intrinsically originates from our implicit familiarity with the world, the intrinsic understanding of a 'referential whole' within which we have come to exist"* (Houliez and Gamble, 2013, p.267). Dourish (2001) focuses on raising our awareness of embodied interaction as "ready-to-hand." It is why he presents first and second wave HCI approaches as being based on the opposite; rationalizing, objectifying and abstracting activity, or interpretation by the user as "present-at-hand."

"Heidegger insists that dwelling occurs when one is at peace with the space they experience- when one can truly be themselves and maintain authenticity within that space" (Houliez and Gamble, 2013, p.267). According to Heidegger (1977), *"the authenticity of dwelling is threatened by the spread of modern technology and its capacity to shrink or compress space"* (Houliez and Gamble, 2013, p.275).[4] Harvey (1989) refers to this as "time-space compression," describing how advancements in transportation and communication technologies reduce the perceived distances between places. Harvey (1989) argues that this compression alters our perceptions of time and space, making the world feel smaller and more interconnected. While advancements in transportation and communication technologies facilitate faster and more efficient connections, fostering economic growth and cultural exchange, they can also strengthen inequalities, disrupt local cultures, and lead to new forms of exploitation and environmental destruction.

However, Houliez and Gamble (2013, p.275) argue that *"virtual worlds, because of the opportunity they offer to its users to act more authentically, may lead to a renewed opportunity to dwell."* Houliez and Gamble (2013, p.275) offer to evaluate virtual worlds on their *"readiness-to-hand, fallenness, and potential to offer multiple existentialities to its users."* Dwelling is related to space, and the two main features of Heideggerian spatiality are "de-severing" and "directionality." Heidegger (1962) explains that *"de-severing equals to bringing it close… Getting things close is about opening up space for Dasein to act on the world via equipment"* (Houliez and

[4] For a discussion on the concept of "shrinking space" please see the section entitled "Phenomenological and Postphenomenological Roots in Lefebvre's Theory."

Gamble, 2013, p.268). "Directionality" *"refers to how equipment lines up in order for Dasein to engage in specific spatial practices"* (Heidegger, 1962; Houliez and Gamble, 2013, p.268). For Heidegger (1977), technology (i.e., *techné*) "*is one way through which the far can become near though de-severing"* (Houliez and Gamble, 2013, p.268). Thus, "directionality" and "de-severing" enable "Dasein" to engage with things in a "ready-to-hand" manner. In this sense, *"the underpinning philosophy of technological mediation is phenomenology"* (Voordjik and Vahdatikhaki, 2020, p.3).

Virtual worlds could be reduced to bits of 0's and 1's stored on servers for Cartesianism, but a phenomenologist would *"instead focus on the raw experience offered by virtual worlds, setting aside any presupposition or objectification"* (Houliez and Gamble, 2013, p.271). As mentioned above, this focus includes some characteristics that belong to virtual worlds, such as the sense of presence. Research shows that high levels of interactivity and immersion led to a greater sense of presence (Steuer, 1992; Sundar et al., 2008). Slater et al. (2009) indicate that there is a stronger feeling of presence when there is a correlation between our motor actions and the response that we experience. There is also a phenomenological dimension to the concept of "break-in presence," introduced by Slater and Steed (2000): *"Presence can be broken by external events or internal mental processes that bring the true nature of the experience to the person's conscious awareness, at which point presence is reduced or extinguished."* In virtual worlds, breaks in the presence (i.e., "severing") occur as a sudden disconnection from the medium. This represents Heideggerian notions of "unreadiness-to-hand" and "breakdowns." Then suddenly, the virtual world becomes "present-at-hand" (Houliez and Gamble, 2013, pp.270-271). When "readiness-to-hand" becomes "present-at-hand," the person's absorption in the world is suddenly interrupted, and what is near becomes far (i.e., "severing") (2013, p.271).

Therefore, ever since Descartes' mind-body dualism has been questioned by the concept of being-in-the-world, especially with the influence of Heidegger, *"phenomenology has become a productive lens to explore the different roles of technologies as tools"* (Frauenberger, 2019, p.6). However, classical phenomenology has been criticized for always looking to find the "essences" and treating technology in abstract and passive ways (Frauenberger, 2019, p.6). This has prompted Ihde (1990),

the founding figure of this approach, to develop postphenomenology. The next section situates the appropriateness of the postphenomenological approach in this study.

2.3.2. Postphenomenology and Technological Mediation

Heidegger's phenomenological perspective on technology is important to understand Ihde's postphenomenology (Verbeek, 2001, p.121). Firstly, there are some differences between their conceptualizations of technology. In classical phenomenology, research focuses on the *"interpretative relation of reality that lies behind technology"* (Verbeek, 2001, p.144). Technology is evaluated as manipulative and alienating human beings from themselves and from the world (Rosenberger and Verbeek, 2015, p.10). According to Heidegger's conceptualization, *"in modern technology, we encounter only beings, and no longer the 'being' that is their ground. We have put ourselves in the place of that ground. We have forgotten being"* (Verbeek, 2001, p.122). On the other hand, Ihde *"does not begin with this world-interpretation, but with our dealings with the concrete technological artifacts, and the praxes and interpretations that are made possible by them. There are many possible forms of technological mediation that transform our access to the world in different ways; some of these open up to us new ways of access, while others narrow this access"* (Verbeek, 2001, pp.144-145).

Ihde (2018) argues that to understand "the technoscientific phenomena" of our current times, classical phenomenology must be modified. Unlike phenomenology, postphenomenology doesn't chase to find absolute foundations of reality or knowledge and does not point to something's "essence" (Rosenberger and Verbeek, 2015, p.1). Instead, *"all knowledge claims are understood to be inherently context laden, perspectival, and made in relation to human problems"* (Rosenberger, 2017, p.471). It aims to collect empirical data to understand technologies as mediators of human-world relationships and adopt an embodied and situated perspective, which refers to practice (Rosenberger and Verbeek, 2015, p.1). This leads Ihde (2009, p.23) to argue that postphenomenology is a modified and hybrid version of classical phenomenology. Therefore, it is not "post" in the way that postmodernism opposes modernism (Rosenberger and Verbeek, 2015, p.11). The "post" represents *"the perspective of openness with respect to technology"* (Whitehead, 2019) and shows its distances from

the abstraction and romanticism of classical phenomenology (Rosenberger and Verbeek, 2015, p.11). In this way, postphenomenology approaches technologies in terms of mediation, not alienation. This understanding makes it possible to explain how technologies mediate relations between human beings and their world (Rosenberg and Verbeek: 2015, p.11), making postphenomenology well-suited for this research.

Rosenberger and Verbeek (2015, p.12) state that *"phenomenology itself was already a move beyond modernism because its concept of intentionality made it possible to overcome the modernistic subject-object split."* For postphenomenology, this intentional relation is reconceptualized by investigating its fundamentally mediated characters: *"It does away with the idea that there is a pre-given subject in a pre-given world of objects, with a mediating entity between them. Rather, the mediation is the source of the specific shape that human subjectivity and the objectivity of the world can take in this specific situation"* (Rosenberger and Verbeek, 2015, p.12). The intentional relation between human beings and the world is extended or stretched through technological artifacts (Verbeek, 2001). According to Gunkel (2018), *"when thinking of human-technology associations, these are not relations between existing subjects who perceive and act on a pre-existing world of objects but as sites where both the objectivity of the world and subjectivity of those experiencing the world it and existing in it are created"* (Evans and Rzeszewski, 2020, p.14; Verbeek, 2001). For Evans and Rzeszewski (2020, p.14), this approach *"recasts HCI as a speculative science of self-reflecting knowing, and the postphenomenological approach ... as a contribution to and advancement of this 'third-wave' approach to HCI."*

Postphenomenology, like classical phenomenology, continues to reject *"the Cartesian subject by replacing it with the existential, lived body as a fundamental concern"* (Evans and Rzeszewski, 2020, p.5; Ihde, 1990). Therefore, the emphasis on the body and embodiment continues in postphenomenology, which *"can be thought of as the human body being caught in the fabric of the world that enmeshes us, and digital technology is part of that fabric"* (Evans and Rzeszewski, 2020, p.5; Irvin, 2018). When it comes to VR, it *"is part of a wider context in which our bodies and lives are enmeshed with the digital; the body is critical in all our engagements with the digital as we are embodied agents in the world, and the digital and our embodied activity act*

as a co-creator of our world (even if that world is virtual)" (Evans and Rzeszewski, 2020, p.5). The next section reviews various models of human-technology-world relations, including immersive VR experiences.

2.3.2.1.Human-Technology-World Relations

Ihde's main aim is to understand the role of technology in everyday human experiences (Verbeek, 2001, p.119). Ihde (2009, p.36) argues that *"embodiment or bodily intentionality extends through the artefact into the environing world in a unique technological mediation."* He tries to understand the relation between human beings and "technological artifacts" on two main levels: Experience and culture. *"On the level of experience, he inquiries into the role that technological artifacts can play in the relation of human beings to reality; on the cultural level, he inquires into the relation between technological artifacts and culture"* (Verbeek, 2001, p.123).

Ihde analyses experience in terms of perception. For him, perception is the key to understanding the relationship between human beings and their world (Verbeek, 2001, p.123), where mediation transforms perception (Verbeek, 2021, p.128). Mediation *"strengthens certain aspects of the perceived reality and weakens others"* (Verbeek, 2001, p.128). For example, when *"we look through a spy-glass… we see objects that we wouldn't otherwise, and to this extent, our visual access to reality is strengthened. But at the same time, we do not hear, smell, or feel what we see; our perception has been reduced to the visual"* (Verbeek, 2001, p.128). In the case of VR experiences, the technology discloses a new virtual reality and opens immersive worlds where users engage physically, simultaneously weakening their sense of presence in the physical world while enhancing it in the virtual world.

Ihde distinguishes two intertwined dimensions of perception: Micro perception, which refers to bodily sensations like seeing, hearing, etc., and macro perception, which refers to the cultural, historical, and anthropological dimensions of experience (Verbeek, 2001, p.123). According to Verbeek (2001, p.128), *"mediations of micro perception have consequences for macro perception, for the manner in which human beings interpret their world."* This notion emphasizes that the use-context of technologies is part of a larger cultural context (Verbeek, 2001, p.134). Ihde names

this as "multistability," a key concept in postphenomenology, that refers to the *"phenomenon by which many entities self-organize into different shapes and arrangements"* (Ihde, 2018).

Ihde (1990) distinguishes four different ways of mediation in human-technology-world relations: Embodiment relations, hermeneutic relations, alterity relations, and background relations. According to Ihde (2009), these relations are affected by five dimensions: *"Materiality of the technology, bodily technique of use, cultural contents of the practice, embodiment in trained practice; and the appearance of differently structured lifeworlds"* (Evans and Rzeszewski, 2020, p.8). Embodiment relations represent the combination of human and technology, together they relate to the world (Vindenes and Wasson, 2021a, p.3). *"In an embodiment relation, the technology is always in a ready-to-hand state, being used to perceive the world through the technology itself"* (Evans and Rzeszewski, 2020, p.6). Transparency is one of the most important characteristics of this relation, and it is highly linked with the "withdraws" of Heidegger and the "blind person's cane" of Merleau Ponty (2012). *"When a technology [such as a VR HMD] is 'embodied,' a user's experience is reshaped through the device, with the device itself in some ways taken into the user's bodily awareness"* (Rosenberger and Verbeek, 2015, p.14).

In hermeneutic relations, humans are involved with the world via a technological artifact, but the artifact is not transparent. In this mediated relationship, humans perceive and interpret the device's readout. Ihde gives the use of a thermometer as an example of hermeneutic relations (Verbeek, 2001, p.127). Thirdly, alterity is the relation not via an artifact to the world but to an artifact itself (Verbeek, 2001, p.131). *"Here, humans are not perceiving the world through the technology (an embodiment relation) or by means of technology (a hermeneutic relation) but are related to the technology itself"* (Voordijk and Vahdatikhaki, 2020, p.4). For example, interacting with an ATM machine, robots, computer games, and visual technologies (Rosenberger and Verbeek, 2015, p.18; Voordijk and Vahdatikhaki, 2020, p.4). Lastly, background relations represent technologies that make up the user's environmental context and remain in the background (Rosenberger and Verbeek, 2015, p.18). The use of an air conditioner is an example of the background relations.

Rosenberger and Verbeek (2015) and Vindenes and Wasson, (2021a) state that the human-technology-world relations proposed by Ihde (1990) do not include all possible relations we have today, so they propose new relations by considering new technologies.[5] The schemas representing these human-technology-world relations are presented in *Table 2.1,* with arrows illustrating the direction of intentionality. Since it provides a suitable postphenomenological framework for studying user experiences in immersive VR, the User-Environment Relation framework proposed by Vindenes and Wasson (2021a) discussed in detail in the next section.

Table 2.1 Human-Technology-World Relations schemas.

Embodiment Relation (Ihde, 1990)	(human - technology) → world
Hermeneutic Relation (Ihde, 1990)	human → (technology - world)
Alterity Relation (Ihde, 1990)	human → technology (world)
Background Relation (Ihde, 1990)	human → (technology / world)
Fusion/Cyborg Relation (Rosenberger and Verbeek, 2015)	(human / technology) → world
Immersion Relation (Rosenberger and Verbeek, 2015)	human ↔ technology / world
Augmentation Relation (Rosenberger and Verbeek, 2015)	(human - technology) → world ↘ (technology - world)
User-Environment Relation (Vindenes and Wasson, 2021a)	(human − technology) → technology (-world)

2.3.2.2.A Postphenomenological Framework for Studying User Experience of Immersive Virtual Reality: User-Environment Relations

Vindenes and Wasson (2021a) propose User-Environment Relation framework to understand how VR technologies mediate user experience. The authors argue that in VR, *"the subjectivity and objectivity of experience are constituted in relation to each other"* (i.e., the human subject and the technology are not poles in the interaction), rather, they see the subject and the object as a result of the interaction;

[5] Rosenberger and Verbeek (2015) expanded Ihde's relations with three new relations: Fusion/cyborg relation, immersion relation, and augmentation relation. In fusion/cyborg relation, *"the physical boundaries between humans and technologies are blurred, and technologies merge with our bodies"* (Rosenberger and Verbeek, 2015, p.20). In immersion relation, technological background interacts actively with human beings. Here, technologies do not merge with the body but with the environment (e.g. smart toilets) (Rosenberger and Verbeek, 2015, p.20). Vindenes and Wasson (2021a, p.4) state that *"Verbeek does not use the word 'immersion' in order to relate it to VR technologies in particular."* Nevertheless, they also find immersion relation relevant to understand user experience in VR because VR technologies open entirely new possibilities for "reflexive intentionalities" (which means that *"human beings are directed toward technologies, and the technologies are in turn directed toward them"*) (Vindenes and Wasson, 2021a, p.4). Augmented relations represent AR technologies, which add an extra layer to the experience of the world.

they *"mutually shape each other in the relations that come about between them"* (Vindenes and Wasson, 2021a, p.2; Verbeek, 2015, p.28). The authors state that this relational approach is more holistic than measuring isolated constructs in immersive VR (e.g., measuring the presence, embodiment, simulator sickness, etc.). They focus on *"how the embodiment and presence take part in constituting the user's subjectivity in relation to the objectivity of the environment,"* which arises from the mediation (Vindenes and Wasson, 2021a, p.2). Therefore, *"for Immersive VR, this entails seeing the user experience as mediated in relations constituted between user and environment"* (Vindenes and Wasson, 2021a, p.2). In VR mediations, *"some possibilities for experience are left open while others are restricted"* (Vindenes and Wasson, 2021a, p.2). VR can "change the self" and affect attitudes and behaviors after exposure (e.g., the Proteus Effect), *"...so that having experienced a virtual reality, reality itself is re-framed for the subject"* (Vindenes and Wasson, 2021a, p.2). Although the content is virtual, the experience is "real as an experience" (Slater et al., 2010, p.5). On the other hand, it restricts the users to the virtual environment, and (mostly) cuts off their connection with the outside world.

The framework recognizes the subjectivity-objectivity structure as constituted within VR (User-Environment Relation), as well as the subjectivity-objectivity structure as constituted outside of VR (Human-World Relation) (Vindenes and Wasson, 2021a, p.1). The User-Environment Relation framework consists of five components (human, world, VR mediator, user, and environment) and two relation types[6] (embodiment relation and alterity relation). Human refers to *"the human being partaking in the study"* (Vindenes and Wasson, 2021a, p.6). Examples of human factors can be *"personality, gender, socio-economic status, interests and motivations, involvements, and previous technology experience"* (Vindenes and Wasson, 2021a, p.6). World refers to *"the use-context of the application where the VR application is being used,"* which *"constitutes the background of VR experience"* (Vindenes and Wasson, 2021a, p.6). Examples of use-context can be home, lab, work, etc. VR mediator refers to the technology, or mediator, which immerses the human into the virtual environment and gives rise to a user-environment relation (Vindenes and Wasson, 2021a, pp.6-7). In this way, *"the human becomes an embodied user,*

[6] These two relation types are also found in the existing human-technology-world relations proposed by Ihde (1990).

immersed in, and standing in an intentional relation to, the virtual environment, while the world is in the background" (Vindenes and Wasson, 2021a, p.7).

User refers to *"the human as user in an embodiment relation to the alterity of the virtual environment"* (Vindenes and Wasson, 2021a, p.6). *"The user subjectivity is in a nested relation to the subjectivity the human individual has in relation to her actual world, but is further affected by avatars, tools, interaction possibilities, position, involvements, and social scenarios. Human subjectivity is being mediated by the VR application, within the simulation in relation to the virtual world (User) as well as outside the simulation in relation to the real world (Human)"* (Vindenes and Wasson, 2021a, p.6). Environment refers to *"the virtual environment as experienced by the user during the VR embodiment. The part of the VR application that is not embodied by the user ["and therefore, that to which the embodied user relates to as alterity"], but is rather acted upon, or that which acts upon the user, including social actors, 3D objects, events, etc."* (Vindenes and Wasson, 2021a, p.6).

Embodiment relation refers to the case when a user is totally immersed and felt present in a VR through VR HMDs (Voordijk and Vahdatikhaki, 2020, p.11). In this relation, the technology is embodied, and the world is seen or experienced through the equipment, *"with bodily motion and perceptual attention being mapped by the VR equipment and fed back to the user as an experience that has visual fidelity and congruence"* (Evans and Rzeszewski, 2020, pp.6-7). However, embodiment relation can also be affected by the choices regarding the design of the virtual environment. The design of an environment determines its affordances and the kinds of interactions possible. Affordance in this sense refers to what the virtual environment, in terms of its properties, offers to users (Voordijk and Vahdatikhaki, 2020, p.13).

In an alterity relation, VR invites users to act in certain ways while inhibiting acting in other ways (Verbeek, 2005). *"The VR tool encourages certain behaviors by carrying a script that guides users in a certain direction. Interacting with VR gives the user a sense of interacting with something 'other' than either themselves or reality. The technology has its own agency that influences human experience"* (Voordijk and Vahdatikhaki, 2020, p.10). Besides, the user-environment relation can also be affected by human factors who use it and engage with it in their context of use (Vindenes and

Wasson, 2021a, p.5). The schema provided by Vindenes and Wasson (2021a) denotes a user-environment relation: *"A human in an embodiment relation with the technology (i.e., the user) in an alterity relation to the technology (i.e., the environment), while the world is in the background."* The original illustration of "The Postphenomenological Framework for Studying User Experience of Immersive VR as Mediations[7]" is presented in *Figure 2.1*.

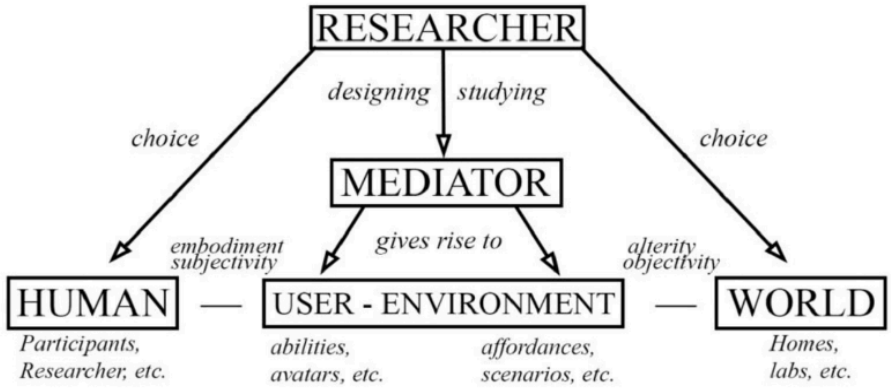


Figure 2.1 The Postphenomenological Framework for Studying User Experience of Immersive VR as Mediations.
Source: Vindenes and Wasson (2021a).

Since *"...each form of VR is a medium unto itself"* (Lanier, 2017, p.204), and *"virtually all other media can be reproduced within it"* (Vindenes and Wasson, 2021a, p.4), determining a valid and comprehensive account of VR mediation is almost impossible. In this research, we are more interested in understanding the relations between users and the virtual environment in social VR platforms through embracing Lefebvre's Production of Space theory as a conceptual anchor, rather than focusing on the relations between the human (i.e., human factors) and the world (i.e., use-contexts).

[7] Vindenes and Wasson (2021a, p.4) summarizes the User-Environment Relation framework in the following paragraph: *"While the VR HMD becomes transparent in use and we act through it, the intentional relation is not mediated toward the world, rather, it is mediated toward the virtual environment. Consequently, when embodied, the user is in an alterity relation toward the virtual environment, interacting directly with the technology within its own system. Thus, in the embodiment of a VR HMD, we act both through it and upon it, which is why VR can simultaneously mediate both (i) the objectivity of the environment in which users are situated (alterity) as well as (ii) the users' subjective position and relation toward that virtual environment (embodiment). So, while we embody parts of the VR technology (hardware, avatars, tools) as part of our subjectivity in a transparent embodiment relation, the objectivity of our experience (environment, actors, social scenarios) is also mediated by the same VR technology, constituting an opaque alterity relation in which the world is in the background."*

2.4.The Production of Space

According to Henri Lefebvre (1991, p.85), *"space is not a thing,"* and *"not a container in the Cartesian sense"*; rather, *"it is a product and a means of production"* (Fuchs, 2019, p.135); *"a 'social reality,' and 'a set of relations and forms'"* (Fuchs, 2019, p.135; Lefebvre, 1991, p.116). The key idea of Lefebvre's (1991, p.170) theory is that *"each living body is space and has its space: it produces itself in space and it also produces that space."* So, human beings produce social relations in space and form it as a social entity (Fuchs, 2019, p.135). The dialectical approach is central to Lefebvre's Production of Space theory and spatial triad (Merrifield, 1993, p.517). Dialectics *"may be understood as some kind of incompatible development or movement of different elements within the whole whereby each element within a relationship simultaneously supports and undermines the other"* (Merrifield, 1993, p.517). In this respect, contradictions are internally related units of a whole. Lefebvre's theory is evaluated as a "unity theory" which brings different fields of space together and shows interrelations between each of them (Merrifield, 1993, p.522; Fuchs, 2019). According to Lefebvre (1991, p.404), there is a dialectical relationship between social relations and space.[8]

2.4.1. Spatial Triad

In his spatial triad, Lefebvre (1991) presents analytical frameworks to investigate the production of space. The spatial triad represents the three moments of social space (Lefebvre, 1991, p.40), and consists of two dialectically interconnected dimensions: On the one hand, Lefebvre (1991) refers to the triad of the spatial practices (physical), the representations of space (mental), and the representational space (social), and on the other, he refers to the perceived space, the conceived space, and the lived space (Schmid, 2008). These two dimensions are in a dialectical relation: One linguistic or semiotic and the other phenomenological (Schmid, 2008, p.29; Avar, 2009). The first triad of spatial practices, representations of space, and representational

[8] Fuchs (2019, p.143) explains this relation as the following: *"Humans produce social relations that are bounded, related and organized in social spaces. In the production of social relations, they produce and reproduce social structures that enable and constrain the practices in social systems. Specific social systems form society's key institutions. Humans produce and reproduce social relations, social structures, social systems, institutions, and social spaces that in a dialectical manner condition (enable and constrain) human practices and are the medium and outcome of such practices."* Therefore, for Lefebvre (1991, p.191), social space is *"always, and simultaneously, both a field of action… and a basis of action."*

space (also referred to as spaces of representation) is based on Lefebvre's three-fold theory of language; they refer to syntagmatic, paradigmatic, and symbolic dimensions of language (Schmid, 2008, pp.35-36). The second triad of the perceived space, the conceived space, and the lived space is based on phenomenology (Schmid, 2008, p.37).[9]

2.4.1.1.Spatial Practice (Perceived Space)

Spatial practice *"embraces production and reproduction, and the particular locations and spatial sets characteristic of each social formation"* (Lefebvre, 1991, p.33). According to Schmid (2008, p.36), it refers to *"the material dimension of social activity and interaction,"* and is linked to the syntagmatic dimension of language which *"denotes the system resulting from articulation and connection of elements or activities."* Spatial practices can be observed on different levels including the built environment and architecture, urban networks, intersections, routes, organization of everyday life, institutional practices, and the creation of particular zones for specific use (e.g., work, private life, and leisure) (Simonsen, 2005, p.6; Schmid, 2008, p.36; Drakopoulou, 2013). Through a sequence of acts (Lefebvre, 1991, p.57), which embody the articulation and connection of activities simultaneously (Schmid, 2008, p.36), *"space is dialectically created as a human and social space"* (Simonsen, 2005, p.6). So, in this dimension, *"social space appears as an interlinking chain or network of activities or interactions which on their part rest upon a determinate material basis"* (Schmid, 2008, p.37).

Spatial practice *"embodies a close association, within perceived space,"* between daily routines and urban reality (Lefebvre, 1991, p.38). It is the realm of the perceived (*"the practical basis of the perception of the outside world"*) (Lefebvre, 1991, p.40). Perceived space *"has a perceivable aspect that can be grasped by the*

[9] Fuchs (2019, p.144) demonstrates the connections between the perceived-conceived-lived triad as the following: *"All social life is a unity of mentally perceiving the physical and social world; mentally conceiving this world in particular cognitive ways as thoughts; and living the world in social relations in which humans communicatively produce themselves, use-values, collective decisions, rules, morals, norms, collective meanings, etc. Perceiving and conceiving are mental and informational activities. They are social and material practices that are part of living and producing a society. Perceiving is the mental conception of the lived physical and social world, the cognitive production of nature and society. Conceiving is a particular form of perceiving; a creative way of living the world by producing information about it. And living the world means perceiving, conceiving and producing society."*

senses… This sensuously perceptible aspect of space directly relates to the materiality of the 'elements' that constitute 'space'" (Schmid, 2008, p.39). As Merrifield (1993, p.524) stated, *"people's perceptions condition their daily reality with respect to the usage of space: for example, their routes, networks, patterns of interaction that link places set aside for work, play, and leisure."* According to Lefebvre (1991, pp.113-114), these practices arise from perceived space; perception depends on the subject so that not everyone perceives the space in the same way. Thus, spatial practices become blurred with respect to the conceived space and lived space (Merrifield, 1993, p.525).

2.4.1.2.Representations of Space (Conceived Space)

Representations of space represent the abstract, conceptualized, dominant space of capitalist society; it depends on the mode of production and the order that these relations necessitate with its codes, signs, knowledge, and "frontal" relations (Lefebvre, 1991, p.33; Avar, 2009, pp.11-12; Simonsen, 2005, p.6). Representations of space are linked to the paradigmatic dimension of language, *"one spatial representation can be substituted by another that shows similarities in some respects but differences in others"* (Schmid, 2008, p.37). These representations are articulated in architecture, design, urban planning, and geography (Schmid, 2008; Avar, 2009). They serve *"as an organizing schema or a frame of reference for communication, which permits a (spatial) orientation and thus co-determines activity at the same time"* (Schmid, 2008, p.37). Representations of space are connected to conceived because it is conceptualized by scientists, experts, and technocrats such as architects, planners, social engineers, etc. (Lefebvre, 1991, p.38; Merrifield, 1993, p.523; Proctor, 2021, p.599). It comprises verbal signs, codifications, and objectified representations produced by those who have scientific knowledge (Lefebvre, 1991, p.38; Merrifield, 1993, p.523). Therefore, the conceived space is the space of those who define the perceived and the lived by imposing an order on them (Lefebvre, 1991, pp.38-39; Merrifield, 1993, p.523; Avar, 2009, p.11).

2.4.1.3.Representational Space (Lived Space)

Representational space is *"dominated -and hence passively experienced- space which the imagination [i.e., conceived space] seeks to change and appropriate"* (Lefebvre, 1991, p.39). It emb*odies "complex symbolisms, sometimes coded,*

sometimes not" (Lefebvre, 1991, p.33). Lived space embraces a combination of bodily senses and lived experiences of its inhabitants, and therefore it is tied to representational space. It represents the resistance towards abstraction and commodification, and therefore it is qualitative, fluid, and differential (Avar, 2009, p.13; Fuchs, 2019, p.138). It is *"lived through its associated images and symbols"* (Lefebvre, 1991, p.39), and is linked to the *"clandestine or underground' side of social life"* (Lefebvre, 1991, p.33). The abstract, dominant, and hegemonic space always attempt to usurp the lived space (Merrifield, 1993, p.524). However, Lefebvre refers to a power that the lived space has on transforming the abstracted and conceived space of capitalism by resistance. This notion refers to what de Certeau (1984) calls the tactics of practice. Correspondingly, *"the battle becomes the moment of struggle between conceiving space through representation and living place through actual sensual experience and representational meaning"* (Merrifield, 1993, p.525)."

Lefebvre linked these two parallel triads in a way that embraces the human body and its concrete practices on the one hand, and the whole materiality of social practice on the other (Schmid, 2008; Avar, 2009, p.10). While Lefebvre (1991, pp.142-144, 159-164) states that it is possible to read space as a text, he never elaborates the Production of Space theory only through a semiological approach (Merrifield, 1993, p.529), because for Lefebvre, space is *"produced before being read"* (Lefebvre, 1991, p.143), and this refers to the lived, bodily experience of its inhabitants in their own context. So, Lefebvre gives a centrality to the acts of the human body in the lived experience: *"The whole of (social) space proceeds from the body"* (Lefebvre, 1991, p.405). As Merrifield (2013, p.109) remarks: *"The Production of Space is, then, very much the production of bodies in space."* Therefore, Lefebvre's (1991) emphasis on the relationship between space and body opens a room for a discussion of the production of space from phenomenological perspectives. The next section traces phenomenological and postphenomenological roots in Lefebvre's Production of Space theory.

2.4.2. Phenomenological and Postphenomenological Roots in Lefebvre's Production of Space Theory

Given the emphasis Lefebvre places on body and space in his spatial triad, Schmid (2008, p.38) argues that the major themes Lefebvre addresses are derived from existential phenomenology. Phenomenological perspectives in Lefebvre's theory have resonances with the work of Merleau-Ponty, Bachelard, Heidegger, Sartre, and Ihde (Kinkaid, 2018, Kinkaid 2020; Schmid, 2008; Elden, 2004; Simonsen 2005; Simonsen, 2010; Ash and Simpson, 2016). The common grounds in phenomenology, postphenomenology, and Lefebvre's theory stem from the disavowal of Cartesian dualism, namely Descartes's separation of subject and object (Schmid, 2008, p.39).

According to Kinkaid (2020), Lefebvre and Merleau-Ponty have common areas of discussion: *"A critique of abstract space based on the inseparability of embodied subject and space, ...a relational ontology of space as a phenomenological totality, ... and the centrality of spatial practice."* Lefebvre, like Merleau-Ponty, denies Cartesian abstract space; and argues that *"space is not simply a container or coordinate system in which things are arranged"* (Kinkaid, 2020, p.173). Rather, the refusal of abstract space lies in the relationship between the subject and space, namely, *"in the site of the embodied subject"* (Kinkaid, 2020, p.173). Merleau-Ponty's (2012) *Phenomenology of Perception* is grounded in concepts such as "space," "time," and the "lived world." Similar to Lefebvre, Merleau-Ponty *"distinguishes a physical space constructed by perception, a geometrical space conceptually comprehended, and, finally, a lived space"* (Schmid, 2008, p.38). While Lefebvre has a lot in common with Merleau-Ponty, he also criticizes Merleau-Ponty and Husserl in some ways. Lefebvre argues that they focus on the subjectivity rather than larger socio-political dimensions in which bodily practices take form so that they cannot overcome their idealism (Schmid, 2008, p.39). This leads Simonsen (2010, p.225) to claim that *"Lefebvre can add to Merleau-Ponty when it comes to social order and power relations."* Similarly, Schmid (2008, p.39) also states that *"Lefebvre's aim is, so to speak, a materialist version of phenomenology- a project Merleau-Ponty pursued too but could not complete."*

Lived experience of the subject reveals a phenomenological reference. However, Lefebvre not only focuses on the experience of the subject but also *"the process of*

social production of thought, action, and experience" (Schmid, 2008, pp.40-41). For Lefebvre, *"...a social space includes not only a concrete materiality but a thought concept and a feeling- an 'experience'"* (Schmid, 2008, p.41). Elden (2004, p.98) states that Heidegger's influence on Lefebvre's spatial triad is "obvious" (along with Marx, Hegel, and Nietzsche); especially from the perspectives of *"the spatial notion of poetic dwelling,"* and *"a notion of lived experience of everyday life."* In Lefebvre's work, it is also possible to see references to Bachelard's *The Poetics of Space* (1964); Bachelard's "felicitous space" corresponds to Lefebvre's (1991) perceived space and lived space. Besides, like Lefebvre, Bachelard also differentiates forms of space (e.g., the conceived space *"is explicitly demarcated from imagined space"*) (Schmid, 2008, p.39).

Theories focusing on relational ontologies like postphenomenology argue that space is constituted by the relationships between the entities (Berger, 2020). It is possible to see this relational and dialectical approach in Lefebvre's theory as well. The phenomenological and relational dimensions of Lefebvre's (1991) theory focus on the distinction between an "abstract body" and a "lived body" (Kinkaid, 2020, p.175). This distinction also arises in Merleau-Ponty's (2012) and postphenomenological philosopher Ihde's (2002) works. Merleau-Ponty (2012) distinguishes between the body as lived (i.e., body-subject) and the body as object (i.e., body-object).[10] Similarly, Ihde's body one refers to the subjective, lived body which has *"general characteristic abilities such as spatial orientation and motility, perceptual abilities, and emotions,"* and body two refers to the objectified, culturally constructed, and abstracted body (Clarke, 2004).[11] These approaches refer to Lefebvre's (1991, p.170) dialectical approach on the lived and abstracted body, where he builds a dialogue between these concepts and binds them to social practices.

[10] These are not two different bodies; rather, they are different facets of people's experience and consciousness.

[11] *"According to Idhe, body one is inadequate because it fails to account for the productive effects of the social or cultural system, and body two is inadequate because it fails to account for any general constancy or agency"* (Clarke, 2004). For Clarke (2004), *"Ihde wants to maintain that there is rather a 'body three,' which cuts across and is an improvement on both these views." "Body three is exemplified in the relation of the technological body, or, more precisely, embodied experiences of (in and with) technology. Body three is interactive with technology, and thereby both constitutes and is constituted by it."*

In this relationality, *"bodies produce space with others"* (Kinkaid, 2020, p.174); they enter *"into a dialectical relationship with its outsides, and in doing so, encounters space as a 'practico-sensory totality'"* (Kinkaid, 2020, p.174; Lefebvre, 1991, p.62). Leibniz says that *"it is necessary for space to be occupied"* (Lefebvre, 1991, p.169). What occupies space is a body, *"not bodies in general, nor corporeality, but a specific body, a body capable of indicating direction by a gesture, of defining rotation by turning around, of demarcating and orienting space. Thus, for Leibniz space is absolutely relative"* (Lefebvre, 1991, p.170). Lefebvre (1991, p.174, p.200) understands gestures in a broad sense through physical gestures and movements. For example, *"turning around may be considered as a gesture"* (Lefebvre, 1991, p.174). *"But whether understood in the broad or the narrow sense, gestures as a whole mobilize and activate the total body"* (Lefebvre, 1991, p.213). For Lefebvre, (1991, p.213) gestures are both material and symbolic realms of space. He (1991, p.215) states that *"gestural systems embody ideology and bind it to practice. Through gestures, ideology escapes from pure abstraction and performs actions."* In this way, spatial practices and *"gestural systems connect representations of space with representational spaces"* (Lefebvre, 1991, p.215; Kinkaid, 2020, pp.176-177). This leads us to discuss gestures in the context of social space (Kinkaid, 2020, p.175). Lefebvre (1991: 216) states that *"social spaces are given rhythm by the gestures which are produced within them, and which produce them." "Space commands bodies,"* writes Lefebvre (1991, p.143), *"ordering bodies through the operation of implicit social and spatial 'codes.' Yet the relationship between embodied subjects and space is not unidirectional; subjects also produce and reproduce space's meanings through everyday practice. The manner in which bodies hold themselves, move through space, and relate to each other can be read as embodied enactments of social and spatial ideologies"* (Kinkaid, 202, pp.176-177). Similarly, according to Merleau-Ponty (2012), *"the spatial level of being"* (i.e., spatial practice) *"produces a synthetic relationship between perception of the world and meaningful action within it"* (Kinkaid, 2020, p.177).

For Lefebvre, *"the body serves as a critical figure too"* (Simonsen, 2005, p.2), and this understanding implies the body *"as an intrinsic part of social practice."* While the visual world fetishizes abstraction and symbolize masculine violence, Simonsen (2005, p.2) argues that *"it is not possible totally to reduce the body or the*

practico-sensory realm to abstract space. The body takes its revenge- or at least calls for revenge." Lefebvre's interest in the body *"relates to nature, to the past and to human possibilities, and it ranges in scale from gestures and corporeal attitudes, over everyday activities, to overall social practice in the economic and political spheres"* (Simonsen, 2005, p.2). While the body constitutes the self in the space as an individual subject, space mediates the body as a public entity, and as an object in the social space (Simonsen, 2005, pp.5-6).

Expressions, movements, and gestures form social interaction in daily life (Simonsen, 2005, p.10). *"Social gestures in Lefebvre's sense consist of articulated movements mobilizing and activating the whole body… Ensembles of gestures or gestural systems are further invested with meaning and codes. Like language, they are made up of symbols, signs and signals. Such codes are, of course, specific to a particular society"* (Simonsen, 2005, p.6). *"To belong to a given society is to know and use its codes for politeness, courtesy, affection, parley, negotiation, trading, and so on- as also for the declaration of hostilities"* (Lefebvre, 1991, p.215). Therefore, *"the articulation between bodily practices and social space may be understood through the way in which the body is involved in the constitution of the dimensions of social space*" (Simonsen, 2005, p.6), ranging from the bodies which generate *"the everyday micro gestural realm"* and *"formalized macro gestural one."*

Similar to Lefebvre, critical phenomenology *"seek to understand the body and bodily encounters as 'always imbued with broader social processes and experiences of which some are occurring in other times or in other spaces' (Simonsen 2010, p.23), opening the concerns of classical phenomenology onto a larger terrain of social and political practice"* (Kinkaid, 2020, pp.171-172). For example, *"issues of social justice, of racial inequality, of gender and sexuality, of incarceration"* (Salamon, 2018, p.17). As Schmid (2008) and Kinkaid (2020, p.170) mentioned, *"critical phenomenological accounts of embodiment and space provide an excellent resource for reading a subject of difference into Lefebvre's account,"* and postphenomenology shares similar roots with critical phenomenological accounts by going beyond the subject through references to the concepts like technological mediation, trans-humanism, social practice, and social and cultural dimensions of the body (Kinkaid, 2020, p.171; Vindenes and Wasson, 2021a; Ash and Simpson, 2016).

Vindenes and Wasson (2021a, p.4) argue that in VR mediation, for example, the technology becomes a part of the subjectivity, and the objectivity of our experience (which includes the environment, actors, practices, and social scenarios) is also mediated by the same technology. Therefore, both Lefebvrian and postphenomenological accounts emphasize the relational role of subjectivity and objectivity in the space. When explaining human experience, rather than focusing solely on the subjective experience of the subject in isolation, they take social practices into account.

Moreover, *"perception is a central concept of phenomenology"* (Schmid, 2008, p.37), and is always the perception of a subject (i.e., intentionality). However, according to Lefebvre (1991), perception cannot only be attributed to the subject; he associates perception with spatial practices and living, and he emphasizes that perception is produced materially, not in thought, and is grounded in the concrete (Avar, 2009, p.11; Schmid, 2008, pp.37-38). Lefebvre's emphasis on materiality and practice has some resonances in postphenomenology. For example, unlike classical phenomenology, postphenomenology embodies the concrete materiality of science and technology, and *"recognizes instrumental intentionalities or built-in selectivities in technologies"* (Ihde, 2015). Ihde analyses experience in terms of perception. For him, much like Lefebvre, perception is the key to understanding the relationship between human beings and their world (Verbeek, 2001, p.123), and mediation is linked to the transformation of perception. Ihde also makes an emphasis on the practice: *"It is in practices of interacting with technologies where the phenomenon of technological mediation occurs and can be studied. Human-world relations are practically 'enacted' via technologies… The materiality of technology can be studied best in concrete, practical situations of use"* (Rosenberger and Verbeek, 2015, p.12).

As previously mentioned, both Lefebvrian and postphenomenological approaches are based on relational theories that understand humans and objects through their interactions and relationships. Proctor (2021, p.603) states that *"much of the current scholarship on the relationality of technological affordances comes out of a 'postphenomenological' school of thought (Ihde et al., 2015; Rosenberger, 2017; Verbeek, 2005)."* The postphenomenological approach argues that *"technologies do not afford action possibilities to preexisting subjects with fixed goals, but subtly invite*

and facilitate certain comportments while inhibiting and foreclosing others" (Aagaard, 2018, pp.5-6; Rosenberger, 2014; Proctor, 2021, p.603).

According to Proctor (2021, p.603), this view of human-technology relationality is similar to Lefebvre's (1991, p.73) social space: *"Itself the outcome of past actions, social space is what permits fresh actions to occur, while suggesting others and prohibiting yet others."* This relationality is linked to Lefebvre's articulation of a social space as a mode itself being multistable and differential in the postphenomenological sense (Botin and Hyams, 2021, p.5). For example, while architecture limits practices via structures, it also enables activities (Botin and Hyams, 2021, p.5): *"Through architecture places are produced, emerging out of more abstract space and the abstracted power-laden strategies of planning at a city scale can be countered by tactics from a pedestrian, experience-based and more place-oriented viewpoint (de Certeau, 1984)."*

Multistability is, as argued by both Rosenberger (2017, p.154) and Ihde (2009, p.12), *"vitally important for postphenomenology's ontological position, where Husserl saw essences, instead, Ihde remarkably finds multistability and differences in experiences"* (Botin and Hyams, 2021, p.5). By multistability, Ihde means that *"any technology can be put to multiple purposes and can be meaningful in different ways to different users"* (Rosenberger and Verbeek, 2005, p.25). While humans design technologies and use them for their purposes, technologies also influence, restrict, and lead their use practices. Technologies determine users' choices and actions in some ways, and yet at the same time itself remains open to their manipulation and interpretation, or in de Certeau's words, tactics. So, *"a multistable technology has multiple 'stabilities' or 'variations'"* (Rosenberger and Verbeek, 2005, p.26). The same is valid for spatial relations too. According to Ihde (2018), "*we do not experience spatiality singularly at all, our spatiality is 'multistable' (i.e., the embodied multistability of places)."*

For Elden (2004, p.94) and Kirsch (1995, p.533), one of the key factors to consider in the production of space is technology. For Lefebvre (1991), the accumulation of technology and technique has been influential in society and the production of space (Kirsch, 1995, p.533). Technology plays a mediating role; *"from*

the material landscape to the financial landscape, and from the global village to the global assembly line, our representations of space are constituted in and through contingent social and technological formations" (Kirsch, 1995, p.533). Kirsch (1995, pp.533-534) calls this as *"the technics of spatialization,"* which illustrate "*how the production of space has increasingly been mediated by technical processes, and more importantly, how this process is critical to understanding the domination of conceived space over lived space- arguably at the center of Lefebvre's project."* Kirsch (1995, p.537) argues that *"as societies become increasingly technological, human activity is increasingly mediated by technology"* and as *"the production of space has increasingly been mediated by technology; the spatialization of social relations has become, for much of the world, an increasingly technical process"* (1995, p.549). Postphenomenological approach aims to explain human-technology-world relations in their "materiality," where the use-context influence the mediated experience (e.g., if users are together with researchers in a lab, their behaviors may change), while also influenced by it (e.g., the Proteus Effect).

Further, Kirsch (1995, p.544) argues that *"space is not 'shrinking' (a critique mainly directed at David Harvey's work), rather, it "has been transformed at a variety of scales."* If we are to understand the changing space experience in a world full of rapidly changing and diversifying technologies, *"we must also consider the processes through which technology is spatialized at the scale of experience"* (Kirsch, 1995, p.533). This material point refers to spatial practices of Lefebvre's theory. For Kirsch (1995, p.552), especially the globalizing technologies which connect the world are essential processes which mediate the production of space, because they directly affect the way we experience the space. Therefore, through a Lefebvrian interpretation, Kirsch (1995, p.532) sees technology as a mediating force in the production of space. As mentioned, postphenomenology's focus is to understand technologies' mediating role in human-technology-world relations. In this study, I aim to analyze the production of social spaces in new digital contexts enabled by Internet networks and embodied technologies, such as virtual reality. To illustrate this, the next section examines the application of Lefebvre's (1991) theory to digital spaces within Internet domains.

2.5.The Social Production of Internet Space

Similar to our approach, there are some studies in the literature that have originated from Lefebvre's theory and focused on analyzing digital spaces. One of these studies is Proctor's (2021) study. Building from Lefebvre's spatial triad, Proctor (2021) proposes a framework to examine Social Production of Internet Space, featuring three co-productive spaces: The space of affordance, the space of programming, and the space of virtuality. Proctor describes the three aspects of his framework, stating:

"While our interaction with Internet social space is enabled through affordances, these actions are constrained by the limitations of the Internet's underlying programming. It is possible to subvert this power dynamic through tactical action when we realize that- unlike the spaces of affordance and programming- the space of virtuality is not tethered to any specific program or paradigm, but rather exists across platforms" Proctor (2021, p.593).

Proctor (2021) is not the first one to apply Lefebvre's theory to digital space. In fact, Benedikt (1996), Cicognani (1998), Nunes (2006), Cohen (2007), Gotved (2006), Drakopoulou (2013), and more recently, Kosari and Amoori (2018) applied Lefebvrian approaches to digital spaces. For example, Gotved (2006) evaluated Lefebvre's spatial triad in cyber social reality through visibility (perceived), re-construction (conceived), and practice (lived). Nunes (2006, p.3), on the other hand, analyzed *"cyberspace as representative of Lefebvrian social production"* (Proctor, 2021, p.598), and stated that Internet sociality took place *"neither here (at the computer screen) nor there (at some other location), but rather within the medium itself*." All these authors see the internet space as social space and prioritize *"user practice as constitutive of the space itself"* (Proctor: 2021, p.595).[12]

[12] Some scholars argue that "ubiquitous computing" (Greenfield, 2006), "locative media" (Farman, 2012), and the "Internet of Things" (IoT) *"have made the concrete world the domain of the Internet"* (Proctor, 2021, p.609). According to Proctor (2021, p.609), *"this turn from the spatial to the networked, they contend, represents a move from traditional power blocs and territories to autonomous insurgencies."* Proctor (2021, p.609) does not contest with these arguments, but he also does not believe "*the incursion of web technologies into/onto the physical world precludes a spatial Internet." "Rather than conflating space and place and assigning space to a locatable 'real' or 'virtual' position,"* he takes *"the Lefebvrian view that social space depends not on emplacement, but on social practice, wherever it occurs: A computer, a phone screen, in augmented reality, or on the bodies and things of myriad physical networks."*

For Lefebvre (1991, p.404), the underpinning of social relations is spatial, and all social relations are abstractions: *"Considered in isolation, spaces are mere abstractions. As concrete abstractions, however, they attain 'real' virtue of networks and pathways, by virtue of bunches or clusters of relationships. Instances of this are the worldwide networks of communication, exchange and information"* (Lefebvre, 1991, p.77). Departing from Lefebvre (1991), Cohen (2007, p.236) argues that the Internet space is also constituted by the relations between practice, conceptualization, and representation: *"Similarly, the spatial relationships and practices enabled by the Internet contribute to the production of social space as they are layered over those that preceded the Internet."*

2.5.1. The Space of Affordance

Proctor (2021) connects the first dimension of his framework, the space of affordance to spatial practices and the perceived space. He defines affordances as *"the ways in which certain technologies communicate to users how they should be used"* (Proctor, 2021, p.602), and he defines affordance as "*the mode of 'material' relation within the perceived space of the Internet"* (Proctor, 2021, p.603). Since affordances are always contextual (Gibson, 1977) and *"relative to the properties of some other perceiving and acting entity"* (i.e., an embodied being) (Keane, 2014, p.7), they are inherently linked to perception (Gibson, 1977; Proctor, 2021, p.602). As Schmid (2008, p.39) explains, perceived space offers a sensory perceptibility linked to the material elements constituting space. In Lefebvrian terms, affordance refers to the 'material' relationship that enables our interaction with Internet content (Proctor, 2021, p.603). For Kociatkiewicz (2004, p.69), perception is tied to sense making, and it involves selecting and organizing reality, with beliefs shaping how we perceive. Additionally, perception is inherently spatial, as human senses can only comprehend space and spatial structures.

For Proctor (2021, p.603), *"affordances are also syntagmatic in the sense that they suggest interaction between user and environment (i.e., platform) through certain ordered features that prohibit others."* Affordances are relational processes (Hutchby, 2001, p.444), they *"make possible- and, in some cases, are used to encourage- certain types of practices, even if they do not determine what practices will unfold"* (boyd,

2014, p.10; Proctor, 2021, p.602). The theory of affordances is rooted in the perceptual psychology (Gibson, 1979). Later, the concept was applied to study of human-computer interaction. Norman, a usability expert, introduced the concept of affordances in his 1988 book *The Psychology of Everyday Things* (later republished as *The Design of Everyday Things*). Norman's definition of affordances as "perceivable action possibilities" between users and objects aligns well with Proctor's (2021) perspective.

Objects can be used for different functions in different contexts (Aagard, 2018), and this refers to the multistability of use in the postphenomenological sense (Coeckelbergh, 2017; Ihde, 1990). Aagaard (2018) illustrates this as the following: *"A pencil affords writing as its suggested 'canonical' use, but it could also be used as a back-scratcher, or a bookmark, or even to stab someone"* (Proctor, 2021, p.602). Proctor (2021, p.603) expands Aagard's example further and states that *"the 'canonical' use of an un-broken pencil (i.e., writing) is only afforded to users who have a means of holding a pencil, who have some sense of language, and who have something to write on. Thus, the use of a pencil is determined in contextual and relational ways between the user, the environment, and the technological object itself."* In that respect, affordances of technological objects are also based on the user and the use context. Recall Lefebvre, *"that perceived space involves varying levels of competence and proficiency"* (Proctor, 2021, p.604).

This approach to affordance *"describes the irreducible relation between organism and environment, enabling us to consider how our embodied involvement with media is interwoven across context, perception, and materiality"* (Richardson and Hjorth, 2017, pp.1658-1659). Thus, affordances are the relations between the properties of an object and the capabilities of the user (Norman, 1988). On the other hand, people, who have common cultural backgrounds, share similar body experiences and "embodied schemas" (Ignatow, 2007, p.128), and this can be an *"explanatory factor in social cleavages"* (O'Connor, 2016, pp.10-11). Similarly, Hammond (2010, p.211) also states that the action possibilities of technologies are shaped by experience and cultural context.

It is important to draw differences between affordances and features. For example, social media platforms offer some actions like liking posts by clicking on heart icons, typing into text fields, and playing videos by clicking on prone triangle skeuomorphs (Proctor, 2021, p.603). These are not considered affordances, rather, they are the features of these platforms (Proctor, 2021, p.603). Affordances, on the other hand, *"are the ways in which the platform reveals itself to be likable, typeable, and watchable by the user -all available relational interactions- whereas features are the specific and various ways the platform offers a user to carry them out"* (Proctor, 2021, p.603). Same features may be used with different intentions and thus may evoke different affordances for different people. For Proctor (2021, p.604), *"in a digital environment, the space of affordances is a complex set of structured structures- they are the invariant materials through which things get done in the context of the particular platform"* and *"features represent the structuring structures through which we enact affordance based on personal choice (i.e., our 'regulated improvisations')."*[13]

2.5.2. The Space of Programming

Proctor (2021) connects the second dimension of his framework, the space of programming to representations of space and the conceived space. The space of programming refers to "*the official sanctioned use of a space: A program is a plan as much as any map, blueprint, or manual. Further, the program itself -before being put into effect through code- is purely conceptual, devised by experts at high levels of authority"* (Proctor, 2021, p.605). In the digital space, *"use is envisioned by executives, lead designers, and boards of tech companies, then communicated through paper mock-ups, prototype presentations, and focus groups on aesthetics and*

[13] Proctor (2021, p.604) shares *Facebook* groups as a social space example: *"Facebook affords the ability to share content with the whole group, comment on other members' content, and communicate directly with the group or specific members of the group. As the 'structured structures' of the platform, these are the only affordances available. We enact these affordances through features such as 'posts' on 'walls,' 'likes,' 'friend requests,' and personal or group 'messages'… Unlike the basic group 'members,' the group 'Administrators' (Admins) enjoy a slightly expanded set of affordances in relation to the platform. Specifically, Admin affordances include the ability to determine who and what can be present in the space, which they enact through features such as 'approving,' 'blocking,' and 'deleting.' Although non-Admin group members engage with and in these environments through features, free to alter how a platform looks and feels to them, they have not changed the actual structures of the platform. But, notably, neither have the Admins. Though their sets of affordances are larger, they are still invariant."* Therefore, while Admins order the practices of the group members, *"they are also following an ordered set of actions as dictated by the programming of the platform"* (Proctor, 2021, p.604).

functionality to the programmers who write the code into pre-existing programs and operating systems with 'bricks' of HTML, CSS, and JavaScript" (Proctor, 2021, p.605). Code is the "bricks" of the Internet, which materializes programming (Proctor, 2021, p.605).[14] However, the space of programming communicates not only through enabling features of code *"but also through the conceptual frameworks prompted by genre of social media: connecting to other users, sharing, and creating content"* (Proctor, 2021, p.605). Therefore, the space of programming can determine user practice in certain ways (Proctor, 2021, p.606).

2.5.3. Space of Virtuality

Proctor (2021) connects the third dimension of his framework, the space of virtuality to representational space and the lived space. The space of virtuality is the *"lived space where we make meaning, where we embody ourselves into digital being"* (Proctor, 2021, p.606). It refers to *"the way the Internet is experienced and comprehended by users in a meaningful sense; it is what the Internet feels like and what being there means to us"* (Proctor, 2021, p.606). *"What we are and mean can change depending on Internet platforms, involving both the space of programming to ascertain what form we take, and the space of affordance to enact the taking of that for"* (Proctor, 2021, p.607).

The embodied "prostheses" we embody on the digital space, *"dependent on the platform, can come in the form of avatars, images, video clips, or simply lines of text"* (Proctor, 2021, p.607). Like Lefebvre's lived space, *"the coding of a platform and the invariance of affordances designates what can and cannot be done, but what we actually do in Internet social space can subvert conceived space"* (Proctor, 2021, p.607). In de Certeau's (1987) terms, *"when faced with Internet 'strategies' (large scale systems of rules and order governing a space), we employ 'tactics' (small, daily, on-the-ground, resistance undermining the strategy)"* (Proctor, 2021, p.607). An

[14] Back to *Facebook* example, Proctor (2021, p.605) states that *"on the main feed of a Facebook group page, a user is induced to 'write something' in a text box in the center of the screen, right beneath the name of the group. The text box is situated in this location in the platform-environment as a direct consequence of the conceived program, materialized through code, and it acts as a feature through which a user can (should) engage the affordance of intra-group communication. It does not only afford, though; it also precludes writing in other areas, and organizes/indicates the conceived use of the space, as envisioned by designers. Without a text box, users would not know where to write (or even to write) and if users could write anywhere, the text box would be useless."*

example to tactical engagement can be the use of emojis in the Internet space (Proctor, 2021, p.607).[15] These tactical actions result in the conquer of the space of programming, and ultimately a change in the practices of the space of affordance (Proctor, 2021, p.608).

Since it is largely symbolic, Lefebvre (1991, pp.33-41) *"saw lived space as dominated by the other spaces, but in a space of virtuality, we are those symbolic elements, embodied. Each avatar, line of text, or icon we embody has an indexical relationship with- a 'pointing to' (Peirce, 1955)- a corporeal human body outside of the space"* (Proctor, 2021, p.608). Therefore, Proctor states that the Internet's inherent networked multiplicity for tactical use to subvert programming's structures is limitless. For example, *"the practice of screenshotting reveals that users can employ affordances from outside the platform's spatial context"* (Proctor, 2021, p.608). So, *"the space of virtuality challenges Lefebvre's initial framework of a dominant conceived space, putting the conceived (programming) and the lived (virtuality) on equal footing: while the programming of a particular platform allocates the available affordances… the lived space of virtuality of being-in-the-Internet has its own unique affordance: Transcendence"* (Proctor, 2021, p.608).[16] Transcendence typically refers to going beyond ordinary limits or boundaries, whether they are physical, mental, or spiritual. The space of virtuality is lived across different platforms, affordances, and programs, and this results in a continuously subverting and pushing force on the spaces of affordance and programming (Proctor, 2021, p.608).

2.6.From Social Production to Reproduction in Virtual Spaces: Migrations in the Metaverse

The shutdown of *AltspaceVR* presented a unique opportunity to explore social production, reproduction, and the migrations that occur within the Metaverse. Unlike physical migrations, where individuals relocate to new geographic spaces, users in virtual worlds experience platform-based movements, a concept referred to as "media

[15] In the past, only available affordance of communication was text-based, so users began to interact with alpha-numeric key-features tactically, *"creating 'emoticons' to convey emotion, like happiness :) sadness :(or shock :O"* (Proctor, 2021, p.607). This was followed using cartoon emojis, and now "bitmojis" are used as the users' own personal avatars (Proctor, 2021, p.607).

[16] In the end, *"paradoxically, it seems the transcendence of Internet space becomes the engine powering the mutual co-production of Internet space"* (Proctor, 2021, p.608).

migration" (Lange, 2022). While a detailed examination of media migration and virtual diaspora theories is outside the scope of this study, these frameworks emerged as necessary to understand how *AltspaceVR*'s communities transitioned and adapted to new social VR platforms following the platform's closure.

Usually, migration studies examine the connections between migrants and the spaces they inhabit. Lefebvre's (1991) production of space theory and spatial triad offers a foundational approach for exploring these connections. His triad has been applied to migration studies to analyze the socio-spatial dynamics of displacement, adaptation, and integration. Lefebvre's works, particularly *Production of Space* (1991) and *Right to the City* (1996), illuminate complementary aspects of migration by addressing the production of space and the struggle for socio-political inclusion.

The integration of Lefebvre's theories with media migration and virtual diaspora concepts highlights the importance of community bonds, social support, asset preservation, and continuity during disruptions such as platform closures in virtual environments. It demonstrates that similar to physical spaces, transitions between social VR platforms involve a transformation with its own challenges. This examination highlights the relevance of Lefebvre's theories in understanding migration in virtual contexts and offers a comprehensive perspective on the connection between virtual worlds and their communities.

I believe this perspective contributes to literature in multiple ways. First, it expands media migration concept to include transitions across virtual platforms. Second, it deepens the understanding of virtual diaspora by exploring the emotional and communal dimensions of "forced" digital migrations, drawing parallels with physical diasporas. Thirdly, it emphasizes how virtual spaces are socially produced and reproduced through highlighting the adaptability and resilience of virtual communities, who respond to disruptions and re-establish themselves in new environments.

2.6.1. Migration and the Social Reproduction of Space

As stated before, Lefebvre's spatial theories provide valuable insights into migration studies, particularly in understanding how spaces associated with migration

are socially produced and reproduced. His *Production of Space* (1991) offers a framework to examine how migration reshapes spatial patterns through the social practices of migrant communities, while "social reproduction" emphasizes the continuity of social practices, norms, and relationships in new environments. Additionally, his *Right to the City* (1996) addresses migrants' access to rights and frames migration as a "struggle" for inclusion in socio-political environment. These approaches demonstrate how migrants shape their environments while negotiating power dynamics and cultural structures within new contexts.

The spatial triad offers a comprehensive framework for analyzing complex dynamics of migration. Whether voluntary or forced, migration involves spatial, cultural, social, and emotional dimensions. For example, perceived space (spatial practices) reflects the daily activities and interactions through which individuals experience, produce, and reproduce space. Hartmann (2017) demonstrates this in refugee camps, where shared facilities and boundaries structure spatial order, while Işıklılar (2022) and Ertem (2019) highlight how Syrian refugees in Ankara create economic and social networks which transform urban neighborhoods.

Conceived space (representations of space), shaped by planners and policymakers, reveals how migration is regulated and controlled. Schäfer and Hinger (2019) analyze refugee housing in Leipzig and Osnabrück, demonstrating how policy decisions, shaped by local histories and political contexts, result in contrasting approaches to refugee accommodation. Similarly, Ertem (2019) shows how insufficient urban planning in Ankara forced Syrian refugees to establish informal spaces that reflect cultural characteristics and spatial isolation.

Lived space (representational spaces) encompasses the subjective experiences and meanings that migrants attach to their environments. For example, Daradkeh (2023) explores refugee camps as sites of resistance and continuity, while Canedo and Elmouelhi (2023) highlight the role of place-making in fostering identity and belonging. Through cultural practices, emotional connections, and acts of resistance, migrants transform spaces into meaningful places, reflecting Lefebvre's view of space as fluid and socially produced.

Migrants do not simply occupy space; they actively transform and reproduce it by transferring elements of their social and cultural practices, such as traditions, norms, economic activities, and social structures, from their previous environments. As defined by Lefebvre (1991), social reproduction emphasizes the maintenance, repetition, and continuity of social practices, norms, and relationships. Migrants preserve their values through different practices; they recreate familiar spatial arrangements, form community networks, or establish businesses that reflect their traditions. Işıklılar (2022) and Ertem (2019) illustrate this process by documenting how Syrian refugees in Ankara reshape urban neighborhoods, developing localized economies and cultural practices that reflect their heritage and their adaptation to new contexts.

Ghettos, "ethnoscapes" (Appadurai, 1996), and migrant-specific spatial formations illustrate how migrants transform spaces. Marcuse (1997) emphasizes how segregation and spatial marginalization shape migrant communities' lived experiences and create distinct urban patterns. Appadurai's "ethnoscapes" framework shows how migrants navigate global and local forces, while Schiller and Çağlar (2011) examine how migrants redefine urban landscapes by embedding cultural and economic practices.

Another work that has been influential about inclusion, belonging, and the continuity of social relations in migration is the *Right to the City* by Lefebvre (19916). Migrants can affirm their presence and claim their place within new environments by taking part in the production and reproduction of urban space. Canedo and Elmouelhi (2023) emphasize that place-making fosters identity and belonging by transforming spaces into places of emotional and symbolic meanings. These processes are central to integration, as they reflect the access of migrants to resources and their abilities to create, maintain, and adapt social and cultural connections with the host community.

Migration often entails a transformation in exclusionary spatial practices. Hartmann (2017) illustrates how refugee camps, while designed to marginalize refugees, become contested spaces through acts of defiance, reappropriation, and the reproduction of cultural norms. Similarly, Schäfer and Hinger (2019) point out how grassroots movements and civil society initiatives reshape the lived experiences within

refugee housing, challenging restrictive spatial representations and fostering more inclusive practices. Social reproduction plays an important role in these transformations since migrants struggle with power dynamics, exclusionary policies, and spatial constraints that often marginalize their cultural practices. This process underscores their resilience and adaptability as they reproduce spaces that integrate their culture and evolving needs.

Beyond individual efforts, collective practices, such as organizing cultural events or maintaining rituals, play a vital role in fostering a sense of continuity and belonging. Together, these acts demonstrate the dynamism of social reproduction in migration contexts where space is constantly reshaped to maintain community bonds and cultural identity during displacement.

By applying Lefebvre's theories, the field of migration studies obtains more profound insights into how spaces are socially produced and reproduced. This framework emphasizes the resilience and adaptability of migrants as they forge through spatial and social disruptions, creating environments that nurture and reflect their communities and identities. What underscores the relevance of Lefebvre's spatial triad further is its versality in both physical and media migrations, where virtual spaces shaped, maintained, and reproduced through social forces, cultural practices, and platform dynamics.

2.6.2. Media Migration

Building on Lefebvre's spatial frameworks, the concept of migration can be extended to mediated environments, where movements and transitions between platforms mirror the socio-spatial dynamics of physical migration. Migration traditionally defined as *"the movement of a person (a migrant) between two places for a certain period of time"* (Boyle and Halfacree, 1998). This concept can also be applied to movements within mediated spaces. Foundational migration theories, like Lee's (1966) "Push and Pull Factors" framework, offer valuable insights into mediated movements. In physical migration, push factors, such as economic difficulties, force people to leave, while pull factors, such as better opportunities, attract them to a new location. Similarly, in media migration, platform dissatisfaction or shutdowns act as

push factors, while improved technical features, vibrant communities, and enhanced engagement opportunities serve as pull factors driving the transition.

Lange (2022) defines media migration as the movement of individuals and communities between media platforms, often prompted by dissatisfaction with a previous platform and the allure of new opportunities. Expanding on her earlier concept of "digital migration" (Lange, 2020), Lange (2022) broadens the framework to include all mediated movements, emphasizing that these transitions are not strictly digital nor limited to technological properties. Media migration encompasses related concepts such as "user migration" (Bourreau et al., 2011), "cyber migration" (Zengyan et al., 2009), "digital migration" (Lange, 2019, 2020), and "virtual diaspora" (Boellstorff, 2008), offering an inclusive framework for examining diverse migration experiences.

Lange (2022, p.93) points out similarities between media and physical migration, each of which may be enabled by self-advancement, social connections, or the wish to return to a place of origin. Media migration faces problems like technical incompatibility, loss of digital assets, or new platform features, just as barriers exist in physical migration. Push factors include restrictive algorithms, diminished monetization opportunities, or lack of creator support. Such emotional aspects as nostalgia for old platforms, excitement about new opportunities, or anxiety about adaptation echo the psychological challenges of physical migration. The broader shifts in the digital ecosystem, such as platform competition, regulatory changes, and the rise of decentralized platforms, are also influential in shaping the pathways and outcomes of media migration.

The existing literature on media migration explores two main areas: Digital tools to foster communication and community building for real-life diasporic groups and the migration of individuals and communities between media platforms. This study focuses on the latter. Historical examples, such as Rheingold's (2000) study of the WELL (Whole Earth 'Lectronic Link) community, demonstrate early instances of media migration, where dissatisfaction with infrastructure drove users to new platforms. Lange (2022) highlights similar dynamics in her study of YouTubers migrating to *Twitter*, while Andersson (2007), Scheifinger (2009, 2010), and Mallapragada (2010, 2014) examine how digital platforms shape migrant identities

and their connections to homelands. Applications of the Push and Pull Factors framework to Social Networking Sites (SNSs) (Hwang et al., 2019) and Massively Multiplayer Online Role-Playing Games (MMORPGs) (Hou et al., 2011) further underscore the parallels between physical and media migration. These studies collectively highlight the socio-cultural and emotional dimensions of media migration, emphasizing these transitions' transformative yet continuous nature.

2.6.3. Virtual Diaspora

Lange's (2022) exploration of media migration draws from diaspora studies, which examine how displaced communities sustain cultural identities in new environments. Lange (2022, p.96) argues that media migration becomes especially relevant when a diaspora shifts from one media platform to another, transforming its primary space of participation. Traditional diaspora studies (Butler, 2001; Clifford, 1994; Tölölyan, 1996) emphasize social reproduction as central to preserving cultural practices. Similarly, digital diaspora studies (Everett, 2009; Laguerre, 2010) reveal how online platforms enable dispersed communities to maintain cultural continuity and identity. Extending these frameworks, Lange (2022) situates digital spaces as both cultural "homes" and transitional sites, providing virtual communities with stability while supporting their transitions across platforms.

The concept of virtual diaspora addresses the forced, often emotional migrations that occur between online worlds. Boellstorff (2008, p.197) defines virtual diaspora as *"a special kind of movement between virtual worlds"* that occurs when one platform shuts down, compelling its residents to seek new digital "homelands." For example, Boellstorff (2008) and Pearce (2009) documented instances of virtual diaspora as users from platforms like *Second Life* and the online game *Uru* migrated to other platforms. These migrations are driven not only by technical requirements but also by profound emotional connections to the virtual spaces. As Lange (2022, p.96) emphasizes, users experience a sense of loss and trauma as they attempt to recreate the visual and social fabric of their communities in new digital environments.

While virtual diaspora shares parallels with physical diaspora, including the challenges of relocation and identity preservation, it also introduces unique dynamics shaped by the affordances of digital environments. Like physical diasporas, virtual

diasporas involve preserving cultural bonds while adapting to new contexts. Displaced users seek to maintain their identities and social practices despite dislocation. However, digital platforms offer immediacy and flexibility and enable users to sustain connections across large distances. As Boellstorff (2008) and Pearce (2009) illustrate, virtual diaspora entails the relocation of users who rebuild their communities in new digital "homelands," creating spaces that echo the atmosphere of their original platforms while re-establishing social bonds and shared meanings.

The interplay of loss and adaptation serves to underline how virtual communities that have been displaced balance efforts to preserve their identity with the need to navigate and shape new virtual environments. Such dynamics signal digital environments as important sites of social reproduction and community resilience. Such perspectives enrich our understanding of media migration, offering insights into the adaptability and creativity of virtual communities in the face of disruption.

2.6.3.1.Community Belonging and Identity in Virtual Diaspora

The emotional and cultural dimensions of virtual diaspora challenge personal and communal identities. As users migrate to different platforms, they are forced to reproduce their social worlds and redefine their collective identity. This reproduction of community calls for an exploration of identity, belonging, and cultural continuity in an effort to recreate a sense of "home" in new environments. Community and imagined belonging are particularly relevant in understanding how displaced virtual communities recreate their identities.

Virtual diaspora studies emphasize the concept of virtual community, introduced by Rheingold (2000), which describes how online tools enable the formation of social networks and relationships in cyberspace. Some scholars argue that virtual communities build on existing structures, serving as digital counterparts to geographically based communities when offline resources are inaccessible (Hiller and Franz, 2004; Kang, 2011; Marat, 2016). Others view virtual communities as new, disembodied forms that transcend physical space and time, unified by shared interests, values, and a collective sense of belonging (Hiller and Franz, 2004; Ardévol and Gómez-Cruz, 2014).

Imagined community concept, introduced by Anderson (2006), refers to the idea that a nation is a socially constructed community, imagined by the people who perceive themselves as part of that group. In the digital and virtual realms, imagined communities can form among users who share common interests, goals, or identities, even if they have never met in person. These communities are "imagined" because members often only know a small fraction of the community personally; yet there is a deep sense of connection and belonging. This sense of community is formed through shared practices, narratives, symbols, and media, much like how Anderson (2006) describes nations being imagined through print capitalism, shared language, and collective experiences.

Anderson's (2006) concept has been applied to digital and virtual communities to explore how shared narratives and cultural symbols enable users to cultivate a collective identity. For instance, Shi (2005) suggests that virtual communities foster a collective diasporic imagination, uniting users around shared cultural, geography, and history elements. These ideas resonate with Gupta and Ferguson's (1997) exploration of "home," "space," and "place," which emphasizes the imaginative processes through which displaced populations reconstitute their sense of belonging in the face of global economic and political shifts. They argue that spatially bounded social worlds are eroded by the growing role of imagined places, where connections to distant spaces are sustained and reconfigured within global capitalist frameworks. This analysis highlights how displacement and migration prompt individuals to negotiate their relationship with physical and symbolic spaces, creating new frameworks of identity and belonging.

Virtual worlds combine these dynamics through providing a mix of the imagined and the real worlds: Users can find a sense of "home" while navigating the inherent structures of digital environments. Advances in computer technologies have made it possible for virtual spaces to resemble the cultural, social, and economic dynamics of real-life environments. For example, MMORPGs and social VR platforms have demonstrated how virtual spaces can serve as extensions of lived experiences. Participants in these digital realms often view themselves as members of online or virtual communities and, when confronted with migration, as part of a broader

diasporic network that bridges physical and virtual boundaries (Herrera and Margitay-Becht, 2010).

The blurring of boundaries between imagined and real spaces in virtual contexts underlines the potential of these social platforms to serve both as sites of cultural preservation and as arenas of the active negotiation of identity. As Gupta and Ferguson (1997) indicate, the imagination of spaces is not merely an abstract process but is linked with material realities and socio-political conditions. This interplay is particularly evident in virtual worlds, which are filled by users' emotional and symbolic significance, hence turning them into a lived space complementary to their physical ones. Social VR platforms enable users to reframe identities and social practices in ways that reflect both continuity and adaptation, similar to the transformative experiences of diasporic communities navigating displacement in physical spaces.

Through these connections, virtual spaces become arenas where users actively reproduce cultural identities and reshape their sense of belonging in response to the challenges and opportunities presented by digital environments. This dynamic reinforces the importance of studying virtual communities as extensions of diasporic identity-making processes, where cultural narratives, norms, rituals, and social relationships converge to create new forms of community and connection.

3. A NEW FRAMEWORK FOR EXPLORING IMMERSIVE SOCIAL SPACES: THE SOCIAL PRODUCTION OF VIRTUAL SPACE FROM THE USER-ENVIRONMENT RELATIONS PERSPECTIVE

This section introduces a new framework for understanding the social production of virtual space from a postphenomenological perspective, focusing on three dimensions: The perceived space of affordances, the conceived space of programming, and the lived space of virtuality. Synthesizing multiple theoretical approaches to capture the evolving socio-spatial processes within the Metaverse, this study builds on Lefebvre's (1991) spatial triad, which conceptualizes space as perceived, conceived, and lived. These dimensions highlight how space is shaped by spatial practices (perceived), design and representation (conceived), and subjective, embodied experiences (lived). Proctor (2021) extends this triad to Internet spaces, introducing the space of affordances, the space of programming, and the space of virtuality, emphasizing how user interactions, platform design, and subjective experiences converge to create socially produced digital environments.

Vindenes and Wasson's (2021a) User-Environment Relation framework complements these perspectives by exploring how immersive technologies like VR mediate the relationship between users and virtual environments. While their framework also considers "Human-World Relation," focusing on variables like users' devices and physical locations (Hauser et al., 2018), this study prioritizes User-Environment Relation to better explore the interplay between users and virtual environments within immersive VR. Additionally, media migration (Lange, 2022) and virtual diaspora (Boelstroff, 2018) concepts expand the framework by providing insights into the reproduction of virtual spaces in the context of platform closures and migration dynamics. Together, these integrated approaches emphasize the fluid and

co-productive nature of virtual spaces, shaped by user practices, platform affordances, design and organization, and lived experiences.

3.1.Integration of Theoretical Foundations in the Framework

Social VR platforms are digital social spaces accessed through technological mediation, such as VR head-mounted displays (HMDs), facilitating intentional relations between embodied users and virtual environments. As Vindenes and Wasson (2021a, pp.4-5) explain, VR technology mediates the user's altered subjectivity while simultaneously constructing the virtual environment they inhabit. In this context, a user's avatar functions both as a 3D body-object interacting with others and as an embodied perspective for experiencing the environment (Vindenes and Wasson, 2021a, p.7). Despite the mediated nature of these interactions, the physical body outside VR remains integral. Kociatkiewicz (2004, p.117) highlights that bodies persist in virtual spaces, bridging the physical and digital realms. Similarly, De Mul (2010) describes the duality of VR presence as the simultaneous experience of being "inside" (subjectivity) and "outside" (objectivity) oneself.

Design choices shape how users perceive and interact with virtual environments. According to Vindenes and Wasson (2021a, p.7), these choices usually reflect the mediation intended by designers, which influences user subjectivity and the "directedness of the technology" (Verbeek, 2008). While VR offers users a seamless embodiment of technological elements like hardware, avatars, or tools, the virtual environment remains a mediated and "opaque background" (Vindenes and Wasson, 2021a, p.4). However, such objective environment features do not solely determine user experience. Recall Lefebvre (1991), through design and programming, the conceived space sets specific parameters where the user experience resides but does not define it. Instead, virtual environments are continually reshaped by users' social practices and lived experiences, fostering a dynamic interplay between design intention and user agency.

According to Kociatkiewicz (2004, p.66), virtual worlds provide settings where *"social practice can unfold, while at the same time being defined by this very practice."* This underscores relationality between user actions and the environments

they inhabit. User-environment relations extend beyond design elements to encompass subjective perception and embodied interaction. This study explores how virtual environments are experienced by users, focusing on how subjectivity is mediated through these relations. Additionally, it examines how the "artificial experiential center" of virtual space is perceived and lived during embodied interactions (Vindenes and Wasson, 2021a, p.7).

In social VR, users' embodied interactions determine how they perceive and experience virtual environments, and these interactions, which are shaped by design choices, social practices, and subjective experiences, align with Lefebvre's spatial triad. As socially produced environments, virtual spaces are continuously redefined through users' embodied practices, user-generated content, and engagement with the platform's affordances and constraints. Drawing on Lefebvre's (1991) Production of Space theory, this study conceptualizes the production of virtual space as inherently tied to the production of social relations within it. Users' embodied presence in virtual space reflects that their social acts are shaped by and shaping the environment. This interplay between embodiment and presence is valuable for insights on design, social dynamics, community bonds, relationships, and cultural dimensions of social VR platforms.

Proctor's (2021) Social Production of Internet Space framework complements this analysis by emphasizing co-productive spaces: The space of affordances, the space of programming, and the space of virtuality. Together with Lefebvre's (1991) spatial triad, these frameworks capture the multistable dynamics of virtual spaces, where users simultaneously produce, navigate, and experience their environments. Proctor (2021, p.594) argues that in physical spaces, people experience and interact with the environment through their bodies, as space unites bodies, tools, and practices to build social relations. Although the Internet space is *"fundamentally devoid of this concreteness,"* (Proctor, 2021, p.594), experts have designed programs to simulate worlds where avatars can exist and move, enabling users to feel a sense of spatial presence akin to being in a physical space. As a result, virtual spaces emerge as rich social environments, characterized by distinctive affordances, cultures, and social practices.

This study conceptualizes social VR platforms as dynamic, interactive, creative, and collaborative spaces shaped by embodied social practices and the interplay among practice, conceptualization, and representation. While users' interactions within these virtual spaces are facilitated by platform affordances, they are also constrained by the limitations imposed by the programming of the platforms and devices in use. However, this power dynamic can be subverted through tactical actions, as the lived space of virtuality transcends programs and devices and operates across platforms.

Lefebvre's (1991) spatial triad, comprising perceived space, conceived space, and lived space, provides a foundational framework for understanding the production of space. Perceived space is grounded in sensory and practical experiences, conceived space represents abstract and planned ideas of space, and lived space emerges from users' personal, social, and cultural experiences (Lefebvre, 1991). Proctor (2021) adapts this framework to Internet spaces, emphasizing the affordances, programmability, and user practices that define digital environments. In the context of virtual spaces, these dimensions take on new forms.

Perceived space manifests as the tangible affordances of the virtual platform, such as spatial navigation and locomotion features that users experience directly. This aligns with Norman's (1988) concept of affordances, where users form mental models, internal representations of how a system works, based on their interactions with its features (Norman, 1988). As Norman (1988) explains, *"mental models, as the name implies, are the conceptual models in people's minds that represent their understanding of how things work."* These models are dynamic and vary across individuals, reflecting the multistability of experience (Ihde, 1990). Staggers and Norcio (1993) further elaborate on this, demonstrating how users' mental models evolve through interaction and influence their ability to navigate and understand digital systems.

Conceived space, on the other hand, refers to the programming and design of the platform, including its technological infrastructure, moderation tools, and the technical frameworks that govern user interaction and creation. This dimension reflects the conceptual models that designers embed in digital systems, which serve as the blueprint for user experience (Carroll and Olson, 1987). Finally, lived

space encompasses users' embodied social interactions, the meanings they attach to these spaces, and the community bonds and cultural practices that emerge within them. This aligns with Dourish's (2001) notion of digital environments as socially constructed and emergent, shaped by the collective practices and interpretations of their users. Together, these dimensions offer a comprehensive framework for analyzing the production of virtual spaces, bridging spatial theory with insights from HCI and interaction design.

Table 3.1 illustrates how Lefebvre's (1991) spatial triad and Proctor's (2021) digital spaces of affordance, programming, and virtuality is extended into virtual spaces in three dimensions: Perceived space of affordances, conceived space of programming, and lived space of virtuality. By integrating Lefebvre's and Proctor's frameworks with virtual dimensions, the table provides a view of how spatial production operates in immersive social VR platforms.

Table 3.1 Lefebvre's (1991) and Proctor's (2021) triads with the addition of virtual dimensions.

Three Moments in Lefebvre's Theory	Physical/Material	Mental	Social
Spatial	Spatial Practice	Representations of Space	Representational Space
Experiential	Perceived	Conceived	Lived
Digital	Space of Affordance	Space of Programming	Space of Virtuality
Virtual	Perceived Space of Affordances	Conceived Space of Programming	Lived Space of Virtuality

Migration in virtual contexts adds a critical dimension to this analysis. The shutdown of *AltspaceVR* and the migration of its users and creators to platforms like *VRChat* illustrate the social production and reproduction of virtual space. During this transition, users carried over established practices, cultural identities, and narratives to different platforms and actively produced new virtual spaces while simultaneously reproducing familiar community dynamics. This case underscores how virtual communities experience a "forced displacement" due to the closure of the platform, preserve their identities, and adapt to new platforms, and showcase resilience.

The virtual diaspora concept provides a valuable lens for understanding emotional and cultural challenges and communities' wish to maintain continuity

during migrations. Similarly, the push and pull factors of media migration concept clarify users' motivations while choosing platforms to migrate to. By contextualizing this process within media migration and virtual diaspora, this study examines of social production and reproduction and offers insights into how virtual communities navigate disruptions and adapt to new platforms. Users' interactions with the perceived space of affordances, the conceived space of programming, and the lived space of virtuality demonstrate how these spatial dimensions are negotiated and redefined through migration. Building on these theoretical foundations, this study presents a comprehensive research framework to analyze the social production of virtual space. As illustrated in *Figure 3.1*, the framework integrates several theoretical and methodological approaches and offers a nuanced understanding of the dynamic processes shaping virtual spaces.

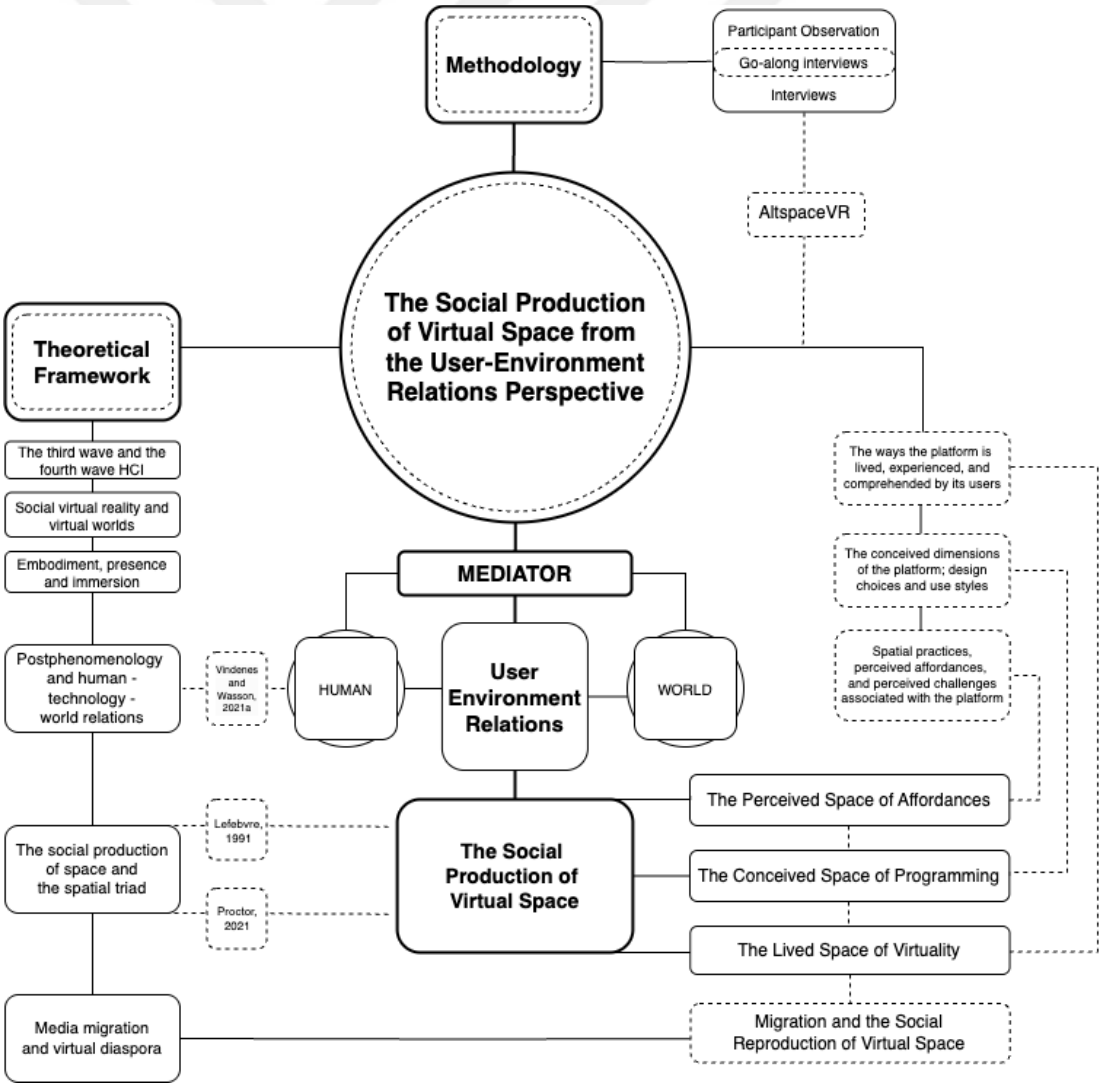


Figure 3.1 Research Framework.

As detailed in the following sub-sections, the framework examines virtual environments through the lenses of perceived, conceived, and lived spaces. Perceived space of affordances focuses on the functional features and affordances users encounter in the virtual environment. I identify designated areas for specific uses and examine perceived affordances based on ongoing activities and repeated spatial practices. I also explore the challenges associated with virtual spaces by incorporating perspectives of both users and creators. Conceived space of programming investigates the platform's design, governance, and technical constraints as determined by developers. This includes understanding how programming and design choices shape users' consumption styles and interactions within the virtual environment. I analyze how creators influence user actions, frame environments for specific uses, enforce norms and rules, and foster relationship development through strategic design decisions.

Lived space of virtuality delves into users' subjective experiences, narratives, emotional connections, and tactical adaptations. I explore how social VR platforms are experienced, understood, and lived by their users, focusing on what "being there" means to them and the tactical uses they develop. The lived space of virtuality is recognized as transcending the limitations of specific programs or paradigms, reflecting the users' ability to reinterpret and adapt virtual environments. Finally, by examining platform closures and the migration to new virtual environments as stages for diasporic narratives, this study aims to reveal how virtual communities navigate displacement, preserve their identities, adapt to new social platforms, and reproduce familiar cultural experiences and social practices. This analysis underscores the resilience of digital communities as they rebuild and sustain their social bonds amid digital displacement.

3.1.1. The Perceived Space of Affordances

Vindenes and Wasson (2021a, p.4) highlight that in VR mediation, technology integrates into both the subjectivity (embodiment relation, encompassing hardware, avatars, and tools) and the objectivity (alterity relation, including environment, actors, and social scenarios) of human experience. Affordances, as conceptualized in this context, reflect the interplay between the properties of objects and the intentions of users, enabling various possible practices within the environment. Rosenberger and

Verbeek (2015, p.12) assert that *"it is in practices of interacting with technologies where the phenomenon of technological mediation occurs and can be studied,"* emphasizing the centrality of interaction in understanding affordances.

Proctor (2021, pp.602-603) extends this notion by explaining that affordances serve as guides, helping users effectively engage with technologies. Similarly, Norman (1988) defines affordances as *"a relationship between the properties of an object and the capabilities of the agent that determine just how the object could possibly be used,"* underscoring the relational and contextual nature of affordances. Bradner (2011) further elaborates that *"the notion of affordances illuminates the perceptual dimensions of human-computer interaction and provides a conceptual tool for analyzing the relationship between technology design and usability,"* framing affordances as key to understanding how design shapes user interaction. This relational dynamic is closely tied to users' mental models- internal representations of how a system works- which are shaped by their interactions with the system's affordances (Norman, 1988; Staggers and Norcio, 1993). Mental models influence how users perceive and utilize affordances, as well as how they navigate and interpret the virtual environment.

The embodiment relation in virtual environments is shaped by multiple factors, including the subject, the technology, the platform, and the specific environmental features provided by the platform. The interplay of these elements determines available affordances and types of interactions that are possible within the space. In this context, affordance refers to the opportunities and constraints that the virtual environment, through its features and properties, offers to users. Proctor (2021, p.603) describes affordances as *"interaction between user and environment through certain ordered features that prohibit others."* For Proctor (2021, p.04) these affordances are structured in their *"invariance,"* embodying an objective intention. This objective intention aligns with the alterity relation within the User-Environment Relation framework proposed by Vindenes and Wasson (2021a), where the environment and its properties act upon the user as external elements of interaction.

In social VR, users interact with the virtual environment indirectly through technological devices such as VR HMDs or desktop computers. In the embodiment relation, technology functions in a ready-to-hand state, seamlessly mediating the

user's perception of the virtual world through the device itself. Hammond (2010, p.211) describes affordance as *"the perception of a possibility of action (in the broad sense of thought as well as physical activity) provided by properties of, in this case, the computer plus software."* This perspective underscores the role of technology in shaping users' potential interactions within virtual environments. Dincelli and Yayla (2022, p.2) analyzed findings from immersive VR literature and identified five core affordances of immersive VR: Embodiment, navigability, sense-ability, interactivity, and create-ability. These affordances are evoked through visual properties, design choices, and programming. These are foundational to most social VR platforms, where affordance represents what the virtual space, through its inherent properties, offers users in terms of interaction possibilities and engagement.

Embodiment in social VR platforms is multistable, shaped by the diverse ways users connect to these platforms and the devices they employ. Users access social VR through various devices, ranging from immersive VR HMDs to 2D desktop mode. The device used greatly influences their experiences. For example, users connected to platforms through VR HMDs experience a higher sense of embodiment, presence, and immersion compared to those using PCs, particularly in terms of perceiving social signals (Williamson et al., 2022). The device's capabilities can also limit or enhance the user's ability to engage with the platform's affordances. For example, a low-quality VR HMD may limit access to some features and reduce the overall quality of the experience. Similarly, differences in performance among VR headsets can lead to different levels of immersion and interaction. Immersive VR HMDs allow users to reflect real-world behaviors into virtual environments, enable greater control, and give them the ability to transform of the virtual space (Lanier, 2017). This enhanced level of interaction underscores the importance of presence in VR environments.

As Houliez and Gamble (2013, p.270) explain, *"affordances, by making of the medium an inconspicuous ready-to-hand, lead to a de-severing of the medium that results in a greater degree of directionality, which itself opens up to the virtual world's user the opportunity to freely exercise its power-to-be… That is, the more the user can achieve a certain level of directionality, of de-severing in a medium, the more presence will be felt."* In this context, the ability to seamlessly interact with the virtual environment amplifies the user's sense of being within the space, enriching their

engagement and immersion. Thus, in social VR, the multistability of the embodiment arises from the interplay between the user, their device, and the platform's affordances, with each influencing the overall experience.

Most VR devices offer diverse communicative capacities that enhance social interaction and extend presence beyond aural and visual modes of expression (Lanier, 2017). For instance, users with full-body tracking devices experience a heightened sense of presence and embodiment, engaging more parts of their body and enriching the immersive environment. These capabilities allow users to perceive and utilize different affordances, enabling diverse social activities. For example, a user with 10 points of tracking on their avatar may find the platform suitable for dancing or partying, since the avatar tracks almost every movement they create in the real world. Besides, a user who feels embodied in the virtual environment may perceive the platform as more fitted for socializing, due to the social presence.

As previously mentioned, for Ihde, mediation is linked with the transformation of perception, which is closely tied to the affordances of VR experience. While a high sense of presence and embodiment can enrich user engagement and interaction, these attributes also have potential drawbacks. For example, McVeigh-Schultz et al. (2019, p.1) observe that *"aspects of embodied presence magnify the experience of harassment in social VR."* This occurs because users with a high sense of presence often perceive harassment as more immediate and tangible, intensifying the emotional and psychological impact (Blackwell et al., 2019).

Another important factor contributing to the multistability of perceived affordances is the difference in individual perception. Lefebvre (1991, pp.113-114) emphasizes that spatial practices emerge from perceived space and underlines the subjective nature of perception. People interpret and interact with spaces differently, which is influenced by their prior experiences with the device, platform, or virtual environment, as well as their unique characteristics, motivations, needs, and capabilities. Factors such as age, gender, identity, culture, socio-economic status, education, and psychological traits (e.g., extraversion and communication apprehension) also play a crucial role in shaping how affordances are perceived and utilized.

Distinct user groups often have varying needs and motivations, which further diversify perceptions of affordances. Proctor's (2021, p.604) example of *Facebook* groups illustrate this variability and can be applied to social VR contexts. For example, on platforms like *AltspaceVR*, administrators (such as event organizers, hosts, moderators, or world creators) have higher levels of authority compared to regular users. Admins can regulate some aspects of the virtual space, including allowing participant access or managing speaking permissions at events. Although admins can shape the spatial practices of regular attendees, their actions are also constrained by the platform's programming.

The differences in perceived affordances and spatial practices underlines the multistability of social VR platforms. In interacting with the affordances of the platform, users do so differently, depending on their assigned roles. According to Schmid (2008, p.37), these multistabilities form an*"interlinking chain or network of activities or interactions."* This network of practices is a central focus of this dimension as it offers insight into how users navigate and interact within the affordances of virtual environments.

In this dimension, our investigation focuses on designated areas for specific uses and the features and affordances offered by the platform. Perceived space of affordances encompasses the sequence of acts, articulations, connections, and the interlinking chains or networks of activities within the virtual environment. These affordances also include the routes, patterns of interaction, and networks that link spaces for work, playing, and leisure. While these affordances are inherently relational and encourage specific practices, they do not determine user behavior. To understand these dynamics, I explore the perceived affordances and challenges of the platform. This exploration involves examining how users perceive and utilize these affordances and how such interactions shape their experiences, practices, and social dynamics in the virtual environment. By doing so, I aim to uncover the interplay between the platform's design and the ways in which users actively produce and reconfigure their virtual experiences.

3.1.2. The Conceived Space of Programming

The conceived space of programming, as Vindenes and Wasson (2021a, p.6) explain, refers to *"the part of the VR application that is not embodied by the user, ["and therefore, that to which the embodied user relates to as alterity"], but is rather acted upon, or that which acts upon the user, including social actors, 3D objects, events, etc."* In this dimension, the focus is on understanding the type of environment or world in which users are situated and the consumption styles shaped by the programming and design of the platform. By analyzing the inherent parameters of the platform- including its structures, constraints, and affordances- and examining what these virtual environments reveal to users (Vindenes and Wasson, 2021a), this analysis aims to establish a conceptual bridge between the three dimensions of virtual space. This approach underscores the significance of platform design in influencing user behavior and interaction across perceived, conceived, and lived spaces.

VR development is a complex process that involves various stages and tools, including design, prototyping, 3D modeling, game engines, system development kits (SDKs), advanced computer hardware, VR headsets, and additional accessories (AltexSoft graphic, 2022). Game engines such as *Unity* and *Unreal Engine* serve as software tools for developers to create and operate 3D virtual worlds (Frank, 2021). While VR offers significant potential for immersive experiences, it also presents several challenges that developers must address to optimize user engagement and comfort.

One important challenge in VR development is motion sickness, which arises from a delay between the actions of a user and the corresponding response in the virtual environment. It points to the accurate synchronization of user actions and events withing the virtual world. Reducing motion sickness and ensuring smooth interactions are the most important tasks for the VR programmers. To achieve this, developers need to manage and integrate multiple layers of functionality in virtual spaces. This complex process yields very controlled and monitored environments, where the creators of such spaces dictate much of the user experience to ensure stability and usability (Proctor, 2021, p.606). Such controlled environments reflect the complexity of VR

development, where technological, physiological, and design considerations need to come together to reflect smooth and immersive virtual experiences.

Since creators possess the tools to control and monitor virtual environments, they can also shape and direct user activity in specific ways. Designers employ various strategies to guide users toward performing certain behaviors within social VR platforms (McVeigh-Schultz et al., 2019, pp.4, 11). Drawing on Lefebvre's (1991, pp.31-48-62) theory, conceptions of space lean toward systems of verbal signs, such as *"words and sentences, along with the meaning invested in them by a signifying process"* (Lefebvre, 1991, p.48). In contrast, representational spaces tend to utilize *"more or less coherent systems of non-verbal symbols and signs,"* such as music, painting, sounds, gestures, masks, costumes, or stage setups. In the context of social VR platforms, verbal and non-verbal signifiers work in tandem to guide user interactions. For example, the use of colors, shadows, or textures for button styling can convey its functionality and make it visually clear that it can be clicked. These small design decisions can make affordances more explicit, while having significant effects on the users' perception and use of virtual space. By shaping the environment's verbal and non-verbal elements, designers create a structured experience that directs user behavior and aligns it with the intended uses of the platform.

Social VR platforms accommodate a wide variety of user groups, including world and event creators. Many of these creators are at once producers and users, and this introduces a new form of complexity into the production of space within social VR. This dual role allows them to directly shape and influence the virtual environments in which they both reside and participate. These platforms offer many advantages for creators and are used to collaborative on world-building and event creation. Creators and their teams often hold meetings on how to go about their projects and sharing knowledge and ideas in the event management or environmental design. This collaborative ecosystem fosters innovation and supports creativity. Moreover, with iterative input, feedback, and co-production processes, the distinction between the creator and the user starts to blur. In this dimension, I seek to understand these exchanges and their broader consequences on the design, functionality, and social dynamics of virtual environments.

In the context of the conceived space of programming, I focus on understanding how the platform's programming shapes and organizes virtual spaces. This includes examining spatial orders, design choices, environmental characteristics, virtual settings, community standards, moderation rules, interaction modalities, cognitive processes, codes, signs, modes of production, and organizational schemas. These elements are rooted in the conceptual models that designers and programmers use to structure the virtual environment, embedding their intentions and assumptions about user behavior into the system (Carroll and Olson, 1987). This dimension investigates how the design and organization of virtual spaces influence social interactions and relationships by analyzing the actions that the environment invites users to perform while simultaneously inhibiting others. As Vindenes and Wasson (2021a, p.7) observe, "*the system may display some objects as interactable and some merely acting as decorative or situational elements, some in the proximity of the user and some at a distance."* These design decisions reflect the intended mediation by programmers and designers, which subsequently shapes users' intentionality, providing specific orientations and directedness to the technology (Verbeek, 2008; Vindenes and Wasson, 2021a, p.7).

In this dimension, I seek to explore these design decisions in depth to understand how they guide users to perform specific actions, use tools, frame environments for specific purposes, and facilitate or constrain social interaction. A central part of this analysis is to examine how designers create social catalysts and social mechanics to stimulate connectivity and engagement within the virtual environment. A social catalyst in social VR can be defined as an element that significantly enhances and fosters social interactions. I also explore how designers make use of embodied affordances and multiple dimensions of virtual interaction to encourage relationship development. By examining these strategies, I aim to uncover the dynamics of the conceived space of programming and its impact on virtual environments. This investigation covers the layers that make up programming and design to show how these elements come together and shape user experiences and interactions. Ultimately, this analysis sheds light on both the intentional and unintentional ways in which virtual environments are crafted.

3.1.3. The Lived Space of Virtuality

Social VR platforms empower users to transcend the boundaries of programmed environments and actively create new, lived spaces. This transformative capacity is evident in their ability to *"create new worlds, customize avatars, playtest new games, invent new rituals, and experiment with new ways of bridging VR and the outside world"* (McVeigh-Schultz et al., 2019, p.11). These activities demonstrate how users adapt and personalize virtual spaces to reflect their individual and collective creativity.

de Certeau's (1984) analysis of walking as a space-producing practice provides a functional approach to understanding these dynamics. He evaluates the practices of everyday life as a balance between strategies and tactics, highlighting the interplay of power relations and spatial practices. While design practices implemented by creators and programmers serve as strategies to shape and control user behavior within virtual spaces, use practices enacted by users function as tactics that reinterpret, adapt, and occasionally subvert these strategies. This reciprocal relationship illustrates how user actions challenge the limitations imposed by design strategies, giving rise to new forms of meaning, social interaction, and community practices within virtual environments. In doing so, users transform static, programmed spaces into dynamic, lived spaces that reflect their agency, creativity, and social needs.

Departing from de Certeau's (1984) framework, I conceptualize users' practices on social VR platforms as tactical maneuvers aimed at modifying or reinterpreting design strategies. These user-driven acts give rise to new social meanings, social affordances, norms, and collaborative opportunities, which illustrate the dynamic and participatory nature of virtual spaces. While users interact with virtual environments through affordances, their actions are dependent on the constraints of platform programming and device features. However, users can eliminate these constraints through tactical actions. These dynamics help us understand how the lived space of virtuality transcends the limits of programs or paradigms.

Through these tactical maneuvers, users create new forms of reality and realize alternative possibilities in their virtual environments (Janz, 2018). This process underscores users' agency in shaping virtual spaces. Although designers set the strategies and lead users to (McVeigh-Schultz et al., 2019, p.11), the users ultimately

decide how to utilize them. In social VR platforms, users redefine their virtual realities, transforming these spaces from designed environments into lived spaces. This underlines the creativity and agency of users in reshaping these environments.

Bradner (2001, pp.67-68) expanded Norman's concept of object affordance to encompass social interaction, defining social affordance as *"the relationship between the properties of an object and the social characteristics of a given group that enable particular kinds of interaction among members of that group."* This perspective highlights how the intrinsic properties of objects interact with the social attributes of groups to facilitate specific forms of interaction. Similarly, de Carvalho (2020) conceptualized social affordance as the *"possibilities for social interaction or possibilities for action that are shaped by social practices and norms."* According to de Carvalho (2020), social affordances are not inherent to the objects or environments themselves but emerge through the interplay of social and cultural practices that influence how interactions occur. Both definitions emphasize the context-dependent nature of social affordances, where objects or environments enable specific types of social interactions and actions based on the surrounding social dynamics. These perspectives underscore the relational and dynamic aspects of social affordances, framing them as emergent phenomena shaped by both material properties and the social practices of their users.

Lefebvre (1991, p.40) emphasizes that social practice is fundamentally tied to the representation of the body, asserting that *"social practice presupposes the use of the body: The use of the hands, members and sensory organs, and the gestures of work as of activity unrelated to work."* This highlights the intrinsic connection between bodily activity and social interactions. Similarly, Jonasson (2000) argues that space is constituted through its inhabitants' performances, where their behaviors shaped by communication rather than predefined rules. In social VR platforms, this connection is obvious, as users usually rely on gestures, emojis, and other non-verbal communication forms to interact with each other. These non-verbal interactions underline the role of avatars, which are central to the embodiment. The use of expressions, body language, and other forms of non-verbal cues in interpersonal communication shows how important it is to analyze ways in which embodied interaction influences and intersects with social action.

Vindenes and Wasson (2021b, pp.193-194) further state that *"as immersive VR is transparent in mediating the bodily comportment of users as they interact with the system, it stands out as a promising candidate for studying embodied interaction as embedded in the virtual environment."* This transparency in mediating bodily movements allows immersive VR to provide insights into how physical embodiment contributes to and shapes social practices in virtual spaces. As a result, the relationship between embodied interaction and social action becomes an area of study to examine how users engage, communicate, and co-create in social VR platforms.

Avatars, identity formation and social status are related to embodied interactions and social practices. Social VR platforms provide a unique environment where individuals can create, reflect, and negotiate their identities through customizable avatars, behavioral cues, and interpersonal interactions. This process often transcends physical boundaries and reality, as VR enables users to experiment with appearance, gender, and social roles in ways that may not be easily achievable in the real world.

Avatar creation and personalization are key components in the ways that users present themselves in virtual spaces. Avatars are both representations of the self and also tools to be used in communicating as one navigates social dynamics and enacts an adopted identity. Users create avatars that represent idealized versions of themselves, play with other identities, and/or conform to the norms of the cultural and community spaces in which they are interacting. Lefebvre's (1991) lived space emphasizes the symbolic and subjective dimensions of space, deeply rooted in how users experience and express their identity. In social VR, the process of identity formation can be a navigation between personal agency and social expectations. For example, users strategically adjust their avatars and behavior to fit into certain social groups or to express individuality within a larger community. These performances of identity are not fixed but dynamically changing through social interaction, the affordances of platforms, and community norms.

In virtual spaces, social status is often negotiated through interactional practices, symbolic capital, and technical expertise. In many cases, the status seems to be related to a person's ability to maneuver and make use of affordances on the platform. In other words, users can gain status and influence among their communities by being particularly skilled in world-building, event hosting, or avatar creation. Identity

formation and social status are related to one another in the way users navigate social hierarchies and negotiate belonging within virtual communities. For example, users may take up specific avatars or behavioral styles that show alignment with higher-status groups while using their unique identity to showcase a distinct social position. This double process of alignment and differentiation underlines the fluid and performative nature of both identity and status in social VR.

Within the lived space of virtuality, norms and collective meanings interact with the complex symbolic elements of associated images, memories, rituals, and acts of resistance. The dimension brings out qualitative, fluid, and differential features of social life that often appear through subtle and symbolic practices. For example, in the form of gestural systems, emojis, avatars, and shared rituals. These elements reveal the clandestine, underground, and often creative dimensions of social engagement within virtual environments.

By investigating how users engage their avatar bodies in social practices- such as body movements, non-verbal interactions, gestures, and emoticons- it is possible to develop a comprehensive understanding of how embodied involvement interacts with social practice. Such a perspective is essential for capturing how users literally live in and experience virtuality. The collection of images, texts, symbols, sounds, and documentation of rituals adds to our knowledge of the lived experience, exposing what meanings users attach to their interactions and the space they are in. Go-along interviews offer a particularly valuable method for exploring these experiences in VR. Using this approach allows researchers not only to collect users reflecting on chosen events but also to tap into their actual lives within virtual spaces as they take part in or create rituals.

Understanding the lived space of virtuality involves the dynamic interplay between user tactics and design strategies, embodied interactions, and the socio-cultural contexts that frame user behavior. This dimension brings to light how users navigate, adapt to, and transform virtual environments through their actions, expressions, and social engagements. It is through the investigation of such practices and interactions that we gain critical insight into ways in which virtual environments are experienced, lived, and continually reshaped by their inhabitants. It indicates that virtuality is not just one-dimensional but multi-faceted, wherein the agency and

creativity of the user meet the programmed restrictions and possibilities of the medium in which complex and changing sociality arises.

3.1.4. Migration and the Social Reproduction of Virtual Space

The perceived space of affordances, conceived space of programming, and lived space of virtuality offer a comprehensive perspective for analyzing the closure of *AltspaceVR* and the transition of its users to alternative platforms such as *VRChat*, *Spatial*, and others. These transitions not only reveal the adaptability of virtual communities but also highlight the interplay between user practices, platform design, and social reproduction in virtual environments.

In the context of the perceived space of affordances, migration represents the ways in which users both identify and adapt to new platforms' affordances. As users transition, they seek to replicate both functional and social aspects of their previous virtual environments. The perceived affordances of the new platforms, such as tools for socialization, world development, event creation, and avatar customization, shape how users reproduce their practices. For example, *VRChat*'s highly customizable avatars and enhanced world building tools allows users to reproduce their previous communities. However, users also face challenges with adaptations to the unique capabilities and limitations of the new platform.

Within the conceived space of programming, migration is influenced by the design and governance of new platforms. As mentioned before, creators' choices dictate how users interact with the environment, establish norms, and recreate community dynamics. Migrants are challenged to navigate new programmed spaces while maintaining their identities, cultural practices, and social norms. For example, users transitioning from *AltspaceVR* to *VRChat* often encountered differences in event management and moderation tools. The lack of these tools in *VRChat* posed a significant challenge to continue their events and, thereby, community activities. These variations compelled users to adapt their practices to fit the affordances and constraints of the new platforms while simultaneously shaping and being shaped by the conceived spaces of programming.

Migration underscores how users bring their memories, cultural identities, and social narratives into new platforms in the lived space of virtuality. The lived space is

where users negotiate meaning, adapt their sense of belonging, and develop tactical uses that transcend the constraints of programming. Through embodied interactions, users embrace new platforms with their previous environments' symbolic and emotional significance. For instance, events and symbolic rituals performed during the final days of *AltspaceVR* illustrate the profound emotional connections users carry into their new homes.

The migration process reflects both the social production and reproduction of virtual spaces. Users actively produce new environments by engaging with the affordances and constraints of the new platforms, while at the same time reproducing familiar practices, norms, and cultural identities. Drawing on media migration theory and virtual diaspora, this study contextualizes the emotional, cultural, and practical dimensions of displacement in social VR platforms. Push factors, such as platform closure and technical limitations, compelled users to leave *AltspaceVR*, while pull factors like enhanced customization options, active communities, and improved affordances drew them to platforms like *VRChat*. These migrations are representative of the resilience of virtual communities, as users and creators recreate their worlds, adapt their social practices, and maintain their collective identities.

The interplay between perceived affordances, conceived programming, and lived virtuality offers a comprehensive understanding on how virtual communities adapt in the face of disruption. By closely analyzing these dimensions, this study investigates complex dynamics of platform closure, transition, and migration in virtual spaces. It draws on qualitative data combined with interviews, participant observation across various platforms, and the analysis of digital artifacts such as video recordings, social media posts, and shared content across platforms like *Facebook, Discord,* and *Youtube* to understand such dynamics. These data sources give insight into how users navigated the closure of *AltspaceVR* and adapted to alternative platforms.

4. RESEARCH DESIGN

To understand the social production of virtual space across three dimensions (perceived space of affordances, conceived space of programming, and lived space of virtuality), this study collected qualitative data from the *AltspaceVR* platform. A mixed-method approach was employed, involving two years of extensive participant observation (from May 2021 to March 2023) and 41 interviews (conducted between January 29 and March 16, 2023) with users, world creators (including developers, builders, designers, and programmers), and event creators (such as hosts, moderators, and community leaders). The study was approved by the ethics committee of Galatasaray University under reference number 23/004.

4.1. Why *AltspaceVR?*

For the fieldwork, I spent two years exploring various social VR platforms, from May 2021 to May 2023, using a *Meta Quest 2*[17] VR HMD. In the first two months, I conducted preliminary observations on three popular platforms: *AltspaceVR*, *VRChat* and *Rec Room*. These platforms were selected based on Radiah et al.'s (2021, p.11) research, which identified them as the most popular social VR platforms and noted their high flexibility for researchers.

While deciding among the three prominent platforms, I attended various events, explored different virtual worlds, engaged in conversations with diverse user groups,

[17] *Meta Quest 2* is a standalone VR headset manufactured by *Meta*. The headset has 1832x1920 resolution per eye with 104,00° horizontal, 98° vertical, and 113,46° diagonal field of view (FoV), 120 Hz. refresh rate and 6 Degree-of-Freedom (DoF) inside-out tracking via four integrated cameras. The tracking frequency of the headset is 1000 Hz. It has two (third generation) touch controllers and partial finger and thumb tracking via capacitive sensors.

and reviewed discussion topics on both official and unofficial *Reddit* and *Discord* channels and *Facebook* associated with the platforms. I also evaluated specific tasks and interaction modes to identify the affordances and features of each platform, along with usability issues and unique use cases. My analysis primarily focused on platform tutorials, usability, menu interfaces, user demographics and characteristics, verbal and non-verbal communication modes, spatial navigation, movement, object manipulation, avatar creation, and other interaction features. These interactions included exploring how users engage with the environment, other users, and interactive objects. Additionally, I participated in online meetings of well-known and relatively active groups.

Realizing that conducting long-term observations on all three platforms at the same time was now possible for a single researcher due to time constraints and the research load, I decided to focus on one platform for my fieldwork. Successfully managing such a broad scope would have required a larger research team, with at least one researcher dedicated to each platform. At the conclusion of the preliminary phase, I chose *AltspaceVR* as the primary platform for my field study. However, I continued to engage with *VRChat* and *Rec Room* to a lesser extent, keeping up with related forums, *Discord* channels and *Facebook* groups. Additionally, over the course of the two years, I explored several other social VR platforms, including *Engage, Spatial, vTime XR, Multiverse,* and *Bigscreen*, attending events and visiting worlds on these platforms to broaden my understanding of the social VR platforms.[18]

I chose to conduct the field study on *AltspaceVR* for several reasons. First, *AltspaceVR* was one of the first (some consider it the very first one) platforms to embrace the term social VR, where humanoid robot avatars represented users to participate in virtual worlds and events and interact with others. The platform was founded in 2013, launched in 2015, and then acquired by *Microsoft* in October 2017. On January 20th, 2023, *Microsoft* announced *AltspaceVR* will shut down on March 10th, 2023. According to the Metaverse Universe report of the *Metaverse Consulting*

[18] I could not explore the *Horizon Worlds* enough because the access from Turkey was restricted to the platform. However, I entered to the *Horizon Venues* a few of times to explore the interface and affordances of the platform. There were quite low number of participants, and I couldn't interact with them.

Company (2023), there were 1.2 million monthly active users in *AltspaceVR*, right before its closure.

Second, the average age of *AltspaceVR* users was older than that of other platforms (i.e., *VRChat* and *Rec Room*). It was one of the main factors in choosing *AltspaceVR* because adult users were more open to talking about their experiences and being with adults made it easier for me to socialize and join conversations. In *VRChat*, for example, I encountered rude behavior and found it more challenging to make observations in public spaces. In *VRChat*, I observed that teenage users shared the environments with their peers and enjoyed spending time in the game-based worlds. VR games were outside my focus within the scope of this research, and *Rec Room* and *VRChat* were mostly game-based worlds. I also observed that some teenage users tended to troll the worlds they entered by making disturbing sounds and behaviors. Some adult users I talked to in *AltspaceVR* have said they preferred to use *AltspaceVR* more often because they did not want to interact with children because they were bothering them.

Thirdly, while *VRChat* had a bigger userbase with many public worlds, the users were mainly using private instances to socialize. It was making it very hard for me to find social groups and interact with them. Even in public worlds in *VRChat*, users can create a private instance and make it private, so that nobody can see them in that world, if they are not allowed to see. These limitations made it harder to observe who entered which world for what reason. On the other hand, in *AltspaceVR*, it was easier to understand who was there for what reason because it was an event-based platform and people usually came together for shared interests. While there were private worlds that one could join with a code, there were many public worlds and public event spaces that I could easily join and interact with various communities. The type of the events and worlds in *AltspaceVR* were quite various. There were festivals, concerts, parties, comedy shows, karaoke shows, educative courses and trainings, collaborative team meetings, conferences and seminars, networking events, meditations, wedding ceremonies, and even funerals. The topic of the events or talks could range from world-building to art, psychology, philosophy, history, religion, spiritualism, mysticism, and mindfulness. Also, there were many meetings organized for/by marginalized identities and minority groups, like LGBTQ+ meetups and support group meetings.

Fourthly, *AltspaceVR* was freely accessible on most VR HMDs and other 2D devices like PCs and tablets. People from all over the world, who had these devices, could use the platform, connect, and attend the events and worlds in real-time. Another reason to chose *AltspaceVR* was because it catered both users and creators and offered a user-friendly experience with a potential of creating environments, 3D objects, and customizable avatars. *AltspaceVR* had many opportunities and guides to support creators. Creators could create 3D worlds and objects in *Unity* and upload them to *AltspaceVR*. Additionally, Pizzolante et al. (2023) tested the usability and user experience of *AltspaceVR* and found *"the usability of the platform as good and user experience as satisfactory."* For these reasons, *AltspaceVR* emerged as the optimal platform for field study.

4.2.Methodology

Communities in virtual worlds should be analyzed with their concepts, meanings, shared values, and unique contexts arising from the virtual space (Hine, 2000). We must investigate users outside of laboratory settings to study social VR platforms' social and interactive implications in a shared virtual space. Research conducted in laboratory settings may disrupt the natural flow of interaction because these settings are controlled environments. Besides, activities in social VR occur in virtual spaces where there is no direct physical interaction. Social VR platforms are multi-user online platforms in which people with appropriate equipment (e.g., a VR HMD) from all over the world can be involved. The platforms link an interactive network of spaces and activities for people in distinct geographical locations. Thus, it is imperative to be included in the platform with users to study the social production of virtual space from a user-environment relations perspective.

Following the theoretical framework of this study, I collected qualitative data related to user experiences in the online setting of the *AltspaceVR* platform. The data was obtained with a mixed-method approach, combining virtual ethnography with participant observation and semi-structured interviews with the users, world creators (developers, builders, designers, programmers), and event creators (hosts, moderators, community leaders) of the platform. The interviews were held in two different formats: (1) Go-along interviews on the *AltspaceVR* platform, and (2) online interviews on

video conferencing platforms, such as *Zoom* and *Discord*. By this approach, I seek to gather multiple perspectives and insights about the uses of the platform. *Table 4.1* presents a summary of the data collection methods of the study.

Table 4.1 Data collection methods of the study.

Methods	**Methodological Expansions**	Screenshots[19]	Voice Recording	Observation/Interview Notes
Participant Observations	Spatial, auditory, and behavioral aspects of users and virtual spaces	*AltspaceVR*	External voice recording	After the field study
Interviews	Online interviews on video conferencing platforms	N/A	Voice recording on video conferencing platforms	During and after the interviews
	Go-along interviews	*AltspaceVR*	External voice recording	After the interviews

4.2.1. Participant Observations

Virtual ethnography involves being included in a virtual culture and observing the virtual community through a holistic approach. Participant observation is indispensable for ethnography in immersive worlds. Through participant observations, researchers can better understand the details, situations, modes, and characteristics of use practices in social VR platforms. In social VR platforms like *AltspaceVR*, users dwell in various virtual spaces through embodied interaction. They inhabit not only the virtual space but also a world of ideas, thoughts, values, feelings, assumptions, expectations, interactions, and practices. As O'Toole (2010, p.121) stated, *"investigating space necessarily deals with the tacit and the unconscious understandings that perceptions of space invoke."* Because *"even when the actors involved in the investigation of space are available to the researcher, the understandings related to the corporeal surroundings will often be tacit and unconscious"* (O'Toole, 2010, pp.123-124).

[19] Although most of the screenshots I presented in the findings are sourced from *AltspaceVR*, I also included screenshots from other platforms, such as *VRChat* and *Facebook*, in some sections to further enrich the discussions.

This study seeks to understand the implicit and interpret the meaning of life in *AltspaceVR*. The first step of this understanding starts with observing built environments and users' daily activities, spatial practices, and verbal and non-verbal interactions. The second step is interpreting and analyzing the observational data within the theoretical framework. During the field study, I entered the platform and collected observational data through an avatar acting as a sensing research body. The type of my involvement varied based on the user population and the ongoing activities in the spaces. In some events or worlds, I took part as a passive observer and directly observed what was going on, while I took moderate and active roles in others.

4.2.1.1.Collecting and Categorizing Observational Data

I first entered *AltspaceVR* in 2017 with a *Samsung Gear* VR HMD, when the avatars were represented in a robotic form. However, for this field study, I started making participant observations on the platform on May 2021, after I bought a *Meta Quest 2* VR HMD. The participant observation process took approximately 2 years. After I signed up for the platform, I created an avatar (see *Figure 4.1*) named with my real name. I designed the avatar within the customization options available on the platform. I did not manipulate or change the avatar's appearance during the field study, and I tried to create it like myself. The avatar allowed me to move around virtual spaces, participate in activities, interact with other users, understand non-verbal communication, and learn how to do something (e.g., hold and grab an object, fly, etc.). It also shaped how I interacted with other users and interpreted what I observed, perceived, and felt during the observations. Thus, my avatar gave me a first-person perspective and a sense of social presence in the virtual spaces I joined. Since this was a remote study, and the potential of remote studies is to reach broad and diverse audiences with various backgrounds, I observed all the users I came across throughout the spaces during the observations. To follow ethical guidelines, I disclosed my identity and the intention of the research to all the users I verbally interacted.



Figure 4.1 The researcher's avatar in *AltspaceVR*.

After a year I spent on the platform, I created a research plan and started to make my observations in a more guided way. The previous process and the time I spent on the platform allowed me to get to know the platform better and improved my understanding of what to observe and how. After I had a complete understanding about the platform on the regular events, specific groups, and virtual worlds in use, and discovered a path to follow during observations, I created an observation spreadsheet (see *Appendix A*) in *Microsoft* Excel to guide myself during the study, keep my observation notes, and categorize them under themes related to the conceptual framework. In the last 8 months of my observations (from July 2022 to March 2023), I kept field notes on the spatial and behavioral uses of the users and the environment every time I logged into the platform. During this process, I regularly entered the platform, at least once a week, and followed the existing events through the website of the platform consistently.

During the observation process, I tried to be careful not to disrupt the lives of the communities and follow ethical guidelines. I regularly entered the platform, at least once a week, and followed the existing events through the website of the platform. I attended various public events and worlds on *AltspaceVR*, walked around the spaces, studied how users use them, watched what users did, observed how they interacted,

listened to them, and engaged in their conversations and activities. These enabled me to collect and capture details and provided insights into which parts of the built environments are used for which purposes. While collecting spatial data, I also tracked users' behaviors to understand what they were doing wherein the environment in which condition. These behavioral data revealed information about the use of spaces under certain conditions.

During my observations, I did not record visual or audial data because it was impossible to take consent forms from all the users in the environments. Since it would be impossible to take notes while using joysticks in my hands, I recorded my voice to keep observational data. I muted myself on the platform so that nobody heard me while I was talking. I recorded my voice through an external voice recorder (via a smartphone) and noted what I saw, heard, or thought about situations, user practices, events, and environmental features. To categorize my observations in the spreadsheet, I listened and transcribed my recordings. Also, I took screenshots to support my direct observations. These screenshots enabled me to capture situations and interactions in the virtual worlds, and these props acted as a vehicle to extract meaning from situations and social relations. Combining the connections between the design of the built environment and the extent of activities and practices in the space enabled me to collect data about the social production of the virtual space.

The worlds and events that I joined on the platform was chosen regarding the number of instant users. It was possible to see how many people were currently in the events and worlds through the main page of *AltspaceVR*. I entered the environments with the highest user numbers so that I could study various groups of users, examine more social interactions in different worlds, and collect richer data. I tried to attend as many different environments as possible to observe different forms of social relations. For example, if certain events/worlds constantly come to the fore, I joined in the environments with the second-highest number of instant users to avoid repetition. I observed the days and hours when the events and meetups are most intense on the platform (and updated this information as needed) and joined accordingly. During the data collection process, I included in the platform on these days and hours weekly. Then, I entered the world with the highest number of instant users.

AltspaceVR was an event-based platform, and some users were generally involved in specific types of groups. Since there was a wide range of events/worlds and activity types on the platform, it was not easy to choose among them. Besides, since it is an exploratory study that does not only aim to observe specific communities or certain types of activities, making a focused choice among the events/worlds would narrow the scope of the research. Therefore, I preferred to be involved in more intensively used worlds to collect richer data. These long-term participant observations helped me to generate semi-structured interview questions. It became easier for me to decide what is essential to ask the users.

4.2.2. Interviews

The second phase of the study includes semi-structured interviews with the users, world creators, and event creators of *AltspaceVR* (n=40). Also, I had a chance to conduct an interview with one of the founders of *AltspaceVR*, Gavan Wilhite (n=1). The interviews were held in two different formats: Go-along interviews on *AltspaceVR* and online interviews on video conferencing platforms (e.g., *Zoom, Discord*, *Google Meet*). To decide the formats and platforms of the meetings, I asked the preferences of participants in the participant recruitment form. When possible, my request was to conduct the interview in the go-along format. In total, 41 semi-structured interviews were conducted between January 29 and March 16, 2023. 24 of the interviews were conducted in the go-along format on *AltspaceVR*, while 12 on *Zoom* (video and voice chat), 4 on *Discord* (voice chat), and 1 on *Google Meet* (video and voice chat).[20] The interviews lasted an average of 1 hour, a minimum of 25 minutes, and a maximum of 1 hour and 50 minutes.

4.2.2.1.Participant Recruitment

To recruit participants for the interviews, I used different methods. First, I invited some users I met on the platform to take part in the study. Second, to reach potential participants, I prepared a participant recruitment form containing a short online survey through *Google Forms* where I explained the purpose of the study and asked people

[20] 27 of the interviews were planned to be conducted in the go-along format. However, because of some technical problems, three interviews were started on *AltspaceVR* and continued *Zoom*. Therefore, I counted them as *Zoom* meetings.

about their willingness to participate in the study. I distributed the participant recruitment post through related and well-known *Discord* channels (e.g., *Educators in VR, EvolVR, Pagans in VR)* and *Reddit* forums of the platform. Apart from these, I tried to spread the recruitment post message through community leaders of *AltspaceVR*. I sent them direct messages from *Discord* and asked for their help to spread the message. Besides, to entice users to participate in the study, I offered $10 e-gift cards from *Amazon*.com.

Since this is a remote study, and the potential of remote studies is to reach broad and diverse audiences with various backgrounds, the participant selection criteria were broad. To take part in the study, all the participants needed to be at least 18 years old and fluent in English. Since the study involved international users of *AltspaceVR*, all interviews were conducted in English. There were different criteria to take part in the study in different roles. To participate in the study as a "user," one must had at least one month's experience in *AltspaceVR*. Besides, only users with over 1 year of experience invited to go-along interviews. This was because only experienced users could provide us sufficient information in this context and demonstrate the necessary insights during the interview. To participate in the study as a world or event creator, one must had at least one year of experience in *AltspaceVR*. In the participant recruitment form, participants were asked to indicate their roles through a multiple-choice question with an open-ended answer section, so that participants could select all relevant roles or identify a different role.

I collected the e-mail addresses of the participants who registered to participate in the study and then contacted them to organize the interviews. Once the organization is done, all the participants were sent an online informed consent form, which explains the purpose of the study, the interview process, and how the data will be collected, stored, secured, and used. Interviewees were told that all data will be kept confidential. All the participants registered to the study signed an online informed consent form prior to interviews, where they gave permission to audiotape the interview. All interviews were conducted and recorded using a smartphone app.

4.2.2.2.Participant Profile

Participants of this study consists of three groups: World creators (e.g., developers, builders, designers, programmers, experience creators etc.), event creators (e.g., hosts, moderators, facilitators, leaders, performers etc.) and users[21]. In the study, 17 world creators, 16 event creators, 7 users, and one co-founder of the platform were interviewed. The description of the roles can be found in *Table 4.2.*

Table 4.2 Description of roles in *AltspaceVR*.

Role	Description
User	Users are the general community of the platform. These individuals may not create worlds or events, but they "participate" in the platform by customizing their avatars, joining events and worlds, and socializing with others.
Event Creator	Event creators host, lead, moderate, organize, and facilitate events within the platform. With access to event moderation tools and special privileges, they curate and perform events.
World Creator	Worlds creators are the architects of *AltspaceVR*. They are the individuals who engage in world-building activities, including development, design, programming, and crafting immersive experiences and mixed reality extensions (MRE) within the platform.

The large majority (n=35) of the participants interviewed had been using the platform for at least three years, which can be considered as a long experience considering *AltspaceVR*'s lifespan. The participants ranged in age, and a quarter of the people were over the age of 50, which was not quite expected. While a participant didn't want to provide age information, some did not directly share their age, but provided a range, such as between 20 and 25. Most participants were living in the US (n=23). All participants had access to VR hardware, except one. *AltspaceVR* was generally considered a *Quest*-compatible platform, and most of the participants were using the *Meta Quest 2* VR HMD. The information of each participant is presented in *Table 4.3*. Participation to this study was entirely voluntary and anonymous. Participants were not asked to provide their real names, affiliations, genders, locations, or any other information regarding their virtual identity to ensure their safety and

[21] When I use the term "user," I acknowledge that, in this context, users are essentially participants in the virtual environment. Although I prefer the term "user" for its broad applicability, it is important to highlight the fluidity between the roles of "user" and "participant," which is especially evident in VR settings. In this study, "users" are actively involved in the virtual space, engaging and contributing in ways similar to the other groups of creators, making the distinction between the two terms more fluid within the immersive nature of VR.

privacy. To preserve anonymity, each participant was assigned an ID (identification) number.

Table 4.3 Participant profile of the interviews.

ID	Age	Experience	Country	World Creator	Event Creator	User	Meeting Place and Format
P1	44	< 3	Germany		X		*Zoom*
P2	53	< 4	USA		X		*Zoom*
P3	33	< 3	Russia		X		*Zoom*
P4	40	< 4	USA	X	X	X	*Zoom*
P5	49	< 3	USA		X		*AltspaceVR*
P6	60	< 3	USA		X		*AltspaceVR*
P7	50s	> 5	USA		X	X	*AltspaceVR*
P8	20-25	> 5	USA	X	X	X	*Discord*
P9	52	< 4	USA		X		*AltspaceVR*
P10	51	< 3	Mexico		X		*Zoom*
P11	40s	< 3	USA		X		*AltspaceVR*
P12	67	< 3	USA		X		*Zoom*
P13	55-75	> 5	USA	X	X	X	*Discord*
P14	53	< 3	UK		X	X	*AltspaceVR*
P15	37	< 2	USA		X		*AltspaceVR*
P16	23	> 5	Mexico		X		*Zoom*
P17	48	< 4	USA	X			*AltspaceVR*
P18	36	< 3	Switzerland	X			*Zoom*
P19	57	< 2	Canada	X			*AltspaceVR*
P20	61	< 4	USA	X			*AltspaceVR*
P21	49	< 3	UK	X			*AltspaceVR*
P22	50s	< 3	USA	X			*Zoom*
P23	60s	< 4	USA	X			*Zoom*
P24	58	< 3	USA	X			*AltspaceVR*
P25	43	> 5	France	X			*Discord*
P26	30	< 3	USA	X			*AltspaceVR*
P27	33	< 4	UK	X			*AltspaceVR*
P28	61	< 4	UK	X			*AltspaceVR*
P29	45	< 3	USA	X			*AltspaceVR*
P30	40	< 4	Canada	X			*AltspaceVR*
P31	24	< 3	Uzbekistan	X			*Discord*
P32	48	> 5	USA	X	X	X	*AltspaceVR*
P33	N/A	< 3	Poland	X			*AltspaceVR*
P34	67	< 3	USA			X	*AltspaceVR*
P35	41	< 3	USA			X	*AltspaceVR*
P36	19	< 1	India			X	*Zoom*
P37	51	< 1	USA			X	*AltspaceVR*
P38	19	< 2	Canada			X	*Zoom*
P39	55	< 3	Sweden			X	*AltspaceVR*
P40	50s	< 3	USA	X		X	*AltspaceVR*

4.2.2.3.Go-along Interviews

Compared to the online interviews on video conferencing platforms which take place on 2D screen, go-along interviewing ("walk along" or "ride along" interviews)

in VR is an explorative, participatory, and hybrid data collection method that combines observation and interviewing in 3D environment (Harvey, 2024). *"Instead of removing the participant from the environment being discussed in the interview, go-along interviews can access the participants' experiences when they are present in and interacting with their environment"* (Vindenes and Wasson, 2021b, p.190). Vindenes and Wasson (2021b, p.190) argue that this method is especially suitable for immersive VR experiences because VR applications are not just tools that people use but spaces where they exist and socialize (Vindenes and Wasson, 2021b, p.190). Thus, this method can *"provide possibilities for being attentive to a broader range of the virtually mediated experience"* (Vindenes and Wasson, 2021b, p.190). In this method, researchers walk through "a spatialized journey" (Duedahl and Blichfeldt, 2020, p.441) and interview participants *"on their 'natural' outings, and -through asking questions, listening and observing- actively explore their subjects' stream of experiences and practices as they move through, and interact with, their physical and social environment"* (Kusenbach, 2003, p.463). This approach provides a dynamic, real-time immersion into participants' lives, offering insights that are often not accessible through static, more traditional interview methods.

The go-along method allows researchers to better understand the *"disclosure of intentional and disruptive connections with environments"* and *"make sense of the lives of the people"* within the virtual world (Duedahl and Blichfeldt, 2020, pp.438-439). These interviews are immersive and allow the participants to reflect on their surroundings for giving contextually rich responses by being more active and moving through the virtual space. In such interviewing, insights may be provided into not just participants' lived experiences but also empowered participants to act as guides and lead the interactions. Duedahl and Blichfeldt (2020, p.439) note that this method *"may empower participants to act as tour guides as they plan and introduce researchers to settings and ways of engaging with nature that are known and familiar to them but likely to be unfamiliar and unknown to researchers."* This empowerment shifts the interview dynamics, creating a more collaborative and participant-driven process, where the researcher is an observer and explorer in the virtual world.

Moreover, go-along interviews *"can evoke participants' memories of past experiences within the environment as well as provide access to the participants' current flow of experience as it unfolds within the particular context"* (Vindenes and

Wasson, 2021b, pp.190-191). This method captures present interactions and evokes memories of significant moments tied to particular places that help participants narrate their experiences from an embodied perspective. Engaging in both the past and the present provides a better understanding of the social and emotional meaning of such spaces. This aspect of the method proved invaluable for this study because it offered insights into how users formed lasting connections with specific virtual worlds, especially as many reflected on their nostalgia for *AltspaceVR*.

I combined participant observation with interviewing through go-along interviews. This created an interactional space where participants could express themselves not only verbally but also through their avatars' movements and behaviors. Real-time data on users' interactions with the immersive environment were obtained, capturing how they navigated and responded to various settings. Observing both participants' verbal responses and bodily reactions, such as using emojis and gesticulations, enhanced my analysis. Such non-verbal acts quite often expressed an emotional state or reaction not explicitly given voice to, adding a layer to the data. For example, I was able to observe the impact of social proximity within VR. Participants' avatars often leaned toward users with whom they were more familiar or displayed particular gestures when comfortable or engaged in the environment.

When possible, my request was to conduct go-along interviews on *AltspaceVR*. I asked participants who were willing to meet on *AltspaceVR* to choose a venue they preferred on an agreed day and time. The participants were free to choose the interview location on *AltspaceVR*, which often provided additional insights into their personal preferences and their connection to specific virtual spaces. Many participants selected worlds that were either personally significant or were spaces they had created. This freedom allowed them to lead the interaction and share their own narratives through the environments they had chosen or designed to conduct to interview, and this provided me with a deeper understanding of their relationship with these spaces.

When participants did not have a particular world in mind, I suggested to meeting at the *Campfire*, a famous community hangout space in *AltspaceVR*. The *Campfire* was an ideal location because it was well-known to many participants, offering a shared, neutral ground for the interviews. Despite being a social hub with a high user count, there were quieter areas where private conversations could take place

without interruptions. For participants who desired complete privacy, we moved to private worlds. While the *Campfire* had fewer users than usual in the final days before *AltspaceVR*'s closure, it still provided opportunities to observe how users interacted with each other in public spaces. These observations were quite valuable to understand how individuals behave when they encountered with their friends or familiar users. In this way, go-along interviews added a social context to the interviews.

Some interviews started in the *Campfire* and moved to other worlds, depending on the participant's preference. For example, participants often took a tour of their favorite worlds, event spaces, or even virtual environments they had personally created. These transitions between worlds during the interviews offered further insight into the diversity of spaces within *AltspaceVR* and the particular connections participants had with these spaces. For example, some participants would reflect on how they spent time building their virtual world, giving glimpses into the creative processes behind virtual space-making. 3 of the 24 go-along interviews took entirely place in the *Campfire*, while another 2 interviews started there but later moved to different worlds. Most were interviews held in worlds that the participants preferred, and in many cases, we ended up visiting three or more different worlds during a single interview.

The go-along method allowed me to gather the variation of users within these spaces, observing world-switching and how these environments shaped their social behaviors and identities. During the interview, the switch between worlds was possible. This is similar to social VR, where users are constantly exploring other virtual environments. This fluidity was an important part of data collection for me, in the sense that it showed how users experience and navigate the wider virtual ecosystem beyond the discrete world. The go-along method was critical for showing not only personal attachments of users to these spaces but also their ability to adapt and engage in different virtual environments according to their social needs and preferences.

4.2.2.4.Online Interviews on Video Conferencing Platforms

In the video conferencing interviews online, which were held on platforms such as *Zoom* and *Discord*, I have asked a similar set of questions from those used in the go-along interviews. However, the interviews I conducted on 2D platforms presented

a number of distinct limitations-particularly, an inability to observe participants' interactions in a 3D environment. Without this spatial and contextual engagement, interactions had to be limited to the participants' verbal responses, in which much of the richness was in the non-verbal behaviors. While I still get insight into the thoughts and perspectives of participants, the absence of their physical movements, facial expressions, and interaction within a shared space limited the understanding that I could achieve with go-along interviews.

In total, 17 interviews were conducted via video conferencing platforms, and while I encouraged participants to keep their cameras off if they preferred, most willingly chose to turn them on. This decision to use video added another dimension to the interview process, allowing for some level of visual connection between myself and the participants. Non-verbal cues such as facial expressions, hand movements, and posture became important indicators of emotional responses, engagement, and comfort levels. However, the 2D nature of these interactions meant that these cues were limited to what could be captured within the confines of the camera frame, lacking the immersive quality and embodied experience of VR.

I ended up conducting a total of 17 interviews via video conferencing platforms, although encouraging participants to keep their cameras off if preferred, most willingly chose to turn them on. The use of video added another dimension to the interview process, allowing a certain level of visual connection between myself and participants. Non-verbal cues, like facial expressions, hand movements, and posture, became very important in terms of signaling emotional responses, engagement, and comfort levels. However, the 2D nature of these interactions made these cues confined to what was captured within the camera framing.

Not having this spatial context also meant participants relied on their memory to describe certain experiences, which resulted in arguably less spontaneous and less embodied accounts than the go-along interviews. In VR, participants could show me specific spaces, objects, or environments which triggered memories or emotions in real time, providing a richer, more dynamic data set. Whereas the discussions were more summary in the video conferencing interviews and disconnected from the virtual settings being described. Additionally, while video conferencing interviews allowed for greater flexibility in scheduling, they lacked the immersive and participatory

qualities that are imporant to understand how users experience and interact with virtual spaces. The choice to keep cameras on or off during these interviews also impacted the level of connection and engagement. As their cameras are turned on for some, I could gather their emotional states from some observation of their facial and bodily cues.

Despite these limitations, video conferencing interviews still provided an opportunity to gather verbal data on exploring participants' reflections of their experiences in social VR. They offered an opportunity for participants to articulate their thoughts in a more relaxed setting, without the added cognitive load of navigating a VR environment. This sometimes resulted in more focused discussions of their experiences at the expense of losing some of the contextual richness provided by the go-along interviews.

4.2.2.5.Interview Questions

In this study, semi-structured interviews with open-ended questions were used to explore various scenarios. The questions were organized into three sections based on the participants' roles and divided into two formats depending on the type of interview. Online interviews included 22 questions for event creators, 25 questions for world creators, and 31 questions for users. For go-along interviews with users, two additional questions were added, bringing the total to 33 questions. While the go-along questions for creators did not change in format, the way I asked the questions and the specific questions I chose to focus on were influenced by the environment we entered. Depending on the context, I adapted my approach to align with the surroundings and the interactions taking place. Furthermore, if a creator had multiple areas of expertise, such as being both a world developer and an event organizer, they were asked all relevant questions. Although all experts were assumed to have some experience with the platform as "users," they were recruited for their expertise and were not asked user-specific questions. However, if a participant identified as having "all roles," a mixed set of questions was asked.

The interview questions aimed to understand participants' experiences. While the semi-structured questions were similar across participant groups and formats, the go-along interview format allowed context-specific questions and provided opportunities to ask the same question in different ways. For instance, participants

demonstrated platform interactions they liked or disliked, used expressive tools to explain their points, and showcased features they imagined would be useful. The virtual environment where I as the researcher and the participant were co-present shaped the course of the interview, often leading to additional questions based on real-time observations. The number and range of questions sometimes depend upon respondents' experiences, skills, and interests. The researcher often asked follow-up questions to clarify or build on participants' responses while omitting some questions. The interview questions can be found in *Appendix B*.

4.2.2.6.Interview Analysis and Writing

To extract meaningful insights, patterns, and themes from the interviews, I employed Braun and Clarke's (2006) approach to thematic analysis. This qualitative interview analysis method involves generating codes and extracting related themes. My analysis began with listening to and transcribing all audio-visual recordings. I transcribed the audio recordings of the interviews using *Word Dictate*, then edited the texts for further analysis. I uploaded all the transcribed documents to *Atlas.ti*, a qualitative data analysis software, and used it for coding and analysis.

I reviewed the transcripts thoroughly for meaningful text units around my research questions and framework. Throughout this process, I looked at the patterns and commonalities in participants' responses and grouped them into code categories. Each category was labeled by descriptive codes that encapsulate the respective themes. Based on the theoretical foundation of my research framework, I identified three primary code categories: Perceived space of affordances, conceived space of programming, and lived space of virtuality. Additionally, I introduced a fourth category, closure and migration, to address the dynamics of platform transitions and the reproduction of social spaces during these processes. To facilitate my analysis, I organized my codes within these categories using *Atlas.ti*. Initially, I identified 72 different codes, which I later refined to 47 by merging similar codes using the software's "merging" tool. Within each category, I identified sub-themes to develop precise definitions for each code. *Figure 4.2* outlines the code categories along with their associated codes.

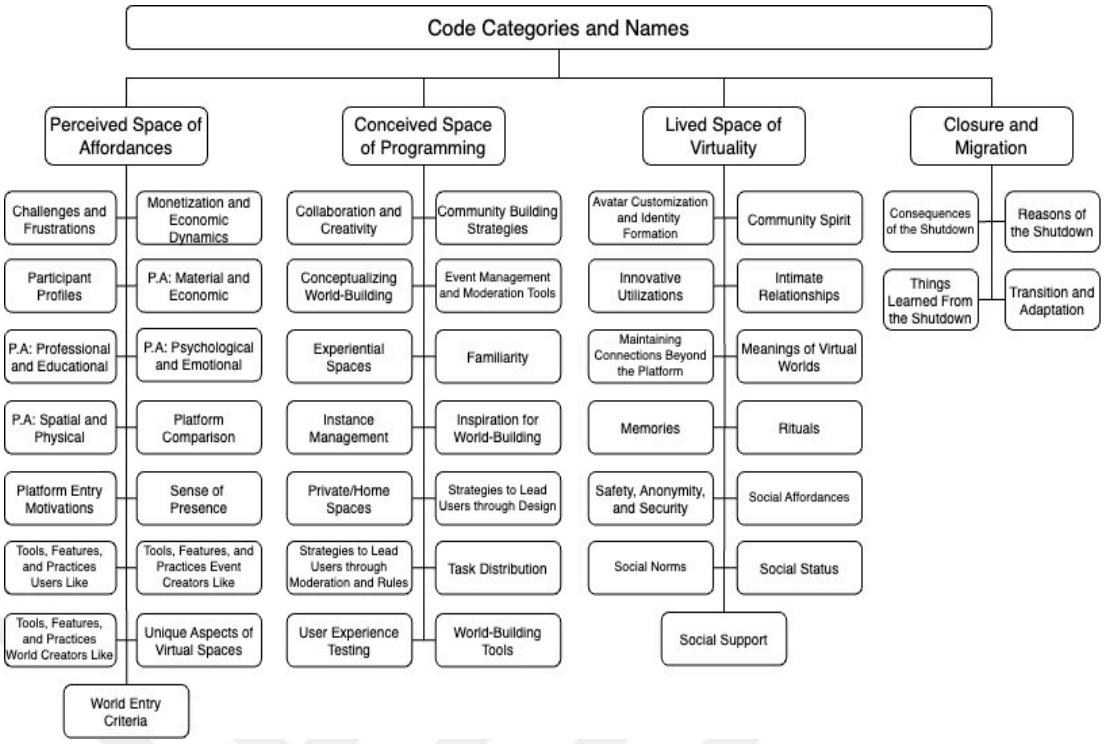


Figure 4.2 Code categories along with their associated codes.

Next, I utilized *Atlas.ti* for an inter-code analysis to determine the relationships between different codes. The "code manager" feature allowed me to manage my codes and display their occurrences across documents. By clicking on any code, *Atlas.ti* displayed all associated quotations. I then used the "code co-occurrence analysis" in *Atlas.ti.* It shows a matrix with the number of instances where two or more codes occur together within the data. Where such co-occurrence happens frequently, there might be a connection between these concepts. The software automatically demonstrated the repeated coding across various codes, which allowed me to identify internal correlations and the connections between different code categories. This holistic analysis allowed me to understand how various code categories relate to each other and to the overall structure of my data. The assessment of go-along interviews was enriched by field notes detailing participants' non-verbal cues, body language, and interaction with the virtual environment.

5. RESULTS AND DISCUSSION

This chapter covers the results of the study, organized according to the framework of research. The aim is to provide a comprehensive analysis of the data collected, the light of key themes and patterns arising from interviews and participant observations, set against wider theoretical and practical debates. Each category of finding is identified and interpreted from theoretical perspectives, providing an insight into their implications and standing within the conceptual framework of the study.

The interview findings are divided into four code categories: “Perceived Space of Affordances,” “Conceived Space of Programming,” “Lived Space of Virtuality,” and “Closure and Migration.” Each category is further divided into related codes and sub-themes, which highlight recurring elements within the data. This approach provides an overview of the key findings, clarifying patterns and notable aspects while illustrating each code’s role and its thematic connections.

Perceived Space of Affordances code category contains 15 codes; Conceived Space of Programming, 14 codes; Lived Space of Virtuality, 13 codes; and Closure and Migration, 4 codes. Additionally, one free-standing code, “future of the Metaverse,” exists outside these main categories. A comprehensive summary of the codes used in the analysis, along with their definitions and sub-themes, can be found in *Appendix C*. By systematically exploring each code category, the aim of this chapter is to answer the research questions and shed more light on the investigated phenomenon. Beyond the presentation of core findings, the chapter further examines the relationships between different dimensions and reflects on the implications of common patterns for social VR platforms beyond *AltspaceVR*.

With this approach, the chapter presents a critical interpretation that contributes to the broader objectives of the study. This investigation sheds light on the complexities and processes involved in the subject matter, furthering the overall aims of the research. Direct quotes from participants strengthen the results by offering rich

qualitative details regarding participants' experiences and views. I also included figures that I extracted from *AltspaceVR* during participant observation and go-along interview processes. These figures add depth to the findings and discussions by offering a virtual context, which can enhance readers' understanding of the concepts and implications presented.

5.1.The Perceived Space of Affordances

This section delves into the Perceived Space of Affordances within *AltspaceVR*, organized into the following subsections to cover how users and creators engage with the platform. It begins with "Affordances," examining affordances that shape user interaction, including "User Interface," which discusses design elements that facilitate navigation; "Environmental Affordances," exploring spatial and object-based interactions; "Communicative Affordances," focusing on tools for social interaction; "Affording Creation," which considers creation and customization tools available to users; "Perceived Affordances," describing the functionality users identify and use; and "Perceived Challenges," outlining obstacles users encounter on the platform.

The section then focuses on "The Rhythms of Everyday Life in *AltspaceVR*," detailing the patterns of platform engagement. Subsections include "Platform Entry Motivations," exploring what draws users to social VR and *AltspaceVR*; "World Entry Criteria," examining the factors influencing which worlds users choose to enter; "User Demographics," presenting insights into the platform's user base; "Device Usage," which considers how device choice impacts user experience; and "Time Spent," analyzing the amount of time users invest in the platform.

5.1.1. Affordances

Identifying the affordances of *AltspaceVR*, in context within the broader landscape of social VR through comparisons with other platforms, reveals a number of key insights into what makes it different or similar to other platforms. *AltspaceVR* was an immersive social virtual reality platform that allowed users to interact with each other inside a shared 3D space. It allowed users to engage in live events,

gatherings, meetups, shows, and casual hangouts while also creating and hosting their own events, worlds, and a wide variety of assets. Interviews and observations showed that the platform differentiated itself from other social VR platforms in terms of accessibility, flexibility, a strong event system with extensive content channels, and strong community focus.

First, *AltspaceVR* was highly accessible since it supported a wide variety of devices and both VR and non-VR participation. The hybrid nature of this made the platform more inclusive, a feature noted by several participants, including P13.On the other hand, *Horizon Worlds* is available only on *Meta Quest* headsets, which makes access impossible for people owning different hardware, and *VRChat* requires specific hardware for good performance and does not support non-VR participation, thus not as accessible.

Another reason *AltspaceVR* was more accessible is that it was free to use. As P37 mentioned, on *AltspaceVR* events and worlds could be created free of charge, while other platforms such as *VRChat* and *Engage* charge for the use of these features. For instance, P29 mentioned how on *VRChat*, users can't build worlds until they have been a user for a certain amount of time and can only build one world per week. Moreover, the world-building in *VRChat* is limited by size, polygon count, or performance, and additional options are unlocked after paying. *Engage* is recognized for professional usage and boasts a high-fidelity environment; Although suitable for educational and business purposes, subscription costs are not very welcoming for users seeking a free platform.

Second, *AltspaceVR* allowed creators to create their assets and worlds in *Unity* and upload them onto the platform. This integration gave creators flexibility beyond the platform's built-in toolset and templates, offering them more creative freedom. In contrast, as noted by P2, P19, and P28, *Horizon Worlds* does not have *Unity* integration, and all creations are owned by *Meta*. There are limitations to using *Horizon Worlds*' built-in tools that restricts creators' control, and they cannot export or transfer their creations out of the platform. Most participants named these restrictions as the main reason for their choice not to use *Horizon Worlds*.

Thirdly, *AltspaceVR* was unparalleled for event management: It sported robust tools for hosting and moderating events-features unrivaled by other social VR

platforms. Many participants mentioned that there is no similar strong back-end for event management on other platforms and highlighted this as a big limitation. This includes the absence of tools for promoting, organizing, and managing events effectively, which were available on *AltspaceVR.* For example, as noted by P15 and P25, *AltspaceVR* featured an organized event system compared to other platforms. It offered host and moderator tools like stage blockers, the ability to mute the audience or use a megaphone. The event calendar and notification system were highly prepared by users for being so effective. *AltspaceVR*'s seamless, integrated event management system was consistently praised by event creators, who often mentioned it as a key factor differentiating the platform from others that didn't even have a built-in event calendar. P6 emphasized the convenience of having an event calendar within *AltspaceVR* to notify followers about upcoming events. Similarly, P2 pointed out that *AltspaceVR* offered a variety of events, and creating, discovering, and promoting events was much easier than on other platforms, where users had to rely on external sites like *Facebook, Discord, Meetup,* or *Eventbrite*. These missing features were viewed as a significant disadvantage for other platforms when compared to *AltspaceVR*'s integrated event management system.

Fourtly, participants frequently highlighted moderation, safety tools, and community standards as major strong points of *AltspaceVR*, especially when these are compared to other similar platforms like *VRChat*. Such features, built into the event management system, helped them establish and enforce policies and norms in virtual worlds so that community building becomes more effective. *AltspaceVR* had a set of principles and community standards which addressed expected user behaviors in events and worlds. These principles were developed to prevent users from harassment, molestation, defamation, intolerance, impersonation, imitation, trolling, bullying, lewd behavior, and the display of offensive content. Public events and worlds containing inappropriate content, such as pornographic, violent, or illegal messages, were at risk of being flagged as "mature content," changed to private status, or removed by the platform. Besides, community standards are called for the protection of personal information and respect for personal space. Violations of these rules could result in immediate account suspension or permanent termination.

To further enhance safety, *AltspaceVR* gives users a personal space bubble, the ability to mute and block, ways to exit, and a way to report users, events, or worlds.

The platform also reminded users regularly of these safety features and reinforced the need to follow the rules in various virtual spaces. By placing safety, accountability, and inclusivity first, *AltspaceVR* laid the foundation whereby users could establish and nurture robust communities.

5.1.1.1.User Interface

The design of *AltspaceVR* was aligned with the core focus of the platform: accessibility, event-based engagement, community building, and immersive interaction. Event-based engagement, community building, and immersive interaction were the core focuses of the *AltspaceVR* design. The "Title Screen" was an entry interface into the platform. This screen provided ways for users to register themselves, personalize their avatar, find content, and launch into events and worlds. The "Title Screen" included tabs for "Destinations," "Entry Code," "Tutorial," "News," "Account," "Main Menu," and "Quit" (see *Figure 5.1*).

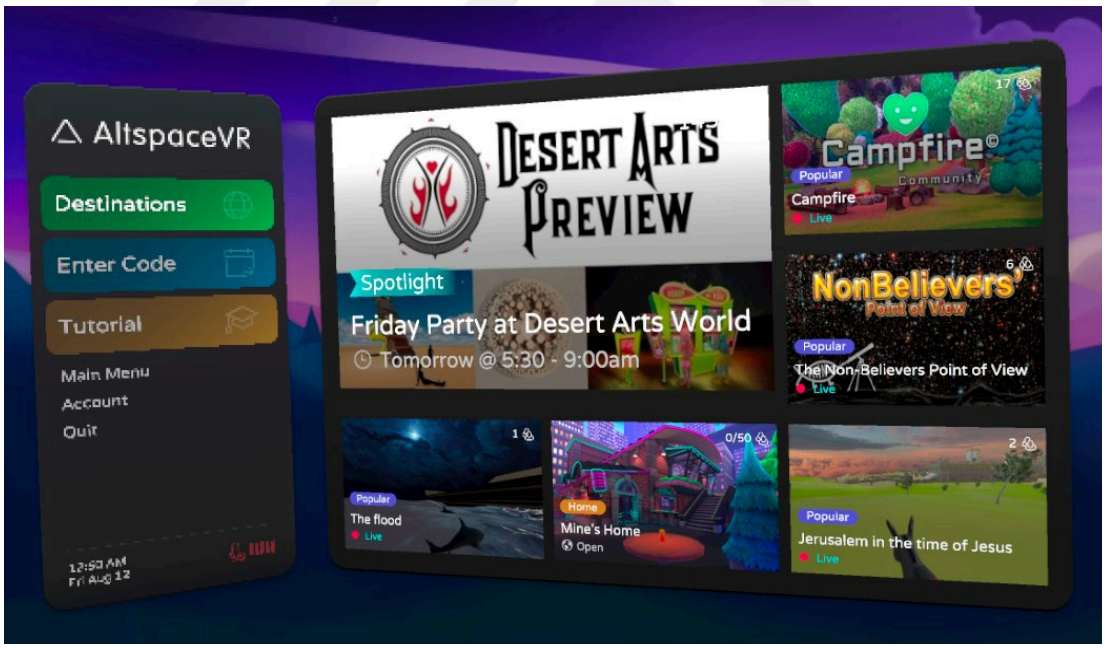


Figure 5.1 The Title Screen in *AltspaceVR*.

Upon logging in, users were provided with two tutorials to learn and practice the basics of the platform. The first tutorial helped new users set up the application on their devices, get oriented in the surroundings, move around, and customize their avatars. The second tutorial was more about information, such as how to use key features like social interactions and community standards. It also taught users how to create and host events. In addition to these tutorials, information boards in the

community hangout spaces offered guidance on how to use the platform, including tips on discovering worlds and flying (see *Figure 5.2*). These detailed tutorials and community information boards empowered users to navigate the platform with confidence while promoting community standards and encouraging interaction.

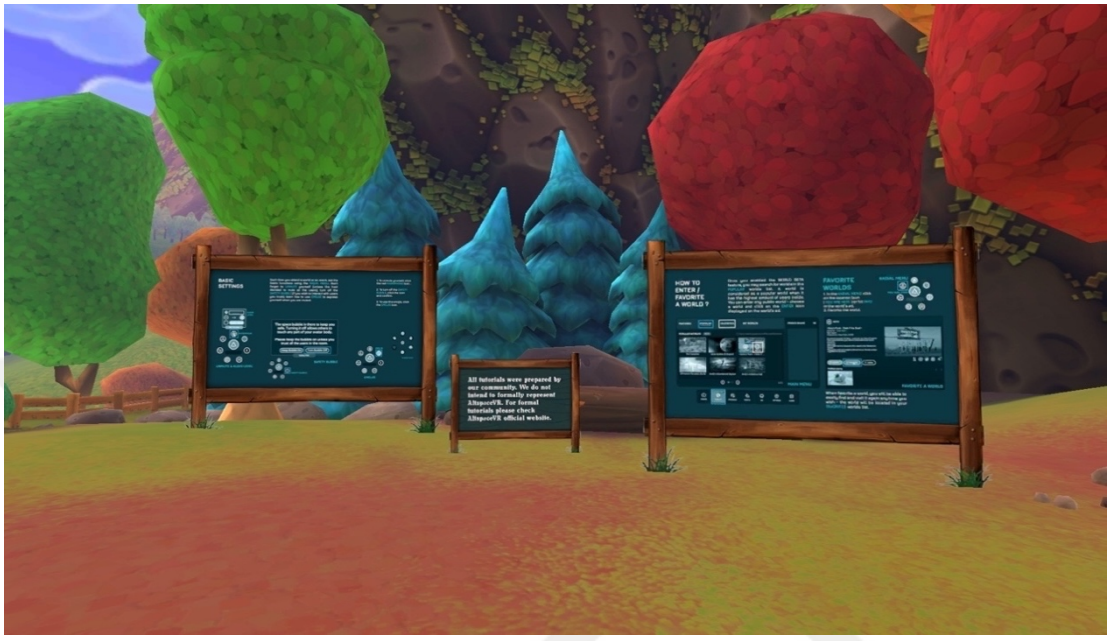


Figure 5.2 Information boards in the *Campfire*, *AltspaceVR*.

The "Main Menu" of the platform served as the primary navigation bar at the bottom of the screen. It streamlined access to key features and made it easy for users to discover new experiences and connect with friends. It included tabs for "Events," "Worlds," "People," "Me," and "Settings" (see *Figure 5.3*). The "People" tab displayed users' friend lists, where they could send and accept friend requests, message their friends, and manage blocked users. The most important function of this tab was that it allowed users to see which of their friends were online and what event or world they were in, giving them the option to teleport directly to those worlds.

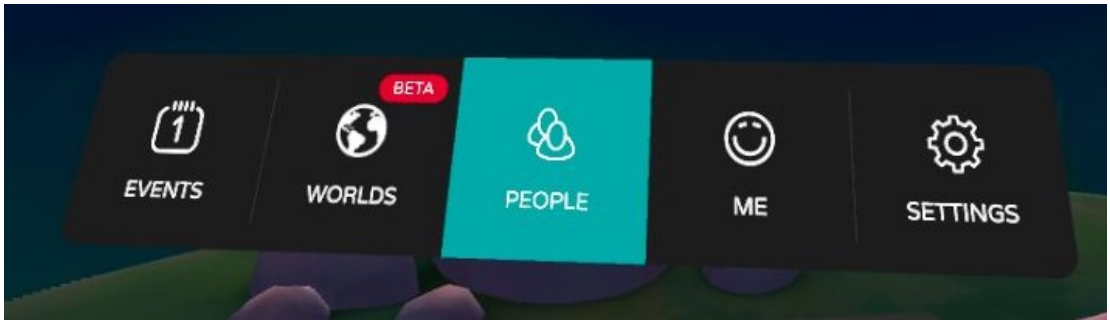


Figure 5.3 The Main Menu and navigation bar in *AltspaceVR*.

There were several ways to find events and worlds on the platform. From the "Title Screen," users could select "Destinations" to browse events. From the "Main Menu," they could navigate to the "Events" and "Worlds" tabs. In the "Events" tab, users could view all live and upcoming events. These events were filtered by date (see *Figure 5.4*) and categorized by activity type (see *Figure 5.5*). Users could also create a list of "Interested Events" by RSVPing.[22] The number next to the asterisk signs showed how many users were interested in an event, and the total number of asterisks reflected the event's overall popularity. The more popular an event was, the more featured it became on the platform.

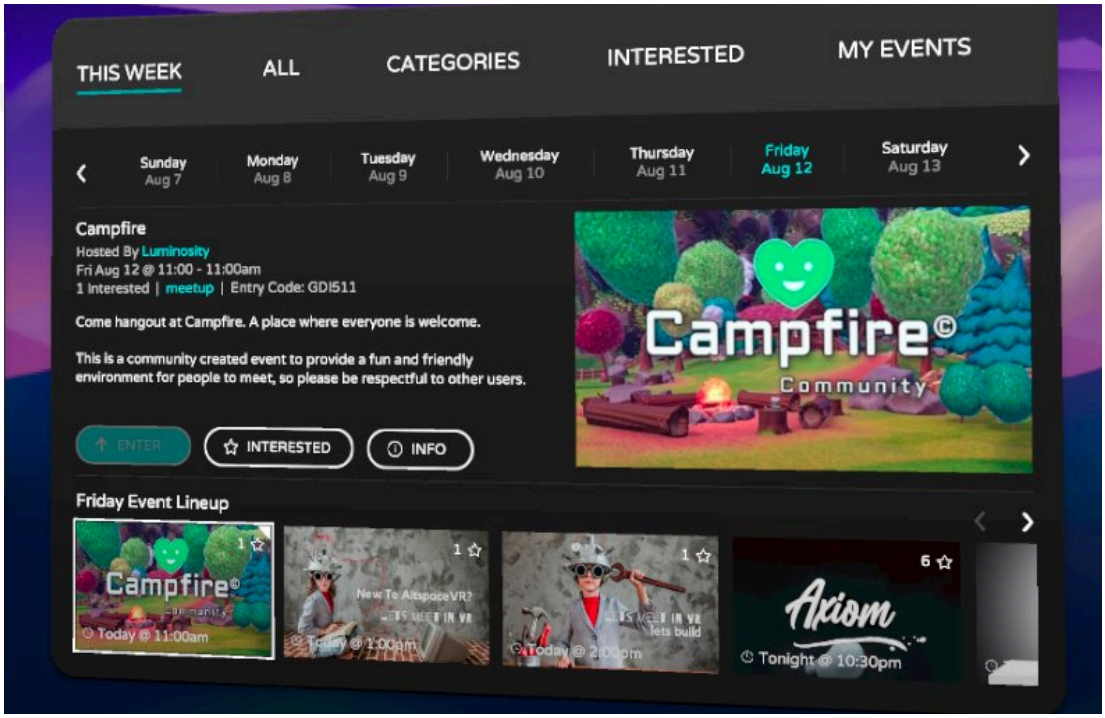


Figure 5.4 An interface displaying upcoming events in *AltspaceVR*.

[22] The term "RSVP" comes from the French phrase *"Répondez s'il vous plaît,"* which means "please respond." In *AltspaceVR*, RSVPing referred to selecting an option to indicate whether a user planned to attend an event.

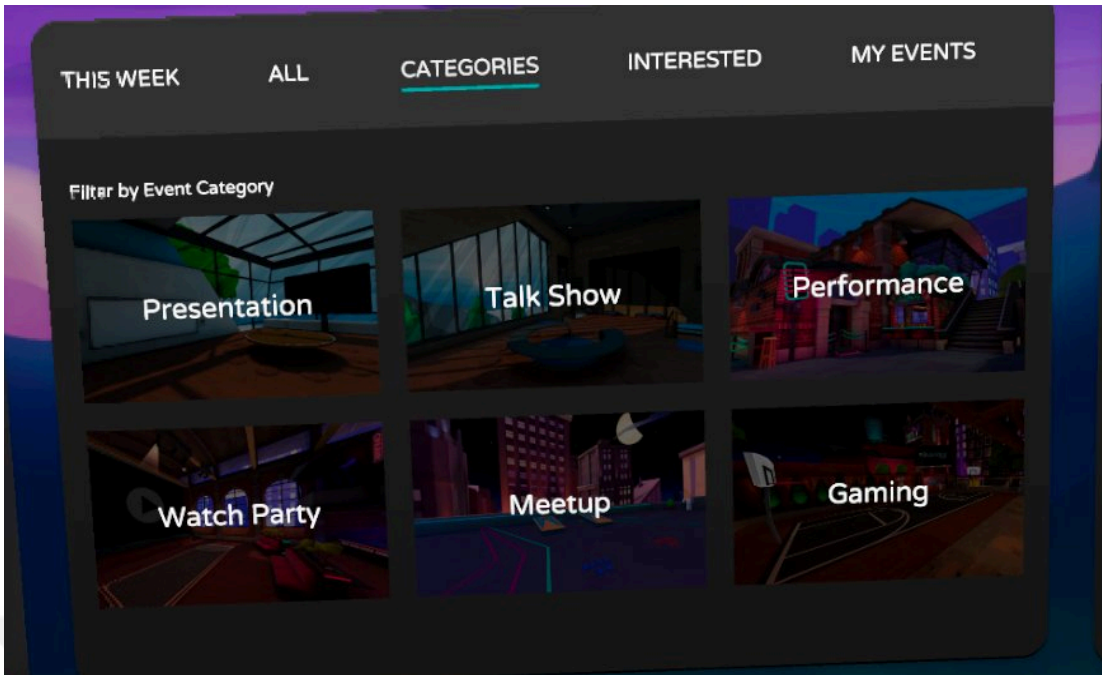


Figure 5.5 An interface displaying events by category in *AltspaceVR*.

Users could also access worlds from the main menu. The worlds were categorized as "Featured," "Popular," "Favorite," and "My Worlds" (see *Figure 5.6*). In this figure, the number on the right side of the slash showed the maximum capacity of the world, while the number on the left displayed the current number of users. In the "Worlds" tab, a notification frequently appeared, warning that "user created spaces can affect performance."

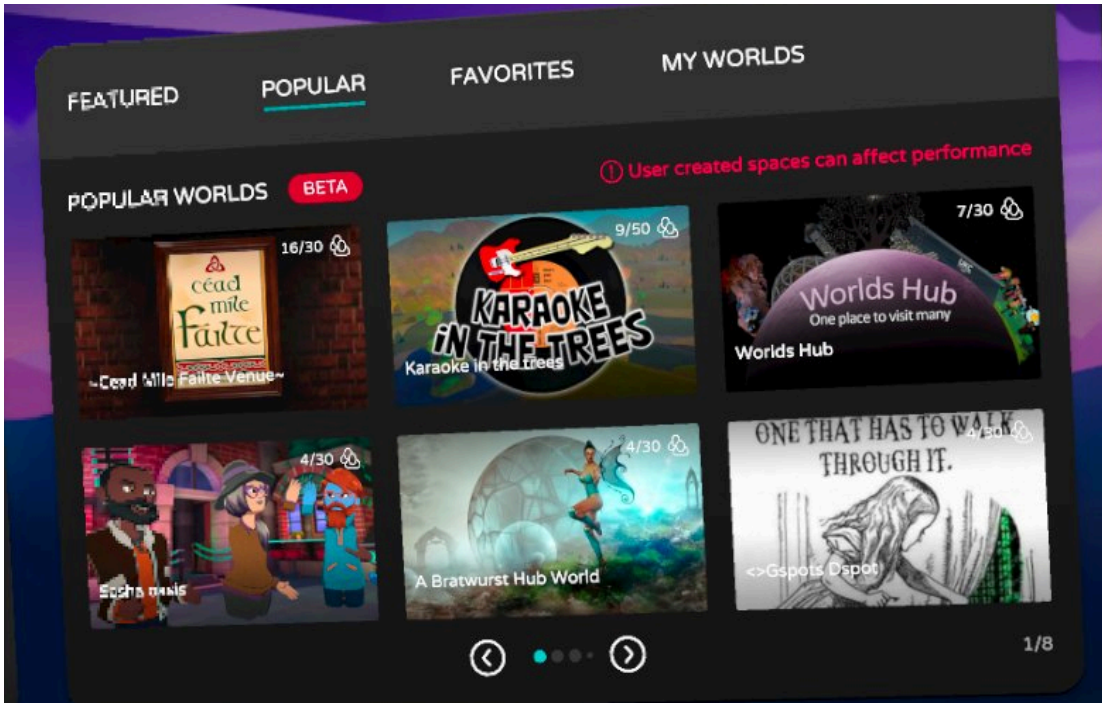


Figure 5.6 An interface displaying worlds by category in *AltspaceVR*.

Another important menu interface was the “Radial Menu,” offering quick access to tools for communication, safety, and customization. Users could use this menu inside a world. It was positioned in 3D on the bottom left side of the screen and remained visible whenever users were in an event, world, or their home space (see *Figure 5.7*). This menu allowed users to access space settings and control the main navigation. Icons represented the various menu tabs, enabling users to access features such as the “Microphone,” “Emojis,” “Safety Bubble,” “Selfie,” “Camera,” “Title Screen,” “You Are Here,” and the “Main Menu.”

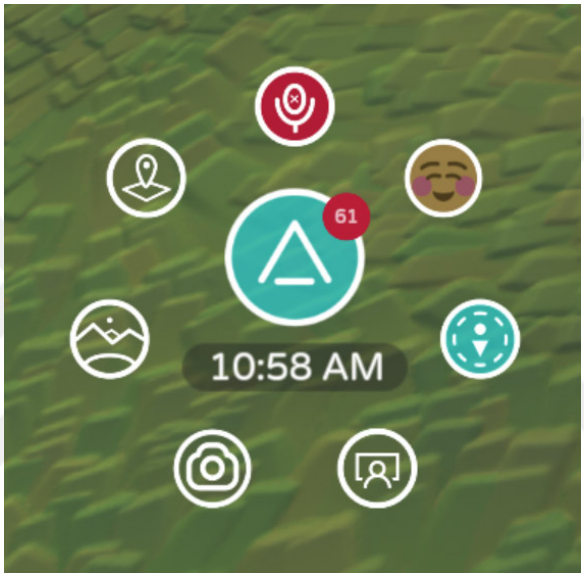


Figure 5.7 The Radial Menu in *AltspaceVR*.

5.1.1.2.Environmental Affordances

AltspaceVR provided spatial presence, object-based interaction, navigation, and locomotion of various environmental affordances for the creation of immersive experiences. These affordances themselves are not separate but together are interlinked in the act of engaging and moving users within virtual spaces. One of the core immersive designs of *AltspaceVR* was the creation of spatial presence through spatial sound, lighting, and interactive objects together, emulating real-world dynamics. This allows users to experience sound directionality and distance: Being able to perceive where voices or environmental sounds are coming from to enhance the illusion of presence. Other simple object-based interactions, such as picking up items, hearing ambient sounds like cracking fires, or engaging with dynamic objects like fireworks, enhanced this feeling of immersion even more. For example, P23 highlighted:

"Things that users can interact with...they feel like you're more part of the world." (P23)

Real-world-inspired sounds integrated with both interactive and non-interactive objects enhanced users' sensory engagement. For instance, the sound of waves near a seaside world or the crackling of burning wood near a campfire added to the realism. Such sensory feedback from interactions not only enriched the experience but also created a closer bond with the environment. Other factors that were important in the creation of the virtual environment included lighting and sound. If properly balanced, these factors would enhance immersion by aligning the virtual environment with the mood intended. P19 is a professional musician and a sound engineer who identifies the light and the interaction of the sound as central elements in setting the environment's overall ambiance. On the same note, P26 has identified the important factors that enhance immersion.

"The depth that light and sound can create is amazing." (P19)

"Lighting, noises, even the environment... depending on what you're making will make it either more immersive or not at all." (P26)

Avatars on *AltspaceVR* also added to the immersion because of the design standardization. At headset setup, the system automatically adjusted avatars' heights based on the ground level to create a consistent experience. Since full-body tracking was not available, users saw only the upper half of avatars, so they appeared to stand at a uniform height. The standardization of the environment added to a cohesive user experience.

In social VR platforms, navigation and locomotion are other critical components for creating an immersive user experience. Navigation refers to the methods users employ to find their way around virtual spaces, while locomotion refers to the techniques used to physically move within these environments. The navigation tools of *AltspaceVR* included various user interface[23] (UI) elements, such as menus and maps to let its users understand where they are and how to get to specific destinations. Wayfinding aids, which include signs, markers, and other visual cues showing the direction, made user navigation in virtual environment even mor straight forward.

[23] The user interface elements of *AltspaceVR* are presented in the "User Interface" section.

Teleportation portals, or stations, also allow users to quickly move to different locations in social VR platforms. In *AltspaceVR*, these portals often took various shapes, such as holes, doors, or buttons and signify destination centers, like the "A Journey Across the German Ocean" portal placed on a pier above the sea (see *Figure 5.8*).

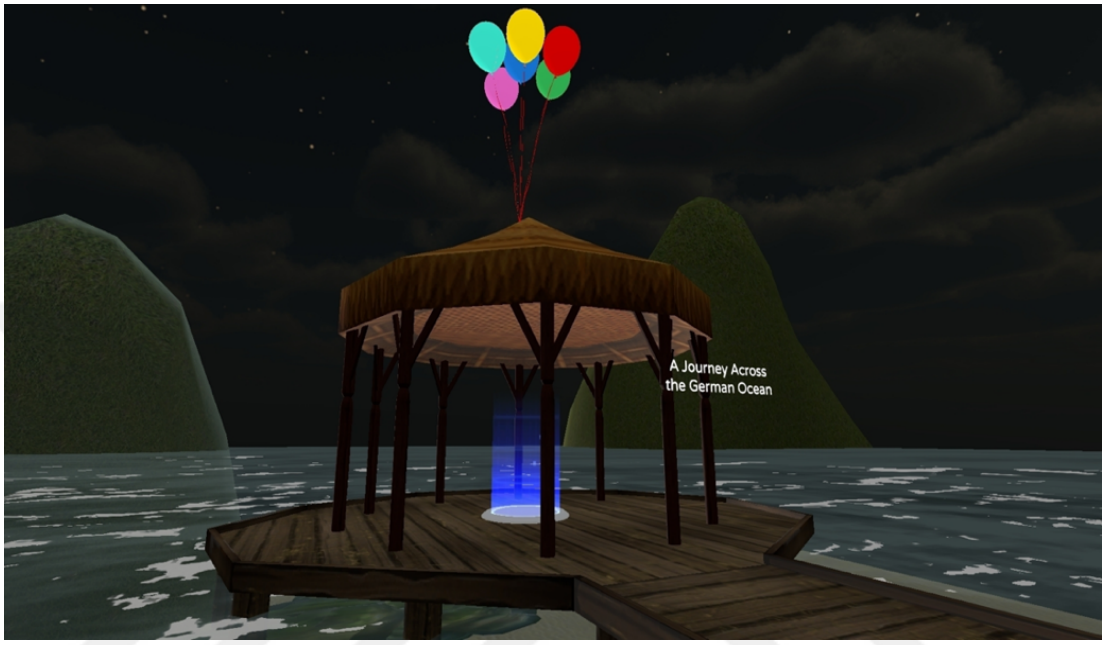


Figure 5.8 A teleportation portal created for *A Journey Across the German Ocean* in *AltspaceVR*.

To teleport multiple users to a different space, users could sometimes open teleportals. *Figure 5.9* illustrates multiple users attempting to enter a different virtual world through an instantly created teleportal. However, there have been several disadvantages with teleportation portals. One could not see the population of the destination world as a user. Besides, they also could not quickly teleport back to their own location. Furthermore, some portals in popular virtual spaces required world codes that restricted users' access. These challenges reflect Kociatkiewicz's (2000, p.72) observation that not all virtual spaces are equally accessible. These worlds stay *"outside the realm of instant travel,"* emphasizing that even in the virtual world, there are centers and borders. This mirrors real-world social dynamics, where some spaces have greater accessibility while others remain disconnected.



Figure 5.9 Multiple users attempting to enter a different virtual world through an instantly created teleportal in *AltspaceVR*.

Teleportation portals represent a unique form of movement between spaces. Much like physical doors that symbolize transitions between indoor and outdoor spaces, teleportation portals instantly transport users across spaces. Lefebvre (1991, pp.209-210) states that doors are not merely functional but also carry symbolic meaning, framing spaces and transitions. In this context, teleportation portals in VR symbolize the transcendence of distances and boundaries, the framing of contrasting worlds, and the creation of new modes of interaction and embodiment.

Apart from navigation tools, *AltspaceVR* had four locomotion forms: Room-scale movement (physically walking around a real-world space corresponding to the virtual environment), joystick or controller movement (controlled by a joystick mimicking walking or running while standing still), teleportation (instantly moving from one point to another by using a joystick), and flying (flying from one point to another by using a joystick). Users could enable flying in the settings if they wished, but it was not available in some spaces, depending on the creator's choice. Flying is a unique feature popularized by *AltspaceVR*, which many other platforms adopted after it gained popularity. Teleportation, on the other hand, has *"a low possibility of inducing VR sickness"* (Prithul et al., 2021, p.1) and is especially useful for saving time and quickly reaching distant locations in social VR platforms.

These forms of locomotion transcend physical limitations. Virtual worlds are not constrained by geographical proximity. It is possible to "teleport" from a skyscraper

with a view of New York to a tropical beach in the Maldives in seconds. This decoupling of space and time, as described by Kociatkiewicz (2000) and Giddens (1990), is emblematic of the "late modernity." Teleportation in VR represents the shrinking of time and space: The destination is reached instantly, with no distance. This contributes to a new mode of being in virtual spaces, where the concept of travel is altered. In physical navigation, travel time is intrinsically linked to distance, but teleportation in VR compresses time into an "everlasting present" (Kociatkiewicz, 2000, p.73).

Like teleportation, flying mode also contributes to an added layer of experience that does not exist in physical reality. When users are teleporting or flying within a virtual space, the objects and scenery around them blur and pass as if it were a time-lapse. This mode of locomotion challenges conventional ways of experiencing space and offers a completely new way of interaction with the environment. It reshapes the users' relationship to space through this transition. The rapid flows of teleportation and flying enhance the participants' lived experience by enabling them to transcend the constraints of time and space into an ever-changing landscape. Thus, teleportation and flying are more than means of locomotion; they symbolize the transcendence of travel in itself, since the notion of distance has shrunk. They redefine users' perceptions of space, presenting them with fluid, ever-changing landscapes.

5.1.1.3.Communicative Affordances

AltspaceVR allowed users to experience social interactions proximate with the real world. Thus, one could walk up to other users, engage in conversations, and interact in ways that are natural and feel real. The communicative affordances provided by the platform were multifold, promoting virtual social communication among participants. Using avatars to represent themselves and communicating in ways involving gestures and expressions helped make their interactions more lifelike.

The main form of communication in *AltspaceVR* was synchronous voice chat. This feature allowed users to have real-time conversations. A speech bubble above a user's head would indicate when they were talking (see *Figure 5.10*). In addition, the use of spatial audio enhanced voice chat by aligning the direction and distance of

sounds with users' virtual positions. For example, users could sit around a table with others and have side conversations.



Figure 5.10 Speech bubbles as speaking indicators in *AltspaceVR*.

Users could also communicate with each other in real-time through "faked" eye contact and non-verbal behaviors. This type of eye contact was primarily driven by audio cues, where avatars engaged in conversation would appear to make eye contact, blink, and gesture with mouth movements. Although the eye contact wasn't based on actual gaze tracking in *AltspaceVR*, the system created the illusion of eye contact between users. Previous research on avatar-mediated communication indicated that *"faked eye contact can increase social presence"* (Bente et al., 2008) and *"perceived quality of communication"* (Garau et al., 2003; Alcala et al., 2023, pp.96-98). Similarly, I also observed that conveying emotions through faked eye contact enhanced the sense of social presence and improved the quality of face-to-face communication in virtual environments.

Users could also convey non-verbal behaviors through their controllers, which allowed various forms of interactions. Basic controls and hand gestures enabled users to interact with the ability to grasp, hold, and throw objects with haptic feedback. Partial finger and thumb tracking enabled users to use their fingers for input, such as making a fist, pointing, raising thumbs, and resting. Users could also wave their hands by shaking the controller in a rest position. Moreover, users could communicate

through emojis. There were six different emojis floating on top of their avatars, which allowed them to smile, frown, laugh, show a heart, high-five, and wave. My observations indicated that the use of emojis was both frequent and important among users, sometimes serving to signaling attention and at other times to express approval.

AltspaceVR enabled synchronous interaction through the alignment of head and body movements, allowing avatars to mirror users' physical actions and convey non-verbal cues. These allowed users to change their orientation in virtual space, such as turning front, back, left, or right, and provided reciprocal gestures like making a half-turn to look at somebody, nodding, or tilting the head upwards, downwards, or sideways. These micro-gestures could acquire specific meanings, such as signaling attention or indicating that one is listening. Synchronous body movements also played a crucial role in facilitating collaborative activities, such as playing games, which required quick, reciprocal actions.

The recognition of body, head, and hand gestures allowed users to develop close bodily relationships with each other. Intimate interactions like touching the face, putting hands on the waist or shoulders, hugging, and even kissing further enriched the virtual social experience. These embodied actions allowed users to simulate personal interactions, despite the absence of physical touch. As shown in *Figure 5.11*, two users virtually hug one another by placing their hands around each other's waists and shoulders, while in *Figure 5.12* two users touch each other's arms during a *Campfire* conversation. Such interactions demonstrated that VR could go beyond simply meaningful bridging physical distances in ways that allowed people to connect.



Figure 5.11 Two users engage in a virtual hug, placing their hands on each other's waists and shoulders while talking in *AltspaceVR*.



Figure 5.12 Two users touch each other's arms while engaging in a conversation in *AltspaceVR*.

As described in the section "Lived Space of Virtuality," the embodied interactions in *AltspaceVR* go beyond technical functionalities into dynamic ways humans seek to connect and communicate. These interactions involve gestures, micro-movements, and virtual touch, reflecting the ability of this platform to replicate and enhance the nuances of real-world social behavior. Indeed, participants often framed such gestures in terms of their emotional and social importance, as even the simplest acts came to be imbued with a sense of presence and shared experience. From casual

greetings and collaborative activities to more personal expressions of care, these embodied interactions facilitated a wide range of social connections. Whether through a simple wave, a nod of understanding, or a collaborative gesture, the platform allowed users to create meaning, establish cohesion, and develop emotional connections. These communicative affordances demonstrate how VR technology reshapes human interaction by allowing users to interact with each other in dynamic and emotionally impactful ways, despite physical distances.

5.1.1.4.Affording Creation

AltspaceVR provided a free virtual space equipped with a diverse set of tools and empowered its users to create, host, and attend both public and private events and worlds. *AltspaceVR*'s event management features were the primary thing that event creators and users liked the most. The platform encouraged the creation of various public events by hosting platform-based community meetups its early years. This approach, in my opinion, led to most events being organized and hosted by its user community.

As mentioned before, in *AltspaceVR*, all public events were categorized by activity type and listed on a calendar. Users could search for current and upcoming events, follow event channels, create an "interested events" list, and get notifications when the events were approaching. Event hosts could also promote their events through *Discord* channels, as well as by recording sessions or live streaming them on *YouTube*. Recording sessions or live-streaming events on *YouTube* was a common activity in *AltspaceVR*, and many videos created within the platform can still be found on *YouTube*.

AltspaceVR hosted a wide range of events, including festivals, concerts, parties, comedy and karaoke shows, LGBTQ+ meetups, educational courses and trainings, collaborative team meetings, conferences, seminars, networking events, religious gatherings, meditation and well-being sessions, support group meetings for issues like anxiety, alcoholism, and grief, as well as wedding ceremonies and even funerals. The topic of the events or talks could range from world-building to art, psychology, philosophy, history, religion, spiritualism, mysticism, and mindfulness. *AltspaceVR*

also hosted virtual red-carpet film premieres, festivals such as the official virtual Burning Man experience, fashion shows, official *Microsoft* events, and even presidential debates. Apart from scheduled events, the platform featured common meeting places, with the most notable example being the world called the *Campfire* (see *Figure 5.13*), as well as various user-generated virtual worlds.



Figure 5.13 The *Campfire* in *AltspaceVR*.

While *AltspaceVR* was managed by *Microsoft* and had its own creators team, the primary creators of its worlds and events were its users. Virtual worlds in *AltspaceVR* could be categorized into two types: User-generated worlds and platform-generated worlds. The creators of user-generated worlds could select a world template provided by the platform or build a custom world from scratch through *Unity*. The platform offered various world templates for different scenarios and enabled its creators to simplify the process of 3D world-building and event space creation. P19 and P21 both emphasized how *AltspaceVR* enabled creativity regardless of technical expertise:

"Creative process here is amazing because it doesn't matter if you are a really strong technical guy or not, you can create worlds just with the tools that are in Altspace." (P19)

"I think Altspace brought up the creative side of a lot of people, a lot of people. It is a really, really good thing." (P21)

Worlds created using templates were typically used for temporary purposes or by creators lacking the knowledge to build from scratch. This encouraged users without world-building expertise to create their own experiences. P6, with no *Unity* knowledge, shared their building experience through a world template:

"It [AltspaceVR] gives us the ability to put in any world template we want. Those of us that don't know Unity, also have the ability to customize. For instance, this is just a template of an apartment that we all got it. I was able to, even though I don't have experience with Unity, able to come in here and customize it in my taste." (P6)

Conversely, spaces that were built from scratch were generally intended for permanent use and were created by experienced creators who could achieve greater customization and originality. Creators could upload their *Unity* creations to the platform, which allowed them to design entirely new worlds and MREs from scratch. The platform encouraged the creation of these kind of original user-generated worlds in various ways, such as providing detailed tutorials, offering community support forums, and featuring user-generated worlds (see *Figure 5.14*). Therefore, the underlying affordances of *AltspaceVR* facilitated varying levels of user involvement and creativity in the creation and consumption of virtual spaces.



Figure 5.14 Featured user-generated worlds accessed through teleportation portals in the *Campfire*, *AltspaceVR*.

This is a very unique capability for creation, especially the fact that users of VR can create their virtual places, whereas in reality, people cannot suddenly produce or change environments. Social VR platforms, like *AltspaceVR*, let users have creative control over spatial production not possible to achieve in real-world settings. Creation, in this case, serves as a transformative affordance that increases user engagement while providing the ability to foster a sense of agency and innovation within virtual spatial experiences, as discussed in the section "Lived Space of Virtuality."

As discussed in the "Conceived Space of Programming" section, creation allows users to move from being passive users to active producers of their virtual environment. This dynamic reshapes the conventional relationship between individuals and space, allowing users to create spaces that reflect their personal identities, values, and needs. For example, users can create fantastic worlds that deny the constraints of physical and natural laws, create real-world places, or design spaces for specific activities such as event hosting or collaboration. Moreover, the creation of virtual spaces has deep social implications. Collaborative creation, where multiple users collaborate in designing a space, adds new dimensions to teamwork and collective agency.

From a theoretical perspective, the production of space by Lefebvre (1991) becomes highly relevant. In virtual environments, users are not just navigating or being in spaces but actively producing them. These aligns with Lefebvre's notion of space as socially produced. VR offers an unprecedented flexibility in that users can reshape virtual spaces instantly. This ability to create and modify virtual spaces shifts the way people interact with and shape their environments. In fostering creativity, user agency, and collaboration, this affordance enriches virtual experiences and reshapes the relationship between people and space in ways that are not possible in physical spaces.

5.1.1.5.Perceived Affordances

Perceived affordances of *AltspaceVR* varied among participants, but some common themes emerged in their narratives. Based on the code analysis, I categorized and ordered the most common themes of perceived affordances under four dimensions: (1) Professional and educational, (2) psychological and emotional, (3) spatial and physical, and (4) material and economic.

The perceived professional and educational affordances were the most emphasized aspects of using *AltspaceVR*. This dimension comprised users' motivations and experiences in utilizing the platform for professional development, networking, and educational activities. For many participants, the platform afforded them with various opportunities for professional growth and networking. P9, P11, and P28 explained how *AltspaceVR* contributed to their professional lives as follows:

"I saw the potential for storytelling in VR and started exploring ways to tell stories in an interactive environment. We use this room for book launches and promotional events for authors." (P9)

"I'm a director in the real world. I come here to stay abreast of virtual reality trends and get inspired for projects in traditional media." (P11)

"I learned 3D modeling and world-building from a community on another platform, which I then applied in Altspace to help companies manage events and build worlds." (P28)

AltspaceVR offered a unique environment for educators and learners to interact, share knowledge, and conduct educational activities. It was also the first home of *Educators in VR*, the largest network of educators in the social VR landscape for many years. The platform was used to host educational events, conferences, and lectures, providing an immersive and interactive experience for participants. P13 and P14 described how *AltspaceVR* supported their educational endeavors as follows:

"I explored VR for educational purposes and realized its potential. AltspaceVR was accessible and democratized, allowing for meaningful educational interactions." (P13)

"Educators in VR provided a great platform for me to connect with educators globally. It was a big learning opportunity." (P14)

Additionally, professional and educational activities on the platform offered dual benefits. Some users, like P28, generated income while pursuing their hobby of teaching world-building.

"I teach world-building as a hobby, but I also do it for financial reasons." (P28)

The perceived psychological and emotional affordances of *AltspaceVR* were centered around social support, overcoming social anxiety, opportunities for personal development, and alleviating boredom. I observed that numerous events dedicated to these themes. Besides, many participants stated that *AltspaceVR* helped them to improve their mental health, build social skills, and enhance their overall quality of life. P21 described how personal encounters in *AltspaceVR* helped them during a difficult time:

"I was in a really low place. I felt worthless. I spoke to this person, and I got it off my chest. ... I had a weight problem. I still have a weight problem and I opened up to this person and we chatted for a couple of hours and it was a sort of emotional night and we came up with an idea together and they said to me, 'Why don't you make a world where you can chart your progress?' and I would start by charting the board and that changed everything." (P21)

AltspaceVR became the place where support groups would hold their meetings: The therapeutic environment helped overcome problems like grief, depression, anxiety, and addiction. Socially anxious participants in social activities stated that they received a certain relief in *AltspaceVR* because they felt more at ease when socializing and talking to others. P26, P32 and P36, who self-identified as introverted, stated that using VR eliminated social anxiety, enabling them to interact and converse more comfortably:

"Altspace helped me dramatically in my life. And it just, it means a lot, you know? It helped me come out. It helped me talk. It stopped me from being agoraphobic and freaking out when people tried to speak to me." (P26)

"I consider myself a bit of an introvert. I do maintain a lot of friendships. But it does take kind of a lot of energy to get out the door and go to gatherings and parties and I enjoy it so much, but there's this anxiety tied to it that I don't even tell my friends much about. And I find that like VR just completely eliminates that. Like it's really not even a thing to pop into VR and sort of introduce yourself, get conversations going. So it's like there's something about it that takes the anxiety of being social and it leads to a lot of rewarding conversations and friendships and experiences that I haven't really had the same level of comfort with." (P32)

"Improving communication skills was my main motivation. Being an introvert, AltspaceVR helped me engage with people and overcome my reluctance to speak." (P36)

AltspaceVR was providing a safe and inclusive environment for neurodivergent individuals as well. The platform offered them to engage in conversations without the typical challenges they might face in real-world interactions. P2 explained this as follows:

"People that are neurodivergent, especially if they have very complicated social skills, like they can't make eye contact, or they have difficulty speaking to somebody else, or the physical presence of another person causes anxiety. When they get into their avatar, all of a sudden they can talk to people." (P2)

The perceived spatial and physical affordances mostly included narratives that were associated with accessibility and inclusivity, convenience and flexibility, overcoming geographic barriers, and enhanced social and cultural experiences. Rural social challenges, age-related issues, physical health and mobility issues, and caregiving responsibilities were the most commonly emphasized themes in the participants' narratives. P16, who lives in a "conservative area," expressed how *AltspaceVR* helped them to socially connect with like-minded people:

"I don't live in a very good area for in-person socialization. And I know there's a lot of people on platforms like Altspace that had the same kind of thing with their rural area or in an area where they really politically disagree with a lot of the people that it influences their habits and ways of thinking. I live in a very conservative area. And especially there's also just not a lot of people my age in this town and I don't have the budget to move to like a city like I'd hope to. And so, for people like me, who don't have a lot of opportunity like that, Altspace was the most like normal people kind of place, like a place where people would be as they are in real life." (P16)

I found that people living in rural areas, where physical social opportunities were limited, often turned to *AltspaceVR* for more accessible socializing options. For older users, especially those aged 50 and above, socializing in *AltspaceVR* was preferred to keep their social life active and engaging since physical interactions become less

feasible with age. P7 and P34 who live in a rural environment with limited social interaction explained how *AltspaceVR* fulfilled her social needs:

"Well, I'm in a very rural location in New York and I work from home... when you're past 50 and you live in a rural area, your opportunities for socializing, are a bit limited." (P7)

"It [AltspaceVR] does a better job for proving my social needs in real life. To be honest, I live in a rural environment. And while I'm friendly with my neighbors, I don't know them very well. No social aspect. There used to be a big social aspect and my husband's huge extended family that since his mother passed away, that's all crumbled away." (P34)

AltspaceVR provided an accessible and inclusive space for many people, including those in wheelchairs or dealing with physical health challenges, making social interaction easier and more manageable. P12, who uses a wheelchair, highlighted how *AltspaceVR* facilitated attendance to events. Similarly, P6 explained how *AltspaceVR* changed and "saved her life."

"I'm in a wheelchair and disabled so it's extremely difficult for me to go to anything. Going around all day really wears me out. However, in VR, I don't have that problem. So, I can stay here at home, I don't have to travel, and I can actually get the closest thing to an actual presence at a conference... And I can go to this conference and stand with a group of people… I can actually just stand there and be part of the group. I'm not in a wheelchair, I'm part of the group and we can all talk." (P12)

"I am pretty handicapped. I don't get around very well physically. I have some hearing loss and some a little bit of sight issues, and I've been spending most of my time, especially at the beginning of COVID, everything at home, I wasn't going anywhere, I wasn't seeing anything. I kind of got to the point where I was just spending all my time in bed. And then a friend got me a headset. And I started interacting in Altspace and getting involved in the communities here. I started using Beat Saber and exercising and getting some exercise and to the point where I was doing it enough and I had a social group I was meeting in the mornings. I was getting out of bed and getting more exercise, so I could stand again. And so, you know, got really involved and was able to go back to work and and at least hold a part-time job down for a little while.

And get involved in doing events out here in Altspace. So really kind of Altspace saved my life." (P6)

AltspaceVR offered a convenient way for people to interact with friends and family, especially when in-person meetings are challenging due to busy schedules or geographic distance. People who were caregivers, responsible for looking after the elderly or children, often found socializing in *AltspaceVR* more convenient due to the demands of their caregiving duties. P9 noted that she met her real-life friends in *AltspaceVR* due to time-constraints.

"The funny thing is, even with friends that I see in-person in the real world, you know, we have busy lives, we have kids, parents with schools and families and so because we can't get together all the time, we can have a few hours. I mean we live in the same city, but we'll get together at night in AltspaceVR and we'll fish or world hop or what else. Nobody has to leave their kids or drive their car. It's definitely enhanced our social interaction." (P9)

AltspaceVR also allowed users to attend various events, conferences, and social meetings where physical travel was not possible. They could explore more of cultural and social events happening around them and enrich themselves socially and culturally without moving from their homes. P9, P26, and P35 expressed this as follows:

"It's been such a great way to like break down barriers, not just age, but like country barriers. You know, I have friends that I've made that you know we are from all over the world and some people I would never have been able to interact with." (P9)

"I've met so many people all over the world here in Altspace. So, it's nice, I'm learning cultures and so much." (P26)

"They represent a chance to experience things that you might not normally get to see, like we get to simulate the northern lights. I live in South Florida so taking a trip to northern lights might be hard, but you know, I can little bit of a taste of what the northern lights are." (P35)

The perception and economic affordances of *AltspaceVR* were primarily centered around the cost-effectiveness of using social VR platforms and the possibility

of earning an income through them. *AltspaceVR* provided a cost-effective alternative to physical gatherings, saving money on transportation and dining out. P40 expressed how social VR provided a financially efficient substitute for in-person gatherings:

"In reality, I have my friends, and I love them, and I spend time with them. But I also know that going out constantly and being in the public and spending money is detrimental... when I have time and when I want to, but I don't go out as much. So, I just feel like it allows me to be home more where I want to be giving money and that kind of thing. For me it's been a huge money saver meeting all the people that I've met was just like a big bonus… When my kids want to hang out and they they can just say, 'hey mom, you want to do this?' I can just be like come out, take my headset off, whereas if I'm out with friends, you can't just leave, you know? And I mean you can, but you have to pay your bill and then you can you drive in that moment if you've been drinking or whatever you've been doing... I don't have to dress up and wear makeup all the time. Nobody can see my face. Although I mean a lot of it rooted to like video chat and stuff like that…. I can't go on game shows in real life. I mean, how am I going to get picked for the prices, right?" (P40)

The platform allowed many people to engage in experiences that would otherwise be inaccessible due to financial limitations. P13 highlighted how *AltspaceVR* offered "democratic access" to social spaces by being free and compatible with a wide range of devices. Similarly, P16 explained how *AltspaceVR* provided a free space for creating and hosting events, which would not be possible for them because of the high expenses in real-life.

"I kept coming back to Altspace because it had many of the things that many people didn't think about. One it was free, which meant it was accessible, affordably accessible. It also was democratized because in the early years it supported Google Cardboard, Oculus, Samsung Gear... It also was supported by Android. If I've got it on my phone, I could go into Altspace on my phone...There were weekly meetups, and I would be driving around a plane, or a train and I connect in and participate in those through my phone... Every headset that came out, Altspace embraced, even before it was bought by Microsoft. So, we had people from around the world. 150 hundred and 160 different countries had access... It created a really amazing global community, and democratized community because we were able to meet people that we would have

never met in the real world, ever. Except by some random trip. Because most of the people in the world can't afford an airplane ticket. So, I could say, 'Oh yeah, we'd only meet them by randomly meeting on an airplane.' No, I wouldn't even meet these people on an airplane because they wouldn't be on one. We're meeting people that lived in like cardboardy tent like homes with random and intermittent electricity that never had traveled more than maybe 30 to 50 miles away from their home. And they were 50, 60 and 70 years old. I would have never met these people. So that democratic access to humanity was beautiful." (P13)

"I would [host events] if I lived in a good area for it. Though I have been like, oh, if I lived in an area for it, I'd absolutely be trying things like that and it also kind of helps that. Besides Internet access, serial production costs because it's Altspace and so we could take a lot of advantage of what could very well with some of the production value could have been 10s and 10s of thousands of dollars." (P16)

While there are challenges to generate income in social VR platforms, some users have managed to generate income through freelance and contract work, such as hosting events, creating content, building worlds, or providing consultation services. P5 mentioned being hired to host events and provide design services as follows:

"Some people have hired me to host events for them... I've also done some design work, some flyers, some things like that for the events that they host." (P5)

In the absence of direct monetary payment, some users engaged in bartering services or accepted non-monetary compensation, such as skill exchanges or educational benefits. I found that people tend to value the social, educational, and personal development aspects more than financial gain. For example, P24 bartered couple counseling for MRE development, while P10, an educator in *Educators in VR*, remarked:

"It was kind of my free English course... that's a good payment for what I'm doing." (P10)

Besides, community support and collaboration were very important for sustaining VR activities. Users created *Patreon* accounts where other people who used their kits could subscribe and support them financially. Also, users often shared their

own skills and resources, sometimes for free, to support the larger community of creators. In addition to these, participants' motivation for using *AltspaceVR* sometimes stemmed from the interactions and abilities that are impossible in the real-world, such as flying, creating experiential and imaginative spaces, and modifying the environments instantly. Most participants highlighted flying as their favorite thing to do in *AltspaceVR*. P2 and P19 expressed her feelings about flying as follows:

"I love flying. That's one of the things that Altspace has that most of the platforms don't have is your ability to like you grab this little flight tool. And then you trigger it and it's like what? You're just like flying." (P2)

"Can you believe that we can fly here? Like it's just too credible, right? So I don't know why I want to do a chair if I don't need it, right? I can create any different things that are related to flying... If I can fly, I can go anywhere and I'm not thirsty. I'm not like, tired." (P19)

As mentioned above, *AltspaceVR* allowed users for limitless creativity and the creation of environments and experiences, including fantastical worlds, interactive elements, and immersive experiences. P19 expressed how *AltspaceVR* allowed them to experiment things that would be impossible in the physical world:

"I was interested in architecture and music. Altspace allowed me to experiment with spatial sound and visual effects in ways that are not possible in the physical world... Here you can create things that doesn't need to match reality. That's the beauty of these, right? So, imagine creating this in the real world. It's just impossible, but here you can do it. If you can dream it, then you can build it, and then you can go there." (P19)

The perception affordances of *AltspaceVR* also varied across participants of different roles since it would cater to a wide range of users with different motivations and needs. Creators primarily utilized *AltspaceVR* for professional purposes, whereas other users connected to it for socializing and networking. The role of participants also had an influence on their interactions with the platform. World creators focused on building activities, while event creators concentrated on organizing and preparing for events.

Event creators primarily valued moderation and security tools, event management features, flexibility and adaptability, accessibility and inclusivity, creativity and customization, and community interaction. Key event management and moderation tools on the platform included stage blockers, host zones, audience muting, voice amplification through megaphones, media projection, and the ability to remove disruptive users. World-building tools and premade kits for creating customized event spaces were also highly valued.

World creators appreciated the accessibility and ease of use of world-building tools, including pre-made kits and the intuitive in-VR building process. When we talk about world-building tools in social VR platforms, we mainly refer to built-in world editor tools, pre-made kits, templates, *Unity* integration, scripting and code integration, environment settings, and collaboration tools. It offered creators immense creative freedom in bringing their imagination into the world, requiring minimal technical knowledge to support both in-world building and advanced *Unity* uploads. Being able to test and iterate on worlds in *AltspaceVR* itself, incorporating collaborative feedback, was particularly appreciated. The collaborative environment supported creativity and project management, enabling users to work together seamlessly and leverage diverse talents.

General users valued effective moderation and security tools, exploration and interaction possibilities, creative tools and features, accessibility and inclusivity, and event management and participation. Socializing in a moderated, safe, and secure environment was important for general users. They enjoyed exploring new worlds, engaging in social interactions, and participating in unique events. Creative tools, such as world-building kits and object interaction capabilities, enhanced customization and creativity.

5.1.1.6.Perceived Challenges

I identified several perceived challenges specific to *AltspaceVR* platform. However, monetization is a common issue among social VR platforms. In general, a significant challenge in social VR platforms is the lack of integrated monetization tools. Although there are opportunities for income, scaling these activities to a sustainable level is challenging, often due to the niche nature of the VR community

and the current economic structure of social VR platforms. The creators of *AltspaceVR* stated that without built-in systems for subscriptions or ticket sales for events, sustaining a profitable model had been difficult. P2 mentioned the absence of sufficient tools to generate a profitable income and the lack of a business model for monetization in the Metaverse. P16 noted that while there were donation and subscription tools like *Patreon*, many social VR platforms themselves did not offer these capabilities. As a result, many users engaged in VR activities as hobbies rather than professional endeavors. *AltspaceVR* had been particularly lacking in monetization tools. The participants frequently stated that they had valued the social, educational, and personal development aspects more than financial gain.

Hardware limitations are yet another barrier to the VR experience. The physical comfort in using the VR hardware is considered to be a key factor in user experience (Yan et al., 2018). Potential issues with motion sickness and discomfort caused by headsets were ranked among the participants' top concerns. P22 identified these issues as follows:

"The biggest problem we have with anything right now is hardware. Strapping on an Oculus headset makes people sick or it's too heavy. It's uncomfortable. It's too much." (P22)

Challenges and frustrations specific to *AltspaceVR* included platform instability, update issues, accessibility and onboarding difficulties, event and world size limitations, complex world-building processes, lack of scripting and documentation, and disruptive behavior. Many participants faced various problems concerning the technical stability of the platform: Difficulties with event entering, glitchy experiences, and instability that imposed the overall user experience. I found that technical issues like bugs and performance problems make a big difference in user experience and often lead to frustration and dissatisfaction. P7 and P15 highlighted technical stability issues with the platform, mentioning long loading times, difficulty entering event spaces, and frequent problems with voice chat.

"The only obstacle that I've had is basically how unstable the platform has become...It took 20 minutes to enter the event space last night." (P7)

"This platform has not been the most technically stable... the voice chat part of things... there seems to be a lot more problems with people talking here." (P15)

Update issues were another major problem. With frequent updates, especially since its acquisition by *Microsoft* in 2017, the platform had lost worlds, broken features, and constant adjustments to new versions. P30 and P34 described this as follows:

"I guess the biggest one [frustration] is the update... I had already had about 20, 25 worlds at that point... I did them all and then they changed the update, and I had to do them all over again." (P30)

"A lot of my favorites [worlds] have died because they're very complex and made by a graphic artist... one of the major updates in Altspace broken." (P34)

The onboarding of the platform was also evaluated as complex and frustrating process, which led to difficulties for new users trying to join the platform, especially after *Microsoft*'s acquisition. The introduction of secure login systems in *AltspaceVR* made the onboarding process cumbersome and a barrier to entry. P3, P12, and P34 expressed these frustrations about onboarding process as follows:

"Entry to Altspace was like an IQ test. If you can get to Altspace, you're smart. Because it has been too complicated for people." (P3)

"We're trying to find something that technologically has the lowest barrier to entry for use and so that's primarily our aim because we're trying to get as many people to be able to use go to our event as possible." (P12)

"The absolutely biggest problem are with our accounts... the onboarding process." (P34)

AltspaceVR was only able to support 50 people per world or event, thus limiting how many could actually be in one place. These limitations on event size and world size often presented challenges for creators trying to design more complex, large, and engaging environments. P6 and P22 shared the following experiences about these constraints:

"There was a maximum size and then our audience we had invited got split up into two or three [instances]. And it was kind of confusing and talking to just seeing part of your audience." (P2)

"We can't hold events in very complicated worlds or even reasonably sized worlds. We can't do it. We won't put it on the event calendar." (P6)

For some participants, world creation and world maintenance were also complicated processes-mostly involving learning new software, suffering through glitches, and managing frequent software updates. Participants often shared that they encountered technical errors and bugs within the toolsets for building worlds, negatively impacting the creative process of world-building. P17 shared the following about experiences with the world uploaders:

"Challenges, I think the [world] uploader was wonky for a while and there were some issues." (P17)

Both my participants, like P30 and P31, and my observations highlighted that many found *AltspaceVR* lacking in advanced world-building tools, such as a programming language, a large world uploading system, more options, and greater versatility. Besides, there was a notable lack of documentation and support for users trying to build worlds and utilize the platform's features. This led to community support being relied on rather than built-in platform support. The creative potential of creators was also limited by the restrictions the platform put on the technical capabilities and scripting available. P22 and P29 expressed these issues as follows:

"Altspace is super restricting in terms of scripting because they are worried about people getting sick or having bad actors." (P22)

"The challenge is, there isn't a lot of documentation... you just have to figure out on your own or talk to other people." (P29)

As I discussed in detail in the section related to safety, social and community issues arise in social VR in general, with trolls and disruptive behavior creating negative experiences for some users and affecting their comfort and engagement. P32 shared this concern as follows:

"Sometimes people come in and they just want attention or they're just, you know, kind of clowning around... sometimes people have really bad faith, too, like they really want to hurt you." (P32)

5.1.2. The Rhythms of Everyday Life in *AltspaceVR*

5.1.2.1.Platform Entry Motivations

I found that the onset of the COVID-19 pandemic in 2020 significantly motivated individuals to explore and join *AltspaceVR*. For example, P2 and P12 indicated that they entered VR due to the pandemic. With social distancing measures and lockdowns in place, many turned to virtual platforms to maintain social connections, attend events, and continue professional activities. P1 and P5 sought social interaction during the lockdowns, with P1 noting the joy of interacting with an audience as a speaker. P10, P18 and P30 appreciated *AltspaceVR* for providing the necessary social life during the pandemic when other activities in the real world were restricted. Most participants I interviewed mentioned visiting *AltspaceVR* daily during quarantine, with some spending half a day on the platform. Both P13 and P39 stated that they observed an increase in user activity on the platform during this period.

I also observed a quantitative rise in the number of events during the time period of COVID-19. P11, for instance, told me that they purchased their VR HMD in March 2020 and organized weekly events. In this way, users from various professional and educational backgrounds found *AltspaceVR* as a useful tool to continue their work, organize events, and experiment with new ways of interaction and collaboration in a virtual space. It is also the situation that benefited *AltspaceVR* because many users gained awareness of the platform by virtue of events. According to participants such as P34 and P37, these are people who had logged on primarily to attend particular events or meetings that interest them. Professional invitations, events, and other tasks that call for virtual interaction were some events in which a user engaged. These events therefore have mostly provided an entry that subsequently leads to exploration. This is in line with the finding that the perceived professional and educational affordances were the most emphasized aspects of using *AltspaceVR*, with the primary motivations for joining the platform being largely tied to these purposes.

Additionally, I observed that the number of user-generated worlds on *AltspaceVR* increased during the pandemic. People I spoke to also mentioned that, although they previously couldn't spare time for world-building or event creation, they began to make time for it due to the extended lockdown periods. The effects of COVID-19 were tremendous, and yet there were more factors driving toward joining *AltspaceVR*. Many participants, such as P19 and P22, explored creative possibilities: From designing and building world spaces to creating new types of storytelling or immersive experience. Curiosity about virtual reality technology itself, in general -and its potential uses around storytelling and gaming, including social interaction reasons- was driving users toward exploring *AltspaceVR*. I also noticed that the *Campfire* was often visited by many non-native English speakers, mostly from India, to improve their English language skills. P36 from India reported starting to use *AltspaceVR* upon recommendations from Indian friends. P36 confirmed my observation, stating that *AltspaceVR* appeared relatively popular among Indian youth for improving their English skills. Several other participants who were non-native English speakers also reported using *AltspaceVR* for improving their proficiency in the language.

5.1.2.2.World Entry Criteria

After joining the platform, users typically entered worlds with specific purposes in mind, whether to attend an event, meet new people, or simply explore new environments. In *AltspaceVR*, the rhythms of everyday life largely occurred around scheduled events, through which users congregated within its various virtual worlds. Accordingly, the key bases of selection regarding world entrances mainly revolved around event-oriented criteria.

During weekends (especially on Friday and Saturday nights), as many as 25 events would take place on the platform, with most scheduled during the late afternoon and midnight hours in the Pacific Time Zone (UTC-8). Mornings were slow, with activity starting to peak around 6.00 p.m. However, famous events could drive high user traffic, even on weekdays and during morning hours. The *Campfire*, central to the *AltspaceVR* community, usually remained active all day and night. Nearly all "Altspacers" (people who frequently used *AltspaceVR*) likely visited the *Campfire* at least once, especially when they first joined the platform. It usually had a high level of user activity throughout the day. Even during the platform's off-peak hours (e.g., early

mornings and afternoons in Pacific Time), when other worlds were often empty, it was possible to see user activity in the *Campfire*. It was a popular meeting spot to meet new people, socialize in groups, play games, have fireside conversations, and even roast marshmallows. In addition to the "regulars" (people who regularly attended specific events or worlds on *AltspaceVR*), I observed that many new users visited the *Campfire* to meet others.

I found that the decision to enter a world or an event was affected by several factors, including social aspects such as the number of participants and the presence of friends; content and interest factors, like event topics and scheduled activities; environmental considerations, focusing on world aesthetics and simplicity; and purpose-driven participation, where users had specific goals for their visits. I believe that these themes from my participants reflect the diverse preferences and needs of the community.

As mentioned before, in *AltspaceVR*, it was possible to see the instant number of users in the virtual worlds. I found that the number of users present in any world at any given moment was a major factor towards entering a world or an event. Users wanted the popular worlds to ensure they had social interaction. For instance, participants P17, P35, P36, and P38 said their decision to enter a virtual space in *AltspaceVR* was the number of people online inside. They preferred popular places, linking high attendance to more interesting and engaging content. I also observed that the number of users who stayed for only a few minutes was greater than those who stayed longer in events with high user traffic. Events regularly organized by well-known groups or content channels on specific days of the week had a more defined audience, with attendees who participated from beginning to end. These events typically had a lower rate of user traffic.

Also, as previously said, under the "People" tab on the Main Menu, it was possible to observe which of their friends were online and in what events or worlds they were present. In that way, it was possible to teleport directly to the place. The presence of friends or known users was important when deciding which world to enter. P17 and P40 emphasized the importance of social connections in their use of *AltspaceVR*. P17 mentioned attending events where friends were present or visiting popular worlds to chat with people before starting to build their own worlds, while P40

noted checking who was online and where they were. It was also possible to share world codes and invite someone to a virtual world, and some of my participants stated that they frequently used this feature to meet friends in private settings.

The topic or genre of an event was another contributing factor in users' decisions to participate in events. Users were more likely to participate in those that align with their interests. Participants, like P35 and P17, mentioned that their interest in certain topics was the influencing factors for attending events. For P35, these included fun topics, while P17 liked to attend events related to their personal interests, such as meditation. Many participants stated that they usually planned their participation based on scheduled and recurring events, which could be tracked using calendars or notifications. Participants like P39, P25, and P17 highlighted how they organized their attendance based on this schedule. P39 checked the schedule online and marked events in their calendar, P25 followed certain weekly events, and P17 regularly checked the events list for anything of interest.

The visual appeal and design of a world also attracted users, especially if it promised something different or special. Some participants, like P35 and P25 preferred simplicity and ease of access in virtual spaces. For P35, themed worlds, such as *The Sky Lounge in China*, drew them in with their appearance, while P25 liked simple, non-overwhelming environments to relax. Decisions about entering a world or event were also influenced by avoiding certain spaces or users. I found that people tended to avoid some virtual environments for various reasons. These reasons included religious and ideological conflicts, sexual or inappropriate content, scary or disturbing themes, sensory overload, social comfort, unoptimized environments, age and maturity differences, disruptive behavior, judgments based on appearance and behavior, and issues related to inclusivity and intolerance.

For example, P7 and P34 avoided religious events, while P35 and P38 disliked horror-themed or scary environments. P14 and P31 avoided spaces featuring non-scientific or sexual content. P32 avoided unoptimized worlds and those with negative collective moods, while P37, being introverted, preferred private spaces. P8 avoided interactions with strangers and younger users, and both P9 and P40 noted the challenges posed by disruptive users. P14 also mentioned avoiding troll-infested

discussion sessions. P25 and P35 avoided users with "stripper" (i.e., provocative or alarming appearances) avatars, and P34 stayed away from intolerant individuals.

5.1.2.3.User Demographics

AltspaceVR attracted various age groups, each having different preferences and interests, while at the same time, it had been used by people from different parts of the world with varying cultural backgrounds. However, I found that the predominant user base came from the United States (US), a trend confirmed by the number of US participants in the interviews. While I anticipated *AltspaceVR* to have a broader age range of users compared to other popular platforms like *VRChat*, the age diversity among the participants I interviewed exceeded my expectations. In fact, a quarter of the participants I interviewed were over 50 years old, with some participants aged 60 or above. P7 even mentioned meeting people in *AltspaceVR* who were 88 and 101 years old. Many creators like P3 and P39 described *AltspaceVR*'s audience as more "mature" compared to other social VR platforms, especially *VRChat*.

"There's a fellow that used to come in here during the day who was 88. And there's another one who comes in for her birthday party, she was 101. And that woman was working in the room with more bloody energy than I have." (P7)

"I was surprised to learn that the average age was higher than I expected... the majority of other participants are around middle age, I think it's like 45 or something around that." (P3)

"Maybe I am quite old, but I'm 55. And sometimes I get a sense that the medium age in Altspace, it is higher here." (P39)

For some participants, the maturity level of the platform equated to a more "respectful community," which led to a more comfortable and engaging social environment. Several users compared *AltspaceVR* with *VRChat* in respect to this, noting that *VRChat*'s social environment was considered more challenging because of the much younger user base and more disruptors. P15, P27, and P30 explained this as follows:

"VRChat has a lot of children in public spaces, which can lead to chaotic and less meaningful interactions." (P15)

"VRChat's public environments are not conducive to rational or adult conversations. It's a very different community compared to Altspace." (P27)

"I like that Altspace wasn't overrun with young people. The avatars, though cartoony, were easier to talk to compared to VRChat's hamsters and kittens." (P30)

Regarding the age diversity in *AltspaceVR*, P8 pointed out that users tend to form distinct age groups, with groups typically consisting of individuals of similar ages who socialize together in their respective areas. As P8 mentioned, and I also noticed, with some exceptions, users tend to create distinct age groups and interact in their respective areas in *AltspaceVR*. This reflects how social interactions occur in the real world, where people tend to form close bonds based on similar life experiences, interests, and comfort levels, which include age. My observations also extend to how such separation into age groups affects the nature and type of activities and discussions in various worlds and events that exist on the platform. For example, while older age groups tend to discuss more professional or serious subjects, younger age groups lean toward more casual or entertainment-based communication.

"I think that there's a lot of people between 16 and 20 and then a lot of people between 25 and 35, and then a lot of people 40 and older. There seemed to be like a, there is a lot of each group, but not much in between age ranges, and usually whenever you are with one group you will never see much of the other group because they don't normally mix friend groups very often. But there are exceptions." (P8)

Since I didn't have access to platform-specific data, my observations suggested that the distribution of female and male avatars in public spaces appeared balanced. My impression was further supported by a survey conducted within the "AltspaceVR Memories" *Facebook* group on August 18, 2023. Out of the 533 members in the group, 45% identified as female and 54% as male. The largest age groups among males were 35-44 and 45-54, while females were most represented in the 45-54 and 35-44 age ranges. Both males and females aged 55-64 also comprised a notable portion of the group. Interestingly, the percentage of males aged 65 and above was almost equal to those in the 18-24 age group. While this data pertained to a *Facebook* group and may

not have been indicative of the actual demographic makeup of all former *AltspaceVR* users, it did bring out the age factor in the user base, which is quite worth mentioning in the context of community dynamics on *AltspaceVR*.

When asked about the user profile of their events or worlds, event and world creators typically defined their audience based on shared interests. Certain events and worlds attracted specific interest groups, such as those interested in literature, technology, paganism, or specific professional and educational fields. This was further revealed in my observations, where the nature of the users in a particular virtual world or event depended on the event type, target audience, and overall ambiance of the environment. For example, in a VR networking event, the user demographic was likely to include more VR developers, world creators, and researchers. For instance, in a VR networking event, the user demographic was more likely to include VR developers, world creators, and researchers. Meanwhile, in a book reading event, the audience consisted of book enthusiasts or individuals with a passion for literature.

5.1.2.4.Device Usage

Although there was the option to use the platform on flat screens, my observations revealed that most users connected to *AltspaceVR* through a VR HMD. The data collected from interviews confirmed this, as all participants, except one (P36), used *AltspaceVR* with a VR HMD. Most participants used a *Meta Quest* headset, primarily the *Quest 2*, though some also used the *Quest 1* and *Quest Go* models. Participants who connected via headset also mentioned that they typically accessed the platform on their PC to perform tasks such as checking friend lists, exploring current and upcoming events, downloading images and personal data. Additionally, many participants I interviewed stated that they used a head strap with their headset, which enhanced comfort, reduced facial pressure, and allowed for extended periods of VR use.

5.1.2.5.Time Spent

Regarding the time spent on the platform, some users reported that they spend their entire day on the platform. Two participants mentioned that they used the platform for seventeen-eighteen hours a day, excluding time for needs like eating or

using the bathroom. Most participants spent time for socializing on weekends or outside of working hours, with daily usage ranging from two to four hours for many, and six to thirteen hours weekly for some. P24 also noted that their usage varied depending on seasonal conditions; during warmer months, they spent more time outdoors, because wearing a headset became uncomfortable due to heat and sweating, leading to increased VR usage during the winter months. I also experienced this firsthand as someone living in Turkey, a country with hot summers. During the warmer months, using a VR headset for extended periods becomes uncomfortable due to the heat.

Time spent on different activities also differed across users' roles. I found that world creators spent more time on VR-related activities both on and off the platform compared to other users. For example, a world creator (P32) mentioned that during periods of active building, they spent eight to twelve hours a day on the platform and an additional four to six hours on VR-related activities outside the platform, mostly focused on creating and testing. Event creators, on the other hand, usually entered the platform on an event-by-event basis. They spent time preparing before events, and their socializing usually occurred afterward. While most event creators stated that they spent at least two hours a day on the platform, the average for world creators was closer to four hours. Therefore, I found that world creators were more active on the platform.

5.2.The Conceived Space of Programming

This section examines the Conceived Space of Programming within *AltspaceVR*, detailing how platform design and user-generated content shape the virtual environment. It begins with "Unleashing Collaborative Creativity: Exploring User-Generated Worlds and Events," which highlights the role of users as creators within the platform, including "User Experience Testing and Iterative Design," discussing how users refine their creations through testing and feedback.

The section continues with "Framing Environments for Specific Uses and Purposes," addressing how spaces are designed with particular functions in mind. Subsections include "The Role of Familiar Cues," exploring how real-world elements help users orient themselves; "The Role of Social Catalysts," discussing features that

encourage social interactions; "Virtual Homes and Private Spaces," which focuses on personalized spaces within VR; and "Experiential Spaces," examining immersive environments that offer unique experiences.

Finally, "Event Management, Moderation Tools, and Community Standards" provides details about the event management and moderation system and shows the organizational aspect of community life within social VR. Sections like "Community Building Strategies" review community building activities focusing on the strategies of event creators. Together, these sections form a very comprehensive overview of the programmed space and show both how the designed environments and user creativity contribute to the overall experience in social VR.

5.2.1. Unleashing Collaborative Creativity: Exploring User-Generated Worlds and Events

As mentioned in the previous section, *AltspaceVR*'s primary affordance was the ability to create worlds, events, and virtual assets, like many other social VR platforms. Users could design virtually anything, from interactive event spaces and personalized homes to themed areas for social hangouts or entire worlds based on specific interests. Additionally, they could create universes, which is a collection of interconnected virtual worlds. The ability to create virtual assets attracted many skilled world-builders to platforms like *AltspaceVR*. Alcala et al. (2023) underscored this trend, noting that the large majority of *AltspaceVR* worlds were user-generated, reflecting the creative influence users had on shaping their virtual experiences.

Even non-technical users were interested in world building and customization. In addition, some showed a medium level of interest, while others were enthusiastic and wanting to learn. Creators who had technical knowledge usually created worlds from scratch using *Unity* among other tools, whereas others relied on the templates the platform. Most participants described learning to use world-building tools such as *Unity* to be a very time and effort-consuming process. P23 described it as follows:

"I always joke that in the classes, when you're bringing in these worlds by using the game engine Unity, you have to be able to follow 250 step directions." (P23)

Through my observations, collaboration was intrinsic to the development of the user-created worlds and events. While there were many challenges, including technical barriers and the steep learning curve of the software used to build the platform like *Unity*, creators overcame those with supportive community dynamics and shared resources. Elements of design in the platform and the provided tools invited users to share ideas, merge skill sets, and collaborate. First, many of the premade kits were created by skilled world-builders and given away for free, thereby giving novices some extremely valuable resources. The learning curve in *Unity* is steep; Thus, templates and premade kits have made world-building easier for beginners. Both P9 and P28 focused on these aspects when describing their experiences:

"The ease of world building in Altspace with the premade kits and the featured tools are fantastic." (P9)

"It [world building tools] is really quite good. It allows the low-level world building with their own kits and doing in world buildings, and it allows a lot of Unity upload ability." (P28)

Second, world-building was inherently collaborative work, as it usually demanded a variety of technical skills. Those with the necessary knowledge would team up, sharing their strengths and supporting others through the process of creating functional worlds. For example, P24 mentioned dedicating much time to helping other people with technical problems, which points to the supportive nature of this community. The collaborative environment in *AltspaceVR* supported the management of projects, creating the ability for users to bring diverse talents into their project. Often, world creators specialized in particular tasks based on their skills, such as modeling, texturing, scripting, or creative direction. Some creators took up leadership or project management positions, overseeing the creative process, coordinating team efforts, and ensuring that projects met objectives. This involved idea creation, directing the build process, and managing contributions from active team members.

Collaborating with other artists and creators allowed for an enhanced creative process. This often involved consulting with team members and integrating their artistic input into the project. While some world creators preferred to handle most of the tasks themselves (especially in smaller projects or when they have the necessary skills to manage different aspects of world creation independently), this collaborative

atmosphere fostered a vibrant and interconnected creator community where creativity thrived. Through these activities, creators not only enhanced their technical and artistic expression but also strengthened a sense of community, which was a unique characteristic of *AltspaceVR*.

Event and world creators built niche communities of creation, where members shared knowledge and worked together on projects of many kinds. In these groups, I repeatedly witnessed a sense of familiarity, as many members knew each other well. For example, P19 highlighted the community of creators in *AltspaceVR*:

"The community of creators was huge, and everyone has an open mind." (P19)

Many world creator groups managed community channels that offered training for world-building, including courses led by experienced creators. In these sessions, participants shared knowledge and tools, collaborated on real-time projects, and engaged in both educational and professional endeavors. P21, P26, P27 and P40 shared their experiences of getting involved in the community and starting to build worlds:

"Someone named ... she had nothing dealing with coding, like she didn't know anything about coding, but since she came here, she's coded awesome MREs. She's made really cool worlds." (P26)

"I started building worlds in Altspace, getting more involved with community groups and volunteering to manage events." (P27)

"For me, Altspace has grown my mind... I've never even heard of Unity before and now I'm building whole worlds." (P40)

Just like world creators, event creators also had their communities where they collaborated. Many events in *AltspaceVR* were made possible by the collaboration of team members who played different roles. They specialized in hosting, moderating, technical setup, and logistics, and coordinated various tasks, including strategic planning, setup, and live management. Technical support included the creation of virtual worlds, the management of any technical problems, and the preparation of equipment; Content creation included the development of the event's material and interactive elements. Typically, hosts established expectations for how moderators and participants would engage in conversations and manage the flow of the event.

Moderators, in turn, took various responsibilities, such as managing the presentation screen, providing a virtual megaphone to participants, recording sessions, broadcasting the event live, and monitoring offensive behaviors. In crowded events, which often had more than exceeded 50 participants, I observed that there were at least two moderators present. This specialization allowed for a more organized and efficient execution of events. P1, P3, P5, P6 and P27 described how they shared tasks as follows:

"I was a moderator... I was kind of a partner in terms of strategic planning of topics of speakers." (P1)

"He was more of a technical director, and I was like a speaking entrepreneur, like hosting talent." (P3)

"One of them, he's a producer. So, he puts together events and talk shows... The other one, she does a lot of the logistics... And then I usually am hosting." (P5)

"I'm the producer of these, I make sure the set is done, that the world built has created this set properly, that the signage is in the room properly, that the props are properly put into the room." (P6)

"I am the stage moderator... I ensure the stage's security, set up the stage, control the entry of people onto the stage." (P27)

As mentioned earlier, some users held dual roles, with event creators also taking on world-building responsibilities. These two groups often collaborated, as event creation involved elements of both world design and content management. P12 expressed this dynamic, saying:

"We provide not only design, like we go in and create this space and come up with ideas of what we're going to do to decorate the space... and we have a team that we have people that help the speakers with their presentations." (P12)

The *Educators in VR* community was a real milestone in professional and educational collaborations to take place in *AltspaceVR*, with dozens of events by this community on everything from VR harassment to teaching methods, world building, and other topics. These collaborative works gave successful examples to manage

effective events and demonstrate the platform's potential regarding educational and professional development. One of the founders of the *Educators in VR* community highlighted that collaboration created synergy and helped foster learning and growth among creators:

"From the beginning, it has been about connection and collaboration, and teaching... We have to collaborate because together, we have the synergy, we have the energy, we learn and grow, and have such joy in the process. And we have to communicate it to others.... No matter what the team does, everyone wants to connect and collaborate. They want to improve their skills, they want to understand, and they want to integrate this into their real world, teaching, training, whatever it is."[24]

In addition, P23, P37, and P39, who utilized *AltspaceVR* for collaboration and learning shared their experiences as follows:

"I used Altspace for simulations and project-based learning, connecting students globally to collaborate on various topics." (P23)

"I use Altspace for remote collaboration and learning. It's an excellent tool for my dissertation work and professional projects." (P37)

"I've been focusing on VR for remote collaboration and learning for the past five years, and Altspace has been a key platform for that." (P39)

For many participants, creation and socialization were linked. Building worlds and events together was at once a creative activity and one of the most popular ways to socialize on the platform. I observed that this blend of collaborative creativity and social interaction helped build social bonds among creators and fostered a collaborative spirit within the community. By collaborating on different projects, makers improved not only their technical skills and artistic work but also developed social relationships. P6, P16, and P19 expressed how creating and socializing were intertwined for them:

[24] I chose not to assign a participant number to this quote to protect the participant's identity.

"We would get together in a new template that maybe ... [mentioning the name of a well-known creator] came up with and we would go and decorate it and spend our evening decorating it." (P6)

"If I am doing any other kind of event, I much much much prefer doing it with other people. It's always fun to have a buddy to balance off and share the laugh with." (P16)

"For me, creating and socializing is the same thing... So, for me, creating worlds with ... [mentioning the name of a well-known creator] was a way to socialize." (P19)

The collective enthusiasm for world-building and event creation underlines the substantial influence users have on their virtual environments. However, world and event creation in virtual worlds exceeds the issues of personal expression and involves complex dynamics whereby users turn into creators, consumers, and economic contributors. By creating worlds and events, users create not just unique experiences but also value for the platform's ecosystem in the form of virtual capital that increases the platform's revenue. Gehl (2014) describes social media platforms as exploiting user-generated content for surplus value, while Proctor (2021) argues that platforms profit economically from users' cultural creations, positioning them as both unpaid workers and cultural contributors. Platforms like *AltspaceVR* capitalize on user-generated content, enabling users to freely create while benefiting from their contributions as part of the platform's offering. This dual role transforms participants into creators who drive the platform's growth while producing value for it. Therefore, these platforms leverage user-generated content: Users can create for free, but the platform benefits from their contributions in adding value to the platform. Such duality of roles converts participants into creators-for and producers-of value for the platform.

This dynamic is further magnified by the ways in which user-generated worlds collapse distinctions between "designed" and "lived" spaces, making virtual environments into dynamic, inhabited spaces. Such a shift reflects Lefebvre's (1991) notion of "lived space," where active users inscribe their experiences and interactions onto the environment. In co-creating this shared, lived environment, users engage with and make customizations to the affordances provided by the platform, blending the foundational design of the platform with personal and community identities.

Social VR platforms like *AltspaceVR* foster a participatory culture (Jenkins, 2006) by offering easy-to-use building tools and templates, empowering users of varying skill levels to engage in content creation. By lowering barriers to entry, these platforms empower users to transition from passive consumption to active creation. This participatory culture enhances the platform's appeal, allowing users to express themselves and build communities, fostering a space for shared cultural production.

In many different cases, users co-created worlds or events as shared community efforts. This blurred the notion of authorship in social VR platforms because worlds or events were shared creations, not individual projects. Sometimes users adopted leadership roles themselves, organizing events, establishing norms, and providing resources for newcomers. These community leaders played an important role in shaping the culture of the platform. Working together also created a form of collective intelligence (Lévy, 1997), which extended the functionality and creativity. Therefore, shared creativity allowed for the emergence of complex, user-driven worlds, which reflects a knowledge base that evolves with the platform.

In these shifts in use to creator roles, new identities and roles form a multilayered social life within the virtual space. New creators often start small, customizing and making personalized touches but usually soon take to world-building, hosting events, and mentoring other users as confidence increases. This fluidity creates a continuum where "user" and "creator" roles are not fixed but shift according to engagement level and social dynamics. McVeigh-Schultz et al. (2019) describe this process as a blurring of the line between design and use, where users embody a "prosumer" role (Toffler, 1980), simultaneously producing and consuming content within the virtual space (Williamson et al., 2022). The concept of "produsage" (Bruns, 2008), the continuous building and modification of user-generated content, is evident in social VR, as worlds and events are iteratively refined and expanded upon through collaborative production and consumption.

In social VR, the shift from user to creator represents a dynamic blending of roles in which users shape the platform's social and cultural landscape through both individual and collaborative effort. By enabling users to create, social VR platforms allow designed spaces to become lived spaces, with users acting as co-architects of virtual spaces. This transformation reflects a wider trend within digital culture, where

consumers are no longer passive recipients but active producers of their virtual environment. In that sense, this participatory model highlights the appeal and sustainability of virtual worlds.

These findings show the importance of collaboration, community dynamics, and access to shared resources in driving creativity and productivity on social VR platforms. The potential for collaboration and the sharing of knowledge enable users to overcome challenges in their endeavors and further engage in advanced world building and event creation. This collaborative environment not only enhances users' skills but also strengthens the social fabric of the platform, thereby creating a space where users feel supported and connected.

5.2.1.1.User Experience Testing and Iterative Design

Testing worlds for usability and user experience was also a collaborative activity among creators. I noticed that creators often invited community members to test projects and take their feedback. This process was particularly necessary in user-generated worlds, as they generally had poorer performance compared to those provided by the platform. Poorly optimized worlds could cause discomfort and motion sickness due to certain graphics, negatively affecting the user experience and the success of events. Testing was mainly for the assurance that the virtual space would be engaging, intuitive, and enjoyable for users. Creators sought to make environments easy to navigate and interact with. Many creators took inspiration from the needs of the community and the feedback received, designing worlds and elements that answer specific requests or enhance the user experience.

World creators used various methods to test and improve the user experience, including informal testing with small groups of friends, observing user interactions, and more formal testing and optimization. I found that many creators relied on informal testing methods, such as inviting friends to experience their creations and provide feedback. P18, P28, P29 and P30 shared how they conducted informal testing:

"I conducted a bit of a study about the different skyboxes, the background, what is a good skybox, and that sort of stuff." (P18)

"I do test, and then I might bring a friend or two into a world just to say 'this is finished. Now what do you think?'" (P28)

"Once I've done that, then I bring friends over and have them look at it, have them try it out, so there's another week of seeing what people think, adjusting it." (P29)

"I usually have a couple of friends... I'll message them to kind of random people, but I usually be here with people kind of show them the concept and say 'what do you think?'" (P30)

Observing how users interacted with virtual spaces provided valuable insights for making improvements. This method helped creators identify areas where users might struggle or behave unexpectedly. P25 and P29 highlighted the importance of observing user interactions to improve virtual spaces:

"When users are interacting, like they are using your space, you can see that sometimes that something is not right, and maybe decide to replace one element or change the way they are moving." (P25)

"I'll let people come in and I'll watch them. Like this world, I put on the fireplace, this is for you and then there are questions on how to open the hidden door to come in here." (P29)

Some creators conducted more formal testing and optimization to ensure their virtual spaces were efficient and user-friendly. This included checking technical aspects like frame rates and ensuring the environment wasn't too resource heavy. P27 described their approach to formal testing:

"When we work with clients on features, we bring them to the space we have created and get their feedback. We either let them test it or conduct a small group test and ask them what they want to find in the space." (P27)

Comfort and accessibility of the virtual environment were major factors in world creators' thoughts, especially regarding movement and lighting, or anything potentially discomforting or causing motion sickness. P32 and P40 emphasized how comfort really added to the user's experience:

"Comfort is a kind of a low hanging fruit there. You definitely want the world to be comfortable, not being loud and lots of flashing lights and the things like that." (P32)

"I had to adjust the speed to make it comfortable. Because in certain speeds, you're bouncing up and down, she's going to get sick. Even though you're just sitting here, your avatar is going up and down and bouncing up and down." (P40)

Moreover, P13 mentioned how important it was to arrange the audience and the speaker in a virtual environment so that comfort was maximized. They recommended slightly looking down at the speaker compared to looking upwards, as this reduced the amount of head-tilting that users had to do, which was uncomfortable given the weight of VR headsets.

5.2.2. Framing Environments for Specific Uses and Purposes

In *AltspaceVR*, virtual spaces were often designed to support a variety of activities and events depending on what the creators' vision was for their intended use. The inspirations for design and ambience of these spaces were varied, ranging from real-world architecture, historical settings to abstract designs, personal narratives, community needs, and drive to overcome technical challenges. I observed that real-world architecture and historical settings provided a rich source of material for familiar experiences, while experiential designs pushed the boundaries of reality and offered unique experiences. Personal and emotional connections infused worlds with specific meaning, and community needs, and feedback guided the the creation of useful and practical spaces. Additionally, overcoming technical challenges and experimenting with new ideas were key motivators for many creators.

When asked to describe how they conceptualize their creations, some creators explained embracing spontaneous creativity, while others adopted a more structured approach. The spontaneous approach was flexible and dynamic in nature, where creators tested various elements and ideas to see what worked best. This iterative process allowed for the exploration of different possibilities and encouraged continuous improvement. P21 and P26 shared their experiences on spontaneous creativity as follows:

"Sometimes I've started off wanting to make a certain thing, and then I'll start doing it, and then it turns into something completely different, and I think that is the fun of building a world is you are so free to make it whatever you want." (P21)

"So, I will make up a plan and start working with it, but then other plans will come up in the middle of as I'm working on it and it will change dramatically to something else." (P26)

Other world builders took a more formal approach: They planned in great detail before they started designing. This included defining goals, making layouts, and making sure the design serves specific purposes or themes. This approach requires planning and an understanding of the platform's capabilities and user needs. Both spontaneous and structured approaches often incorporated strategies to lead user behavior through design. However, I observed that structured approaches employed conscious design strategies to influence user behavior more frequently. The design and layout of virtual environments had an impact on how users act, moved, behaved, and communicated within them. Application of thoughtful spatial and interactive cues could guide users in the virtual space. In this context, familiar cues and social catalysts need particular mention since they are essential in shaping user behavior in virtual spaces.

5.2.2.1.The Role of Familiar Cues

Based on my observations in the different virtual worlds and events observed for an extended period of time, it was quite common for creators to use familiar cues as an effective strategy to control or lead users' behaviors. As such, the perception of these cues -visual, auditory, or interactive- transcended their properties to include the possibilities they afforded for action. My observations align with the findings of McVeigh-Schultz et al. (2019, p.11), who argue that designers often draw inspiration from physical spaces to generate expectations about behaviors and integrate familiar cues into virtual environments.

Digital twins are virtual replicas of physical places created for simulation and reproduction in a virtual setting. On *AltspaceVR*, these digital twins would often replicate historical sites, cultural landmarks, or famous locations for various activities, providing users an experience they may never have in reality. One example was the

digital twin of Black Rock City in *AltspaceVR,* which was built for the official virtual *Burning Man Festival*. This virtual space closely mirrored the real site in Nevada and captured the atmosphere of the environment at the original festival. Key features like the iconic *Burning Man* effigy (see *Figure 5.15*), the desert landscape (see *Figure 5.16*), and the camp areas (see *Figure 5.17*) were replicated in a way that provided users with a sense of familiarity.

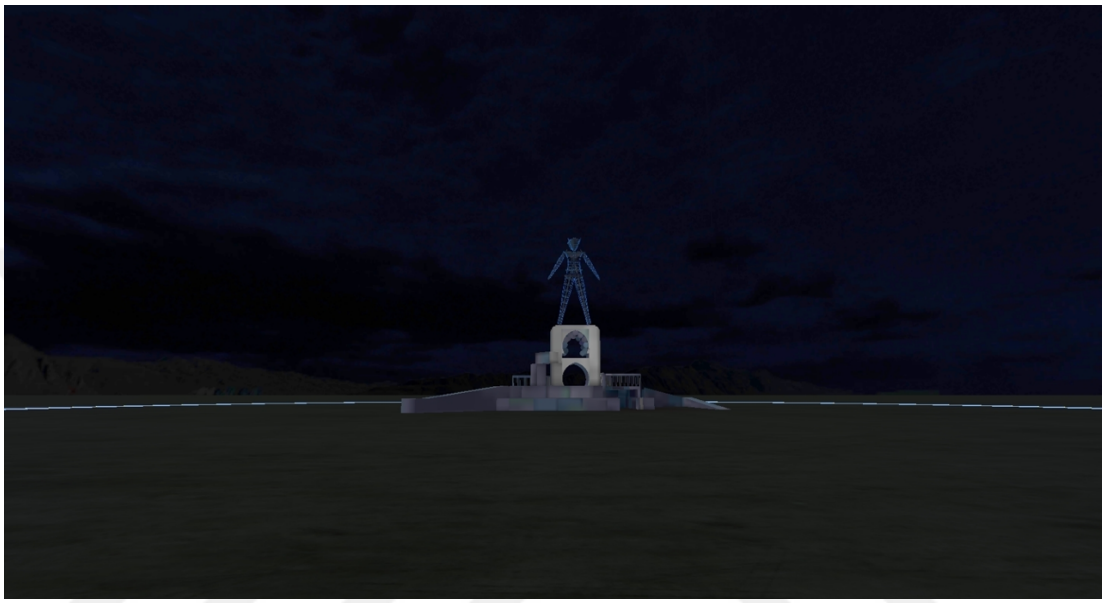


Figure 5.15 The iconic *Burning Man* effigy in *AltspaceVR*.



Figure 5.16 A virtual recreation of the *Burning Man Festival* in *AltspaceVR*, mimicking the real-life playa experience.



Figure 5.17 A virtual recreation of the camping area at *Burning Man Festival* in *AltspaceVR*.

To further enhance the immersive experience, the creators of this virtual experience filmed a 360-degree video at the real *Burning Man Festival a*nd incorporated this footage into a virtual cave within *AltspaceVR* (see *Figure 5.18* and *Figure 5.19*). By embedding the 360-degree footage in this cave-like environment, users could watch and feel as though they were surrounded by the actual festival and real people. This combination of a digital twin of Black Rock City and the inclusion of real footage bridged the virtual and physical worlds and allowed users to experience the festival without being there in person.



Figure 5.18 A virtual cave created through 360-degree footage from the real *Burning Man Festival* in *AltspaceVR*.



Figure 5.19 A virtual cave capturing the burning of the iconic effigy, where avatars gather to witness this symbolic moment of the *Burning Man Festival*, *AltspaceVR*.

I found that familiar cues helped users feel more comfortable in the virtual environment, and this allowed them to experience it in a more intuitive way. One of the creators of the official virtual *Burning Man* experience also noted that because these virtual spaces mirrored real-world locations, participants often experienced a "sense of normalcy" and "comfort."

"By creating this digital twin, we allowed participants to have a sense of normalcy. They were like, 'oh, I know where I am. I know Black Rock City'."[25]

P13 also emphasized that while digital twins aimed for exact replication, a touch of familiarity was often enough to make virtual spaces feel welcoming and engaging. P13 reflected on the evolution of communal spaces, particularly the living room, which originally began as a "parlor" where people gathered for social activities like storytelling, music, and conversation. While physical living rooms became less of a focal point over the years, as entertainment has moved from the TV to purely digital experiences, P13 showed how, even in virtual reality, people were still creating for themselves familiar spaces like a living room or a cafe because they wanted familiarity.

P27 further added to this notion and emphasized how placing help desks, meeting tables, and conference areas in virtual spaces can create a structured

[25] I chose not to assign a participant number to this quote to protect the participant's identity.

experience for users. P27 noted that the inclusion of familiar elements like a help desk at an event or a gathering space like a campfire gives users a sense of *"this is where we gather,"* helping to orient and engage them in the virtual world:

"Having help desks like this, for example, helps direct people, like a place where we sit down and talk. If this was an event, your help desk is probably going to be the desk at the front where you can have someone there. The campfire is a classic and exists in every Metaverse platform I've thrown." (P27)

Many creators emphasized that familiarity was essential in virtual spaces, as users often seek environments that help them feel comfortable. Familiar elements such as virtual bathrooms, furniture, buildings, and everyday objects helped users feel as they were in a more familiar environment. P22 and P29 explained this as follows:

"It's sort of key to help people feel more comfortable. 'Oh, I'm familiar with this space'... Aligning the virtual environment with real-world elements helps achieve that." (P22)

"The more familiar things feel the more like real life, I think the easier it is to forget that you're in VR." (P29)

While familiarity might have brought a sense of comfort for most users, this was not true across all users. I observed that older users generally liked to stay with familiar spaces, while younger users always sought novelty. This pattern follows what is found in real-life behavior and may be due to psychological factors. Familiarity can be comforting for older adults, and greater risk aversion may be evident as a preference for settings that seem safe and predictable. On the other hand, younger people are still in an exploratory stage of life when new experiences are more readily accepted. The environmental psychology research supports it: Familiar environments provide a sense of stability for older adults, while novelty provokes curiosity and personal growth in younger individuals.

As noted above, familiar cues comforted users in virtual experiences but also served practical purposes for guiding user behavior and navigation. Several world creators highlighted how important it was to have clear entry points and intuitive design to guide users around the virtual space with ease. It was important that users

could understand with ease where to go and what to do. P29 emphasized this as follows:

"For me, the worlds I build I always had the entrance where people can come in and they kind of get an idea that separate from the world, it would be like a lobby area." (P29)

Additionally, I found that creators utilized various visual and environmental cues, such as lighting, paths, corridors, stairs, different textures, space barriers and trackable areas, and signposts to guide users through virtual spaces. P12, P13, and P28 explained their use of familiar cues to help users navigate in virtual spaces:

"So providing some of that structure gives them the automatic orientation. I know where I'm supposed to be what's going on." (P12)

"We use what we call signposts, which are physical representations to help people understand where to go and they just do." (P13)

"So, I would lay a path and then I expect people would wander the path while still looking at the things around." (P28)

For example, in *Figure 5.20* and *Figure 5.21*, we can observe how the world creators used distinct floor tiles to define the walkways, guiding users from the entrance towards the buildings. The contrast between the textured tiles of the walkway and the surrounding elements, such as the grass and trees, helped users understand where to walk. These visual cues enhanced navigation by providing users with structured design elements.

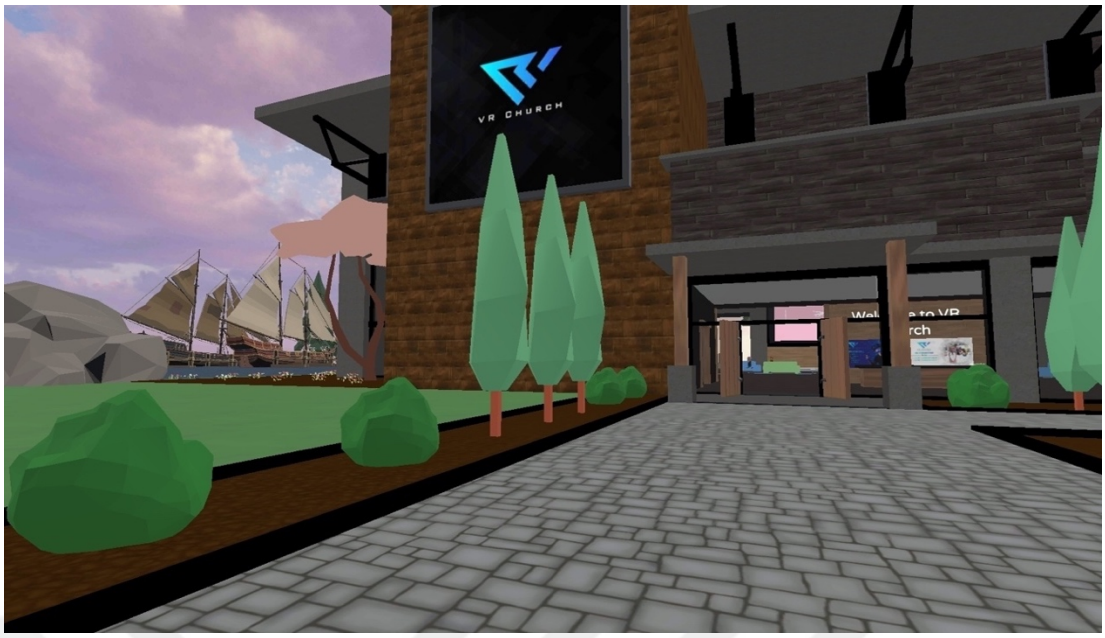


Figure 5.20 The walkway indicated by floor tiles in a virtual space designed for *VR Church*, *AltspaceVR*.



Figure 5.21 The walkway indicated by floor tiles in a virtual space designed for *OCC Metaverse Campus*, *AltspaceVR*.

One illustrative example of the use of familiar cues in virtual spaces came from P20, whose designs usually featured a path which leads users from the welcome point to the main activity area. When asked about this recurring design strategy that I observed in their worlds, P20 explained that it was a conscious and intentional approach to guide users through the virtual space. The following comment of P20 demonstrate that creators made these design choices with particular purposes:

"I do that in order to get people to understand where to go, because a lot of people look around and they are like 'I don't know where to go.' So, if you have like a pathway to there, or maybe even that I also have been known to put a lot of arrows 'this way,' even I have audio that says, 'come this way.'... I always have to have a path as if they don't know where the path is, they don't know where to go. And I make it easy for them to see a path. I don't want to push them, I've never pushed them, where you have to go here. But I will put indicators like an arrow or something like that. And I want them to where I wanted them to go, and that's kind of where I like. I guess it might be considered a controlling feature. Yeah, there's people, you're telling them where to go and where not to go and stuff like that. I like to make sure people don't go the wrong path. I also know people will go to the wrong path all the time, so I sometimes put barriers to stop from that's happening all the time... So that's kind of another reason of protecting people from on the wrong way and I want this experience to be more of a real good experience as opposed to 'let's go over here' and then you're looking to go let the world sucks. I don't like that. It's because I'm doing the path. If you stay on the path, you get the perfect experience." (P20)

P28, another world builder, highlighted the importance of guiding users through design by emphasizing that the purpose of a virtual space should always come first. Once the purpose is clear, the design process follows, focusing on the user's journey through the space.

"I tend to suggest design first, which is what's your purpose, your world. Mine is just showing off a place, but lots of people who define a world wanted for a specific purpose, such as they wanted to hold a party, or they do it to celebrate something, Christmas is quite popular or Halloween. So, they need to have a purpose first, and with purpose, you go to design what are you going to do. That tend to be the layout, and I also try and ask them to say, 'well, what's the journey for the person is likely to take when they come into your world?' So, for instance, we landed here by the stone in the Sensory Garden. Almost everybody will immediately walk through the mountain because it's the most obvious thing to walk to, and then you just wander out and see what you want to see." (P28)

P28 also emphasized that the user's journey through a virtual space should feel natural and not directed by big arrows but rather by other design like landmarks and

points of interest. For example, I observed that familiar design elements, such as a basketball court or a moving object, signaled to users that they could explore and interact with those areas. A moving boat by the sea, for instance, suggested that users could engage with it (see *Figure 5.22*). P28 described this method of guiding users to points of interest as follows:

"I'm trying to [guide users], but softly, no big arrow saying, 'go this way.' It's more when you land, what are the points of interest you see, and therefore that will then lead the people on to the next point of interest." (P28)



Figure 5.22 Interactive boats by the sea, allowing users to engage with the environment and explore the virtual space through interactive elements in *AltspaceVR*.

The purposeful use of teleportation portals further contributed to navigating between and within spaces. Teleportation destination points in such virtual worlds were, for the most part, set by the creators; I have seen where at times, creators led users onto the other worlds they have created. Therefore, by placing the portals at strategic positions, creators developed a connected network of experiences, making users explore and discover different virtual worlds more effectively.

The design of virtual spaces also played a big role in setting the tone and expectations for behavior during events. I observed that in general, spatial design elements like furniture, lighting, textures, color, and environmental sounds became important in shaping event experience. In support of the event's goals, creators

adjusted the design to theme or purpose. P5, P7, P13 and P16 emphasized the importance of spatial design in events as follows:

"The environment that you create sets the mood and the expectation to the guest as to what is expected of them." (P5)

"Environmental design is very important because it sets expectations and helps with crowd control." (P7)

"An educational space needs a strong narrative, while an event space brings people together to enjoy the stage." (P13)

"Adjusting lighting and stage elevation to suit the event's needs can greatly impact the experience." (P16)

P7, event moderator, invited me to one of their event spaces used for meditation. P7 mentioned the crucial role of design in terms of guiding participants and crowd control at events. They explained the importance of a strategic design, which created a "funnel effect" to guide users to the main event space (see *Figure 5.23*) and keep users within designated areas (see *Figure 5.24*). This insight highlighted the role of virtual space design in influencing user behavior.

"This is one of the event spaces that we use for a number of the events. So, what you want is that design give us some funnel for the people, where really want them to stay. The stairs here lead to the old pads, so you don't want them wandering into the woods. So certainly, the design of an event space will have an effect on how the event unfolds and obviously how you do crowd control when people come in. So normally we have people on these little pads here. Actually, in the same way you should do in the physical world. But you have it set up, so they can't wander into the woods or wander above. You tell them when they come in, 'you'll stay in one place, no portals, no emoticons during the event or you will be kicked.' So, when you're designing the space, you're designing expectations, before the average user has plumped the backsides down in the space." (P7)



Figure 5.23 The entrance to the event space featured stairs that created a "funnel effect," leading users directly upward in *AltspaceVR*.

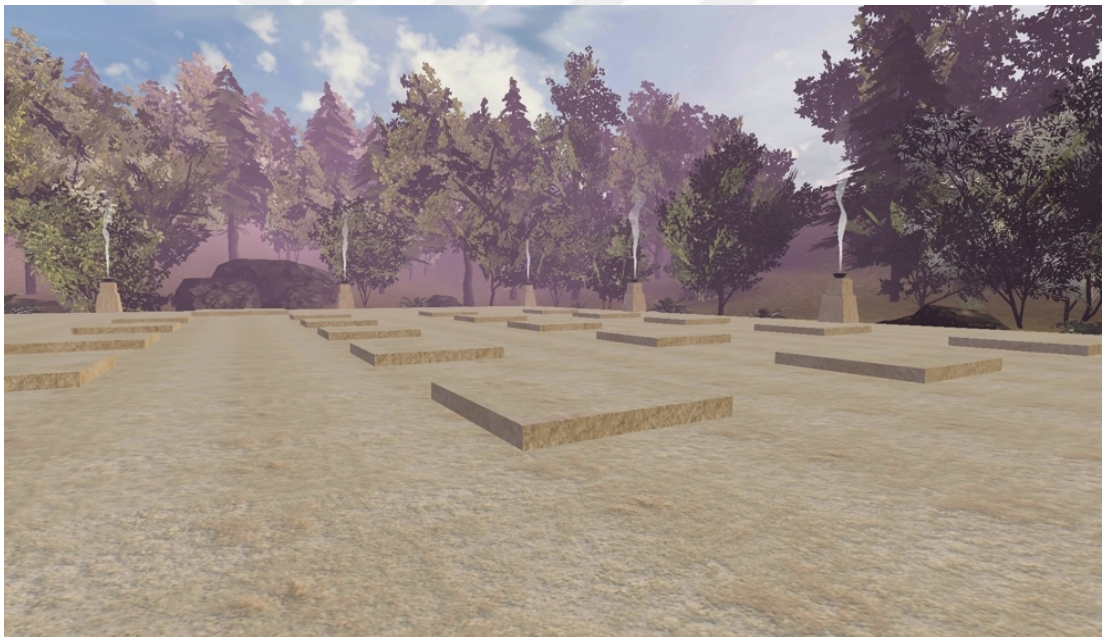


Figure 5.24 Designated areas for users encouraged them to stay within their confines and avoid scattering during meditation in *AltspaceVR*.

Another example of how the spatial environment was designed to support events was the *Death Q&A* sessions organized by the *EvolVR* community (now known as *TRIPP*). In these sessions, participants engaged in discussions about death, mourning, and loss, guided by two moderators. The outdoor area of the event space featured a 360-degree skybox that displayed cemeteries from around the world, with a new cemetery setting used for each weekly session (see *Figure. 5.25* and *Figure 5.26*). An *EvolVR* member explained that they selected beautiful and culturally significant

cemeteries from across the globe to reflect different cultural approaches to death. This not only contributed to the visual appeal of the sessions but also carried a symbolic meaning. The skybox served to symbolize the universal aspects of death and mourning.



Figure 5.25 A 360-degree skybox used in a *Death Q&A* session in *AltspaceVR*, featuring an expansive view of a colorful cemetery.



Figure 5.26 A 360-degree skybox used in a *Death Q&A* session in *AltspaceVR*, featuring a fire burning against an industrial landscape.

Another remarkable example was the *Amateur Psychotherapy for Free* event I attended. The setup featured a stage where the host stood and an audience platform for the participants (see *Figure 5.27*). The stage was designed to look like a cozy living room, with paintings on the walls and carpets on the floor.



Figure 5.27 The spatial design of the *Amateur Psychotherapy for Free* event in *AltspaceVR*.

As mentioned earlier, my observations revelated that during the design process, creators prioritized the anticipated activities within the space, shaping design elements to encourage specific behaviors during those activities. P15 exemplified this approach, as shown in *Figure 5.28*, explaining:

"Most of the people that are going to be in here, they're probably back on my dance roof or out in the pool. Because even though there's no sensation of swimming, during a party at somebody's house that has a pool, obviously he wants to swim." (P15)

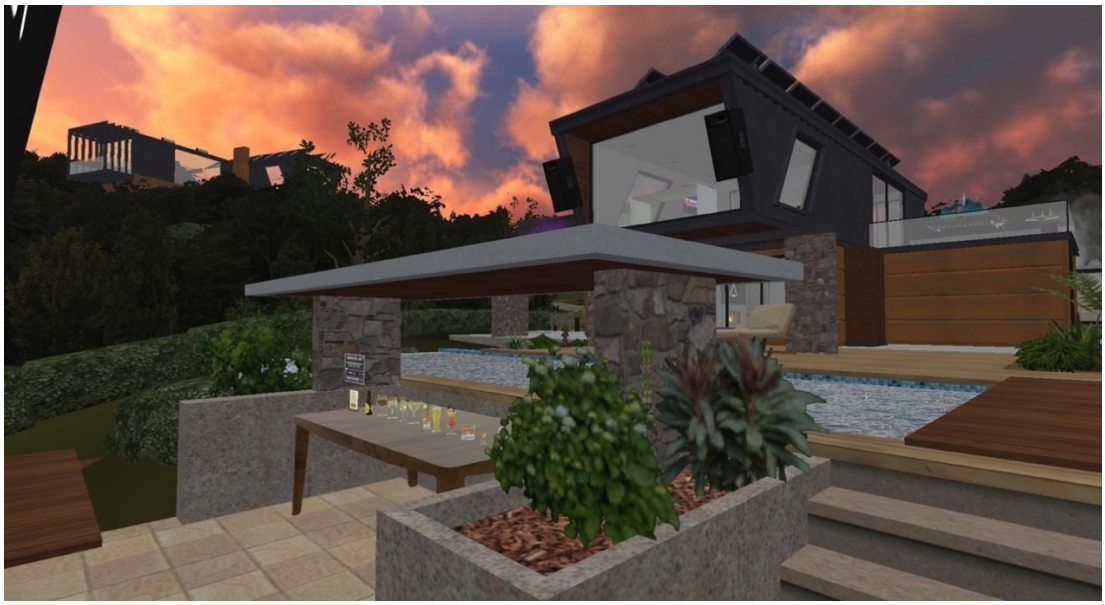


Figure 5.28 A virtual house in *AltspaceVR*, featuring a pool area designed for partying with an outdoor setup.

Similarly, the virtual bars I visited usually contained a bar station, drinks, a dance floor, and a stage (see *Figure 5.29*). In these spaces, participants did what one might expect, such as taking drinks from the bar, dancing on the dance floor, or playing music on the stage. Without these familiar elements, the space would lose its identity as a bar, and participants in such settings would unlikely to engage in activities like listening to music, dancing, drinking, and socializing.



Figure 5.29 The Scottish bar at the *Ceat Mile Failte Venue* in *AltspaceVR*, featuring interactive drinks and live performances on the stage.

In virtual dance worlds, the setup often included dim lighting contrasted with bright, colorful lights, a high ceiling, and a dance floor. Laser lights projected patterns on the floor, and mist contributed to the overall ambiance (see *Figure 5.30*). These design elements conveyed the message that the space was intended for dancing and socializing. P5 explained this as follows:

"I feel like in some of the events that we do, there are interactive things such as like the bar where you create drinks, and people can go up and grab a drink and walk around with it. That is setting the expectation that this particular place is super social and that we expect you to be, you know, walking around, having a drink, having a good time, as if you were like in a bar or in a club." (P5)

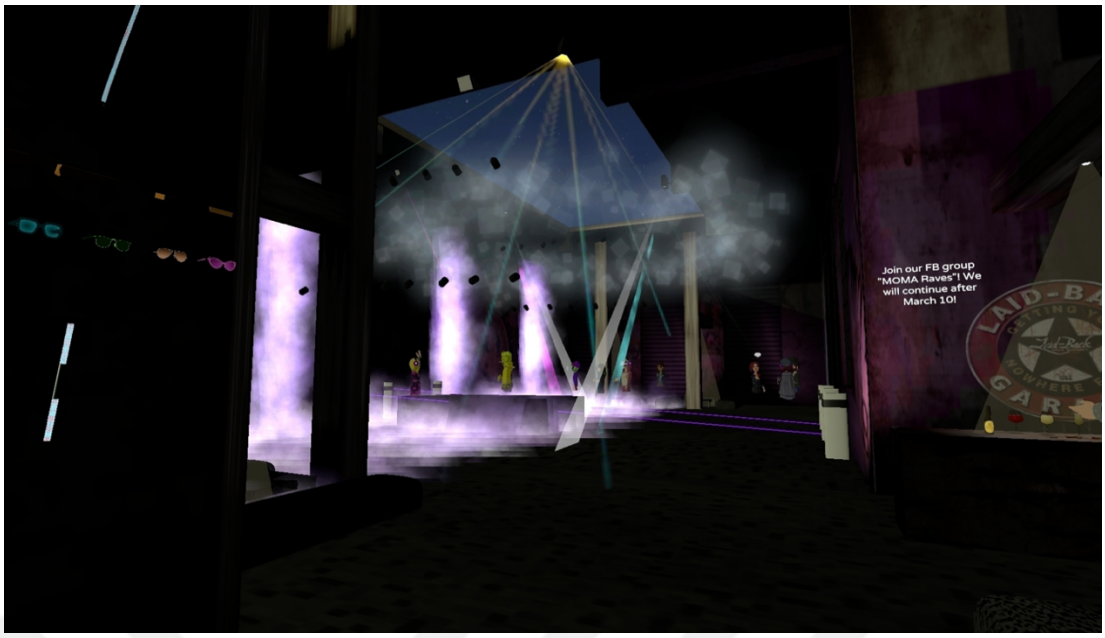


Figure 5.30 A *Moma Raves* community club in *AltspaceVR*, specifically designed for partying and dancing, featuring interactive elements.

Creators sometimes added non-player characters (NPCs) to enhance the lively atmosphere in spaces devoted to entertainment. Other than enhancing the ambience, NPCs could inform users about the space narrative and invite them to engage in related activities. For example, designers commonly placed dancing NPCs on the dance floor to engage users to dance along (see *Figure 5.31*). The interaction of human and non-human (i.e., NPC) bodies contributed to the overall dancing atmosphere. However, I observed that users seemed to avoid the spaces that had many NPCs in them. Even when they spent time in such spaces, they kept themselves distant from the areas where NPCs were positioned. When asked about their thoughts on NPCs in virtual worlds, several participants expressed that NPCs made them feel like they were in a more "synthetic environment." Personally, I found that interacting with real users created a more authentic atmosphere, as humans are dynamic, complex, and unpredictable, which brings vitality to virtual spaces. Their presence adds depth and richness to these environments, giving them a distinctly social character.

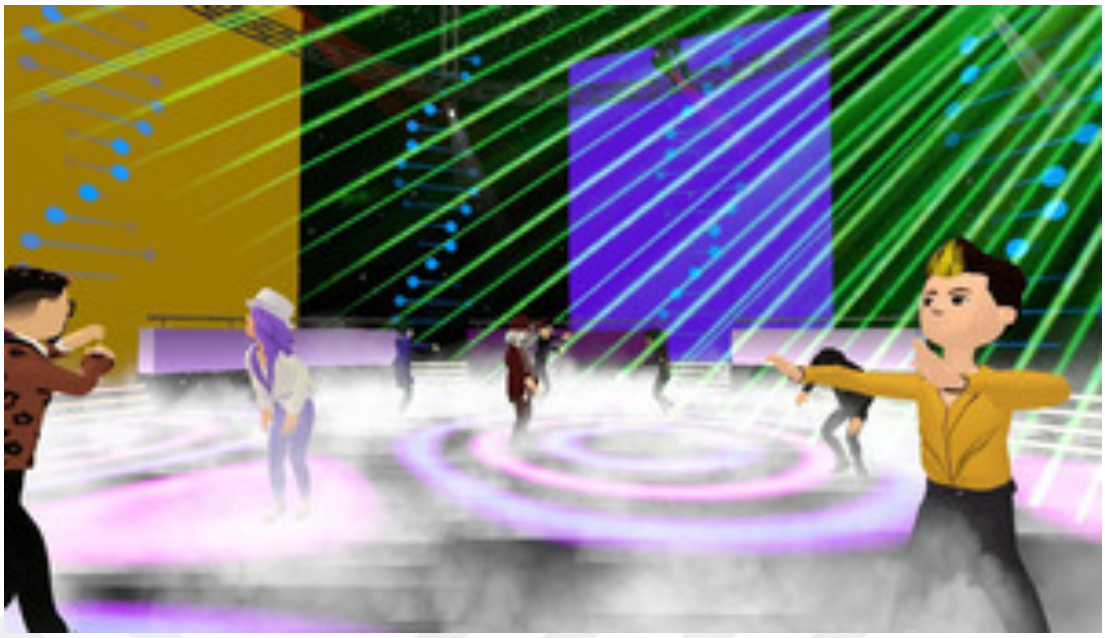


Figure 5.31 Dancing NPCs in a dance club in *AltspaceVR*.

With the use of various tools and features, creators were able to set event settings to create a formal or casual atmosphere, as they desired. In support of an event's goals and leveraging design effectively, I observed that spaces intended for formal talks, educational events, or conferences often incorporated minimal interactive elements. These spaces often consisted of a stage, a presentation wall, and a seating area. Notably, I observed that users were more inclined to sit (or stand on the seats) when specific seating options, such as audience platforms, sofas, or benches, were provided. *Figure 5.32* illustrated a virtual event space organized for an informational talk, featuring theater-style seats where users stood on or near the seats, facing the stage and presentation screen. This formal or semi-formal setting demonstrated how seating arrangements could influence user behavior.



Figure 5.32 A virtual event space in *AltspaceVR*, featuring a stage, presentation screen, and seating area, where users were seen standing on theater-style seats facing the presentation.

P26, a world creator, reflected on how virtual theater design was influenced by traditional theater-style seating. According to the creator, seats needed to be carefully placed so as not to obstruct the view of the event and to guide users in their placements. P26 also noted that users usually tend to gravitate toward available virtual seats instinctively:

"When people come in, they know where to go, instead of just randomly standing in the spot and accidentally getting in front of them, that will just allow you to be able to be like 'oh I'll sit here' and everyone instantly. I've noticed even I did it a few times too, when I go into an event or that world, or any world with a seat, I subconsciously go to the seat and try to act like I'm sitting in. I don't know why, I just do. So that is something that has always been interesting in a lot of worlds." (P26)

In VR spaces, people often lean towards the wall in order to overview from a more comfortable distance, and this can prevent interactions with more central activities like the speaker's area. This tendency to "hug the wall" reflects a behavior of observation, with people coming into the space, checking out what's going on around them, and other participants, and determining an advantageous place to be within that environment. Recognizing this, P26 developed strategies to influence user behavior in virtual environments, aiming to prevent users from distancing themselves

from the stage by "hugging the wall." To overcome this, P26 designed a small, round room for *Educators in VR* events, ensuring that users remained close to the speaker regardless of where they chose to stand.

P26's approach also included incorporating visual cues to direct users' attention. For example, they used triangular shapes and a transparent glass roof to influence where users looked. Upwards-pointing triangles guided viewers up at the stars in a fashion that created wonder; On the other hand, downwards-facing elements pulled back down towards the speaker's location, subtly guiding viewers' attention to the main interaction point. These intentional visual and spatial design elements allowed P26 to manage users' focus and behavior in the virtual environment strategically. P26 also noted that while some design choices were made consciously to shape user behavior, others emerged more intuitively. For example, they created hidden areas within a space, where they unintentionally encouraged exploration and interaction. Later on, they realized that these hidden areas added depth to the experience. Through blending strategic design and subconscious decisions, P26 exemplified how virtual spaces can be crafted to meet the observer's natural inclination while also guiding them toward a more engaging and interactive experience:

"One I built specifically for Educators in VR and it's a small round room. Because people are so used to what we call it is 'hugging the wall.' It's when they come into the event, they look for the closest wall and lean and stand against it. I think it makes it, so people are further away from the stage. So, I created a round room, so wherever they stand, even if someone standing along that wall, they're close enough that it makes it feel like they're still close enough to the speaker. So, I did do that on purpose because of that. Then I created another world there are these triangles and a glass roof that is over you. These triangles that go up and down right in the center, what they do is they draw your eye up to see the stars, but when you're done with it, your eye has been pulled back down with the arrows that are going downwards. We'll pull your eye back down toward where the speaker is. So, I have done that subconsciously and it's like abstract art or something like that… So sometimes subconsciously I do it. And then other times I do it on purpose of controlling people's behaviors without even knowing." (P26)

Referring to *Figure 5.33*, which illustrates the event space where we conducted the go-along interview, an event creator emphasized the significance of seating design in shaping the overall atmosphere and influencing user behavior during events as follows:

"For example, these chairs here have a much more corporate look, so I expect people to come in sit down, be quiet, watch the show. When I did the show prior to this one, I wanted it more casual and so I had back chairs as the seat. So, people would come in and they were still respectful. They were still quiet during the show, but they never had to be muted because if they had something to say, they raised their hands and they could be part of it because it was a more informal environment... There are other times when you go to an event and if it is a business event or an educational event, they might have a projector up on the wall. And they expect you to be paying attention and listening to it. So, I do feel like the environment that you create, sets mood and the expectation to the guest as to what is expected of them."[26]



Figure 5.33 An event space in *AltspaceVR* designed for talks related to cryptocurrency, featuring a "corporate look" seating design.

Similarly, P12 used traditional theater and street performance to explain how virtual spaces guide user behavior. In the case of a street performance, performers were in minimal control of their environment and had to capture people's attention to create

[26] I chose not to assign a participant number to this quote to protect the participant's identity, as the event space was unique and easily recognizable.

their stage. In virtual spaces, it was the familiar elements, the stage and seating, that aimed to set users' expectations and create comfort. These are the social cues that P12's team deliberately introduced, so that there would be some structure using which users would orient themselves and interact with others. P12 reflected that structuring spaces with clear social cues helped users get comfortable and understand their roles, whether they were watching a performance, attending a lecture, or viewing an exhibit.

"In a street performance, you have little to no control over your environment and you have to by force of will, you're the audience, this is my stage, stop, watch the show… Well, there's still a space rebuild where you say you're the audience where this is the stage because that is on top of built in expectations that people have. They get there, and they say, 'oh I know what I'm supposed to do here. It's a cooperative play.' And in cooperative play, well, you know, I'm supposed to be the first baseman. I know what my role is in this game, and people want to have that structure… So, we've kind of relied on that and said, 'OK, we're going to continue with a space that's outdoors. You can wander around just like we do. We're at a hotel in Las Vegas. You can wander around and go to the bar and do stuff. Well you can also go into the room where the presentation is, and there's a theater with seats and a stage with a presentation screen, and a guy puts his slides on the screen.' So, people know and understand what to expect, they are formatting basically automatically, oriented on what's supposed to happen. So, we've actually discussed all those dynamics of world building to determine what do we want to do to utilize these social cues to help people feel more comfortable automatically know what to do and all that sort of thing to give them some of that familiarity. We're still talking about the other way of doing it that is being experimented with a lot of the world building and VR right now we've discussing that. We haven't quite decided what to do with it." (P12)

The design of a virtual space could foster or limit social interaction. In *AltspaceVR*, while formal event spaces were typically designed to encourage the audience to sit and focus on the stage and the event, casual social spaces were intended to promote user engagement and activity. I observed that formal or semi-formal event spaces were also connected to more casual areas where participants could socialize before or after events. These casual spaces usually featured drinks, interactive objects, game stations and encouraged more informal interactions between the host, moderators, speakers, and audience. Art galleries (see *Figure 5.34*), exhibition centers,

and performance stages provided opportunities for users to share, explore, and participate in events. As seen in these examples, most public virtual spaces developed social practices that matched the intended atmosphere, where thoughtful layouts and familiar elements helped guide user behavior and create a sense of comfort and familiarity.



Figure 5.34 *Before Impressionism 3D Stereo Art Gallery* in *AltspaceVR*.

The creators further added that the visual design of virtual spaces was playing a crucial role in creating user engagement. According to them, users would be more willing to spend time in a space if it was visually appealing and matched the atmosphere of the event. Besides, they mentioned that the visual elements, lighting, and immersive features were important aspects of creating an emotional engagement. They also said that design should find a balance between stimulation and comfort to keep participants engaged, yet not overwhelmed. This was emphasized by several creators as follows:

"If it's not visually engaging to be in the space, then you'll lose people fast." (P8)

"Lighting, color, and immersion are important to create the right atmosphere and emotional response." (P14)

"Lighting really sets a mood; it sets a tone. It produces an atmosphere that leads the person in the world to feel a certain way." (P23)

Similar to my observations and findings, a recent research by Alcala et al. (2023, pp.96-98) underscored the significance of world design in enhancing the success of virtual events. Alcala et al. (2023) found that in *AltspaceVR*, creators often designed event spaces to replicate familiar real-world environments, such as bars or auditoriums for stand-up comedy events, or settings like Tibetan temples and forests for meditation and yoga sessions. This alignment between virtual spaces and the intended atmosphere or activity reinforces the idea that thoughtful world design plays a crucial role in shaping user experiences and engagement.

By creating environments that mimicked real-world settings, designers facilitated expected social practices. I observed that when users became acquainted with virtual spaces, they were more likely to replicate regular social practices similar to those in physical spaces. For example, in a virtual café I entered, there was a coffee station surrounded by tables and chairs. A user took on the role of a barista behind the coffee station, taking orders while other users waited in a queue. Meanwhile, a group of users sat at tables, engaging in a typical café experience by drinking coffee and sharing whispers. In line with my observations, P35 noted their experience in a virtual coffee house:

"I like that place because of the world design, and it really reminds me of a coffee house like, If I want to get a cup of coffee and sit down, I can feel like I'm really there and they have some events for people to meet." (P35)

I also observed that the design of virtual spaces could lead users to engage in chatting, dating, and flirting. For example, design features like ambient fires, dim lighting and warm colors could be used to create a romantic ambiance. Including private spots, such as hidden gardens or quiet corners away from the crowd, provided spaces for users to have more private conversations, thereby became places for these activities. As a result, these findings showed that the way a virtual space designed was a powerful tool that could influence how people act and connect in different ways.

5.2.2.2.The Role of Social Catalysts

I noticed that another approach the creators used in directing the users' behaviors and creating ease of engagement through design was the inclusion of social catalysts. In this perspective, a social catalyst can be defined as an element, activity, or even

person that can trigger interaction within a group or a particular space. It triggers and enables the users to be communicative, collaborate, and interact. Since physical interaction is limited in virtual spaces, the role of social catalysts becomes important. My observations revealed that social catalysts drew users together, encouraged communication, helped facilitate social interactions, and enhanced the overall social dynamics. In *AltspaceVR*, there were several social catalysts, with interactive games being the most prominent. Many of these games were designed for at least two players, naturally inviting users to come together and engage in the activity. In addition, virtual spaces often incorporated gamification with rewards, usually intended to increase user participation and collaboration.

Multimedia screens or web projectors in *AltspaceVR* also served as social catalysts. Users could share their favorite videos or music, watch movies, present and discuss topics, and create opportunities for shared experiences through these screens. For example, *Altspace Meetup* was a space rich in social catalysts. During one meetup, after learning that I was from Turkey, a user from Iraq played videos by famous Turkish TV shows and singers on the *YouTube* screen. One of the songs was from a popular TV show of İbrahim Tatlıses (see Figure 5.35), and another was a video by Turkish singer Tarkan. It was a unique experience to watch these videos with participants from Iraq, Australia, and India. The Iraqi user mentioned that Turkish music, TV series, and movies were very popular in Iraq, which started a conversation about media consumption preferences across different cultures. Additionally, in the *Altspace Meetup*, another multimedia screen displayed a new topic and question each day to encourage conversation and discussion among users.



Figure 5.35 Watching videos from multimedia screens with users in *Altspace Meetup*, *AltspaceVR*.

Virtual furniture, such as seating groups, sofas, tables, and chairs, also played a significant role as social catalysts by inviting users to gather and interact. As Thibault and Bujić (2022, p.2) mentioned, virtual mirrors also served as "social gathering points," where users would come together to talk and engage with other avatars. These virtual mirrors served various purposes and were key components of social interaction in virtual environments.[27]

Based on my observations, some basic interactive elements in virtual spaces brought users together and acted as social catalysts. One interesting example was virtual drinks. Virtual drinks played a key role in facilitating social interactions on social VR platforms. During events like parties, concerts, or in virtual worlds designed as bars, users frequently gathered at virtual bar stations and invited each other to share virtual drinks, many of which represented alcoholic beverages. This phenomenon was particularly common in small music breaks: Users would navigate to the bar station to grab a virtual drink and continue talking with their friends. It wasn't uncommon to hear someone ask, "Who wants to take a drink?" as they invited others to join them at the bar station (see *Figure 5.36*). While these drinks couldn't be consumed physically, they compensated for the lack of physical interaction. In line with my observations,

[27] I explored the use of virtual mirrors in greater detail in the "Social Affordances and Innovative Utilizations" section.

some creators stated that they placed virtual drinks to enhance users' experiences because they enjoyed interacting with them. This is where social catalysts like virtual drinks highlighted the importance of design in shaping user interactions and enhancing the social dynamics of virtual spaces.



Figure 5.36 The bar station featuring interactive drinks in the *Basement Hangout*, *AltspaceVR*.

While social catalysts like virtual drinks and multimedia screens enhanced social interaction, it's important to note the difference between human and non-human interactions in virtual spaces. As it was partly mentioned in the previous section, human presence adds a layer of spontaneity and emotional connection to the interactions that non-human elements, such as NPCs, are incapable of reproducing. For example, I observed that the use of live musicians and performers at events like karaoke parties created much user than interactions with NPCs did. In the end, this implies that the presence of human users remains indispensable in turning virtual environments into social spaces. Nevertheless, the thoughtful use of social catalysts provides the framework and opportunities needed to create meaningful interaction.

Welcoming messages appearing at the entrance of spaces were also effective social catalysts. For instance, a message could invite visitors to be active participants in musical activities, among others, hosted in the space. Besides that, plaques on the walls, such as "the regulars" or thanks for the amount of world visits, also served as a token of appreciation for the active user. These little details were not only a thank you

gesture but also an encouragement towards the newer users to become more participatory since the platform actually valued regular attendees. With all these subtle elements combined, the user engagement was highly increased, creating great social interaction in the virtual space.

Not only in *AltspaceVR*, but also in all social VR platforms, virtual campfires or fireplaces (see *Figure 5.37*) often served as social catalysts. They became iconic meeting points, with many public spaces featuring them, including a popular community hangout space named the *Campfire*. In *AltspaceVR*, designers placed interactive marshmallow sticks near campfires, and users often interacted with these marshmallow sticks, which became symbolic of "feeding" one another, especially loved ones.[28]



Figure 5.37 Users gathering around a fireplace and interactive rockets in a virtual event space in *AltspaceVR*, designed for socializing after events.

5.2.2.3.Virtual Homes and Private Spaces

Users in *AltspaceVR* created worlds that functioned not only as public spaces but also as virtual homes and private spaces. I observed that many "regulars" had personalized environments in the platform. These spaces usually reflected the tastes, personalities, and needs of their creators, and were used in various ways. They could

[28] The practice of feeding each other with marshmallow sticks is explored further in the "Social Norms" section.

host small gatherings, foster intimate relationships, or socialize with close friends, mirroring real-life social dynamics while offering a controlled setting for personal interactions.

For example, users like P8 only spent time in their private spaces when accompanied by others, highlighting their use of these areas for social activities. P6 treated their virtual house as a true home, where they watched TV in the evenings and hosted friends for movies nights and casual visits. P6's private space also became a venue for dating and even tarot card readings. Similarly, P15 and P32 often hosted small parties in their private areas, while P29 built a house with a fireplace to chat with friends and equipped it with a *YouTube* player to watch movies. Likewise, P30 incorporated a video player that streamed their desktop, allowing up to ten friends to watch *Netflix* or other content together in a home-like atmosphere. P30 also mentioned that their friends could even fall asleep while watching movies together. P5's private space was a hangout spot for their friends, while P39 valued this space for personal meetings away from the crowds. Similar to P39, P32 and their friends occasionally met in quiet private areas, away from public disruptions. Some users created private spaces around specific themes. For example, P31 designed a sci-fi-themed conference room for private events and personal interactions.

These private areas also offered a controlled and safe space for users to nurture personal relationships and have intimate interactions without the presence of unknown users. P4 and their partner created a house filled with personal items like family photos and plants. This space also included familiar details such as cell phone charging spots and teleporters to their favorite places. Similarly, P40 and their partner built a personalized space, including a room decorated in their favorite colors and items. They collaboratively decorated their house with pictures from their life together. P15, on the other hand, used their virtual space to stay connected with a long-distance friend, where they would watch movies and TV shows together in this virtual environment.

Some of these virtual homes and private spaces were the part of larger housing projects and community towns. In *AltspaceVR*, users engaged in collaborative housing projects to build and decorate communal spaces, fostering a sense of community and shared creativity. Housing projects like *Aqua Complex* and *Metavale Park Apartments* allowed users to become neighbors, personalizing their spaces by writing their avatar

names on doors of virtual apartments (see *Figure 5.38*) and creating communal floor plans (see *Figure 5.39*).

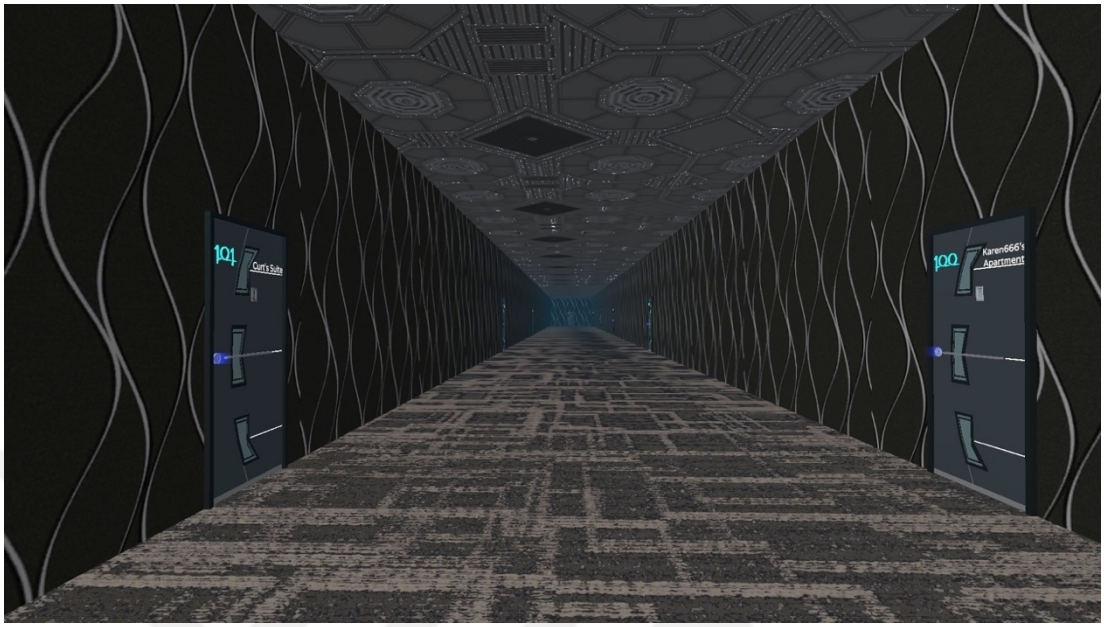


Figure 5.38 Residents' avatar names and numbers displayed on the doors of virtual houses in *Aqua Complex*, *AltspaceVR*.

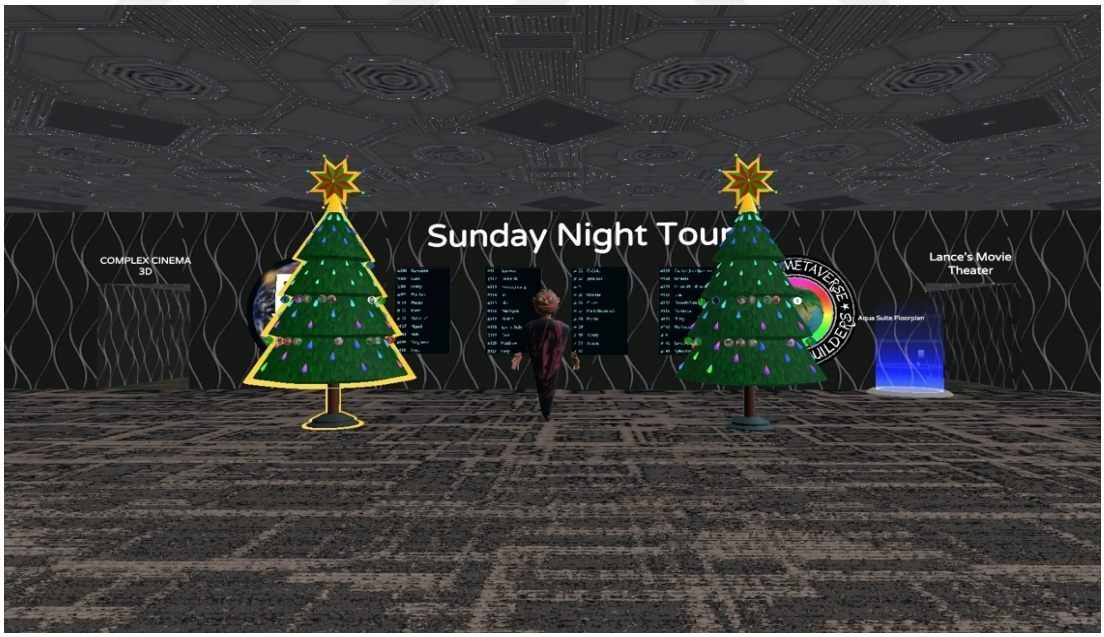


Figure 5.39 The entrance of *Aqua Complex* in *AltspaceVR*, featuring communal floor plan with residents' avatar names and door numbers displayed.

I interviewed the creators of these two popular housing projects on the platform. The creator of the *Aqua Complex* stated that the project's main goal was to foster a sense of community among friends. They invited users to fill out forms to select their apartment numbers, which enabled them to personalize their spaces by writing their

names on the doors and adding portals to their customized worlds. The creator highlighted how the *Aqua Complex* allowed users to feel closer to each other by choosing neighboring apartments as follows:

"I started to create something for me and my friends. It was called the Aqua Complex. It's been a two-year project so far. I wanted to make it to my friends and my community and stuff, which feel like we are together. I built the complex and I had people fill out forms that they wanted an apartment. They would fill out forms to find out, not find out but pick a number they wanted. They would go in there, write up their name on the door with their room number and put a portal that would lead to their world that they decorate. Because I would share my template which is called the Aqua Suite with them, so they could create and design their own room... Some like love living next to each other and it's nice too. There are smaller communities in our community. Like there was a group of friends who wanted to be near each other, and they picked one floor and a group of numbers that were next to each other. You know it was just them in that area, which is you know it was nice to see, you know because they were they wanted to live next door to each other, so they did, here in VR using the Aqua complex." [29]

As noted in the quote above, the creator offered a template called the *Aqua Suite*, which were provided users to design their own apartments. While each apartment was built from on the same template, users reflected their individual creativity and diversity onto their personal spaces, showcasing their "unique touches." The creator described it as follows:

"It was nice when we first did that, you could see the diversity of everyone. Each apartment did not look the same, the template was the same, but how their apartment was decorated was actually different. You know, and it was nice to see. Some are like, I'm not a big world builder. I did my best and it was good, you know, it was fabulous because it was their unique touch and that's the reason why I started doing this." [30]

[29] I chose not to assign a participant number to this quote to protect the participant's identity.
[30] I chose not to assign a participant number to this quote to protect the participant's identity.

P6, who had an apartment in *Aqua Complex*, mentioned that it was a group community experiment where everyone received an apartment and had the freedom to decorate and design it as they wished.

"So, the building itself was done as a kind of a group community experiment. It's an entire apartment building and we each got an apartment and we each got to decorate it and and design it the way we wanted to, some a little more elaborate outside than others." (P6)

One of the creators of *Metavale Park* (see *Figure 5.40*), a large community-built world that included not only virtual apartments (see *Figure 5.41*) but also streets, shops, restaurants, clubs (see *Figure 5.42*), and even a police station (see *Figure 5.43*), shared their motivation for creating this complex:

"We wanted to be sure its a 100% free place where people weren't in to be in there, so I think it was a real community to build. We also made houses. We gave people a house. And then they, because it was impossible to allow them to decorate their houses, because the world would be just too heavy. So, what we did was we created a template of the houses and then they make a world out of that house and then we created a link to that house. So, you could put a portal to that house. It is quite a big place."[31]



Figure 5.40 The map of *Metavale Park* community town in *AltspaceVR*.

[31] I chose not to assign a participant number to this quote to protect the participant's identity.



Figure 5.41 *Metavale Park Apartments* in *Metavale Park*, *AltspaceVR,* featuring residents' avatar names and door numbers.



Figure 5.42 *Moma Raves* community club in *Metavale Park*, *AltspaceVR*.



Figure 5.43 The police station in *Metavale Park*, *AltspaceVR*.

P40, a user with a virtual house in *Metavale Park*, invited me to their private space. This private space was designed for socializing with friends and spend time for partners. The house was surrounded by a lake, and it was not situated in the center of *Metavale Park*. However, it still maintained a connection to the town center. To create this connection, P40 positioned a virtual camera on a *Metavale Park* street and projected the live feed within their house (see *Figure 5.44*). This camera setup allowed them to observe street in real-time whenever they looked out of their window to have a sense of connection with *Metavale Park* and their neighbors (see *Figure 5.45*).

"It's a house in Metavale Park. There's a place called Metavale Park, and everybody has a house or an apartment. And then you click on it, it takes you to the world where that house or apartment resides. So that's how you get to it... If you click, don't click in the mailbox, but if you did, that would take you back to Metavale Park which is there, so you would see like the house in a row, but I have inside you'll see what it looks like. So, if you click on the green tag it will take you inside. So over here, this up here is what this street looks like. So, if you were looking out my front window, that's what it would look like. Those are my neighbors across the street." (P40)



Figure 5.44 The live feed projected from a camera on a *Metavale Park* street to P40's virtual house windows in *AltspaceVR*.



Figure 5.45 A street in *Metavale Park*, *AltspaceVR*, where P40 likely positioned their virtual camera.

In line with the above discussions about the use of familiar cues, I observed that users often included familiar design elements in their private houses, even if they lacked functionality. Aligning with my observations, the creator of *Aqua Complex* noted that users frequently added bathrooms to their virtual houses.

"When I was creating the Aqua Suites, I did not create a room for a bathroom. Because I knew it was for VR, but it's interesting to see some people like my friend …,

in his apartment, he created the living room to be cut in half and half of it could be the bathroom. It's very interesting. And there's other people who did the same thing too where they created bathrooms in their apartments as well. You know, obviously I don't understand why, it's still cool."[32]

P40's virtual house had a bathroom with doors that featured an interactive function: The door was opening and closing when someone approached towards it. P40 stated that they added this interactive feature because this them feel as if they were physically walking into the bathroom. They also had a non-functional kitchen in their house. When I asked P40 why they included a kitchen despite not being able to cook there, they explained that it contributed to the immersive experience.

"You can interact with some stuff in the kitchen. You can have a drink. Because, yeah, it just gives you that feeling, yeah. Just like upstairs, the door to the bathroom opens and closes, so when you go in, you feel like you walk into the bathroom. Just a little tiny thing that we added." (P40)

Like P40, P15 mentioned that they incorporated various decorative elements into their virtual house to create a sense of familiarity, even though these items had no functional purpose. For example, P15 stated that they had a bed in the bedroom even though they could not sleep on it. Referring to it as their *"home in the virtual world,"* P15 invited me to visit this space and explained the reason behind including familiar elements as follows:

"This is my home in the virtual world... Every home needs a bedroom, for example, this is one of those sorts of surreal things. I have no use for a bed in the virtual space, but I put one in here... This space is for all of the decoration and the thing that's going on in here, yes, I have the games over there, the videos. Beyond that, this place has no functionality, the computer does nothing, the DJ equipment does nothing. This is simply a just a visual representation of my life." (P15)

As mentioned above, I observed that many users had real pictures and family photos in their virtual houses. P15, for example, displayed both real and virtual

[32] I chose not to assign a participant number to this quote to protect the participant's identity.

pictures on the refrigerator in the kitchen and on the walls of their virtual home, replicating common real-world practices (see *Figure 5.46*). P15 described it as follows:

"I have a place that I call, you know, my house. I have a lot of more personal sort of digital artifacts, I guess, some pictures and things. And it's kind of a space that represents me as a person, a little bit more than this space does... This one is a very personal space with just a lot of pictures and things that represent me... Inside, in the kitchen I've put pictures on the refrigerator. But you know, there's some other pictures in here as well, like for example this one here I took when I was in Japan for work." (P15)



Figure 5.46 A virtual house with an exterior view showcasing pictures displayed on the interior walls in *AltspaceVR*.

Similar to P15, P6, who referred to their virtual apartment as "home," invited me to their space in *Aqua Complex* and shared real family photos they had added to the virtual environment (see *Figure 5.47*). By pointing out these photos, P6 showcased their children, grandchildren, late husband, current husband, and even their pets. This virtual space reflected their life and family, blending physical and digital realities into a representation of family relationships.



Figure 5.47 A virtual house in *AltspaceVR*, featuring a kitchen and living room with real family pictures displayed on the walls.

In addition, in the virtual houses that I entered, I observed that users sometimes added elements representing their dreams or items they wished they had into their virtual homes. For example, P15 included a motorcycle they wished to own in real life. During our tour in their virtual home, P40 mentioned hosting a prom with friends, creating a car and trampoline, and decorating their house with personal items like green sofas and pictures of themselves and their partner.

"You have neighbors and people you interact with, and you have parties. When we went to prom, everybody gathers here, we put the trampoline in the backyard, and everybody got dressed up and I had made a car. There was a car outside. I don't know if you saw it, but I made the car that's outside. And everybody got in the car, and we took pictures. Like we were all gathering to go to the prom, and everybody came to our house and went to the prom together. So, I mean, stuff like that makes it really feel like, somehow, it's just a whole another world to live in, yeah. It's definitely a lot of fun. I loved it when virtual worlds simulated reality. I thought it was really cool and it gave you a way to be at peace in a surrounding that you maybe couldn't have in real life. I would have loved to have all green sofas in the real world. This house was like a shrine to our love. In the virtual world, it was cute to have pictures of me and my boyfriend everywhere, something that might have seemed odd in real life. It gave us the freedom to speak more freely from our hearts." (P40)

As seen in these examples, users in *AltspaceVR* created personal and communal spaces that helped them form social, psychological, and emotional ties with the

platform. Following Lefebvre (1991), space cannot be understood only through mathematical concepts; people add values, actions, and meanings to the spaces they inhabit. As cited in Ersen and Aksu (2017, pp.71-72), Schütz (1945) argues that home holds symbolic and emotional value beyond its concreteness. When considering the values and meanings participants projected onto their virtual homes, it becomes clear that most of them formed a sense of belonging. Much like real-world homes, these virtual spaces became symbolic extensions of users' identities. For example, participants like P15 and P40 incorporated elements from their real lives, such as personal photos, digital artifacts, favorite colors, and dream items like motorcycles, cars, or green sofas.

Virtual homes in *AltspaceVR* also fostered a sense of community. As demonstrated by examples, there were two communal apartment projects in *AltspaceVR*, *Aqua Complex* and *Metavale Park*, where many regulars had an apartment next to each other and even had neighbors. P40, for instance, established a connection between their private home and the *Metavale Park* community by projecting a live feed of the town's street into their home through a window. This allowed them to stay connected to the outside world and neighbors while remaining in their private space. Lefebvre (1991, p.209) stated that windows are transitional objects with dual orientations- offering a view both inside and outside, symbolizing the relation between private interiors and public exteriors. However, in virtual spaces, windows more often have the function of framing the interior view, as they are not tied to any physical location. In fact, P40's house was not even virtually located in the town center, and the view was of a lake rather than a street. Therefore, it was not visible from the outside.

P40's use of a virtual camera to observe a public street while remaining in their house illustrates this one-way dynamic in virtual spaces. This example highlights the role of objects like windows and cameras in virtual environments while underscoring user-environment relations' technologically mediated nature. As Vindenes and Wasson (2021a) argue, virtual environments introduce new ways of interaction between users and their environments through technological mediation. In P40's case, virtual window functioned not only as a boundary to have a sense of private space, but also as a tool for connecting public spaces, which was mediated by camera and live

feed. This mediation not only challenges traditional notions of presence but also enables users to actively manipulate their spatial experiences. By combining Lefebvre's ideas on transitional objects with his broader theory of the Production of Space, we can see how the space is socially produced and how technological mediation in virtual spaces creates new opportunities for user-environment relations.

5.2.2.4.Experiential Spaces

While many users incorporated familiar cues in user-generated worlds, there were also many worlds that did not follow familiar conventions; instead, they were more unique, experiential spaces. In these spaces, the virtual world itself became the focus of interaction, often featuring imaginative, futuristic, or utopian elements and narratives. I observed that these spaces often transcended boundaries and limitations of physical spaces and provided users with an "escape" into imaginative environments. In these experiential spaces, users could do whatever they dreamt of- driving a car on the rings of Saturn (see *Figure 5.48*), navigating through floating islands and futuristic cities (see *Figure 5.49*), or experiencing musical journeys (see *Figure 5.50*). I observed that most of these worlds offered unique interactive elements that often defied the laws of physics.

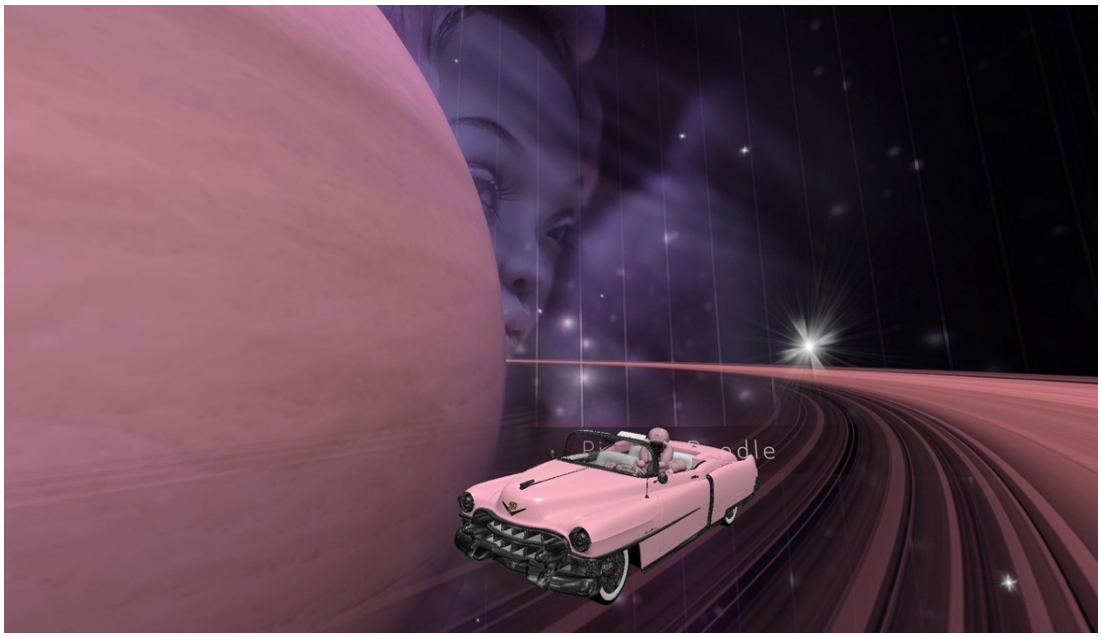


Figure 5.48 Driving a car on the rings of Saturn in *ArtSpace*, *AltspaceVR*.



Figure 5.49 *A Sky City* in *AltspaceVR*, showcasing a futuristic cityscape.



Figure 5.50 A world designed to have a musical journey in *AltspaceVR*.

One of the most unique and popular examples of experiential spaces was *The Solar System* (see *Figure 5.51*). In this world, users could fly around planets, see the size ratios of planets and moons, and experience interactive animations. The experience provided users with an immersive learning experience that made complex scientific information about the planets and solar system more accessible and engaging. As of now, this world remains available on *VRChat* and is still one of the most visited worlds by users.

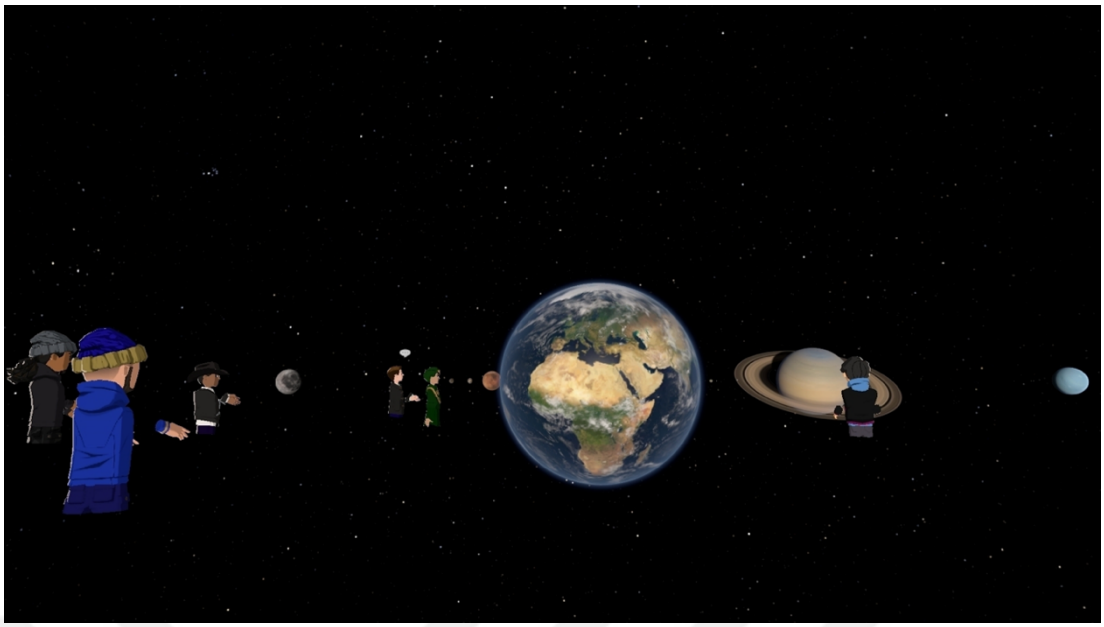


Figure 5.51 *The Solar System* in *AltspaceVR*.

When asked about their interest in this genre, many creators explained their desire to explore or create abstract, imaginative virtual spaces that transcend the limitations of the real world. For example, as illustrated in *Figure 5.52*, a world creator described their world-building as an exploration of what was possible, experimenting with elements like gravity and creating environments that challenged conventional perceptions of reality.

"The worlds that I make are just me trying to sort of see what is possible. Like I wondered if I could make this, if I could make a wall and then throw and kind of do this with the gravity and see what that was like... So, I think that's what excites me. Maybe not making a totally immersive space, but just like sort of changing people's perceptions of what's possible... I think you could be a magician or God of what's in here. You can fly, you can build things, you could spawn whatever you want."[33]

[33] I chose not to assign a participant number to this quote to protect the participant's identity, as the world was unique and easily recognizable to identify the creator.

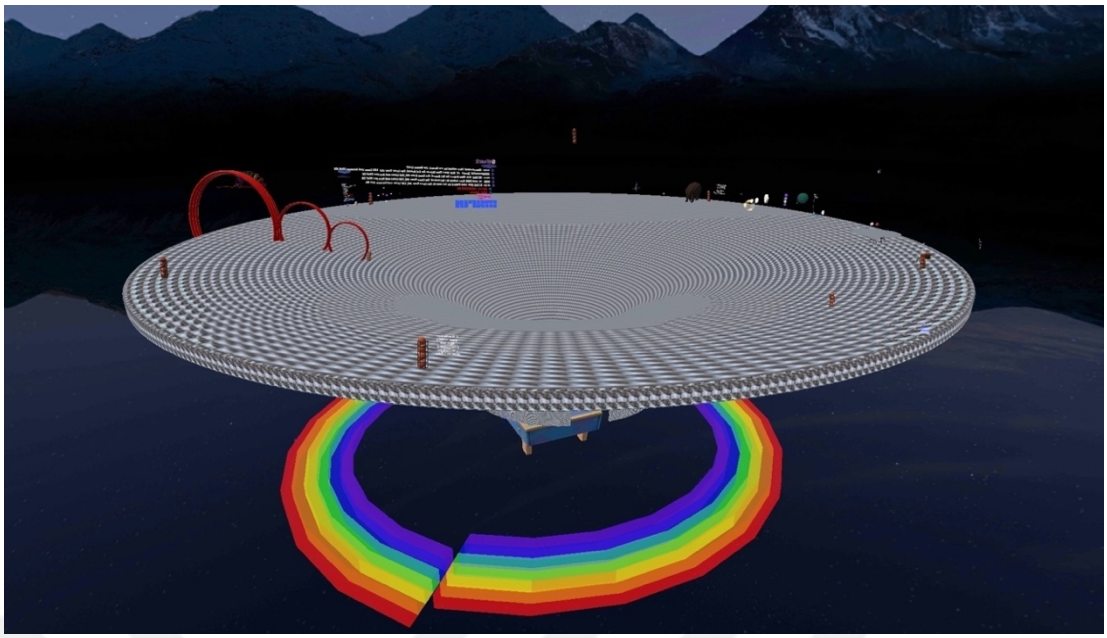


Figure 5.52 A virtual world in *AltspaceVR*, showcasing elements that challenge conventional perceptions of reality.

Another world creator expressed excitement about the limitless possibilities in virtual spaces, especially the ability to fly and create environments that are impossible in the real world. They emphasized how, unlike the physical world, virtual spaces do not require familiar objects like chairs or beds. What the creator enjoyed most was being able to design complex structures, like labyrinths for gameplay (see *Figure 5.53*), which could not have been physically constructed in the real world. This creator found that the most interesting part about VR was freedom from the need to simulate reality and thus opening completely new opportunities.

"If you think like a kid, the most amazing things that you can do here is flying. Can you believe that we can fly here? Like it's just too credible. So, I don't know why I want to do a chair if I don't need it. I can create any different things that are related to flying. I can put sounds in different places. I understand the need for some people to make sense this new reality. But for me, I don't need that. I have my own reality. I'm sitting now in my bed, and I don't need another bed here. Like why? If I can fly, I can go anywhere and I'm not thirsty. I'm not tired. I can go everywhere. So, for me, it's like unleashing my creativity… I think one of the most beautiful things that there's is the nexus. Like the labyrinths are just beautiful things. So, the possibility of doing really labyrinths inside Altspace is amazing. You don't need to be in a flat, ground. You can do many different stages. Because we have this possibility of creating different stuff... I mean here you can create things that doesn't need to match reality. That's the

beauty of these. Imagine creating this in the real world. It's just impossible, but here you can do it. So, for me, it's creating things that are new." [34]

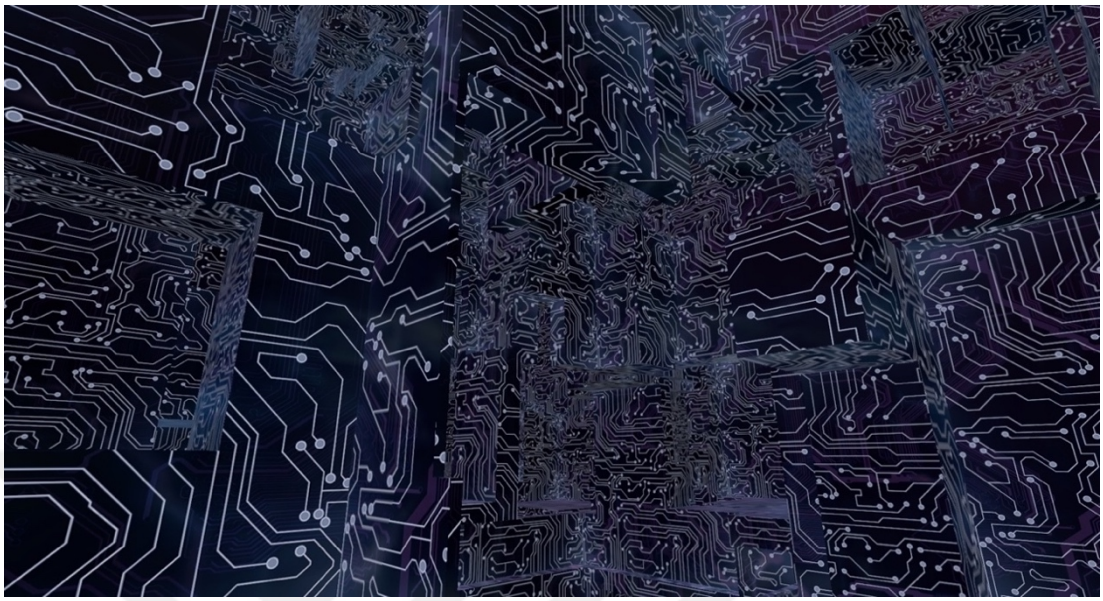


Figure 5.53 A virtual world created to play Hide and Seek in *AltspaceVR*, featuring multiple layers and intricate labyrinths where users can fly around.

P20 was also attracted to imaginative and fantasy worlds, noting that many people were drawn to these environments to escape reality, seeking out unique, fantasy-like spaces that offer a break from the familiar experiences of everyday life.

"A lot of people have a great imagination. They like to see imaginary things, or I think they're drawn to imaginary things. And I think that's what gives people, they want to get away from the normal reality. OK, I feel, if I get away from the normal reality of worlds that they can go to and they want to go to some other places that are interesting and fantasy kind of worlds." (P20)

As mentioned before, there was a large community of creative world builders and designers in *AltspaceVR*. Many provided the first examples of unique spaces and experiences in social VR platforms. Some of these creators and designers became quite famous in their own field of expertise. One of the unique creators, self-identified as an "experience creator," created VR artworks. The creator[35] worked with creative team of skilled artists and creators to create complex virtual worlds. All our their focused

[34] I chose not to assign a participant number to this quote to protect the participant's identity, as the world was unique and easily recognizable to identify the creator.
[35] I chose not to assign a participant number to this quote to protect the participant's identity.

on an innovative project brought together: *The VRium Performing Arts Space*, *"a futuristic acropolis of art in the Metaverse, which offers a new quality of VR artworks."*[36]

While all *VRium*'s projects were unique, the team's main piece was *NYMPHS*, which was awarded the Discovery award at *Raindance Immersive* in 2021 and the Best Virtual Reality Short at *Cannes World Film Festival* in 2022. *NYMPHS* was a VR theater performed by monumental art-dolls (see *Figure 5.54*). I had a chance to conduct a go-along interview with the creator in their worlds, including *NYMPHS*. Like many other many other creators in this genre, the creator emphasized the unique creative freedom VR offers, allowing them to explore immersive, metaphysical spaces that cannot be replicated in the physical world. For example, VR allowed them to overcome the limitations of traditional theater in *NYMPHS* and provided complete control over the design process without the existence of traditional theater managers or financial pressures.



Figure 5.54 The monumental art-dolls of *NYMPHS*, *AltspaceVR*.

The creator's inspiration for world-building was particularly unique, ranging from mythological themes to immersive experiences. Their worlds often included spiritual and fantastical elements. At this point, the creator highlighted the importance of balancing technical elements (e.g., choosing colors, lighting, and textures) with the

[36] For more information about *VRium*, please visit https://www.shushu.style and http://vrium.io.

metaphysical experience of the virtual space. For example, *NYMPHS* explored emotional and dark themes, drawing from fairy tales, mythology, and classic literature. It was a three-chapter story; each chapter explored different aspects of the story. The story incorporated characters like The Little Mermaid and Ophelia from *Hamlet*. The space itself inspired by an anatomical theater used for autopsies and switched between underwater scenes (see *Figure 5.55*).

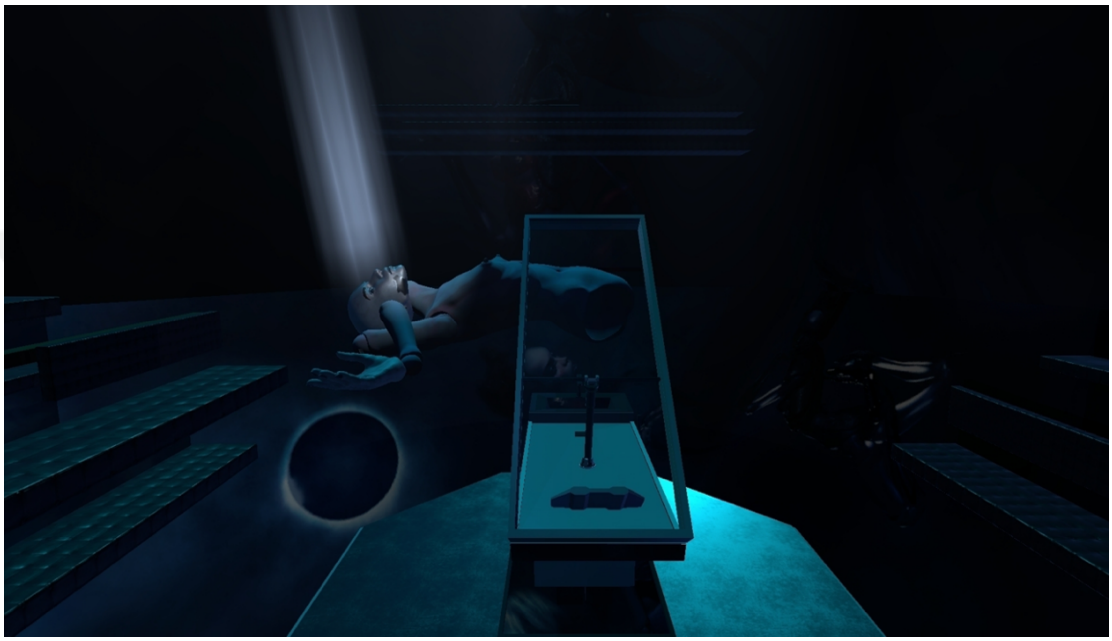


Figure 5.55 The autopsy table in *NYMPHS*, *AltspaceVR*.

The creator's goal with *NYMPHS* was to create a metaphysical experience that went beyond traditional theater by using "Actroids" (a combination of androids and actors), controlled through full-body tracking (see *Figure 5.56*). They aimed to convey emotion and storytelling through animated figures rather than human actors, because they believed that in this way, they could achieve greater control over the artistic expression. Due to financial constraints, *NYMPHS* has not yet been fully realized as a theater production, as it requires significant investment and technological support to bring the project to life. Besides, it has not yet been recreated in *VRChat* or any other platform. Another notable project of the *VRium* team was *ELYSIUM* (see *Figure 5.57*), which was a sensual meditation space designed for live events (see *Figure 5.58*). The design was again unique, featuring an underwater theme with big flowers in the moonlight. Unlike *NYMPHS*, *ELYSIUM* was recreated in *VRChat* and remains available.

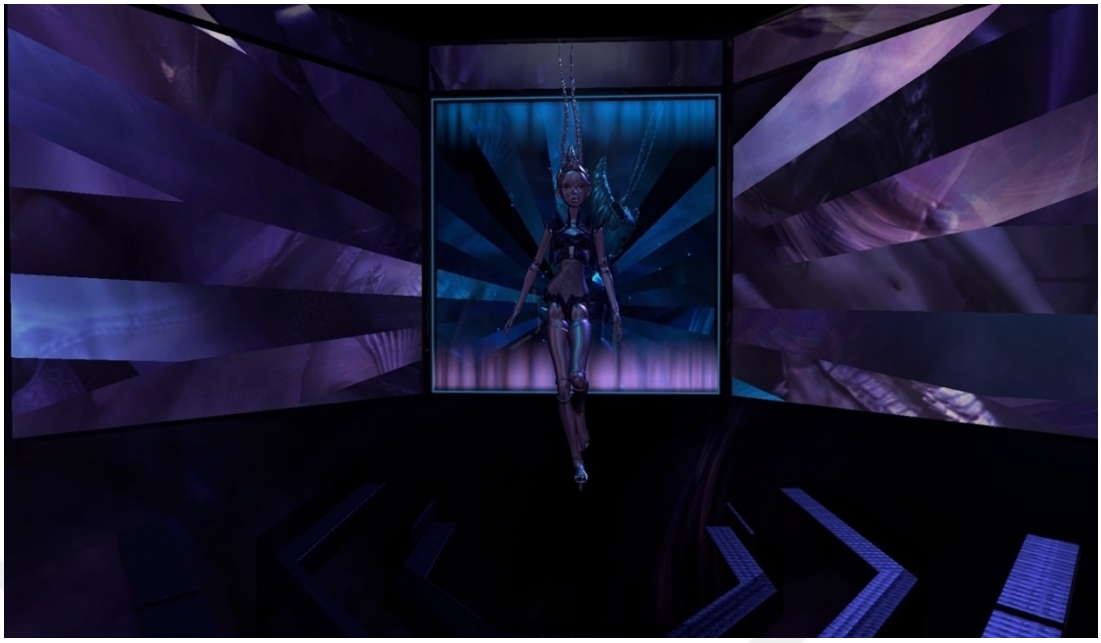


Figure 5.56 The "Actroids" in *NYMPHS*, *AltspaceVR*.

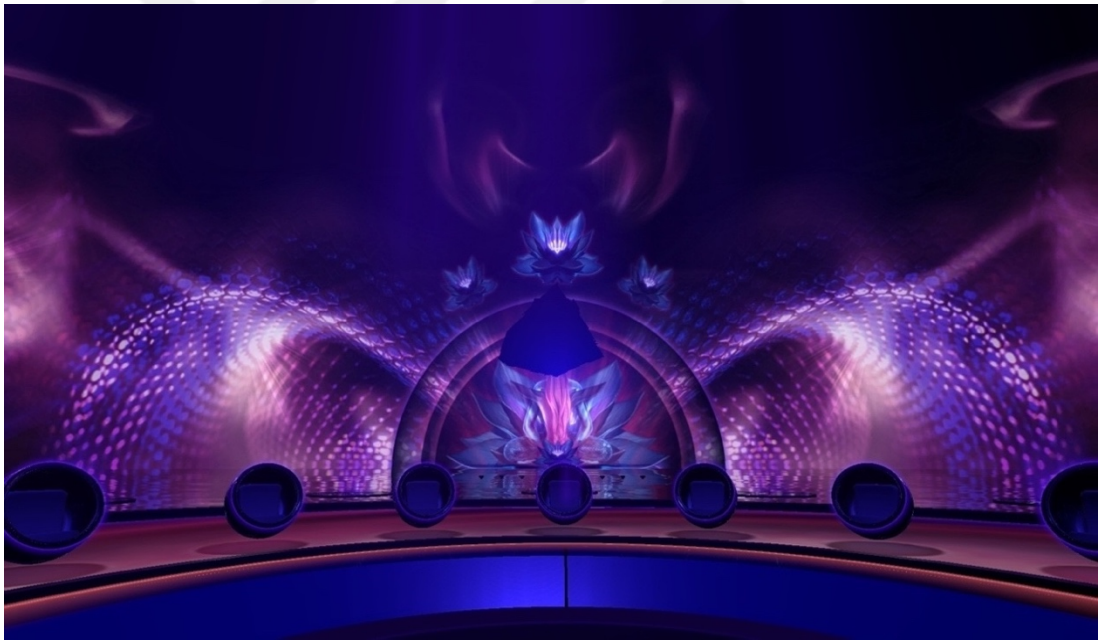


Figure 5.57 *ELYSIUM* in *AltspaceVR*.



Figure 5.58 An event on *ELYSIUM* in *AltspaceVR*, featuring colorful halo effects around participants.

As demonstrated by these examples, these spaces were provided experiences that differed from familiar. I observed that some users were particularly drawn to spending time in these types of experiential worlds. In fact, many participants identified this as the central logic of VR. However, some creators believed that there needs to be a balance between replicating familiar elements and creating unique virtual experiences. For example, while the *Aqua Suite*, as previously mentioned, incorporated familiar elements such as apartments and corridors, it was part of an underwater city, where users could see floating fish through their windows (see *Figure 5.59*). The creator of the *Aqua Complex* stated that while they need realism in their creations, they also prefer imaginative settings as follows:

"I do love fantasy worlds that are apart from real life. I love the thought of being in a spaceship, being underwater in like a city or something, or being in a base or a cave. You know, something that would be really hard to do in real life. I don't like to mimic the real world. I am a person, when I build, I want to have it be as realistic as possible, like physics and so many other stuffs I wanted to map. If it would be done in the real world, it would be done that way, you know? But I still like to be somewhere else, like this cave I've built. You would never see floating platforms or a big cave like this in general... So, a lot of themes I do is as I said is fantasy, futuristic, and stuff like

that. I love thinking a forehanded future. If you look at that local complex and you go to the window, you'll see that you're in an underwater city."[37]

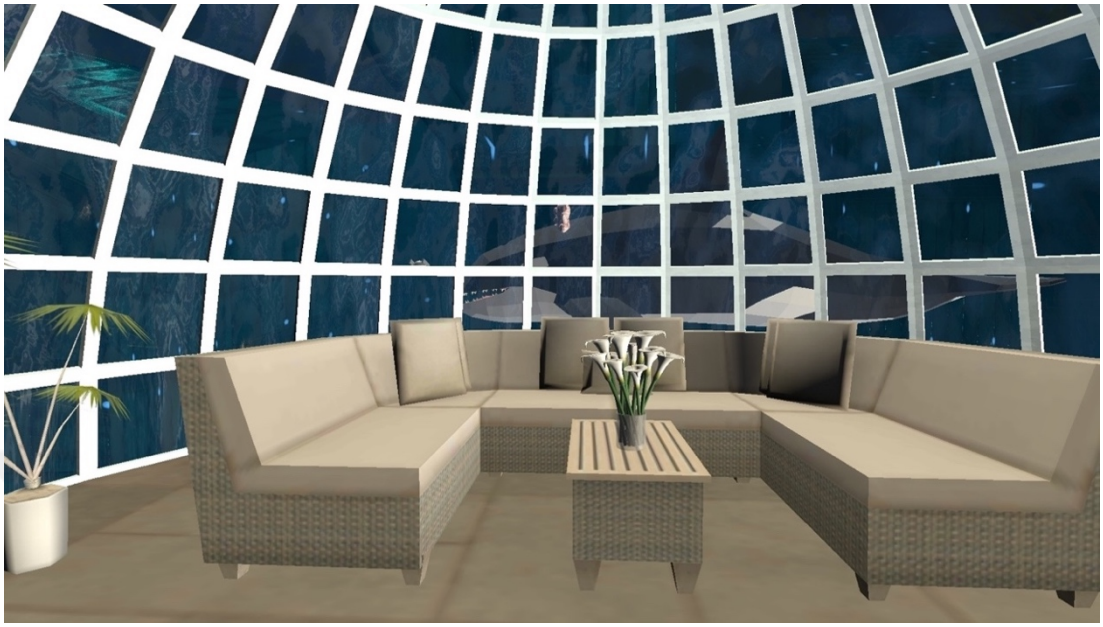


Figure 5.59 A whale in the underwater city, as seen from the windows of a house in *Aqua Suites*, *AltspaceVR*.

Similarly, P14 expressed a preference for blending familiar elements with imaginary aspects. For example, they enjoyed creating realistic experiences like the Chinese New Year celebration, while also designing imaginative events where users could interact with creatures like blue whales- things that would be difficult or impossible to experience in the real world.

"I created a slay for Christmas and you can fly it, you can drive it and go across the world and stop and go down a chimney Santa and things like that. So obviously that isn't something that I would do in the real world. In some ways I like creating the familiar, like the Chinese New Year experience with recreating something that was real. I also like the sort of almost fantastical things that you can't do, so I've done an event where it's about perspective and where you start off normal size and then you shrink and then you get big and a few things like a blue whale to the biggest creature on Earth. No way that you couldn't get close really easily in the real world, but you can use the virtual tools." (P14)

[37] I chose not to assign a participant number to this quote to protect the participant's identity.

Some creators supported blending familiar and abstract elements in virtual experiences to provide comfort and prevent user disorientation. P25 noted that too much abstraction could confuse users or cause them to lose interest. Similarly, P13 told an experience where an 83-year-old user became stressed in a VR space featuring planets like Pluto and Mars because of feeling unbalanced due to the lack of legs on the avatar. This underscored the importance of maintaining a degree of realism to avoid physical discomfort, such as motion sickness. P13 emphasized that familiar cues like floors are essential for creating a stable and comfortable virtual environment.

"We've also found that if we dump people in a completely empty world, they freak out, like 'Where's the floor, Oh my God, there's no floor.' And depending on the avatar, one of my favorite moments was when I took my mother first time, I put her in VR and we were in Titans in space and she loves space, so we were flying from Pluto and Mars and she's just going crazy over all of this. She just loves this. And then she looks down and starts screaming because she's screams that she doesn't have any legs, and she can't stand up. And my 83-year-old mother starts to pitch over and fall, she can lose her balance. I'm like 'I'm going to grabbing her hand to hold her up.' But she's just freaked out. So, when you completely remove and create a totally alien experience that lacks familiarity with indent experiments with tilting perspectives and trying to get people to walk on a slant, it screws up their brain. And we know pretty much how far we can go before the brain kicks in and tries to straighten the experience which leads to motion sickness. So, we tested to see how far we could do with all of our experimentations. So, we have to have some form of realism." (P13)

Kociatkiewicz (2004, p.76) argues that entering cyberspace offers a form of "liberation" or escape from the limitations of the physical world, suggesting that the body is restricted by the "prison of the flesh," and freedom can only be achieved through transitioning into the cyberspace. According to Kociatkiewicz (2004, p.100), *"cyberspace enhances the embodied experience of the world."* Here, cyberspace is represented as a virtual space where the user can transcend the limitations of the real world and body, unlocking creative and imaginative possibilities such as flying, interacting with imaginary spaces, and exploring unrealistic architectural structures.

While virtual spaces offer all kinds of possibilities for unlimited imagination, finding a balance between reality and fantasy seems important to maintain user comfort. If virtual spaces over-replicate the real world, they may constrain the creative potential that makes virtual spaces appealing. However, it is also crucial to blend these elements in some ways because familiar cues help maintain user orientation and comfort. Additionally, excessive abstraction or a complete departure from recognizable elements can lead to disorientation, discomfort, or motion sickness, as seen in participant responses.

5.2.3. Event Management, Moderation Tools, and Community Standards

AltspaceVR attracted not only world creators but also event creators such as hosts, moderators, and facilitators. Whereas world creators used tools for world-building, event creators relied on a set of moderation tools that greatly influenced event management within these worlds. These tools allowed hosts and moderators to control various aspects of the environment to ensure smooth and uninterrupted events, features that many creators and users found lacking outside *AltspaceVR*. These tools were usually used by event creators to manage the flow of events, maintain security and safety, enforce community standards, and customize user experiences.

As mentioned before, key event management and moderation tools on the platform were stage blockers, host zones, audience muting, voice amplification through megaphones, media projection, and the ability to remove disruptive users. Events usually adopted a hierarchical structure with specific roles assigned to hosts and moderators who held the permissions to use these tools. When there were no moderators, users often had to take proactive measures, such as reporting inappropriate behavior or content. I also observed that the experience of moderators in successfully controlling virtual spaces was quite important, as not all event spaces were moderated effectively. Moreover, the ability to use the right tools was the responsibility of the moderators, depending on the type of the events or activities taking place within the worlds.

All the event creators I interviewed emphasized *AltspaceVR*'s success in providing moderation tools, community standards, and community-building tools compared to other platforms. P6 highlighted *AltspaceVR*'s robust event system and its

various features like the web projector and messaging system, while P2 provided insights on how *AltspaceVR* differentiated itself from other social VR platforms with its community-building tools.

"Altspace has been that platform for events, that's what they've been geared for. And when you go to the other 17 platforms out there and you go checking off the boxes, there is no other platform out there that checks off all the boxes that Altspace that off. It has the ability to do screen share or web projecting, meaning you can bring movies in or TV or whatever. You can project it into the room. Many of the platforms don't have that ability or it gives us the ability for speakers to be seen over different incarnations. So, if you have more than two people in the room, they can be seen through all of those. It has a messaging service which many of them don't have, but we can leave messages and communicate within platform as well as outside. Many of them don't have that ability." (P6)

"No other platform has a robust events back-end. Nobody, not one. Only Altspace... Most people, most platform creators, and we've met with lots of them, they're like, 'oh, we made creator tools.' I'm like, 'I don't need creator tools. I need a Unity uploader. We can build the whole thing in Unity, and we can upload it. I need to invent production tools, and I need community building tools because that's social VR.' If you don't have event production and community building, then the fact that I can take shapes and things that you created as a kit and put them together and build a world. Who's going to come to the world and see it if I can't produce an event? Who cares? There are all these events with creator tools. None of them with community building tools, that's the shortcoming." (P2)

As mentioned in the "Affordances" section, *AltspaceVR* had its own community standards. In addition to these platform-wide standards, communities within the platform established their own rules and norms to create a safe and respectful event atmosphere. Event creators underscored the importance of leading participants by example and providing clear communication at the beginning of events to set expectations for behavior and interaction. P2 highlighted the significance of community standards in social VR platforms, particularly in the formation of various social communities, while P1 and P16 emphasized the need for clarity and organization in events.

"I think that any immersive social VR platform needs to adopt a set of community standards in order for the participants to have a better understanding of what they're joining. Because when you join an immersive social VR platform, you're joining a community, you're joining a group of people, and you need to know where they stand, their ethos... And when you join the community, you understand where all the people stand and what they represent and how they live. And these platforms are no different. But if you have a platform that doesn't have that foundation, then nobody really understands where they stand, and it becomes a lot of social chaos. Altspace didn't have social chaos. VRChat has social chaos. And that's why there's these little private groups that are popping up, because this private group has its social standard, and this private group has its social standard. But if all these private groups got together, they would understand that their social standards are probably the same in the core of its being, they're probably the same. But there isn't a platform social standard, so overall there's social chaos." (P2)

"I tend to be very clear about it in the first 2, 3, 4 sentences at an event. Or in invitations we're sending out how we want people to interact and to enter the space." (P1)

"We try to show pretty clearly how there is some sort of structure in every event." (P16)

Moderation tools were especially important to maintain safe and secure public events. These tools gave moderators the ability to manage disruptive behaviors and create a positive experience for all participants. To create a safe environment, creators went beyond simply enabling specific actions (such as managing permission to talk or controlling media), they also limited certain behaviors and defined the intended use of the space. Appreciating the value of moderation tools, event creators especially valued the possibility to mute, kick, and block disruptive users, and the presence and efficiency of moderators in keeping the environment safe. For example, P2 explained that moderators in *AltspaceVR* typically observed interactions, stepped in when necessary, and reminded disruptive users that virtual interactions should mirror real-life behavior. While the goal was to correct behavior through communication, P2 emphasized that sometimes it was necessary to remove users from events.

"The moderators are there to just stand back and watch the interactions going on. Maybe move around the room and listen. And if someone's being an asshole, you talk to them and you try to help them realize that this isn't a game, this is life, you wouldn't be this way if you met somebody on a sidewalk and you were physically in front of them. So 'don't do this here.' Most people don't understand. Sometimes you just have to make somebody disappear. That's the other reason why I love Altspace, because they had great moderator tools where I could click on somebody and make them disappear from the event and they cannot get back in." (P2)

While they were quick to respond to disrespectful or disruptive behavior, moderators like P3 generally tried to be polite while warning disruptive users. They usually addressed disruptive users directly, pointing out inappropriate actions and offering guidance on how to behave during events. P3 emphasized that giving people a chance to correct their behavior before kicking or blocking them was important, as some disruptive individuals could became more cooperative when given the opportunity to engage properly.

"I try to be polite in general, but if I see the person is not very polite and respectful, I just retaliate very quickly, and I can be punishing, and I could be violent in some ways, like verbal or anything, if I don't like the behavior and if they're disrupting the whole general thing... If I see that somebody's disruptive, I would name them and say like 'hey, it's not very polite to do this' or maybe 'hey, it's ... about the concept and blah blah blah. I would recommend standing in a circle so that way everybody can hear you and if you want to talk, you can raise your hand, and I can give you a megaphone.' So, we always give the rules and give a chance to a person because I can kick them out or block them. But before I do that, because I have that, I can always give a chance to person and you would be surprised how much like I revealed after allowing these people to get into the accompany because they would be disruptive, go crazy, make jokes." (P3)

P7 described how moderators could privately message disruptive users with warnings, such as asking them to stay in place or stop bothering others. If the behavior continued, moderators could kick the user out or choose between permanently banning them from events or just the current one. P7 also noted that regular users did not have the ability to remove people, highlighting the special permissions given to moderators.

"You can actually message individual users and say 'please stay on your platform or don't annoy the other person next to you. If you would do this, you're out,' or you can just simply kick them. You also have the choice of whether you permaban them from events or just ban them from the one event. The average users can't kick people out." (P7)

P5 stated that they usually muted the entire audience during recordings to avoid recording background conversations. This allowed them to rebroadcast the event without disruptive audience noise. P5 also pointed out that such moderation tools, available in *AltspaceVR*, were often lacking on other platforms.

"We mute the entire audience so that while we're recording it, we're not picking up conversations of people who are out in the audience. That allows us to not only have a very successful event, but it allows us to take that recording and rebroadcast it later, so that people aren't hearing all the disruptive voices from people chatting in the audience. So 'this particular show is not really a social event, more an educational one, so if you want to chat with your friends, go ahead out on the back-patio area. But if you're in here be quiet so that you can listen to the show.' Those types of tools that they afford us in here, you don't really have in some of the other platforms." (P5)

Event creators could define trackable areas to prevent users from going beyond certain borders and restrict the use of certain forms of locomotion. For example, they could ban flying. Some moderators mentioned that they occasionally ban flying, as floating users could disrupt the flow of events. Event creators also valued other tools that restricted access to certain areas, such as stage blockers, host zones, and audience zones. These tools provided moderators with the ability to set boundaries in a virtual environment. In formal or semi-formal events, they often used a stage blocker between the stage and the audience. Speakers and moderators typically remained on stage, while the audience stayed in the areas designated for them. For some moderators, restricting audience access to the stage zone encouraged participants to sit quietly and watch the event. P8 emphasized the importance of integrating these moderation tools to ensure better control, protection, and communication during public events as follows:

"I love whenever they [AltspaceVR] integrated a lot more moderation features and ways to help protect the event hosts... They introduced a stage blocker, which is

essentially a force field that you can put in certain areas, and a person that doesn't have permission to get beyond that area cannot get beyond it, which then made it to where you could have an uninterrupted stage because for a very long time, anyone could just run up and be in your area. And then they also introduced the host zone, so it was another type of fields that you could place and if anyone is within that certain area they would automatically be megaphoned and or I think there was also an audience zone. So, if you had the zone turned on, the audience couldn't speak. So, if you were hosting an event where there wasn't audience participation, you could ensure that no one would be trying to speak over what you were saying. So, I loved it whenever they made good features to help to make our job of hosting an event significantly easier." (P8)

P26 and P28 explained their use of stage blockers and liners to restrict movement within virtual spaces. These boundaries prevent users from moving outside designated areas or attempting to push through walls. P28 also mentioned banning flying and restricting access to certain areas to maintain control over what users could see and where they could go.

"Moderating, that really does come useful. I've learned so much and I've actually become a professional at what they call me as a stage blocker, and good at manipulating the stage blockers to work in my favor when I'm either moderating or hosting an event. Nowhere else has that capability. I really hate that. That's the one thing I'm really going to miss about Altspace is the stage blockers, because they allowed me to play around, set it up specifically so when the events going on, everyone is where I want them to be. And they can't go anywhere if I won't let them. And I'm still picky at it. I don't want no one breaking it. So, I look at it as if I was to break it, and then I fix it, and then everyone is stuck in that little area." (P26)

"I use liners a lot where you can't go outside particular spaces. You can't try to push through the wall because you've been blocked by a liner...I limit the flying and I limit the ability, stop you being able to go outside of a world, or push into a space which I don't want you to see." (P28)

Moderation also played an important role in managing different instances within a virtual world. *AltspaceVR* created multiple instances controlled by the server, each with a space limit of 50 people. Event creators employed various strategies to

overcome this restriction and played a key role in maintaining a good experience across different instances. In such cases, moderators were responsible for ensuring that each instance provided a consistent experience despite user segmentation. For example, creators needed to set the ID of MREs to ensure they appeared across different instances. Additionally, users in one instance could not see those in another. For example, if there were 60 users in total in a world, only 10 avatars would be visible in the second instance. In such cases, moderators would announce the use of emojis, since floating emojis were visible to everyone, they could signal the presence of the crowd in all instances, even if users couldn't see other avatars directly.

P1 highlighted the challenge of designing large worlds that felt empty with only 50 users. To address this, designers created worlds that appeared large but were contained, where they encouraged users to gather at central points. They employed strategies like using fake crowds (e.g., NPCs) and low-poly billboards to make the space feel livelier. These tactics employed by event and world creators underscore the importance of designing and managing events within the platform's limitations.

Drawing from the contributions of the participants, event management, moderation tools, and community standards are crucial in organizing successful events on social VR platforms. In event-based worlds, the role of event creators is crucial since they are expected to use the moderation tools of the platform to balance freedom with order. However, these creators are constrained by the platform's limitations, aligning with Lefebvre's (1991) concept of conceived space, where programming and technical boundaries provide structure within virtual spaces. While creators have the authority to restrict user actions for safety, they are also limited by the platform's technical constraints. Therefore, the platform's role in setting these boundaries is also important; it needs to provide the creators with a balance between creativity and limitation. The most visible limitation is the space limit in social VR platforms, a technical boundary that fragments the social experience. To overcome this, event creators in *AltspaceVR* employed creative tactics, which reflect the lived space. Just as physical space is shaped by social forces, virtual worlds are maintained by creators who know where the boundaries need a push for the experience to stay alive.

5.2.3.1.Community Building Strategies

Community building was an important aspect of *AltspaceVR*, which was an event-based platform. Event creators used some strategies to create, nurture, and sustain engaged communities. Key themes were facilitating communication and interaction among participants, encouraging active participation through the use of interactive elements, and ensuring that spaces were safe and inclusive for all users. Additionally, fostering a sense of ownership within the community was seen important, as well as leveraging technology and innovative methods to enhance engagement and maintain connected communities.

Facilitating communication and interaction with the audience was deemed fundamental in establishing virtual communities and the development of sense of belonging. Event creators indicated that participants needed to have easy means to connect with others and to participate in events. P6 emphasized that full participation in VR was key to community-building and friendships. P1 explained how open communication and a playful atmosphere made connections with others quite easy, while P5 revealed how engaging an audience with game shows created a feeling of participation. P16 explained the practice of bringing new audience members on stage to participate.

P11 focused on the interactive experience by using slides, videos, and music to avoid passive listening; The opening of questions during podcasts added a lively side to the event. P5 stated that audience participation was necessary, incorporating Q&A sessions at the end of the shows, while P9 pointed out the use of interactive elements to encourage audience participation. According to P1, choosing relevant topics is important to maintain an immersive and community-oriented event design. P5 described their strategy of promoting audience participation, emphasizing the role of audience inclusion:

"I want people to be involved and be part of it. You know, I don't want it to be, you know, me sitting up here just talking about stuff, talk, talk, talk. Nobody wants to listen to that. I want people, I want to share with them and then have them come and share their story." (P5)

Interactivity within virtual worlds and events was one of the most effective ways to keep users engaged in them. This included objects that could be used by the users, a path to follow, and clues to be found. Involving the users in the event through interactive features, personalized invitations, and incorporation of their feedback were some of the strategies employed effectively by the creators of these events. P20 emphasized the sound effects that were used to keep the user engaged and interactive challenges that required users to think and act to progress. P23 pointed out the availability of interaction with the environment, which made them feel more connected and integrated with the virtual world.

As mentioned earlier, most formal event spaces lacked social catalysts and interaction points. In such a situation, the hosts and moderators were able to fill up the gap by engaging users with numerous strategies, which range from the creation of greeting rituals, hosting icebreaker activities, hosting discussion prompts, and integrating Q&A sessions into games. Participants were further encouraged to engage in "raise hand" features during a conversation or discussion. Organizers of events confirmed that these strategies facilitated social interaction and provided a better experience when the events were more formal. Establishing community standards to create a safe and inclusive environment was also considered important for forming communities. P3 emphasized the importance of researching a community before engaging with it, like preparing for a documentary. P13 highlighted the need to be clear about goals, particularly in VR, where there may be greater resistance. P6 added that creating intimate activities fosters a comfort level where community members feel safe and willing to share their stories.

Creating a sense of ownership and identification with the community space was also an important strategy for ensuring engagement among participants. Letting them contribute to the design of the space or having ownership of the space made them feel more connected and involved in the community. P12 further emphasized this point when referring to taking a template and changing it in order to suit the kind of space that they wanted. By allowing members to personalize, tailor, and co-create their setting, creators fostered participants' comfort and belonging, which ultimately lead to more engagement and community connection. P1 added that ownership was key in that people should have felt like they owned the place:

"I think ownership is an important one that people will have the feeling of kind of owning the place. That doesn't have to be like they really have to own the, like real estate kind of way, but like it's their place. They can identify with." (P1)

The design of community spaces played a crucial role in community formation. For example, P13 emphasized the need for small event spaces with minimal distance between the stage and the audience. Visual aids such as slides, posters, and images should have large text and minimal writing because people do not read in VR due to pixelation issues and the lack of note-taking capabilities. P13 stressed the importance of clear visuals to ensure effective communication in virtual events:

"The event space needs to be small, and the distance between the stage and the seats needs to be very tiny. Depending upon the purpose of the event, slides, posters, images and things have to be huge with zero writing on them or very little giant letters. I say when you're making slides, it needs to be no words or few words, big pitchers, big text, few words. Because people do not read in VR. Partly because they can't. Partly because it's it pixelates depending on the headset. So having an event that says 'enter here, go here, do this, pick up that, subscribe to this website here, remember this link' they have no way of taking notes, they have no way of remembering. They can take a picture and then they never look. There's no way to preserve that information. So anytime you put a wall of words in front of anyone, no one's going to read it because they don't want to spend time, so nobody reads in VR." (P13)

Maintaining community engagement through continuous interaction was crucial for community building. P8 emphasized the importance of spending time with audiences after a show. As previously noted, many events in *AltspaceVR* included post-event socializing sessions where speakers and audiences could interact informally. However, a key element of maintaining these connections extended beyond the virtual platform itself, with external tools playing a crucial role in community-building.

One of the most important platforms in this context was *Discord*, which supports text, voice, and video communication. In the wider context of social VR in general, it provides all spaces for members to collaborate and coordinate event planning, provide announcements of activities, disseminate event-related media and technical support,

and host casual discussions on various aspects. Most of the well-established communities in *AltspaceVR* maintain communities with other platforms like *Facebook* groups, *Instagram* accounts, and dedicated websites. However, it was a space at the center where communication was facilitated, thereby improving interactions among community members in *AltspaceVR.* It plays a significant role in keeping communication going, planning for the future events and having discussions outside of *AltspaceVR*. Many participants, including P27, also discussed the ways in which *AltspaceVR*'s event-driven system made the process for users of the virtual space to find and join communities much easier. They tempered this with a suggestion that these relationships were sustained outside the platform via *Discord*. P12 explained that the organization which went into coordinating events was similar to a "backstage" operation in a "theater," echoing Alcala et al.'s (2023) article on this topic. Similarly, P6 stressed the significance of *Discord* in maintaining connections between events, allowing members to contribute, ask questions, and make suggestions. They also underscored *Discord*'s role in keeping the community together.

"We run Discord in the background... to coordinate the background, kind of like if you've ever been to a theater and seen the guys with the headsets running around behind the scenes." (P12)

"We have our Discord, so we have the continuation off channel off virtual reality. It's very crucial that Discord is what keeps us together in between meetings and virtual reality." (P6)

5.3.The Lived Space of Virtuality

This section explores the Lived Space of Virtuality, focusing on the real-life dynamics on *AltspaceVR*. It begins with "The Meaning of Virtual Worlds," which analyze how users interpret and experience social VR as meaningful spaces. Next, "Social Dynamics" delves into interactions among users, including "From Casual Acquaintances to Friendships and Intimate Relationships," exploring relational bonds; "Rituals," covering recurring social practices; "Social Affordances and Innovative Utilizations," which examines how platform features enable social connection; "Social Norms," highlighting shared behavioral expectations; and "Social Status," focusing on factors influencing standing within the virtual community.

The section then turns to "Embodying Avatars and Forming Virtual Identities," examining identity formation in VR, with subsections including "Creating Alternative Personas and Escapism," discussing users' experimentation with new personas; "Identity and Real-life Representation," exploring real-life reflections in avatars; "Anonymity and Freedom from Social Stigma," which looks at how anonymity reduces biases; "Customization Features and Preferences," detailing avatar personalization; "Social Connections, Consistency, and Recognition," emphasizing avatar continuity for building bonds; "Influence of Avatar Appearance on Social Interaction," discussing visual impact on social dynamics; and "Emotional Connection to Avatars," analyzing attachment to avatars as personal representations. It continues with "Community Spirit," which delve into community cohesion in subsections like "Social Support," which details supportive interactions, and "Maintaining Connections Beyond the Platform," covering connections that extend offline.

The section concludes with "Safety in Social VR," addressing diverse perspectives on safety, including "Social VR as a Safer Environment," "Contrasting Views on Privacy and Safety," "Safety of Children," and "Emotional and Psychological Safety." Finally, "Ensuring Safety, Privacy, and Security" discusses practical safety measures with subsections on "Anonymity and Identity Management," "Creating Safe Spaces and Using Safety Tools," and "Effective Moderation for Safe Spaces."

5.3.1. The Meaning of Virtual Worlds

The exploration of what *AltspaceVR* and its worlds mean to participants yields a set of meaningful connotations: A mix of reality and fantasy, personal and emotional connections, social and psychological impacts in their narratives. When reflecting on their experiences, participants often recalled significant moments, such as interactions with others, memorable moments virtual homes, participation in unique events, exploration of worlds, and the strong bonds they formed within the community.

For many, virtual worlds represented an extension of their personal and emotional lives that served as an alternative reality that transcended physical, social, psychological, and economic barriers. As discussed in the section titled "Virtual Homes and Private Spaces," several participants referred to *AltspaceVR* as their

"home." Departing from Lefebvre, when a space like home is mentioned in everyday discourse, everyone knows what is meant: *"These terms of everyday life describe a social space. They correspond to a specific use of that space, and hence to a spatial practice that they express and constitute"* (1991, p.16). Home can take on various meanings, but it often refers to a private space where people form meaningful relationships and feel a sense of belonging, which enriched by personal and social connections. It can also be linked to family, security, comfort, warmth, and stability. In *AltspaceVR*, virtual homes and private spaces were recreated as a personalized space that fostered relationships, self-expression, identity, and emotional attachment, much like its real-world counterpart. However, participants didn't only define their personal virtual homes as their "homes," they also considered *AltspaceVR* itself as a "home," indicating that they attached meaning to the platform and the life it offered as a comprehensive "home" experience, likely referring a sense of place where they felt they belonged. For example, P40 referred to *AltspaceVR* as their "second home" where they could "suspend realism" and experience an entirely different life.

"My home, you know, it's like my second home. So, I have my outside of the headset right there. I have my job, and I do fun things with my kids and my family, but when I'm in my headset, I'm with a whole different neighborhood. I'm in a different neighborhood. I have a different job, which I love because it's doing comedy... It has changed my life. It's not the same. It's my life. This is definitely a thing where I kind of suspend realism." (P40)

As echoed in P40's words above, users could adapt different roles, take on various jobs, or create new personas in social VR, which offer them an escape from reality. However, virtual spaces also provided opportunities for identity exploration and transformation, which could have a positive impact on users' real lives. P26 highlighted this aspect by noting that for many, *AltspaceVR* felt more like a "home" where they were "properly born," emphasizing that it was more than just a "game."

"My head says that this is a game, but to people who have been here who have had their lives shaped because of Altspace, it's their home. It's where they grew up, it's where they were properly born." (P26)

Similarly, P33 emphasized how some users discovered a sense of self and even achieved success in VR. P33 provided an example of someone marginalized in real

life due to social, physical, or economic challenges. In VR, this individual, previously isolated, became a "superstar." VR allowed these individuals to realize their strengths, transforming their position and identity in the virtual world.

"Imagine for example a very poor person, poor in terms of his social situation, with no friends, with no family, some physical problems, that is a handicap or retorted or whatever is rejected by the society. Without any help from anybody, alone, is nothing. There's no value for himself. Many discover VR. He puts on his head, gives all his savings to buy a headset, and enter… And he makes friends. And after half the year or two years, he's a superstar. He finds out the first time in his life that he's a wonderful person and everybody loves him, and he gives hope for people and love. He means so much to so many people. And that all his position in this world will change in VR." (P33)

Community and a sense of belonging were evident in many participants' responses about those virtual worlds. As one participant explained, it was not just the platforms themselves but the support groups and "families" that formed around them that have been so important. Of particular relevance here is the importance these spaces held for people who felt marginalized or isolated from mainstream society. P33 expanded on that idea by saying that in VR, there could be the possibility of offering people spaces for relationships that would hardly be possible in physical surroundings.

P23 explained that while some users saw virtual worlds as an "escape" from reality, they also saw them as an integral part of their identity. For P23, virtual worlds were "another dimension" of themselves, not a means of escape. However, they acknowledged that others might turn to these spaces to escape difficult real-life circumstances, which could make it a fantasy world for them.

"I see them [virtual worlds] as real. Mostly because I'm not escaping anything or trying to escape anything at all. This is all part of me. It's just another dimension of myself. But I know that there are a lot of people who want to escape their existence. You know, the world that they're living in, the, you know, the circumstances that they're in. So, I think for those people it is a fantasy world." (P23)

For some users, these virtual worlds provided a venue for creative and fantastical experiences. For example, P29 viewed virtual worlds as a medium for creative expression, where people could create spaces that reflect their desires or fantasies:

"I think it's just creative expression. It could be fantasy; it could be something people hope for or want... It is a big mansion, or a small apartment and I think it gets something that they would like to have in the real world. That is what they are creating in here." (P29)

5.3.2. Social Dynamics

5.3.2.1. From Casual Acquaintances to Friendships and Intimate Relationships

In *AltspaceVR*, users often spent time within shared social spaces, fostering a wide range of relationships from casual acquaintances to deep and intimate relationships. Casual socializing often occurred in public worlds like coffee shops, parks, and other hangout areas, where users could spontaneously meet and interact with others, mirroring the casual interactions that one might have with strangers in the real world. As discussed in the section titled "Perceived Affordances," P38, like many participants, noted that in VR, casual interactions were perceived as more comfortable and less stressful compared to those in real life.

Shared interests, events, and common activities were the main drivers of social relationship-building on the platform. Whether participating in events or exploring worlds together (i.e., world-hopping), users found opportunities to connect with one another. Those attending recurring events, such as talks and discussions, often interacted with the same group of users (i.e., the regulars). These repeated interactions created familiarity, whereby users started to recognize and become attached to familiar avatars. Thus, the longer the user spent in certain worlds or events, the more casual interactions could turn into intimate connections. P31 stressed that due to regular events and discussions in *AltspaceVR*, socialization and mutual attachment are encouraged:

"...we had the kind of almost the same idea that comes out from every weekly event, and step by step we had a social engagement and mutual connection and that's how it started and still going right now." (P31)

I found that in-depth bonds and lasting friendships had formed on the platform, much like social connections in a real-world environment would. P4 believed that the friendships one formed in VR tended to happen a lot quicker than in the real world for specific reasons related to VR itself. They mentioned that since the avatars are not showing detailed facial expressions, the users rely more on the voice factor, which creates an emotional bond with them. P4 also emphasized that the safe and somewhat detached nature of VR relationships, along with the illusion of physical proximity, helped accelerate the closeness between individuals. As a result, friendships in VR felt as if they had lasted for years, even after only a short time:

"There's this weird phenomenon and I don't know what it's called, but I feel like VR friendships accelerate faster than regular friendships. I'm not quite sure why. My hypothesis is that because we're in VR and we look kind of like cartoons and we don't have really decent facial expression, we have to pay very deep attention to each other's voices and there's a closeness with that. When X [mentioning the name of a friend] calls me, X and I talk on the phone every single day. When X calls me the way that I say 'hi' or 'hello,' he already knows if it's a bad day or good day, if I'm in pain, like he picks up on it better than me. There's some sort of magic in VR friendships. They start in a very safe place, we are kind of removed, and I think that's a part of it too, because they don't know who you really are, and you don't know who they really are. So, if you encounter somebody and you don't like them, they just disappear, right? You just block them, and they disappear. So, I think that between us having to pay more attention to each other's voices and just the fact that our brain still thinks that we're physically together and we spend a lot of time together. We figured that one-week close year friendship in VR, feels like you've known them for like 10 years. It's the weirdest thing. It sounds like it accelerates your closeness a bit." (P4)

I found that many people formed romantic relationships within social VR platforms, not just in *AltspaceVR*. These relationships sometimes evolved into serious commitments, including real-world meetings, engagements, and even marriages. P5 noted that several users who met in *AltspaceVR* fell in love and got married. P11 shared

a memorable event called *Love in the Metaverse*, where four couples who met in *AltspaceVR* celebrated their relationships, with one couple announcing their engagement during the event.

Consistent with the findings of Zamanifard and Freemand (2019) and Maloney and Freeman (2020), I found that VR allowed people in long-distance relationships to spend meaningful time together, helping them maintain their connections despite physical separation. P8 highlighted the role of VR in maintaining long-distance relationships and shared how VR allowed them to emotionally and physically bond despite not being able to meet in real life due to financial constraints. In another example, P6 recounted virtually marrying a couple who met in *AltspaceVR* and continued to spend their evenings together in the virtual space, despite living in different states and caring for their elderly mothers.

As previously mentioned, I observed that many couples built virtual homes and private spaces in *AltspaceVR*, which served as hubs for intimate relationships and activities with close friends. In these private settings, users had greater control over the environment. If a user didn't know the world code, they couldn't enter or even find the space. P4 described their relationship with their romantic partner in *AltspaceVR*, noting that although they had not yet met in real life yet, they had created a virtual home together and frequently video chatted. Similarly, P40 described the deep commitments she formed in *AltspaceVR*, explaining that her relationship with her boyfriend extended beyond the virtual world into their daily lives. They stayed in touch all day, video chat, watch TV together, and spend time in various VR apps, simulating mundane activities.

"Me and my romantic person... So, I made us a little house. we video chat and stuff like that, but not [seen each other in real life] yet. You know something really interesting. We had another couple that was an EvolVR couple. And it was actually said one of them acts one of them. You know they were older they found love later in life and they found each other on Altspace and I didn't know this time, but they also built a house together in Altspace. I found that out later." (P4)

"I found my boyfriend... We haven't met in person yet. We met here in Altspace... We're in touch all day now and then we video chat, you know, and we watch TV together like over the phone and we come in here and spend time, we build together,

and we go in other apps together. So, we like go bowling and play pool and just like you would do on any normal day, you just do it from your home... We have like spaces belong to us, we have a house we go into, and it's all decorated with all the pictures of our life here in the last two years." (P40)

Couples in VR could replicate not only activities typically done in real life, such as watching TV, but also more intimate actions like sleeping together. Maloney and Freeman (2020, p.518) found that *"intimate, mundane behaviors such as falling asleep together in social VR"* provided a novel way for couples to make their time in virtual spaces more meaningful. They also mentioned that sleeping together in social VR helped them feel more intimate, especially for those who were in long-distance relationships. While this wasn't common in *AltspaceVR*, sleep worlds exist in *VRChat* where such experiences could be done by users.

Further, P4 described unique interactions in *AltspaceVR*, such as virtual touch experiments, which enhanced their connection when physically apart. They shared how they and their partner turned off the personal space bubble in VR to simulate physical closeness, like nuzzling noses. In one experiment, one partner removed their headset while the other simulated touch, and the results felt almost like a "sixth sense." P4 noted that, despite not meeting in real life yet, their relationship felt natural due to the intimacy developed in VR. They also noticed many others who transitioned from VR into in-person meetings reported having the same comfort level with them and noted how VR actually accelerates relationships, the experience of which is nearly identical to that in real-life connections.

"My favorite thing is in Altspace you can turn off this bubble. And you can get really, really, really, really close to the person, and you can like nuzzle your noses... So, we did an experiment one time, where one of us took our headset off and we could not see. And then the other one touched, I'm touching your hand, I'm touching your arm and then try to guess it. I think it was 90% of the time we can got it. It is almost like a sixth sense kind of thing… And what is interesting is, think it having an online relationship that when you meet in person it would be awkward for a few minutes, but this is different. Because VR is so magical, it doesn't seem to really have that sort of thing. It is kind of like they are already so familiar like they have been together for long… So, I don't quite understand how it works... like friendships get accelerated

really fast in VR, relationships do that too... Everybody reports the same thing. 'Oh, he was exactly the same. I had almost the same experiences I have online, I just wasted a lot of gasoline.' Which is funny, but just it's so weird how our brains just make it all so real and I don't understand how it works what it does." (P4)

Similarly, P11 elaborated on the uniqueness of the intimate relationships in the Metaverse, claiming that for those who believe in everlasting love, it is all about knowing a person's vibe, energy, and personality are just not based on looks. Being able to be close with someone because of their virtual presence, and not due to what they looked like in real life, was really unique for the participants:

"It was lasting love that was warmed in the Metaverse, not seeing the real person, just seeing the vibe and the energy and the personality come through that prism and that is just a beautiful thing. So that was really special." (P11)

5.3.2.2.Rituals

Social VR platforms offer a diverse range of human experiences, encompassing not only the everyday dynamics of friendship and love but also the milestones of life, such as birth, loss and death, marriage, health, education, work, and spiritual or religious rites. In *AltspaceVR*, users engaged in various rituals, including ceremonial, cultural, historical, religious, emotional, and commemorative practices. The platform became a venue for rituals such as birthday parties, wedding ceremonies, funerals, and religious celebrations. P30 explained this by saying:

"I've been to weddings in here, I've been the funerals in here, I've been to birthday parties. I've had arguments in here, I've had new relationships in here, you know I've got really close with people in here, so there's a lot of memories." (P30)

Religious, cultural, and historical celebrations in AltspaceVR were diverse, which offered userswith the opportunity to explore and engage in various traditions from around the world. P10 mentioned a team member who created worlds to teach history, such as a detailed recreation of Mexico's Day of the Dead, allowing global users to experience the celebration as it is done traditionally. Similarly, P6 highlighted Renaissance Festivals that transported users to medieval Europe. P19 noted impactful worlds based on political and historical events, such as those related to Black Lives

Matter. P22 shared that historically oriented worlds, like recreations of the Stonewall Riots or virtual museums, excelled at connecting users to significant cultural and historical moments. Users also participated in themed events such as Zodiac bashes, holiday celebrations, birthday parties, and special interest group meetups. As P5 explained:

"Once a month we actually host a Zodiac bash. So basically, it's a big birthday party for whatever Zodiac sign it is that month." (P5)

P6 reported a chapel inside *AltspaceVR* where all kinds of life ceremonies were performed. In this chapel, for instance, weddings took place, one of which is shown in *Figure 5.60* where P6's friends got married. But other than weddings, ceremonies such as themed services were held in the chapel including Halloween services and Christmas services.



Figure 5.60 A virtual wedding ceremony at a chapel in *AltspaceVR*.

Campfire gatherings in *AltspaceVR* carried historical and cultural significance as well. Historically, gatherings around fire have served as spaces for storytelling, reflection, and communal warmth. In *AltspaceVR*, similar virtual gatherings around a symbolic "fire" or shared focal points recreated this ancient tradition. As mentioned in the "Social Catalysts" section, campfire-like settings unified people around shared experiences, much like historical gatherings around fire. Roasting marshmallows over a campfire is a well-known and cherished cultural activity, at least in the United States.

AltspaceVR developers introduced virtual marshmallow sticks into their virtual campfire environments. Such an approach allowed VR users to connect their interactions to real-world cultural activities. *AltspaceVR*'s rituals, in that respect, evoked historical practices.

Despite being a virtual environment, *AltspaceVR* included many aspects of loss and death. In addition to the events and talks about these topics- such as the Death Q&A and Saying Goodbye sessions- users participated in commemorative rituals and practices on the platform. These often included the creation of personalized memorials, memorial services, funerals, and virtual ceremonies with altars held in the virtual space. For example, P30 described how they adapted a show to honor a community member who had passed away, transforming it into a virtual funeral where everyone gathered to speak and remember the deceased. P7 shared experiences of how the community came together after the passing of loved ones and supported others who lost partners or family members by holding ceremonies, such as eulogies and memorials. Similarly, P10 recounted a special event where a team member created an altar for their son, placing his picture at the top to honor his memory. P4 mentioned conducting numerous memorials, including making personalized ornaments for Christmas trees to commemorate those who had passed away.

Virtual cemeteries can be found on almost all social VR platforms, including *VRChat*. A notable virtual cemetery on *AltspaceVR* was *Memorial Park* (see *Figure 5.61*), which housed the memorials of 50 *AltspaceVR* users' real-life losses, including their families and friends. Some people created memorials for their dogs, while others did so for their husbands, wives, children, or other loved ones. Each bench in *Memorial Park* represented a person who had passed away, with a plaque and a picture placed on it. When someone sat on a bench, music associated with the deceased would play, allowing visitors to sit, listen, remember, and pray.



Figure 5.61 *Memorial Park* in *AltspaceVR*.

In the interview with the creator of *Memorial Park*, the creator explained that the idea began when they placed a plaque on a bench to honor their mother. Realizing they could offer this opportunity to other users, they invited the community to memorialize their loved ones, and many responded with interest. The park provided comfort for users who did not have a place to visit in the real world. The creator expressed pride in the park, noting how meaningful it had been for many users:

"I created a memorial garden for people. It's basically just a park with loads of benches around it and I had it for ages... My mum had passed away a couple of years ago and I looked at this bench that I could put a little plaque on this bench for my mom and put her photo on it. And I thought, I came in, I put it all up. I thought I could do this for everybody if people want to remember a loved one. I asked the community in one of my groups if anybody would be interested in putting a plaque for someone who's passed away, and I got inundated with people wanting to have a plaque on a bench and a photo of their loved one. In some cases, I put some music as well. And now there are 50 people in there... I've got one dedicated to people who were in Altspace who passed away as well. And there's a little memorial to them as well. It's just a nice place because I've had people since come over and say how it helps them when they are missing the person, you know, because a lot of them couldn't do it. They didn't have anywhere in the real world to go because they may have been cremated or people buried like miles away from where they are, and they can't get there. It was a place

that they could just go to and just sit on the bench and talk to whoever it was, and it gives them a bit of comfort. And that all came from just one idea, I was just sitting on the bench and thought I could make this a Memorial Park. And that's now become its own thing and it's something I'm really proud of because it meant a lot to a lot of people. That's the one that's going to hurt to say goodbye because it was really a special place." [38]

For *AltspaceVR* users who had passed away, a unique memorial existed in this world (see *Figure 5.62*). Entire worlds were constructed for some former users, featuring their avatars and favorite objects or themes as virtual memorials. *Figure 5.63* illustrates a memorial with a teleportation portal to the world created for a user. *Figure 5.64* shows the world itself, which included a message upon entering: "Remember him when you look at the night sky!" Another notable example of a memorial I encountered on the platform was the *Ostrog Memorial World* in the *Campfire*. This world was created in memory of an *AltspaceVR* user who passed away. Ostrog was represented by an old version of their robotic *AltspaceVR* avatar, with a "RIP Ostrog" message was inscribed on a stone (see *Figure 5.65*).



Figure 5.62 The Altspacers Memorial in *Memorial Park*, *AltspaceVR*.

[38] I chose not to assign a participant number to this quote to protect the participant's identity.



Figure 5.63 A memorial for a deceased Altspacer in *Memorial Park*, *AltspaceVR*.



Figure 5.64 A memorial world in *AltspaceVR*, created in honor of a deceased user.



Figure 5.65 The memorial of Ostrog in the *Campfire*, *AltspaceVR*.

Traditionally, memorials serve as spaces of remembrance, reflection, and honor for the deceased. Physical memorials- through monuments, plaques, or dedicated spaces- stand as lasting testaments to memory and respect, providing a place for communities to gather, mourn, and remember loved ones. This tradition was reimagined digitally in *AltspaceVR* through spaces like *Memorial Park*, where users could memorialize loved ones with personalized plaques, images, and music. These virtual memorials allowed users to perform collective rituals of remembrance, such as memorial services and gatherings, sharing stories, reflecting, and comforting each other despite physical distance. Thus, *AltspaceVR*'s virtual memorials mirrored the role of traditional monuments by offering a space for remembrance and continuity, enabling users to extend the memorial tradition into a digital environment. In doing so, they found new ways to connect across distances, blending traditional forms of memory with the unique possibilities of the digital world.

As Lefebvre (1991, p.221) describes, monuments serve as "materially realized appearances" that embody rituals of remembrance, imposing durability and *"transcending death, and hence also what is sometimes called the 'death instinct.'"* I argue that the portrayal of death in virtual spaces reveals a lived dimension of VR: Users render death as an ongoing, lived experience within digital environments. Furthermore, VR's flexibility allows users to customize and personalize these spaces. Unlike physical memorials, which are static, digital environments enable a

participatory form of remembrance. Virtual spaces replicate a memorial visit and enhance the immersive visual, auditory, and interactive elements of that space to allow users to practice dynamic and meaningful acts of remembrance that honor tradition and innovation. Memorials and remembrance rituals also are often tied to religious practices as religion plays a major role in shaping how individuals and societies approach and make sense of death. However, discussion of this is beyond the scope of this research.

The other main ritualistic activity in *AltspaceVR* was religious ceremonies. The wide variety of religiously committed communities on the platform was great, each investing great amounts of time in creating their virtual place and events: Community channels, weekly gatherings, ceremonial participation, sharing knowledge or educating. P19 emphasized the unique advantage of being in *AltspaceVR*, emphasizing the opportunity to engage in conversations with individuals from diverse religious background as follows:

"The beauty of here is that I have the opportunity to talk with many people from other religions that they give me their thoughts, so I learned an incredible amount of things about them and it's really, really interesting." (P19)

Similar to my observations on the intensity of religious activities in *AltspaceVR*, Reed (2022) highlighted in his book *VR & The Metaverse Church: How God Is Moving in This Virtual, Yet Quite Real, Reality* that *AltspaceVR* hosted more organized churches than any other social VR platform. Based on my observations, notable churches on the platform included, but were not limited to, *VR Church, Cornerstone VR, Lakeland VR, Prayer Garden, Oasis VR Church,* and *Living Room VR*. For example, *VR Church* (see *Figure 5.66*) held weekly meetings in their own virtual community worlds, where they had designated prayer rooms (see *Figure 5.67*), and installations with verses from the Bible (see *Figure 5.68*).



Figure 5.66 The entrance of *VR Church* in *AltspaceVR*.



Figure 5.67 The Prayer Room in *VR Church*, *AltspaceVR*.



Figure 5.68 Installations featuring verses from the Bible in *VR Church*, *AltspaceVR*.

The diversity of religious communities in *AltspaceVR* extended beyond Christianity, as the platform also hosted Pagan, Jewish, and Islamic communities. P6, one of the creators of a Pagan community in *AltspaceVR*, explained that their community held rituals two or three times a month, along with weekly meetups for around 20-35 members. According to P6, the community attracted individuals from diverse backgrounds, including those interested in non-Christian religions such as Native American, Celtic, and Hindu traditions. P6 also emphasized that many members lived in isolated areas without access to local Pagan communities, and *AltspaceVR* provided them with a space to connect, learn, and practice their beliefs together.

"Usually, people that don't have the ability to have that community where they live, like they live in isolated places or they live where there's not a lot of Pagan people that live where they live, and so they're able to come together with us and build our community." (P6)

I observed that religious events and virtual worlds in *AltspaceVR* typically included architecture, symbolism, and imagery specific to the respective religion and respective local community it was built by. For example, virtual worlds dedicated to host hosting Muslim communities often featured a mosque. *Figure 5.69* illustrates *The Speakers' Corner*, where a Muslim community held religious debates and discussions.

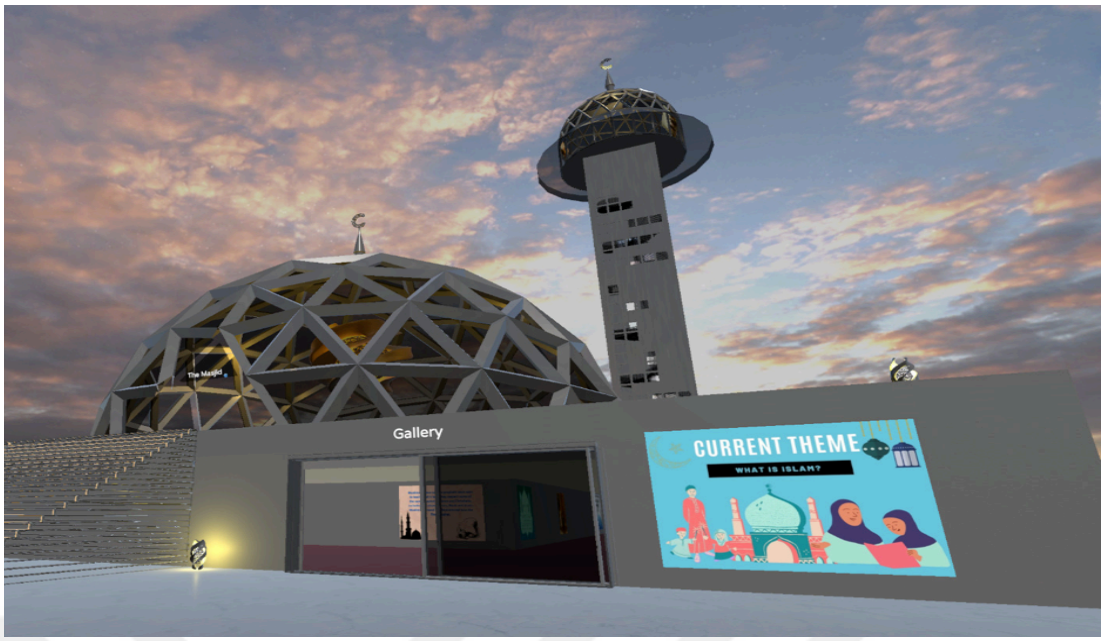


Figure 5.69 *The Speakers' Corner* in *AltspaceVR* that hosted a Muslim community.

Another notable example of virtual worlds hosting religious communities was *Last Revelation: Islamic Golden Age*. This world was built on an island resembling a dune by the sea. The island was enclosed by an invisible wall adorned with various Hadiths, which were suspended in the air as text and images related to the Golden Age of Islam. At the island's highest point, the creator dedicated a specific area for the Quran, placed on a table with its lid closed, accompanied by an interactive button for online reading (see *Figure 5.70*). Olive trees considered a "blessed tree" in Islam, were placed behind the Quran, symbolizing Islamic beliefs.



Figure 5.70 The Quran placed at the world's highest point in *Last Revelation: Islamic Golden Age*, *AltspaceVR*.

Another religious world was *Jerusalem in the Time of Jesus,* where the creator built an installation featuring a historical site, offering both a spiritual and educational journey (see *Figure 5.71*). This world tried to bring into reality the city of Jerusalem during Jesus' time, in order to make it possible for users to walk through one of the most important places related to Christianity. Key locations include the Temple, Golgotha, and other locations of interest that would be the sites where some very pivotal events of Jesus' life were said to take place.

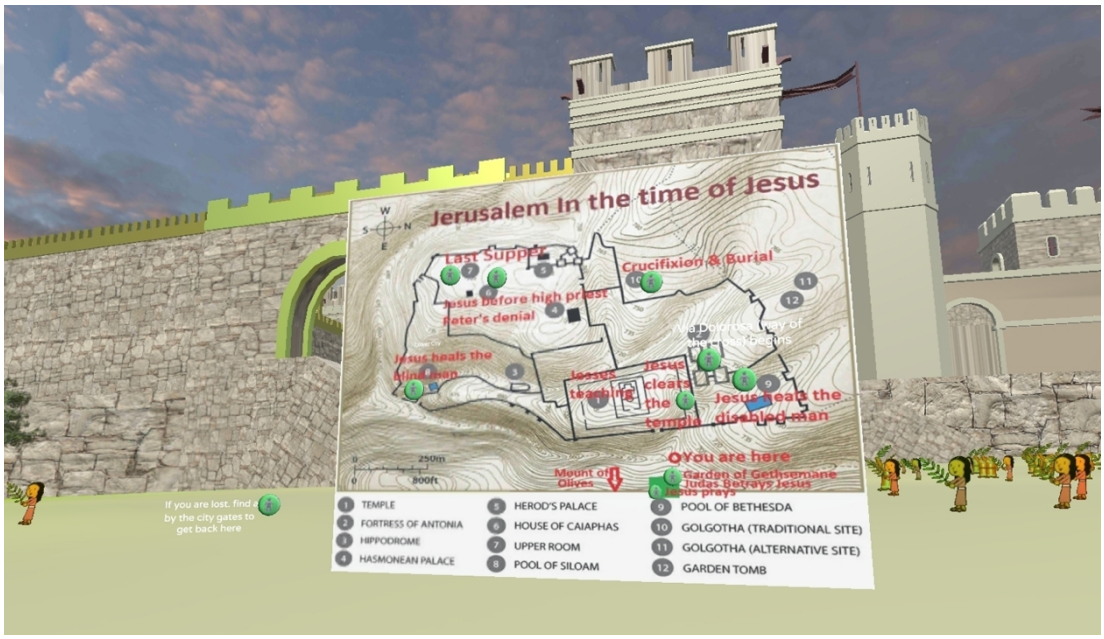


Figure 5.71 The map of *Jerusalem in the Time of Jesus* in *AltspaceVR*.

Rituals on *AltspaceVR* demonstrate how the platform allowed users to witness and ritualize important events, such as birthdays, weddings, memorials, or religious gatherings, across distances-allowing virtual spaces to be transformed into lived spaces through "inhabiting," as described by Lefebvre (1991). By making the tools to create and partake in these rituals accessible, *AltspaceVR* allowed users to become active in "inhabiting" the space; through this, a virtual setting reflected both individual and group identity.

Foucault's (2008) "heterotopias" and Soja's (1996) "third space" provide frameworks for understanding how *AltspaceVR* functioned as a distinct virtual realm where diverse human experiences coexisted. Daradkeh (2023) examines Foucault's heterotopias and Soja's third space as concepts for understanding lived space.

Foucault (2008) describes heterotopias as "other spaces" that transcend traditional spatial norms, creating environments where social expectations are both mirrored and subverted. Rituals such as virtual marriages and memorial events in *Memorial Park* have enabled users to bridge spatial gaps, while transforming practices of commemoration and celebration. This is how *AltspaceVR* functioned as a heterotopia, making variant experiences possible from religious services to cultural celebrations in mutually occupied virtual space. This aligns with Foucault's idea of spaces that juxtapose disparate traditions, allowing unique interactions between beliefs that might rarely come together in physical settings.

Daradkeh (2023) examines Soja's (1996) third space as an evolving form of lived space. According to Daradkeh, third space represents a paradigm shift in spatial thinking, highlighting the production processes and fluid social interactions that give space its meaning. Soja's third space, influenced by Lefebvre's lived space and Foucault's heterotopias, emphasizes spatial fluidity, social dynamism, and the continual reinterpretation of meaning. In *AltspaceVR*, this concept materialized as users engaged in rituals blending the physical and digital. This created what Soja (1996) calls an "accumulative trialectics," where history, society, and space interact openly, which allow users to reshape and renegotiate cultural boundaries. Thus, *AltspaceVR* embodied Soja's third space as a hybrid environment, merging real and imagined elements and fostering ongoing meaning-making. As Daradkeh (2023) explains, Soja's (1996) third space represents collective experiences and structured individuality, evolving into a *"milieu of activities, ideas, and meanings."*

These perspectives place *AltspaceVR* into the role of a digital transformative environment. *AltspaceVR* was much more than a venue; it was a participatory and dynamic landscape in which rituals were reimagined, cultural identities crossed, and personal relationships continued across boundaries. Such convergence encapsulates the very spirit of lived space, heterotopia, and third space in virtual space.

5.3.2.3. Social Affordances and Innovative Utilizations

As discussed in the "Conceived Space of Programming" section, creators could influence users' practices in a virtual space through the strategies they employed, such as design and moderation. However, it was the users who ultimately decided how to

move, act, communicate, interact, and live in virtual environments. In the absence of direct physical interaction in social VR platforms, users engaged with the space and others through various verbal and non-verbal communication, which they could adapt to express their preferences. This adaptability not only showcased how social interactions in virtual environments could reflect and sometimes transform those in physical spaces, but also highlighted the emergence of new social affordances. These affordances expanded the social production of space by reshaping the uses of the conceived space.

As mentioned before, user-generated worlds provided room for users to personal reflection and creative expression for both the users and creators of the platform. The ability to create and shape these spaces offered new opportunities that might not easily be accessible in physical life. For example, worlds that provided activities like experimenting with virtual drugs (such as smoking weed and eating mushrooms) and alcohol consumption expanded the range of interaction possibilities. These activities were represented through synthetic visual and audio effects in the space. By physically mimicking holding a cigarette or blunt, the users' physical motions triggered a virtual smoking effect as avatars exhaled virtual smoke to simulate actual smoking. Each virtual puff intensified the visual and auditory effects, such as blurriness, color distortion, and mixed sounds, mimicking the experience of being under the influence of weed in real life (see *Figure 5.72*). Similarly, eating virtual mushrooms altered perceptions, with the effects varying based on the type of mushroom "eaten" (see *Figure 5.73*). Alcohol consumption could also simulate a sense of dizziness.

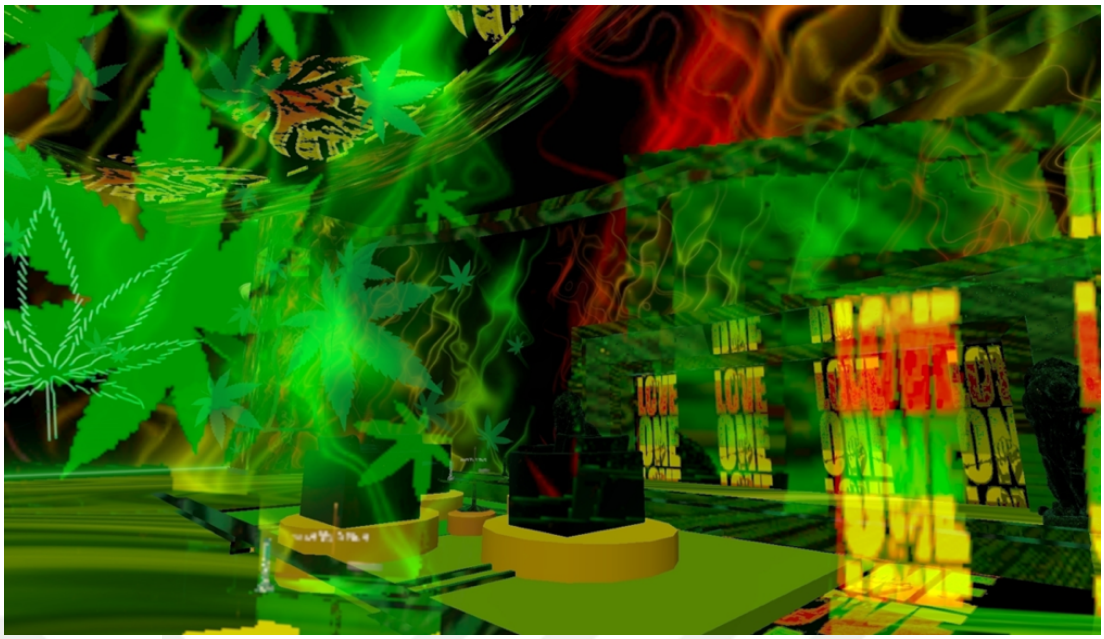


Figure 5.72 The spatial effects of smoking weed in *Pass the Dutchie*, *AltspaceVR*, showcasing the visual distortions experienced by users.



Figure 5.73 The spatial effects of eating mushrooms in the *Campfire*, *AltspaceVR*, illustrating the visual distortions experienced by users.

Most user-created worlds lacked official moderators, and because of that, the social interactions would happen in a more spontaneous way, whereas these became places of vivid and rich experiences. I noticed how this often worked as an essential ingredient toward creating social affordances; for example, P12 paid homage to the *Cult of the Dead Cow*, which was a famous hacking group in the 1990s, where they placed an interactive cow at an event. This unplanned element became a playful focal point, demonstrating how spontaneous interactions can shape social dynamics within virtual spaces. Similarly, P21 related that one could pick up virtual instruments and

start a spontaneous jam session in a virtual space prepared for music enthusiasts, representing potential for spontaneity leading to collaboration:

"Altspace is probably one of the few places that you can have a player like this, just sit in this world, anybody could come into this world, and just play some music... The creativity of these people on Altspace who probably don't even realize that they are really creative people... they just took an empty shell and made it into a homely place or a welcoming bar or whatever." (P21)

According to my observations, users often adjusted their behavior to fit their social atmosphere. For example, during a virtual concert, users were synchronously moving to the beat, keeping the rhythm, dancing, moshing, waving their arms, and raising their index fingers together. All these contribute to being in a concert, just like it would have been in a real-world concert. In a virtual club, users could have a dance party by synchronizing their avatars' movements to create a dynamic and energetic dance floor. Similarly, in a virtual art gallery, users could collaborate on a digital artwork by using virtual paintbrushes to contribute to a jointly created piece of art. In a virtual storytelling setting, users could just start sharing their personal stories with no prior formal arrangement.

In addition to bodily behaviors, users often relied on gestures and emojis for communication and interaction. This was obvious in environments where social interaction was more restricted or where shared activities were absent. For example, in moderated environments, users were usually muted by default to prevent disruptive sounds. In such environments, there was a noticeable increase in emoji usage; emojis became the primary method of interaction. I observed that users often responded to speakers on stage with these emojis. P3 mentioned other common uses of emojis. For example, they used smiley emojis to agree with or show appreciation for others' ideas without interrupting the flow of conversation. Similarly, P40 shared that gestures used in virtual conversations often carried over into real-life interactions, sometimes resulting in exaggerated expressions to make a point.

This reliance on virtual communication tools points out one of the limitations to social interaction in virtual space: The lack of physical presence. For instance, even though avatars can virtually hug each other, people cannot feel each others' warmth or

smell. Despite these limitations, the creativity of users in adapting to their environment demonstrated how social affordances continue to evolve in virtual spaces. In *AltspaceVR*, users simulated virtual hugs through real-time hand and arm gestures, coupled with body rotations. However, to truly "feel the hug," they sometimes hugged each other in front of mirrors. McVeigh-Schultz and Isbister (2021) referred to this as "mirror cuddling," an example of social affordances introduced by users.

Mirror usage in social VR platforms extends beyond cuddling and offers various playful uses that demonstrate novel social affordances. In both *AltspaceVR and VRChat*, I observed that users frequently interacted in front of mirrors (see *Figure 5.74*), using them as a medium to communicate, play, dance, change outfits, and even take mirror selfies (see *Figure 5.75*). This practice of spending time interacting with mirrors is referred to as "mirror dwelling" (Thibault and Bujic, 2022: 2). P3 noted that it was fun to see and interact with their avatar in front of a mirror, as it was a unique experience compared to seeing oneself in real life.



Figure 5.74 Two users interacting in front of the mirror in the *Campfire*, *AltspaceVR*.



Figure 5.75 A mirror selfie in the *Campfire*, *AltspaceVR*.

My observations also revealed that mirror dwelling was a more common practice in *VRChat*. P26, a world-creator and event moderator in *AltspaceVR,* mentioned being referred to as a "mirror dweller" in *VRChat* and explained how they used mirrors for playful self-reflection as follows:

"I go to VRChat, just play some games, mess around. They call me a 'mirror dweller' VRChat. Because what I like to do is to stare at myself. My friends always laugh because like oh I'm like, oh hold up, I've got the got the camera, pulled the camera out, not the film, anything. But just to stare at myself, I play a game. You always laugh." (P26)

Mirrors also served as tools for creative and interactive uses in virtual spaces. P14 described a personal experience where they used a glass mirror on the ground, surrounded by toy frogs, to create the illusion of a pond. Event creators, like P6, leveraged the reflective nature of virtual mirrors to enhance audience engagement during events. By incorporating mirrors into interactive activities, P6 encouraged participants to reflect on themselves and share personal insights.

"So, I look at it through my eyes and I was a brownie we had a glass mirror on the ground some toy frogs things around it and that was a pond. And for me, it represented a pond, and it wasn't a pond, but it gave me the emotion that we were

standing around a pond in a woodland. So that's my sort of starting point that I recognized the power of that for me, but it's not for everybody." (P14)

"One day we had everybody look in the mirror. What did they see about themselves and share that. We had people, throw a piece of paper into out of water and they said when we did that what we were trying to throw away what part of us were we trying to get rid of. So, by creating these very intimate activities and nobody's required to do them but I think we foster a good enough comfort level among our community that everybody feels comfortable sharing, or most people do." (P6)

These examples demonstrate that virtual mirrors are used in various ways in social VR platforms- sometimes for play and fun, and at other times to foster interaction among users. Thibault and Bujić (2022) analyzed *Reddit* and *Steam* discussions among *VRChat* users to identify emerging themes around the use of virtual mirrors. Similar to my findings, they found that users interacted with mirrors in various ways, such as adjusting avatars, using mirrors as social gathering points, and mimicking physical interactions like touching. Their findings highlighted how virtual mirrors shape social VR communities on multiple levels: Bodily (enhancing embodiment with avatars), social (causing conflicts over narcissistic practices), and cultural (highlighting the tension between platform affordances and Internet culture).

Mirrors in VR could help users enhance feelings of body ownership - that is, when users experience their avatars as an extension of their own physical bodies. This is realized through "proprioception," the awareness of one's body position and movements. By observing their avatars in mirrors, users strengthen the feeling that their virtual body is theirs, creating a proprioceptive link to their avatar. Fu et al. (2023) build on this by stating*"avatar-mediated communication through mirrors provides functions like ensuring synchronization of incarnations, increasing immersion, and enhancing idealized embodiment to express bolder behaviors anonymously."*

Since physical interaction is limited in virtual spaces, virtual mirrors provide a way for users to visually locate their avatars in space, creating a "body ownership illusion" and thereby "strengthening VR embodiment" (Thibault and Bujić, 2022, p.4). When users look into a virtual mirror, they receive visual feedback of their avatar's

appearance and movement, simulating face-to-face interaction (Well, 2018). This process strengthens the link between their physical body and the virtual space, as Ducheneaut et al. (2009) and Schroeder (2001) suggest.

Touching each other in front of mirrors and "mirror cuddling" showcase users' creative approaches to mirror use in virtual environments. This highlights how VR facilitates the development of unique social practices that adapt to the limitation of its sensory limitations. Many of these practices seek to establish a sensory bond to mimick physical touch through visual and auditory cues. These show the potential of VR to foster meaningful social interactions even in the absence of direct physical interaction (Li et al., 2001). Heidegger's concept of "dwelling," establishing meaningful connections with one's environment, also parallels mirror dwelling in social VR. With mirror dwelling, users form relationships with the virtual environment by observing their avatars' reflections on the mirror. In this way, they develop a sense of spatial presence and body ownership. Therefore, in social VR platforms, virtual mirrors enable embodiment and help building a deeper connection between users' physical body, avatars, and the virtual space.

Beyond mirror dwelling, users often demonstrated their creativity by finding unexpected ways to overcome or transform platform and/or world limitations - whether sensory or not. For example, P6 described creating a simple world with a doorway and assigning a host to keep it open, which allowed users to access a larger event world that wasn't listed on the event calendar. During the interviews, world creators frequently mentioned instances where users engaged with their creations in ways that they didn't anticipated. For example, P26 explained how users interacted with the objects or worlds they designed in unexpected ways. P26 appreciated this experimentation, comparing it to game design, where creators want users to "break" their designs, so they can improve and refine them.

"I've seen it plenty of times where I create an object or a world and someone would use it differently. I wouldn't even expect it. I can't describe which times I have, but yes, I have seen people do something with my objects and my world that I didn't even know of. So, which is nice because again, I like people to experiment and, in my eyes, if I created a video game, I would want someone to try to break it, and so I can

fix it, so they can't break it again. You know, that's the point when it comes to a game designer, you want people to break your game, so you can fix it." (P26)

Similarly, P17 shared how the accidental discovery during user interaction sparked the creation of a new virtual world. An accident with a rolling ball hitting an object produced a musical pattern, which inspired the development of a virtual space around this concept. Users started experimenting with rolling balls to create music, which later led to the intentional design of a world where these patterns could be used to play songs. Users also made virtual spaces their own in very personal ways. For P8, a couple got married in one of their virtual worlds -something the creator had never envisioned. P8 knew about the event only after it had occurred in their world, which shows how virtual environments can be used in unpredictable ways by users.

Users also enjoyed discovering and creating hidden features or "easter eggs" in worlds, which adds an element of surprise and exploration to the experience. For example, P22 observed that users enjoyed finding easter eggs and secrets embedded within virtual environments. They explained that while creating "realistic movie set-like scenes," the illusion could be broken if users went beyond the intended perspective by flying or exploring restricted areas. P22 tried to prevent this by blocking certain zones but found that users appreciated the freedom to explore hidden elements. They shared an example of a well-known world designed to appear ordinary, which included a hidden underground labyrinth that users enjoyed exploring.

Similarly, P27 observed that users embraced unexpected opportunities for interaction. For example, they observed that users liked climbing, even though it wasn't intended as a feature by the creator. Watching users come together in unanticipated areas and take advantage of spatial audio illustrated how users created dynamic social spaces. P27 shared that they had built numerous, tall staircases in one world. They didn't expected users to take them frequently because there was an elevator available. However, they were surprised to see that users choose to use the stairs. This prompted P27 to add rewards at the top to enhance the experience. Again, this adjustment confirmed the appeal of discovery and demonstrated how users often engaged with environments in unforeseen ways.

Users also found innovative and unforeseen ways to use kits and MREs developed by creators. For example, P29 shared that users had creatively used their kits in ways that surprised them, such as transforming a marble table into a wall, using a glass table to build a nightclub, or experimenting with a camera to create a feedback effect. P29 explained these uses as follows:

"Sometimes they bring me into their world, and they want to show it to me, to maybe impress or to thank me and I look around and they say 'these are like kits' and I don't see it. I don't know what they're talking about. One time I have a table with a marble surface on it. It is a marble table, but they took the table and put it to the side and they used it as a wall. So, they have a marble wall. And then another time I went to a nightclub, and they said this nightclub was built with my kit and I don't see it. What happens is they took my glass table, animated huge, so that the tabletop, the ceiling and the legs are the pillars. Or I have a camera where I just want people to be able to use the camera just to see other people. But they'll put cameras facing each other and have a feedback effect…They were very creative and using my kits in ways I never anticipated." (P29)

Building on Hollan and Stornetta's (1992) concept of social interaction, McVeigh-Schultz and Isbister (2021) argue that social VR platforms offer the potential for *"more radical departures from familiar social encounters"* and should be viewed as opportunities to expand everyday social practices. They emphasize that users *"shape social practice with a range of props and routinized structures in order to scaffold social interaction"* (McVeigh-Schultz and Isbister, 2021). These platforms, therefore, *"offer new opportunities that go 'beyond being there'"* (Hollan and Stornetta, 1992), enabling users to explore and develop novel social affordances.

While users influence the worlds they build, the platform owners can modify the environments as needed and are ultimately in control. However, Lefebvre's (1991) notion of "differential space" describes the means to resist abstract space's homogenizing forces by preserving individual and social integrity, a key feature often observed in user-generated virtual spaces. This dynamic underscores how users can create unique experiences within virtual worlds, showing how virtual space can be used as a medium for creativity and self-expression.

In line with McVeigh-Schultz and Isbister's (2021) findings, this study show that social VR platforms enable users to go "beyond being there" by expanding the scope of everyday social interactions. Users reshaped social practices and developed new social affordances through their creative use of virtual environments, often pushing the boundaries of what was possible within the conceived spaces. This dynamic also underlines how social VR is collaborative in nature, with creators and users contributing to the changes in the virtual environment. The production of space in virtual worlds is a dynamic process, constantly being reshaped and redefined by the interactions, creativity, and innovations of its inhabitants.

In all these examples, the users were able to demonstrate the transformative power of social affordances in virtual spaces. While design elements provided cues for social interaction, user choices on how to engage shaped the social dynamics for these environments. This relates to the relationship between design and user behavior wherein users, again, have played an integral part in shaping the social production of the virtual world. Users created these spaces, but also created the affordances, practices, and interactions to be developed through inhabiting these virtual worlds and thus transformed them into user-driven environments.

5.3.2.4.Social Norms

Social norms in *AltspaceVR* consisted of behaviors, practices, and etiquette developed, adapted, and maintained by users within the virtual environment. The norms reflected a mix of real-world values and unique virtual interactions specific to *AltspaceVR*. Similar to social affordances, the VR-specific norms were not defined by the platform or its creators but were created, implemented, and practiced by the users themselves. My observations showed that the establishment of such social norms was one of the most important factors for community cohesion, creating a shared framework to guide users in their interactions on the virtual space.

I observed that many social norms related to respect and etiquette from the real world were maintained in *AltspaceVR*. Users often carried real-world values and expectations into the virtual environment, including maintaining interpersonal distance, being respectful of personal space, using polite communication, and taking

turns in conversations. In the case of public worlds, in general, users spent most of their time in areas where both the activities and crowds were centralized. However, they still kept an interpersonal distance from each other. Most of the users mingled with the rest of the crowd while some stood away from areas of main activity, placing themselves in corners or far edges of the space, presumably for privacy. Treetops turned out to be popular spots for private conversations with users jumping onto large leaves or floating above them (see *Figure 5.76*).



Figure 5.76 Users floating above the treetops in the *Campfire, AltspaceVR*.

When people were having private conversations, others showed respect for privacy by moving around and keeping their distance. Distance from others users often demonstrated the relationship between them. Close friends or familiar users were standing proximal to one another and touching faces, shoulders, waist, or hugging, while unfamiliar users were standing farther away from others.

During formal events, the audience would orient themselves towards the main stage and typically remained on audience platforms while speakers and moderators were on the stage and often aligned in a row if there were multiple speakers. As shown in *Figure 5.77*, the moderator took their position a bit in front of the speakers, oriented to face both the audience and their fellow panelists when speaking, mirroring real-world behaviors. This figure also demonstrates the considerable interpersonal distance between speakers that was kept on stage.



Figure 5.77 An *Educators in VR* event in *AltspaceVR*, illustrating the positions of the moderator and speakers on the stage.

Both in formal and informal settings, proximity with unknown users might receive a variety of responses, seen as attempt to engage or, at times, as a source of discomfort. P3, P8, P14, P15, and P38 noted that personal space was respected in VR, with non-verbal cues indicating users' comfort levels. P14 observed that these cues were conveyed similarly to real-life interactions, while P3 added that users often physically stepped back in real life when a virtual person got too close. According to P3, the spatial arrangement at events played an important role in users' social comfort levels, much like in real-life settings:

"You can see the atmosphere of the event clearly on the spacing, how people stand here or there, like whether they want to protect and cover themselves from the society or they're open and they want to be in the center of the society. It's a very obvious way to do that.... Some people tend to stay in the corner somewhere and hide themselves, and some people tend to be in the middle and try to be more exposure to get more exposure to stuff." (P3)

Some participants highlighted the persistence of real-world social norms in virtual spaces. For P8, despite the lack of physical sensation, making inappropriate gestures in VR was just as offensive as in real life. Similarly, P10 emphasized that community standards from the real world, such as moderating tone of voice and

manner of speaking, needed to be upheld in VR. P38 emphasized the role of body language during virtual interactions, while P14 pointed out that social norms of politeness, such as not interrupting or dominating the conversation, were maintained in virtual environments. P3's perspective offered a unique insight into why people in social VR maintained real-world norms. P3 observed that many avatars in *AltspaceVR* closely resembled their real-life counterparts, which led the brain to perceive these avatars as real due to the personal interactions and shared histories between users:

"I realized that the first time I came to some lecture I was focused on the lecture, but I was trying to move or something, and I caught myself thinking that 'wow, I'm acting as if I'm in a real audience' because I know that there's a guy, I saw in my periphery that was a person standing behind me. And I was trying to make sure that I'm not blocking their view of the speaker of the lecture. Why do I do that? These are not even like real people. But they are more real actually because your brain believes it. Because they talk to you, and they have their personal histories and you can see them because avatars in Altspace interesting statistics. The majority of avatars in Altspace look like the real people." (P3)

In the absence of direct physical interaction and social feedback, users developed a certain set of social norms specific to social VR platforms that mirrored the virtual the environment and contrasted with the real world. Very often, such a process of establishing norms was grassroots in nature, with users creating through collective activity norms of acceptable behaviors and practices in social VR. P1 explained the possibility of establishing new norms from scratch in VR:

"You can think of it as it's up to us to actually build from scratch, right? And build new norms." (P1)

P3 provided an example of how social norms in virtual spaces differed from real life: Muting oneself to avoid background noise, such as breathing, became essential in VR. They also emphasized using headphones to prevent audio feedback. Similarly, P4 observed that users in *AltspaceVR* often experienced audio glitches that made conversations unclear. Instead of interrupting to clarify, users would infer the missing words and allow the conversation to flow without disruption. P4 also highlighted that sudden disconnections due to headset battery loss were common in VR and accepted.

Users could disappear without explanation and resume their interaction the next day. These examples illustrated how VR required different etiquette compared to physical environments.

P13, an experienced event creator, exemplified how movement and communication in VR differed from real-life interactions. P13 underscored the importance of understanding and adapting to these unique dynamics of virtual worlds, where traditional norms were often modified, or entirely new ones were created. For example, users in VR were constantly moving and twitching, with their controllers often causing their avatars to shift back and forth. In VR, distractions like constant movement and noise were normal, so people had to learn to tolerate higher levels of disruption and rely on moderators to manage more significant issues. P13 also mentioned "emoji jumps" or "steps," where users would accidentally teleport across the virtual space due to a missed button press. This would make users pop up in places they should not be, such as right in front of a speaker or on the stage. P13 added that this could be embarrassing but was a common occurrence in VR and should be treated as normal behavior.

Another unique aspect of social norms in VR that P13 mentioned was the development of specialized language and expressions that were only meaningful within the VR context. For example, the phrase *"I'm going to get off now"* was widely understood in VR as logging off, but outside of VR, it could easily be misinterpreted. P13 highlighted that these humorous and context-specific phrases added to the unique culture of VR and illustrated how virtual environments fostered their own sets of social norms and etiquette.

P5, another experienced event creator, highlighted how social norms in VR differed from real life. P5 noted that greetings in VR often involved hugging, even between individuals who were not familiar with each other, something uncommon in physical life. P5 explained that in VR, it was also common for users to spontaneously start dancing at music events and to compliment each other's avatars. These practices created more spontaneous and inclusive interactions in VR, whereas such behaviors might be considered unusual in real life. Similarly, P4 noted that giving hugs in *AltspaceVR* felt more normal than in real life; in VR, it was a frequent form of greeting. Further, P7 stated that social interactions in *AltspaceVR* tended to be more respectful

than everyday interactions in the real world. For P7, people in *AltspaceVR* were more likely to engage in polite interactions, such as introducing themselves and greeting others.

P8 described a popular social activity in *AltspaceVR*: Users fed each other marshmallows at campfires, a gesture they usually show for close friends and loved ones. According to P8's observations, this was an almost universal and enjoyable experience for many users, although some found it annoying. For example, feeding strangers with marshmallows was considered impolite because of the sounds that accompanied it. According to my observations, new users were drawn to this activity more often, seeing it as a fun and engaging way to interact. The marshmallow feeding ritual was a beloved and memorable part of the *AltspaceVR* experience.

Social norms in *AltspaceVR* represented a combination of both real-world norms and new norms developed for the virtual environment. My findings showed that the concept of social presence played a key role in maintaining real-world norms. Users experienced a high sense of realism and connection when interacting with avatars, and the identity associated with these avatars, along with their resemblance to real people and the real-time nature of interactions, created continuity between the virtual and physical worlds. This sense of continuity encouraged users to carry over real-world social norms into VR, as their brains perceived these interactions as natural extensions of everyday life.

As McVeigh-Schultz and Isbister (2021) argue, the unique mechanics of social VR introduced both constraints and affordances that led users to *"invent novel interaction rituals and redefine social norms."* Following Proctor's (2021, p.605) argument that every media platform comes with unwritten rules, the communities in *AltspaceVR* developed their own social norms, which were not dictated by the platform but emerged from the communities themselves. The need to overcome technological limitations of social VR platforms played an important role in shaping these new social norms. Users adapted to these limitations and accepted them as part of the virtual experience. Over time, these shared experiences helped to cultivate social norms unique to the virtual worlds.

5.3.2.5.Social Status

Like social norms, social status in VR reflected a blend of real-world dynamics and VR-specific social dynamics. While real-world indicators of status such as race, gender, wealth, and physical appearance, became less prominent in virtual environments, social standing was more influenced by cultural and personal traits, avatar appearance, contributions to the community, world and event creation, active participation, time spent on the platform, and proficiency in navigating and utilizing the virtual space. These factors played a bigger role in determining an individual's status within the community. This again reflects how communities build their own social dynamics within virtual environments.

Many participants noted that VR helped reduce real-world biases. P2 stated that in VR, factors like race, gender, or physical appearance had little influence on social status, as users typically did not know each other's physical identities. P2 valued the freedom to create diverse avatars, even choosing unconventional forms like a "stick of butter." Similarly, P7 noted that people in VR tended to be friendlier than in the real world because many real-world biases were absent. Without visual cues such as nationality or appearance, users were more open to approaching and interacting with strangers. P7 emphasized that this openness and lack of judgment made VR a more welcoming and inclusive environment. P10 added that in VR, ideas and interactions took precedence over physical appearance or socioeconomic status:

"I found that these people could socialize without your body, how you look, how much money you have, which school you go in, what are your knowledge, how far you went to school... So, I started to to think, OK, I don't know these people, but I don't even need to know them because I just can have friendship and I can have a lot of joy, a lot of fun time without knowing them. I just need to know what I need to know. They are funny. I like their voice. They have a good talk. And that's what matters here." (P10)

P1 noted that, unlike in the real world where height often plays a role in social interactions, height in VR did not hold the same significance. P1 shared a story about 10-15 years ago, where they hosted a party in which they used sticks of wood to make everybody stand at the same height. This experiment also showed how height could be a factor in social dynamics in physical space, drawing a parallel

to how VR equalizes and anonymizes, where physical attributes like height become irrelevant.

Many participants noted that cultural and personal attributes like kindness and character played a more significant role in determining social status in social VR. P5 emphasized the importance of kindness, P8 highlighted the value of being nice, and P34 stressed the significance of being inclusive. P3 observed that *"thoughts, intelligence, character, and charisma"* were influential in shaping one's social standing in virtual environments, because these were reflecting a person's approach to conversations and topics. P3 explained how these traits manifested through body language in VR:

"Thoughts, intelligence, character, charisma. The way you speak, I think it matters a lot. Your body language. Surprisingly, you could see the body language. You could feel the energy of a person because you could read their body language when they wear their headset, you can see if they are like fidgeting and that's why they have very energized personality. They talk faster, and they are more charismatic. And some people are like just calm and mellow. They have very low temper of voice, like the pitch of voice and that's why they're like more calming and you feel comfortable around them because they are just like mellow. So that's the personality that you can see behind the screen, headset." (P3)

While social VR platforms like *AltspaceVR* offered opportunities to reduce biases and emphasize individuals' character over appearance or possessions, I observed that real-world prejudices and social dynamics were still transported onto the virtual environment. These were manifested in various ways, such as group exclusivity based on different criteria. According to P11, social groups in *AltspaceVR* naturally formed "in" and "out" groups, creating distinction among many users. Similarly, P35 described a divide within the platform itself: A "Black Altspace" and a "White Altspace," describing racial separation within the platform. Like P35, I also noticed that users with black and white avatars often gravitated towards their own respective spaces, reflecting a division within the platform.

While for most participants, physical appearance was deemed to lose its significance in VR, I found the appearance of avatars could signal and represent social

status. The ability to customize one's avatar, including the creativity involved in such a process, had the potential to influence a user's standing in the community. Unique or well-designed avatars often attract attention and admiration, enhancing users' social status. This trend was not limited to *AltspaceVR* but was also evident across other social VR platforms. Users often preferred customized avatars adorned with clothing and items from popular creators. Users with default or non-customized avatars were often perceived as new or inexperienced, for which reason others sometimes preferred not to interact with them. P1 marked on this issue as follows:

"Of course, there can be the creative ones with their avatars, right? And expressing themselves in a way that makes them look stronger, funnier, and making people curious." (P1)

Social status in *AltspaceVR* was also shaped by one's role and "title" within the community and their contributions. For example, people who made valuable contributions, like building worlds, hosting events, or creating content, were generally seen as having higher status. If their contributions were gained popularity, their standing in the community could improve. The world and event creators positioned themselves through assuming leading roles that raised their status and distinguished them in their respective areas. I noticed that they constructed an idealized self and presented themselves as productive, creative, and collaborative. For instance, success as a creator of events was defined by the popularity and number of events created, experience, and ability to work well with others. P1 cited the status derived from being on stage or speaking first in an audience, while P33 noted that the creation of many events and community building could increase someone's importance in the virtual space.

Like event creators, social status of world creators was shaped by the contributions and recognition received from the community. The criteria for success included the quantity and popularity of the worlds they created, the level of user engagement, and their collaborative efforts. Sharing world templates, offering free kits, assisting others in world-building, and providing training also contributed to their standing. P3 highlighted a famous world-builder as an example of someone who achieved high status through popular and well-crafted worlds. Similarly, P9 noted that world builders who shared their assets and gained popularity enjoyed higher status

within the platform. P35 referred to the most impressive creators as the “A-listers” of the community, further emphasizing how world-building could elevate one's social standing in the platform.

As a user, one’s social status was raised by the active participation in and engagement with the community: Attending events, contributing to discussions, and helping others. What these findings point to is that the experience and knowledge shared by users and creators in VR were integral to standing in the community. This correlated with time spent on the platform, as the more prolonged the presence, the deeper the involvement and recognition. P2 underlined that both the amount of information one had, and the time invested in a platform played key roles in determining social status. P2 further explained that their high status on *AltspaceVR* was due to the time they had spent there, whereas on other platforms like *VRChat* and *Horizon Worlds*, where they spent less time, their status was lower.

P13, an experienced event creator, provided an understanding of how time spent within these environments impacted users regarding their social status. As pointed out earlier, in *VRChat*, for example, a person needs to invest some hours to be able to acquire privileges such as building worlds. However, P13 was skeptical about the idea that this time limit automatically makes one a “trusted user,” pointing out that long-term presence doesn't necessarily equate to good intentions or trustworthy behavior.

In a similar sense, after *Microsoft* acquired *AltspaceVR*, long-time users were recognized as “community leaders.” P13 was one of the community leaders and noted that this led to unintended issues in the platform. “The Community Leadership Program,” which aimed to represent trusted users, became a competitive badge-collecting system, which caused divisions and conflicts within the community. Later, *AltspaceVR* tried to solve this problem by rebranding community leaders as “helpers,” but this caused more division. The word “helper” was seen as disrespectful by some users, and that again caused splits between those who supported and opposed the naming. Furthermore, some “helpers” abused their status, further complicating the social dynamics within the platform.

My findings suggest that while VR freed individuals from real-world dynamics based on physical appearance or economic status, it introduced new layers of social dynamics intertwined with users’ virtual interactions. Although a user’s status was

distinct from their physical life, it was shaped by the social interactions and roles they assumed within the platform and their communities. In *AltspaceVR*, social status was actively produced within the platform's "lived space," where users engaged in daily interactions. As Lefebvre (1991) emphasized, space is socially produced, and within social VR, social space mirrored users' power dynamics and social practices. This space often reproduced real-world dynamics, such as the formation of "in" and "out" groups and exclusivity based on status.

Time investment proved one of the main factors that formed one's social status on social VR platforms, such as *AltspaceVR* and *VRChat*: In general, users with much more time invested developed richer knowledge and expertise, translating to better standing within the community. That also created factional conflicts and status misuse issues. For instance, *AltspaceVR*'s "community leadership" program sometimes created divisions and misuse that reflected tensions between recognition, status, and community cohesion. This echoes the findings of Turkle (1995) on platform governance, where social structures can foster unity and competition.

Moreover, time investment on the platform served as a form of social capital, as Bourdieu (1986) describes, with long-term users gaining privileges and status over time. Applying Bourdieu's (1986) concept of social capital to social VR reveals how virtual platforms both build upon and recreate traditional social capital dynamics. Bourdieu's theory recognizes that capital is not purely economic but includes social, cultural, and symbolic assets. In social VR, social and cultural capital included digital and platform-specific forms of capital, such as avatar customization, world-building skills, and community contributions, which became key indicators of status.

Bourdieu's theory, grounded in concepts of "social reproduction" and "symbolic power," explains how capital maintains structures of inequality by reinforcing certain power dynamics. Bourdieu (1990, p.11) describes social reproduction as the perpetuation of class-based power relations, emphasizing how social hierarchies are upheld through accumulated capital. This was quite explicit in *AltspaceVR*, where community leaders usually gained their position by means of continuous participation, influence, and networks. Active participants earned symbolic power related to familiarity with the norms and tools of the platform and network-based privileges. The

same users often built structures or organized events that, in turn, strengthened their position and thereby reproduced their social capital over time. This dynamic created barriers for newer users in social VR platforms, especially in *VRChat*, because those with experience had greater access to opportunities and influence. The "community leadership" program in *AltspaceVR* also represented this dynamic, where privileged access fostered competition and divisions, reinforcing Bourdieu's argument that social capital can perpetuate social hierarchies. Thus, social status in these virtual spaces was tied not only to individual creativity and time investment but also to the structure and governance of the platform itself, reinforcing the idea that conceived spaces strive to dominate the lived space (Lefebvre, 1991).

5.3.3. Embodying Avatars and Forming Virtual Identities

5.3.3.1. Realistic Avatars vs Creative Self-Expression

On *AltspaceVR*, users could embrace corporeal anonymity, which granted them the freedom to express themselves through 3D avatars. Although *AltspaceVR* limited customization to humanoid forms, unlike platforms such as *VRChat*, which allow diverse non-human and fantastical avatars, users still had considerable latitude in designing avatars that could reflect different genders, appearances, and even personalities. The platform's design facilitated a complex relationship between users' virtual and real-world identities. While for some, this was the freedom to self-express by creating avatars most proximate to their real selves and thereby sustaining continuity with one's identity, for others, it opened up avenues toward the exploration and playing out of different identities.

Participant insights showed how the rendering of avatars in *AltspaceVR* created spaces where users could both explore and express various dimensions of identity. For example, P5 discussed freedom in *AltspaceVR* to express oneself through avatar design, noting that some users intentionally created avatars that looked different from their real-life appearance as a form of "escape." P12 noticed that the youngest users were more likely to produce an avatar that didn't look like them, as a way of using the space to experiment with completely other personas, such as assuming quite unusual-looking appearances in comparison with their professional selves. P39 noted that for many participants, the freedom afforded by VR to try on other identities, including

other genders and body types, was very appreciated by many people. Similarly, P11 shared their journey of starting with a realistic avatar and then moving into a separate persona, with its own personality and social network, which allowed P11 to embody a new virtual identity for creative purposes.

Conversely, many participants stated that they created avatars that reflected their real-life appearance and identity, using customization to maintain a sense of self in the virtual world. P3 noted that most avatars in *AltspaceVR* closely matched users' real-life appearances, a sentiment echoed by P5, who mentioned that many users designed avatars that looked like themselves. P7 and P12 also shared that their avatars were approximations of their real-life looks, while P15 affirmed that the real person behind the avatar often mirrored the virtual representation. P32 described their avatar as almost a copy of themselves, right down to specific clothing choices, while P39 emphasized their intention to make their avatar look as much like themselves as possible.

These diverse ways of doing avatar design in *AltspaceVR* underscore the dual nature of virtual identity formation. For some users, the platform provided an extension of real-life identity, which served as a digital reflection of their real-world appearance and personality. In contrast, for other users, the platform offered an opportunity for identity experimentation, which allowed them to try out new roles, personalities, and appearances that might be stigmatized in the real-world.

AltspaceVR's was designed to support both of these identity pathways, demonstrating the potential of VR to host fluid, multidimensional approaches to self-representation. It allowed for and supported a flexible social space within which one could be oneself or become someone else, whichever one preferred, depending on the situation and social context. This dynamic reflects a unique facet of social VR: The interplay between anonymity and identity flexibility, empowering users to reshape or affirm who they are based on the circumstances they encounter in the virtual world. Ultimately, *AltspaceVR* shows how social VR platforms can serve as sites of identity negotiation, providing a space in which users experiment with both the familiar and the new in ways that reflect, challenge, or expand their real-world selves.

5.3.3.2.Anonymity and Freedom of Social Stigma

According to my observations, VR allows individuals to express themselves without fear of judgment based on their physical appearance or disabilities. It offers users the opportunity to present themselves as they choose, free from social stigmas and real-world constraints. This anonymity fosters a unique dynamic in which users can explore different aspects of themselves or escape their real-world selves.

Participants underlined that VR offered the possibility to express themselves with idealized versions of their selves, unrestricted by the body or society. P1 stated that VR allowed the expression of oneself without being judged for physical features one is not comfortable with. The freedom regarding the choice of avatars was considered important, and P14 enjoyed being able to change avatars and identities across platforms, enjoying the novelty and freedom this brought. P8 identified as gender fluid, and the use of the neutral-looking robot avatar felt safe because it allowed them to keep privacy and express themselves without being bound by their appearance.

The anonymity in VR also influenced user behaviors. P7 observed that the absence of real-world biases often made people friendlier in virtual spaces, as judgments based on physical appearance were absent. P8 shared that they felt more outspoken and confident in VR because they weren't subject to visual social cues that could make them self-conscious in real life. P31 emphasized that hiding one's physical appearance in VR allowed for more open discussions and sharing of ideas, free from the biases typically encountered in face-to-face interactions.

Some respondents reported that VR had the potential to change how individuals view themselves and also improved social relations. P33 reported that the virtual world could give the individual a feeling of value and acceptance that was not available in the real world, thus improving self-esteem and improving one's social life. This further confirms how VR can transform users' self-perception from the existing literature. As Thibault and Bujic (2022) point out, the close relationship between VR and users' bodies, combined with the ability to adopt new forms and identities, has made social VR particularly popular within the LGBTQ+ community. It provides safe spaces (Acena and Freeman, 2021) and can help alleviate experiences of gender dysphoria (Schwind et al., 2017). On the other hand, the anonymity and freedom in VR can also present certain challenges. P40 pointed out that the ability to change identities and

behaviors at will could lead to unpredictability in interactions, as users might present different personas at different times.

5.3.3.3.Customization Features and Preferences

Although changing the whole avatar appearance wasn't that common for users in *AltspaceVR*, changing clothes and accessories were one of the popular ways of expression of personality, mood, and alignment with certain events or themes. This practice allowed them to dynamically adapt their appearance as they wished. Participants often related how the outfits of their avatar varied according to their mood or the occasions they would attend. According to P37, if they changed their mood or attended an occasion, they switched their avatar's outfit to adapt to those feelings or occasions, as they did in real life. This included changing items such as tops, shoes, or hairstyles to reflect a more masculine feeling. P35 stated that they changed into more appropriate clothes, such as a polo shirt, for a virtual class, showing a respect for context and setting even in a virtual space. P15 described wearing a performance outfit with a disco ball texture and a western vibe, highlighting the theatrical aspect of avatar customization in VR.

P17 explained that they dressed more formally when hosting events or attending special occasions, such as adding a tie or removing a jacket to suit the environment. P24 stated that they customized their appearance for themed parties, which showed the dynamic and event-specific avatar adjustments. P14 mentioned how they changed their avatar back from a Halloween-theme, which was one good example of how users changed their avatars across different seasons and events. P34 stated about using seasonal or event-related wear, such as Xmas hats during Christmas season or Star Trek uniforms when meeting with their Star Trek friends, which shows how outfits can signify group affiliation and shared interests. P40 emphasized dressing up for different social occasions, such as New Year's Eve celebrations or a black-and-white party, to underline the social and celebratory aspects of social VR platforms.

These examples showed that avatar customization in *AltspaceVR* was not only an aesthetic appeal but also a way of self-expression and means of involvement with the communities. By changing their avatar clothes and accessories, users could reveal their identity and change to suit the social setting.

5.3.3.4.Social Connections, Consistency, and Recognition

Maintaining a consistent avatar appearance was important to recognition in *AltspaceVR*, which allowed stability and continuity helping users create and maintain a social relationship with others within the virtual environment. This is evidenced by how many participants noted that their consistent avatar appearance was important for recognition and the development of social connections.

P4 mentioned how wearing the same outfit in social VR affected the impression others received from an avatar. As P4 clarified, even though people may change their clothes a lot in the physical world, in VR, there is a kind of "mental image" created based on what an avatar looked like. P4 shared a personal experience where their boyfriend mentioned a deeper connection to their consistent avatar look. Similarly, P8 mentioned not changing or adding new accessories to their avatar due to attachment to distinct colors that had been part of them for years. This connection to specific colors underlined how important visual consistency was in maintaining a recognizable and stable virtual presence.

P12 noted that recognizing familiar avatars at events helped build connections, as seeing a recognizable avatar across the room could facilitate recognition and social interaction. P15 echoed this thorugh sharing that their consistent semi-casual look and hairstyle had become part of their virtual identity, which made them easily identifiable. P17 and P21 also emphasized the value of consistent avatars for recognition. P17 found it enjoyable to recognize familiar avatars in photographs, while P21 shared an experience of dressing up for a wedding while keeping a consistent jacket to ensure others could still recognize them. They observed that many "regulars" rarely changed their outfits, which made them easily identifiable within the community.

Several participants also mentioned how changes in avatar appearance could challenge recognition. P24 mentioned that minor changes in avatar appearance helped maintain recognition, but a complete transformation could confuse friends. P32 highlighted the importance of having unique avatars and noted how even a minor change in hairstyle could make recognition difficult. These examples showed the role of visual consistency to sustain social connections. While social VR platforms provide opportunities for self-expression, maintaining a consistent avatar appearance was crucial for fostering social connections, ensuring recognition, and building continuity.

5.3.3.5.Influence of Avatar Appearance on Social Interaction

My observations revealed that avatar appearance influenced social interactions in virtual environments. In *AltspaceVR*, new users could be easily identified by their default avatars; having a default avatar was like a marker that regular users considered when choosing whom to engage with. Many participants stated that they tended to avoid interacting with users with default avatars, as these were typically perceived as representing "inexperienced or new users." To avoid being perceived as inexperienced, users needed to customize their avatars. Creating an identifiable virtual identity helped users present themselves in a more recognizable way within social circles. P35 also noticed that the appearance of other users' avatars was usually taken into consideration before one decided to approach them. They mentioned that there are avatars with certain features, like multiple earrings and marginal looks, which might prevent them from initiating interaction with them, similar to real-life judgments by appearance.

P3 shared a personal experiment they conducted, where they changed the appearance of their avatars to see how that impacted their social interactions. The experiment included changing their avatars for different racial backgrounds, as shown with darker skin, and older appearances, as shown with white hair. With this experiment, they found that changes in one's avatar appearance could impact how others interacted with or treated them. Similarly, P35 discussed the relation between racial identity and avatar appearance. Self-identified as a Black individual, P35 considered changing their avatar's skin color to white, thinking this would change how people approached them socially and accepted them. They noted that their social circles and the responses they got varied based on the perceived race of their avatar. As I discussed earlier, P35 described a divide within the platform as *"Black Altspace"* and *"White Altspace,"* indicating a racial separation within the community.

Reflecting on the notion of a divide within the community based on avatar appearance, I observed that avatars often aligned with the theme and atmosphere of specific virtual environments. For example, at VR networking events, avatars were more likely to wear glasses and adopt a stereotypical "nerd" appearance (see *Figure 5.78*). In a virtual world like *The Speakers' Corner,* there was a predominance of male avatars, many with long beards, reflecting aspects of Islamic culture- distinct from what one might encounter in more public virtual spaces (see *Figure 5.79*). Conversely,

at a Red Hot Chili Peppers concert, avatars often had varied hair colors and marginal accessories. As previously discussed, while some users changed the appearance of their avatars to fit the style of events and worlds, others tended to chose spaces where the look of their avatar matched the environment.



Figure 5.78 Appearance of avatars at a VR networking event in *AltspaceVR*.



Figure 5.79 Appearance of avatars in an Islamic-themed world in *AltspaceVR*.

P10 emphasized the importance of avatar appearance, especially for presenters at events. They noted that users speaking at events, whether hosts, moderators or speakers, were expected to convey professionalism through their appearances. This

expectation often included having a more formal avatar appearance, with choices like business clothing. According to P10, this emphasis on avatar appearance was not just about aesthetic appeal; it also built the speaker's credibility and shaped audience perceptions. The friendliness or authority of a speaker or moderator may be signaled by their appearance.

These findings showed that avatar appearance in social VR is a crucial factor in shaping social dynamics, group affiliation, and individual identity within virtual spaces. As Fu et al. (2023) also highlight, the appearance of an avatar impacts the communication experience within VR, with design choices like clothing, accessories, and facial expressions providing cues that shape perceptions of personality. By providing these different forms of expression, social VR platforms make up for the lack of physical cues in the real world. By allowing users to present themselves in ways that better align with their intentions and self-concept, they enable more nuanced social interactions, with users communicating aspects of their identity that are central to how they would like to be seen and known.

5.3.3.6.Emotional Connection to Avatars

My findings showed that users developed strong emotional attachments to their avatars. Many participants mentioned how platforms like *AltspaceVR* let them experiment with parts of themselves they did not even know existed in the real world. It was particularly important for those people who have social anxieties; the virtual space represented a low-risk platform to interact with others. For these users, avatars provided a means to experiment with various forms of self-expression and were instrumental in the development of self-confidence. P9's experience exemplified the emotional attachment users could develop towards their avatars when describing an "identity crisis" after *AltspaceVR* updated the designs of its avatars:

"You get kind of attached [to your avatar]. I was surprised. When I started Altspace, we had robot avatars. And I had my robot. And when they took the robots away, we were devastated. It was almost like an identity crisis. It was so bizarre because you'd come to think of that body as representing you in this space. I just did to the new one, but I really did, it was a blow to lose that identity." (P9)

P9's description highlights how avatars can have psychological impacts on users, and this is in line with the argument Freeman et al. (2020) put forward: An avatar designed to reflect personal traits and unique behaviors creates deeper emotional connections with users. When avatars are designed to reflect personal qualities, behaviors, or styles, users often see these virtual bodies as extensions of their identity, which can lead to an "embodiment illusion" (Gonzalez-Franco and Peck, 2018). This attachment deepens the emotional connections users hold with their avatars, as they become integral to the representation of themselves within VR.

The experience of P40 further underscores the impact of VR identities on real-life self-perception. Famed for their distinctive avatar, uniquely colored and styled hair, P40 mentioned how they adjusted their real-life look to make it just like their virtual self. They shared personal photos of how their real and virtual looks have almost become identical. Although I can't show these images to protect the participant's privacy, P40's experience shows how virtual and physical identities are alike. This blending of VR and real-life self-representations underlines the transformative potential of avatars by showing how social VR can allow users to explore new aspects of their everyday selves.

5.3.4. Community Spirit

AltspaceVR was praised for its community spirit based on collaboration, support, and knowledge-sharing. According to P10, the community was driven by an intrinsic motivation for exploration, creation, and supporting each other, often through sharing skills, collaborating, and building expertise together:

"This community was very strong about exploring things, exploring technologies, exploring ways of managing events and getting together." (P10)

Collaboration through world-building and event hosting played an especially important role in fostering a sense of community spirit on the platform. This sense of community extended beyond shared activities to forming larger support networks where community members helped each other. P10 highlighted the mutual support

within the *Educators in VR* community as particularly impactful. Similarly, P19 noted how creative collaboration fostered a sense of community in the platform:

"I found the same thing [in Educators in VR], a great community, helping each other, trying to have a lot of fun, trying to learn, trying to share with the people out of the 3D space." (P10)

"When there's creativity involved, there's community involved, automatically." (P19)

A strong sense of belonging and emotional connection was also central to the *AltspaceVR* experience. P5 referred to the community as an *"Altspace family,"* underscoring the deep bonds they formed in the platform: Community-built worlds like *Metavale Park* and the *Aqua Complex* also strengthened the sense of belonging among users. P21 described the creation of *Metavale Park* as a place for people to gather and share their thoughts and experiences freely, while P26 shared similar motivations for building the *Aqua Complex*. This sentiment was echoed by P2, who noted that *AltspaceVR* brought people together from diverse backgrounds together and created a shared bond:

"We call each other 'family' a lot. We call this 'our Altspace family.'" (P5)

"I wanted to make it for my friends and my community, to feel like we are together." (P26)

"People came together from all over the world to have a sense of community, to feel like they're a part of the whole." (P2)

P2 stated that kindness and inclusivity were the core values that created a community ethos, since *AltspaceVR* was composed of users coming from diversity of backgrounds. Similarly, P34 valued *AltspaceVR* for its emphasis on inclusivity and kindness, noting that it stood out from other platforms in fostering these values:

"For me, my social values are kindness and inclusion. And here I find it more than other places." (P16)

Community spirit in *AltspaceVR* extended beyond social interaction to building a supportive, inclusive, and collaborative environment. The following statements of P13, P24, P40, and P21 were particularly meaningful for the purposes of this research, particularly in the context of the lived space. P13 emphasized the importance of communities in shaping the platform. The sense of creating a new community with its own rules and culture was also highlighted by P24, who compared the *AltspaceVR* experience to *Burning Man Festival*, where active participation led to meaningful connections and experiences. P40 also emphasized that the community-driven nature of *AltspaceVR* made it particularly unique:

"It was the community that made the platform. It is not the platform that made the people." (P13)

"I think that that attracts people who want to make something new of the world and society, you know, they're inventing a new society, new rules of engagement." (P24)

"It's like not utopian by any means. I mean, you have the drama, you have the interactions, people, the conflict and all of that is part of it… Those things are here for you, and you can just experience them. The community here, the people in Altspace are amazing, it's just the feel of it, because I think it's built mostly by the users, you know what I mean? We build what we want to be, where we want to live. And that makes it amazing." (P40)

P21 further illustrated the organic development of popular virtual worlds like *Karaoke in the Trees,* (see *Figure 5.80*) which started as a simple template-based world and evolved through user interactions and a shared sense of purpose:

"I would say that the most popular world on Altspace is Karaoke in the Trees… it got a real spirit, I suppose, people would have adhered to it because there was a good atmosphere and people in there, just the people from all sorts of countries, races, and sexuality, whatever you want to mention, we would just come together as one. There was no leader in that room. It was built from all of us, just born in there, when interacting with each other. I think it's the people more than the actual world itself that make it into whatever it becomes." (P21)



Figure 5.80 *Karaoke in the Trees* in *AltspaceVR.*

For Lefebvre (1991), lived space represents the realm where individuals experience, interpret, and transform space through their daily interactions and social relations. In the context of *AltspaceVR*, the lived space was not merely a digital environment, but a shared social environment shaped by users. The community spirit that was formed in *AltspaceVR* exemplifies socially produced aspects of virtual space, as users reflected their own norms, rituals, values, and practices. P13's statement, *"It was the community that made the platform,"* directly reflected this idea, highlighting that the platform's social fabric and cultural practices emerged from user interactions rather than the structures imposed by the platform.

This creation of virtual spaces based on user-driven dynamics and shared values, as noted by P24 and P40, resembles the participatory aspect of communities like *Burning Man*. Such communities are co-created by participants, where they formed a unique social culture that was characterized by collaboration. P24 observed that users invented *"a new society, new rules of engagement."* The development of unique norms and practices echoes Lefebvre's (1991) lived space as a site for social production of meaning and social cohesion.

The collaborative, inclusive, and supportive nature of *AltspaceVR* demonstrates how lived space in VR can enable a form of collective identity. Worlds built by communities illustrate how users actively participated in creating shared environments. This again aligns with Lefebvre's (1991) notion that lived space is a site

of expression where individuals create meaningful attachments. P26's sentiment of designing the *Aqua Complex* "*for community, to feel like they are together*" further reflects this relational dimension. Moreover, the popularity of worlds like *Karaoke in the Trees* exemplifies the role of lived space as a dynamic and socially produced environment. As P21 described, the space was not defined by any specific leadership or predetermined structure. Rather, it grew through users' interactions, creating an open, inclusive atmosphere where people from diverse backgrounds gathered and *"came together as one."*

These findings demonstrate how social VR platforms like *AltspaceVR* can bring people together and foster a sense of community spirit in virtual spaces. These spaces were created though the collective actions of users and, in turn, created a community based on the lived experiences of its members. This showcases how virtual worlds function as sites for social connection and collaborative meaning-making, manifesting Lefebvre's (1991) conceptualization of space as a social product.

5.3.4.1.Social Support

In *AltspaceVR*, there were a variety of events and communities committed to promoting emotional, psychological, and physical well-being. These included support group meetings, meditation and mindfulness events, religious practices and discussions, sports activities, and events addressing issues like LGBTQ+ awareness. What I have observed in these events is that participants mostly shared personal stories, talked about every day or meaningful topics, and listened to others. Events like these were instrumental in fostering diversity and inclusion within *AltspaceVR.*

Inclusivity was especially meaningful for marginalized groups who found safe spaces to gather and connect with each other. For example, LGBTQ+ communities regularly organized events and created their own worlds within the platform (see *Figure 5.81*). P16 emphasized their commitment to establishing a safe LGBTQ+ space in *AltspaceVR*. This aligns with the findings of Acena and Freeman (2021), who found that social VR offers LGBTQ+ users an inclusive, multi-modal environment where they can safely explore their identities. Similarly, Li et al. (2023) noted that social VR

holds value for marginalized groups by providing a supportive space for identity formation and social support that we don't normally see in other online platforms.



Figure 5.81 *The LGBTQ+ Zone* in *Metavale Park*, *AltspaceVR*.

Lorenzo (2010) describes "listening spaces" as environments where multiple voices on diverse themes can emerge, leading to collective empowerment and facilitating both individual and group action. According to my observations, users in social VR platforms like *AltspaceVR* can form alternative social spaces which act like listening spaces for marginalized groups. With community values integral to their formation, these spaces not only offer inclusion but also challenge the "hegemonic" physical spaces where exclusion often restrict social interaction. In this sense, Lefebvre's (1991) concept of "differential space" becomes relevant. Lefebvre (1991) argues that in spaces marked by homogeneity and conformity, new social spaces emerge to accentuate diversity and foster unity in ways that transcend the fragmented nature of abstract space. By supporting marginalized identities and organizing minority-focused events, social VR platforms hold a potential to create a "differential space" that opposes dominant social structures of physical world.

The supportive and inclusive nature of *AltspaceVR* was not limited to specific communities but extended to individuals facing personal challenges, who found a sense of belonging. Several participants shared that the platform played an important role in their grieving processes following the loss of their loved ones, while others, who struggled with social anxiety, used *AltspaceVR* as a space to communicate without

the constraints of physical world. P32 underscored the significance of mental health events hosted by the *EvolVR* community (now known as *TRIPP*), which provided a safe space for users to openly discuss trauma, anxiety, and other sensitive topics as follows:

"Sometimes we do mental health events too. I really like those, we watch a YouTube video on trauma, anxiety. And we sort of just open the discussion from there, people share, have questions. Those events can be a little bit difficult because... we're not like professional counselors or anything. But I do love that there can be a place where people can come and talk about stuff that they might not have another person in their life that really understands or is willing to listen." (P32)

I observed that the *EvolVR* community was quite important in fostering social support in *AltspaceVR*. This community organized various activities and events to support its members. As mentioned above, *AltspaceVR*'s supportive culture extended to grief moments: Memorial events were organized for those who had passed. For example, P7, who lost his wife, described a gathering where community members came together to offer condolences:

"After my wife died, we had a big event... where everybody turned down, saying they were really sorry for what happened to me. The same thing happened when another young woman lost her partner, there was a whole ceremony. This kind of support is something you don't always see in the real world." (P7)

Several participants stated that *AltspaceVR* helped them get through difficult moments in their lives; some even considered the platform as their lifesaver. For example, P4, who had a serious illness, joined *AltspaceVR* after hearing that VR could reduce chronic pain. In 33 months, the community became a huge part of the participants' life. Accordingly, P4's pain and reliance on medication reduced. Similarly, P21 mentioned that a conversation with a friend from *AltspaceVR* sparked a life-changing support during time of a personal crisis, stating that the platform had *"literally saved his life."*

The emotional and mental health support provided by *AltspaceVR* communities was quite important for many users. P3 emphasized the importance of *"genuine connection, safe spaces, and conversations"* for mental well-being. P32 stated that

meditation events were a regular and meaningful part of their everyday life. Support groups within *AltspaceVR* also addressed specific issues such as ADHD (Attention-Deficit and Hyperactivity Disorder); I observed that these communities held weekly meetups on the platform. P34, a regular participant of an ADHD community, stated that these meetings helped manage symptoms. *AltspaceVR* thus cultivated an environment where users could find both general and specialized support, addressing a wide range of emotional, psychological, and social needs.

"Altspace provides a platform where people with ADHD can meet, share, and support each other in a positive environment." (P34)

5.3.4.2.Maintaining Connections Beyond the Platform: *"Discord is the Metaverse"*

AltspaceVR's communities extended beyond the platform, with members seeking ways to maintain and strengthen their relationships across various platforms. This multi-platform approach ensured continued engagement and connection within communities. P1 highlighted the use of *Slack, Discord, WhatsApp,* and *Signal* as the communication tools the community relied upon. Community members also utilized social media platforms, including *Instagram, Facebook, Twitter,* and *Snapchat* to keep in touch and share their experiences. More established communities often managed their own *Facebook* groups, where members could hold discussions, share photos from events and virtual worlds, and promote upcoming events. As P17 and P30 observed, many members stayed in touch through multiple social media channels:

"There's the groups of people that go in other places, and then there's also people on Facebook." (P17)

"I know most of these people I can still contact on Instagram and Snapchat and Facebook and all that." (P30)

However, *Discord* was particularly popular as the central platform for communication outside of *AltspaceVR*. Established communities used *Discord* as a hub where members could organize events, collaborate, share updates, ask for help, and foster ongoing interaction. P16 emphasized the role of *Discord* in the fostering

virtual communities. For many, as noted by P27, the continuity of the Metaverse experience was supported through *Discord*:

"We made some really tight-knit friendships, especially getting acquainted through Discord, you know, because we got Discord server for it and forming really strong bonds." (P16)

"Discord is the Metaverse" (P27)

The point of P7 reflects an integrated, multi-platform understanding of the Metaverse, which suggests that community-building and social interaction extend beyond social VR to platforms like *Discord*. This approach exemplifies how Metaverse operates within a large and interconnected digital ecosystem. While social VR platforms face instance caps, event duration limits, and the challenges of textual chat problems in VR, *Discord* overcomes these limitations by providing a consistent and easy-to-use platform for communication.

Reflecting participant insights, Alcala et al. (2023) also highlighted that while immersive experiences occur within social VR, the continuity and strengthening of community bonds often rely on platforms like *Discord*. Alcala et al. (2023, p.96) found that *"AltspaceVR users and communities have turned to Discord to solve many of their needs, such as facilitating more ubiquitous communication, planning community activities and AltspaceVR events, and hosting casual social discussion."* Using the "communicative ecology model," they (2023, p.96) described the relationship between *AltspaceVR* and *Discord* as a "stage" and "theater" dynamic, in which *"Discord acts as the 'theater,' where actors and crew collaborate and communicate to prepare for the main event, all the while building important social bonds. AltspaceVR acts as the 'stage,' where those efforts manifest in ephemeral but high-value experiences that bring the community together."*

This multi-platform approach also represents a shift toward user-driven virtual community-building methods that support varied social contexts. As Proctor (2021, p.608) noted, *"the space of virtuality is lived across different platforms, affordances, and programs, and this results in a continuously subverting and pushing force on the spaces of affordance and programming."* This flexibility of adaptation by virtual communities makes them a resilient network evolving over time, one not confined to

individual platforms but rather opening to a multi-platform ecosystem. This reflects the flexibility and persistence necessary to sustain the Metaverse as an interconnected digital space, an issue that needs particular attention from platform owners.

5.3.5. Safety in Social VR

5.3.5.1.Diverse Perspectives on Safety, Security, and Privacy

As mentioned earlier, users were provided with various safety tools in these platforms and hosts and moderators played an important role in creating safe and secure virtual environments. However, regarding the effectiveness of safety measures in social VR platforms, participants had contrasting opinions. While some participants reported that social VR offered a safer environment compared to the social spaces in real world, others mentioned potential risks that are related to anonymity, impersonation, and the absence of physical presence in virtual worlds. This section presents these differing perspectives of users, focusing on their perceptions of safety in social interactions.

5.3.5.1.1. Social VR as a Safer Environment

Many participants believed that social VR provided a safer alternative to social interactions in real life. According to P38, VR provided a socially fulfilling atmosphere where users could freely exit interactions. P38 also noted that effective moderation contributed to making social VR a safer space overall. P11 acknowledged concerns about harassment in the Metaverse but highlighted that, in the absence of physical threat, it was relatively safer when compared to real world. Similarly, P35 valued the opportunity to engage with various people across the globe in real-time without the risks associated with physical presence. Users also valued the emotional and psychological safety that social VR provided. P24 shared a personal experience of how VR helped a person with social anxiety feel protected and empowered to leave interactions. P18 also valued the anonymity of VR interactions, allowing users to express themselves more openly without long-term consequences, reducing physical, emotional, and psychological risks.

5.3.5.1.2. Contrasting Views on Safety

While some users viewed social VR as a safer environment, others raised concerns about privacy, safety, transparency, and emotional well-being. Participants highlighted the need for stronger security measures, clearer data privacy policies, and more sensitive approaches to mental health-related interactions. Many reported that the public nature of VR, coupled with limited privacy protections, exposed them to risks not as prevalent in real-world public spaces. P15 underscored this concern, noting that personal information could be more accessible in virtual environments than at physical events.

"This is a public space, and this is a little bit more public than say a public space like for example ... were at a support event or a comedy club or a dance club out in the physical world, I can't just look at everybody and see their name up above their head." (P15)

This increased visibility, in addition to data collection and corporate oversight, made participants concerned about the transparency of data usage in social VR. P1 stated that there needs to be more clarity on what happens to the data since traces left by interactions online are permanent and that they were uncomfortable with current practices. Similarly, P14 expressed apprehension to share personal information due to concerns over corporations such as *Microsoft* and *Meta* having great access to user data. This reflects a concern about social VR platform's ability to collect non-verbal data, such as user behaviors and biometrics (Giaretta, 2022). As Zuboff (2019) argues, such platforms are often designed to extract and monetize data, where corporations usually prioritize their profit over users' well-being. This imbalance increases inequities since users have little control over their data or the policies that govern these platforms (Srnicek, 2017). Such practices highlight the dominance of surveillance and platform capitalism (Zuboff, 2019; Srnicek, 2017), in which profit is prioritized over ethics, consolidating power in the hands of a few corporations.

Emotional and psychological safety in VR was another important aspect for participants. P11 highlighted the reduced aspects of physical violence in VR but underscored the need to address emotional harm. Similarly, P4 shared concerns about potentially harmful mental health consequences of VR interactions, especially the possibility of triggering vulnerable individuals. P4 described some discussions at their

community's monthly staff meetings on how events could impact emotionally fragile participants.

"We get to the stage where we eradicated the worst kind of violence which could threaten your life now or onto the emotional violence." (P11)

"This is actually a very hot topic at the monthly ... staff meeting... In the back of your mind there's always a possibility that somebody that's vulnerable to come to one of our events, say saying goodbye and somebody could say something or share a story that triggers them." (P4)

P23 and P32 further mentioned the risks associated with mental health events. If mental health guidance is not provided by professionals, it could create a potential harm for vulnerable users. P32 noted that even though mental health events were valuable for many, they did need a regulatory approach:

"Sometimes we do mental health events too... Those events can be a little bit difficult because you want to be cautious because we're not like professional counselors or anything." (P32)

While it enables a sense of freedom, the anonymity provided by VR also introduces some safety risks. Anonymity can increase harmful behaviors, which can be more difficult to control. P40 mentioned the unpredictability of users' behavior in VR, while P23 expressed concerns for those trying to escape abusive situations: The anonymity of VR might still fall short. P24 pointed to the complexities brought by avatars and anonymity in VR. While users might feel safer behind a "mask," this could also allow negative behaviors to thrive:

"But you're also not showing your physical self, you're in a mask, you're in a costume. So, there's that too." (P24)

While anonymity is helpful in identity exploration, it might be abused by bots or users impersonating others, and this again raises concerns around identity protection and the need for robust security measures. The lack of robust biometric security in social VR platforms extends these concerns. As Maloney et al. (2020a) and Thibault and Bujic (2022, p.5) suggest, VR offers a "new sensory reality" that both amplifies identity tensions and necessitates a level of self-disclosure, such as biometric data, for

smoother user experiences. This duality of anonymity and visibility brings new complexities to the social VR: There needs to be a balance between offering freedom and protecting user identity in virtual environments.

Concerns over data breaches and unpredictable interactions adds another dimension to the perceived risk in social VR platforms. For example, P25 mentioned the dangers of doxing and other malicious activities that could extend into real life. P30 shared a personal experience where harassment in VR was extended into real-life stalking, and highlighted the potential of these virtual incidents to have tangible consequences:

"I did get harassed by people and like they got my phone number, and I was getting calls like over and over. It got really bad, and I reached out to Altspace... and they basically said, 'well, we can't do anything.'" (P30)

Moreover, P5 described the vulnerability of proprietary work to malicious actors, mentioning incidents where hackers tampered with interactive elements. P7 also recalled a significant hacking event in *AltspaceVR*, where unauthorized users disrupted events with offensive language, thus pointing out the security challenges of the platform and how such breaches had to be handled by the community.

5.3.5.1.3. Safety of Children

While social VR platforms present opportunities for social interaction and creativity, they may also pose risks for younger users and children. The safety of children in these spaces was a critical concern among the participants. Many of them expressed the need for robust safety measures to protect children from exploitation and inappropriate content. P8 emphasized the risks for children in VR, mentioning that they could easily become targets for exploitation. P8 shared an experience where they witnessed inappropriate behaviors targeting children, such as sexual touching and attempts to groom. As a result, P8 noted the potential long-term impact of such experiences on young users. P7 shared a similar observation and noted that some behaviors seemed gender-specific. They saw that a user brought young girls into private spaces and exposed them to disturbing content. P7 further detailed the collaborative steps taken by platform administrators to ban this user and emphasized the importance of monitoring in preventing harm.

Participants also discussed the existing safety measures within platforms. P5 mentioned that *AltspaceVR* included settings for mature audience and age restrictions to keep children away from accessing inappropriate content. However, they said that children could easily bypass these controls, and this highlights the need for a powerful enforcement. P15 observed that *AltspaceVR* appeared to have fewer young users than platforms like *Rec Room* and *VRChat*, where children are more prevalent. In contrast to *AltspaceVR*, several participants mentioned that public and unmoderated *VRChat* worlds were frequently populated with children, which needs further attention.

5.3.5.2.Tactics for Safety, Security, and Privacy

Users employed various practices and tactics to create a safe, private, and secure environment within *AltspaceVR*. Some of the tactics were maintaining anonymity and protecting identity, effective use of safety tools, and the role of moderation in ensuring a positive virtual experience. By adopting these approaches, users tried to make the social VR environments safer and more controlled.

Many users in *AltspaceVR* considered maintaining anonymity essential. I observed that users often viewed personal questions such as their age and hometown as "strange" or "weird." There was almost a mutual agreement and respect for each other's anonymity, and no one asked each other personal questions. To manage their identities, users employed various practices, such as using pseudonyms or employing alternative personas. Sometimes, users did it for safety reasons and other times for professional reasons. For example, P8 preferred to keep their real-life identity entirely separate from the virtual one so that no complications would arise, while P38 revealed that sometimes sharing wrong information would help to protect one's privacy. Similarly, P25 shared the importance of guarding one's identity to prevent misuse. The participant gave personal details only to trusted individuals. However, for some users, anonymity was required for different purposes, usually related to business or social standing. P35 emphasized the need for multiple VR accounts to separate professional and personal interactions. For example, P11 maintained a distinct Metaverse identity, which also had social media accounts but separate from their real-life persona. Similarly, P34 created an online persona for gaming with a fabricated background and separate social media accounts. Likewise, P26 used an online nickname and shared personal details only with close friends.

Participants also mentioned simple but effective tactics for maintaining their privacy. For example, P7 suggested using VPNs (Virtual Private Networks) for extra security. P21 pointed out the importance of protecting sensitive and private information, such as birth dates to safeguard identities further. In addition to identity management practices, participants included tactics like creating private instances to ensure safe spaces. P34 appreciated the option to create private instances to meet with friends, which helped avoid unwanted interactions. Similarly, for P7, private instances helped maintain an environment free of disrupting users, while P20 mentioned how these private settings allowed for undisturbed personal experiences.

Users also relied on existing safety tools, such as safety bubbles, the ability to leave the environment easily, and options for reporting and blocking disruptive users. Effective moderation tools and techniques were also important for maintaining a safe and respectful virtual environment. P38 noted that VR provided a sense of safety for social interactions due to the presence of moderation, while P2 emphasized the importance of having greeters and moderators to welcome newcomers, ensure proper conduct, and use tools to remove disruptive individuals from events. Similarly, P31 highlighted the effectiveness of the event system and moderator tools while managing large audiences, which allowed moderators to block or remove disruptive users. P9 shared that having at least one or two moderators at events helped handle disruptive individuals effectively.

P11, an event creator, stated that they muted everyone in their events to prevent disturbances. Also, they used the kick button to remove or warn users who were trolling or harassing others. P5 emphasized that moderators play an important role in keeping an event safe by intervening in cases of harassment and reporting abusive behavior to *AltspaceVR* for further action. P7 mentioned that moderators needed to adopt a zero-tolerance policy toward harassment, especially if it was a sexual one. P13 identified the importance of another aspect, having clear and strict community standards, emphasizing that moderatirs should agree that abusive behavior should not be tolerated.

Collectively, these insights highlight the importance of human oversight through active moderation, effective use of safety tools, and strict community standards in

fostering safe spaces. When combined, these efforts can help create a safe and engaging environment in social VR platforms.

5.4.Future of the Metaverse

While the Metaverse holds a great potential in creative expression and cultural exchange, it promises a transformative impact in different facets of life. The future of the Metaverse will have multiple dimensions, including economic, technological, legal, social, and cultural aspects. Participants, who are early adopters and creators of the Metaverse, were asked to share their insights on this matter. They emphasized aspects such as the need for robust monetization tools, advancements in hardware, integration of AR, VR, and MR, and the importance of social connectivity and community standards. These perspectives reveal both opportunities and challenges anticipated with the development of the Metaverse.

A common challenge that participants emphasized was the need for robust monetization tools to generate sustainable income. P2 noted the absence of monetization tools and effective business models as a limitation, yet expressed optimism about future economic opportunities, particularly around Web3. P2 highlighted the challenges of integrating Web3 and cryptocurrency within the Metaverse, but also stated that they hold great potential. P2 also proposed incorporating fiat currency alongside crypto could enhance economic viability, avoiding overreliance on NFTs and digital assets. Similarly, P27 stated that platforms must offer ways to make a living for creators. P27 envisioned economies within social VR platforms as essential for fostering user investment and long-term engagement.

The future of the Metaverse also rests on how hardware evolves. Most participants said that more accessibility and comfort would bring mass adoption. P22 cited that ease with user hardware would increase engagement, while P27 stressed that reducing the friction of accessing social VR experiences, worlds, and events would increase adoption. This includes creating streamlined onboarding processes and removing accessibility barriers that currently limit user access. Also, the integration of AR, VR, and MR was seen by participants as an important step towards bridging physical and virtual worlds. P2 emphasized how necessary it is to connect these technologies together for a better, smoother, immersive experience in connecting real and virtual worlds.

Participants considered the social connectivity of the Metaverse to be one of its major drivers for growth, especially for those who have limited real-world social interactions. P23 perceived the ability of the Metaverse to facilitate social bonding as central to its future growth. Besides connectivity, effective moderation and community standards were emphasized as necessary in creating positive and inclusive digital spaces. P13 stressed that effective moderation is key to maintaining a safe and welcoming community environment.

Participants also recognized the growth and creative potential of the Metaverse. For example, P11 predicted that the Metaverse could grow two to three times larger than its current scale in the future, while P8 emphasized that the Metaverse holds a unique role in extending opportunities for creativity and cultural exchange. P27 expected competition among social VR platforms to increase, with possible collaborations or mergers in adapting to economic conditions.

Legal and privacy issues also emerged as important themes in participants' narratives. P13 noted a lack of awareness about security and privacy issues in the Metaverse, expressing concerns about potential regulatory changes that could restrict online freedom of speech. P13 also added that forthcoming legal restrictions by the US Supreme Court may significantly affect VR communities and their activities, thus shaping the Metaverse's future.

Interoperability, especially cross-platform compatibility in XR, represents another critical challenge. The ultimate vision of an interconnected Metaverse faces barriers due to a lack of standardization across platforms. As also seen in the *AltspaceVR* case, currently, users experience various obstacles when transitioning between different XR ecosystems, as many virtual environments are built on proprietary systems that do not easily communicate with one another. Achieving interoperability can allow users to retain their digital identities, assets, and avatars across multiple platforms. However, this requires collaboration among tech companies, developers, and stakeholders to establish common standards and protocols.

As a result, these issues present significant obstacles to the widespread adoption and evolution of XR. Overcoming them is essential to realize a fully immersive, interconnected Metaverse.

5.5.Migration and the Social Reproduction of Virtual Space: Narratives of Virtual Diaspora

Despite rumors, the shutdown of *AltspaceVR* was unexpected. Many users had assumed that *Microsoft*'s acquisition of the platform in 2017 would secure its long-term stability. However, on January 20, 2023, at 10:42 am (PST), an official announcement titled *"AltspaceVR to Sunset the Platform on March 10, 2023"* was posted on the platform's website and shared via its official *Twitter* account. Around the same time, members of the platform received an e-mail stating:

"A fond farewell: We have some sad news to share, Altspacers. Our run in the sun is coming to an end. AltspaceVR is shutting down on Friday, March 10, 2023." (AltspaceVR)

While platform shutdowns are often framed as technical or business decisions, the closure of *AltspaceVR* revelated its deeper social and cultural ramifications. It provided a unique opportunity to investigate how virtual communities negotiated the loss of their virtual space and adapted and migrating to other platforms in the Metaverse. As one of the pioneering platforms in social VR, the shutdown of *AltspaceVR*'s underlined some critical aspects of media migration and virtual diaspora, showing how virtual communities respond to disruption and displacement. Migration from *AltspaceVR* to other platforms demonstrates the interrelated processes of social production and reproduction. The closure of *AltspaceVR* disrupted established community spaces and forced users and creators to preserve and reproduce their virtual worlds, assets, and community practices on platforms like *VRChat* and *Spatial*. This was not only an effort to save identity, shared cultures, and social bonds of the community, but also to reimagine and adapt them within new platforms.

Lefebvre's (1991) theory of social reproduction provides a valuable lens to understand this process. Social reproduction occurs in practices such as maintaining rituals, reproducing spatial layouts, and creating networks that mirror past relations. *AltspaceVR* users preserved avatars, recreated shared worlds, built community groups, and and maintained cultural rituals and norms in new platforms. These practices reflect

the interplay between continuity and adaptation in sustaining communities during migration.

The shutdown of *AltspaceVR* became more than a simple closure of the digital platform; it was a human experience. The platform had developed a sense of belonging, connection, and identity in its users, which was disrupted when the platform was closed. As users and creators started migrating to new platforms, they began rebuilding their communities. This migration echoed themes of virtual diaspora (Boelstorff, 2018), involving forced displacement, reformation of communities, and cultural preservation. *AltspaceVR*, was a "placeless" yet virtually significant space for its communities, making it an example of a diasporic virtual community.

The communities of *AltspaceVR* also took the form of Anderson's (2006) "imagined community." As users migrated to new platforms, they carried with them the shared experiences, cultural practices, and symbols that formed their collective identity. Participants argued that the loss and dislocation experienced upon the closure of the platform paralleled the loss of a "home." However, users demonstrated resilience by preserving digital artifacts, shared narratives, and social practices, demonstrating how an imagined community is able to sustain its collective identity across platforms. This complex process is a parallel to migration themes in physical contexts: Migrants make their way through social, cultural, and economic dynamics in new environments, all while continuing to maintain ties to the original cultural practices and community bonds.

This chapter explores these themes by exploring how practices intertwined with *AltspaceVR*'s culture, norms, rituals, and interactions were internalized, preserved, transformed, and reproduced on new platforms. "Understanding the Shutdown: Key Factors and Community Insights," part explores the reasons behind *AltspaceVR*'s closure, including technical, business, and strategic factors, while demonstrating community responses and user-proposed solutions to avoid the shutdown.

In the "Impact of the Closure: The Platform's Final Month," the focus is on the increased activity during *AltspaceVR*'s final days, the emotional responses of its users, and the significance of farewell events in expressing community identity. This leads

into “End of the World: The Shutdown of *AltspaceVR*” section, which reflects on the platform’s final moments, offering a detailed narrative of how users experienced the end of the platform. Following the shutdown, “Post-closure and Adaptation: Virtual Diaspora and Narratives of Migration” section examines how *AltspaceVR* users migrated to new platforms, navigated adaptation challenges, and reproduced their communities, preserving and reshaping their cultural identities in the process. Lastly, “Reflections and Key Lessons from the Shutdown of *AltspaceVR*” reflects upon community resilience, the implications of dependency on a single platform, and broader lessons for social VR platforms in creating sustainable communities.

5.5.1. Understanding the Shutdown: Key Factors and Community Insights

AltspaceVR’s shutdown represented a forced migration, as the platform’s closure left users and creators with no other option. This involuntary displacement was driven by the short-notice announcement of the shutdown, which was announced only weeks before its closure. While platforms like *VRChat* presented appealing “pull factors” such as enhanced technical features, vibrant social opportunities, and a dynamic user base, the migration itself was not voluntary; it was a direct response to the loss of *AltspaceVR*.

The closure forced users and creators to find alternative platforms to preserve their social networks, digital identities, and cultural practices. However, Boellstorff’s (2008, pp.197-198) discussion of *“lesser forms of virtual diaspora”* is also relevant in this context. While the shutdown of *AltspaceVR* forced users to migrate, its outdated features and low user base acted as a push factor that triggered the migration. Lange (2022, p.96) notes how declining popularity in virtual platforms often drives participants to migrate, carrying their social connections with them. However, in the case of *AltspaceVR*, the migration was not a response to declining features or engagement but a sudden closure that displaced communities. Therefore, although some users embraced the opportunities provided by alternative platforms like *VRChat*, *AltspaceVR* users were left with no choice but to transition elsewhere.

Understanding the reasons behind the platform’s shutdown can shed light on the push and pull dynamics in social VR platforms. Based on participant insights, five key

factors contributed to *AltspaceVR*'s closure: Its relatively low popularity, lack of monetization, ongoing technical challenges, strategic shifs in business priorities of *Microsoft*, and increasing competition from other social VR platforms.

Among the main reasons participants pointed out for the shutdown of *AltspaceVR* was its relatively low popularity compared to other platforms. P3 noted that while the platform maintained good standards in terms of user experience and usability, it lacked the broad appeal needed for growth and struggled with low user numbers. This, in turn, limited its ability to compete with more popular social VR platforms. In general, *AltspaceVR* was perceived as having a smaller user base compared to other social VR platforms like *VRChat*, and the user numbers confirmed this view. According to the Q4 2023 Metaverse Universe report by the *Metaverse Consulting Company* (2023), *VRChat* had 20 million monthly active users (MAUs), while *AltspaceVR* had just 1.2 million MAUs shortly before its closure. These numbers highlighted *VRChat's* significantly larger user base.

Also, P19 noted that competition with *Horizon Worlds* resulted in a decrease in attention to *AltspaceVR*. Additionally, P24 observed that post-pandemic shifts contributed to a decline in user engagement on *AltspaceVR*, as people returned to real-life activities and overall VR usage decreased. This aligns with my own observations, where user activity on *AltspaceVR* increased during the pandemic but began to decrease again in the post-pandemic period. However, this decline was not observed across all social VR platforms. For example, *VRChat* maintained and even increased its user base post-pandemic. This suggests that *AltspaceVR*'s challenges were more platform-specific rather than broader occasions.

Monetization issues were considered another key factor for the shutdown of *AltspaceVR*. P3 mentioned that the platform wasn't generating enough revenue to sustain its operators due to a lack of advertisement options and events with business purposes. Similarly, P15 stated that the platform didn't establish corporate partnerships or develop structured efforts to commercialize the platform. Agreeing with P3 and P15, P16 further noted that *Microsoft*'s funding for *AltspaceVR* was not enough to grow or sustain the platform. While *AltspaceVR* had the technical potential to improve its features, financial investment in the company was not enough.

Therefore, users and creators identified resource allocation as an important factor behind the platform's closure.

AltspaceVR could not compete with other social VR platforms which had more sustainable monetization strategies. For example, *VRChat* has a "Creator Economy," which allows users to create and sell virtual assets such as custom avatars, worlds, and accessories. By allowing creators to profit from their work, *VRChat* encourages creativity in its community and creates a profitable monetization model. Similarly, *Meta*'s *Horizon Worlds* benefits from being part of a well-funded ecosystem, with integrated monetization initiatives that support its long-term growth. In contrast, *AltspaceVR* relied on a free-to-use model with no opportunity for users to make in-app purchases or subscribe to premium services. Therefore, the lack of a monetization strategy constrained its ability to generate revenue.

Ongoing technical problems and the effects of new updates were also seen as significant factors contributing to *AltspaceVR*'s shutdown. P34 mentioned that many favorite virtual worlds became unusable due to updates that broke their functionality. Some creators, like P20, stated that they spent a significant amount of time to fix the issues caused by these updates, which broke their worlds more than once. During my observations, I saw broken features in many popular worlds, including missing textures, disappearing objects, and malfunctioning interactive elements. P25 pointed out persistent bugs and glitches, noting that the platform had not received "necessary" updates in years, which led many users to abandon it.

P30 criticized *Microsoft*'s decision to move everything to the Universal Render Pipeline (URP). Following this update, they observed a decline in platform support and an increasing number of unresolved issues. For example, P30 observed that some key features were removed, such as the *Campfire* community hub. Additionally, P22 pointed out that *Microsoft*'s implementation of a secure login system created onboarding barriers for users, and the challenges of integrating *AltspaceVR* into *Microsoft*'s broader ecosystem made it difficult to attract new users.[39] Overall, most participants stated that *Microsoft* didn't make the necessary investments

[39] These issues were addressed in the "Perceived Challenges" section in detail.

to develop the platform, and in some cases, updates made the experience worse, which further contributed to *AltspaceVR*'s closure.

Microsoft's strategic shift in business priorities was also seen as a key factor in the platform's shutdown. The closure followed shortly after *Microsoft* laid off 10,000 employees, which affected several teams working on VR-related projects. As a result, many viewed *AltspaceVR*'s shutdown as part of these broader cost-cutting measures and a shift *Microsoft*'s strategic focus. I fact, *Microsoft* officially announced that they had shifted their focus to business applications for VR, specifically *"immersive experiences powered by Microsoft Mesh." Microsoft Mesh*, which was designed to connect workplaces and facilitate remote collaboration, was first introduced in *AltspaceVR* during the 2021 *Microsoft Ignite* event.[40] The public preview became available in October 2023, even months after *AltspaceVR*'s closure, with a new integration of *Teams*, signaling *Microsoft*'s shift toward more business-focused applications.

P13 stated that *Microsoft Mesh* couldn't compansate with the social needs of *AltspaceVR* users because it was a business-focused platform. Agreeing with P13, P15 noted that *Microsoft Mesh* was designed for workplace collaboration, not for social interaction. P18 pointed out that *Microsoft*'s decision to lay off the entire MR team, which impacted both *AltspaceVR* and *HoloLens*, left users and developers disappointed. P24 also mentioned significant turnover within *Microsoft*'s MR division.

Many participants expressed the feeling of betrayal towards *Microsoft*. They felt that financial and strategic gains had prevailed over the social and emotional outcomes of the *AltspaceVR* community. Many users like P9 stated that *Microsoft* underestimated the value of *AltspaceVR* as a social platform. Similarly, P21 viewed the shutdown as a cold business decision with little consideration for the community and criticized the way *Microsoft* handled the process. P7 recalled how *Microsoft* had engaged with the community through town halls and meetups when it first acquired the platform, giving the impression the platform was secure, to "abandon it" later.

[40] The Microsoft Ignite (2021) event held on *AltspaceVR* can be watched through the following link: https://www.youtube.com/watch?v=uErR_3kmRUM.

Some users like P30 speculated that *Microsoft*'s goal in acquiring *AltspaceVR* was to repurpose its technology for *Microsoft Mesh*. This speculation was reinforced by the noticeable similarities between the two platforms, which also led some users to view *Microsoft Mesh* as a potential *AltspaceVR 2.0*. Users shared numerous posts on *Facebook* and *Discord*, demonstrating the similarities between these two platforms, which further fueled this speculation. The migration literature often references the "return myth," where migrants construct narratives of returning to their homeland (Lange, 2022, p.93). While *AltspaceVR* users lacked a platform to return to, discussions about *Microsoft Mesh* as *AltspaceVR 2.0* reflect the persistence of this myth in a virtual context. However, based on my observations, users and creators did not embrace this new platform. Instead, they migrated to various platforms and actively worked to recreate familiar experiences to establish a sense of "home." In my opinion, *Microsoft*'s shift toward workplace applications like *Mesh* reflects its move away from social VR platforms. The acquisition of *ChatGPT* further illustrates this shift as *Microsoft* invests in AI technologies to enhance its business operations.

5.5.1.1.Alternative Solutions to Shutdown

Many participants believed that there were alternative solutions to shutting down *AltspaceVR*, such as creating new monetization channels, selling the platform to another company, or making it open source. P2 suggested that a different company could take over and manage the platform, while P18 proposed selling it back to the original creator or downsizing operations to reduce costs. P39 argued that making the platform open source upon shutdown would have allowed others to continue its development. The idea of making *AltspaceVR* open source became a major point of discussion among the community, with many members criticizing *Microsoft* for not pursuing this option.

I interviewed Gavan Wilhite, one of the founders of *AltspaceVR*, who highlighted some key considerations regarding alternatives to the shutdown of the platform. Wilhite emphasized the potential benefits of adopting a Public Benefit Corporation (PBC) structure for platforms like *AltspaceVR*. According to Wilhite, a PBC offers both legal protection and flexibility to companies to focus on sustainability and user benefits rather than profit maximization, which could mitigate challenges

associated with acquisitions and shutdowns. Wilhite also emphasized that one of the missed opportunities during the closure of *AltspaceVR*'s was the lack of a comprehensive social graph export feature. While it was possible to download a CSV (Comma Separated Values) file of friends list, there was no built-in tool to help users reconnect on other platforms. He suggested that future platforms should focus on make transitions seamless for users.

Regarding the possibility of making *AltspaceVR* open-source, Wilhite stated no regret for not pursuing this option before handing the platform over to *Microsoft*. He explained that open sourcing such a complex platform would have been extremely difficult; it would have slowed the development and required substantial engineering resources. The platform's reliance on proprietary components, particularly in the back-end systems, would have further complicated the process. While open sourcing some parts of the platform could have benefited the broader VR ecosystem, Wilhite felt it would not have provided meaningful continuity for *AltspaceVR* or its community. Wilhite also stated that maintaining platforms like *AltspaceVR* after financial support ends would be difficult, as it would have required ongoing resources and highly paid engineering talent. Ultimately, Wilhite emphasized the importance of adopting sustainable business models like PBCs, providing social graph export features, and recognizing the complexities of open-sourcing large-scale platforms.

In the end, despite potential alternatives, no measures were implemented, and *AltspaceVR* was ultimately shut down, marking the closure of a pioneering platform and leaving its community to navigate the challenges of transitioning to new social VR platforms.

5.5.2. Impact of the Shutdown: The Platform's Final Month

Following the official announcement of the shutdown, I observed an increased user activity on *AltspaceVR*. Farewell events multiplied, world tours increased, and the number of active users in both events and worlds began to rise. Users gathered in their favorite spaces to take photos and collect memories before they disappeared. Some former users who hadn't been on *AltspaceVR* for a long time became active again to spend their last days on the platform. Even social VR users who had never

previously used *AltspaceVR* joined the platform to experience it before it shut down. One of the creators of the official virtual *Burning Man Festival*, who organized the final reburn event on *AltspaceVR*, confirmed my observations with these words:

"We had so many people come to reburn that had never been on Altspace before because they heard it was sunsetting. Tons of people ran in. Our greeters were saying like every fifth or sixth person was somebody new who had never been there, that heard it was being sunset, and they wanted to see what they were getting ready to miss forever."[41]

The final month of *AltspaceVR* was marked by somber moments. I observed that the initial reactions of many communities focused on saving the platform. Some thought that if they raised their voices enough, they might be able to change the decision. To save *AltspaceVR*, users launched petitions on *Change.org* (see *Figure 5.82*).



SAVE AltSpaceVR from CLOSURE — Protect our community ❤️

Figure 5.82 A *Change.org* petition, calling for the preservation of *AltspaceVR*.

Additionally, several events and gatherings were organized to protest the decision. *Figure 5.83* illustrates a group of users protesting at the *Campfire*, who refused to leave the platform. Written messages displayed in the image, such as "Try

[41] I chose not to assign a participant number to this quote to protect the participant's identity.

and make me go!" and "Hell no! We won't go!" capture the spirit of resistance among users as they asserted their "rights" to remain on the platform and preserve their virtual community.



Figure 5.83 A group of users protesting at the *Campfire*, claiming that they refuse to leave *AltspaceVR*.

Communities that had formed on the platform throughout the years organized their final events, which took on various themes, with some being labeled as "end of the world" (see *Figure 5.84*) or "commemorations." The common theme of these events was a farewell to the platform; users came together to share their stories and say goodbye to the worlds that had become a significant part of their lives.



Figure 5.84 The poster of *End of the World Event* in *AltspaceVR*.

AltspaceVR's official closure announcement featured a sunset image (see *Figure 5.85*), symbolizing the platform's shutdown, which was referred to as "sunsetting."

The sunset became more than just a symbol of closure; it evolved into a ritualized farewell to *AltspaceVR*. Many farewell events adopted this theme as part of their final gatherings.

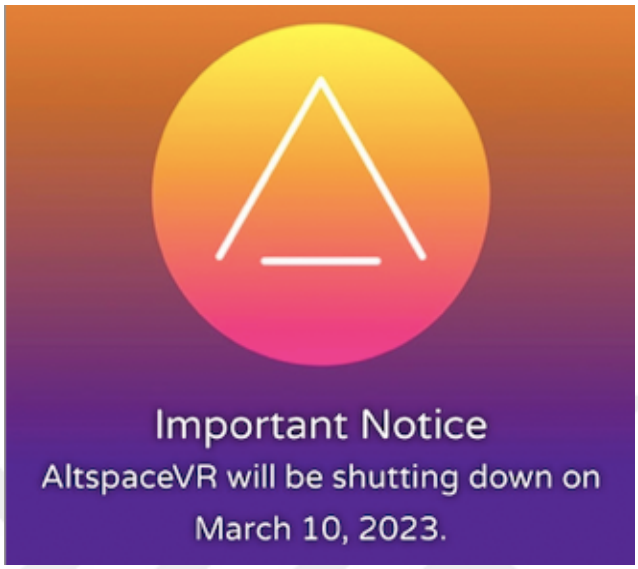


Figure 5.85 *AltspaceVR*'s official announcement poster, depicting a sunset as a symbolic representation of its closure.

As part of this ritualized theme, "floating off into the sunset" became a popular way to say goodbye to the platform (see *Figure 5.86*). Many farewell events incorporated a sunset-themed skybox, where participants symbolically floated into the sunset as a gesture of goodbye. On January 29, 2023, a creator hosted a farewell event on a platform floating in the sky, with a sunset view. As users shared their memories and farewells, the host conducted interviews and captured each attendee's reflections on what *AltspaceVR* had meant to them. Users shared their thoughts, and this event was recorded for a *YouTube* video.[42] After the interviews, the host invited everyone to "float off into the sunset," symbolically taking their leave from the platform (see *Figure 5.87*). As they floated off into the sunset, I heard that many became emotional and shed tears.

[42] This video was never published on *YouTube*, or if it was, I could not find it.

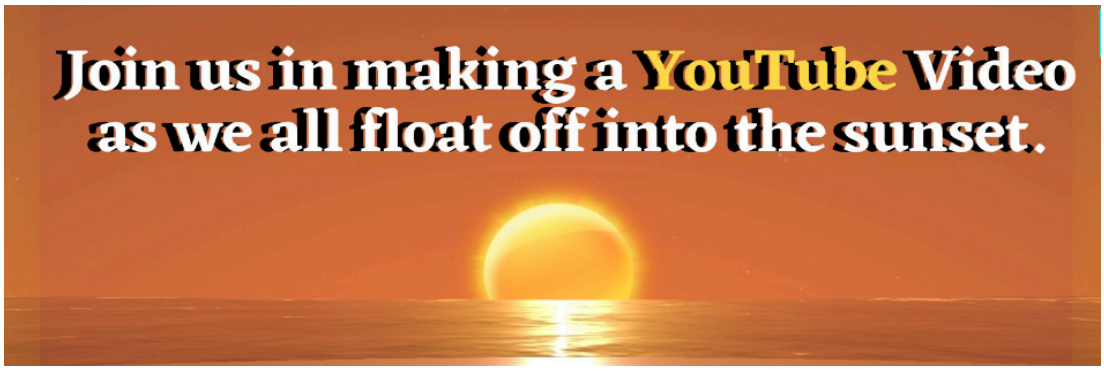


Figure 5.86 A farewell event in *AltspaceVR*, set against a sunset skybox, symbolizing the platform's final moments as users floated off into the sunset.



Figure 5.87 Users floating off into the sunset during a farewell event to say goodbye to *AltspaceVR*.

At certain events, users placed their old robot *AltspaceVR* avatars in coffins, symbolizing their goodbye to the platform (see *Figure 5.88*). In one event, users created a tombstone for *AltspaceVR*, complete with a crying NPC beside it and farewell messages inscribed on the gravestone (see *Figure 5.89*): *"…you have been a great community space for us, a home…where we made friends, shared stories and worries…where we could come and have fun… you will be dearly missed."*



Figure 5.88 A farewell event showcasing *AltspaceVR*'s old robot avatars placed in a coffin.



Figure 5.89 A gravestone for *AltspaceVR* featured at a farewell event, accompanied by a crying NPC and inscribed with farewell messages.

I asked users' and creators' thoughts on the shutdown during the interviews. I found that the effects of the shutdown encompassed emotional, social, and practical impacts on users and communities, including a deep sense of loss, challenges in preserving digital assets and maintaining connections, and efforts to adapt to new platforms. Users and creators experienced a range of emotions, including sadness, frustration, anger, grief, acceptance, excitement and hope, as they cope with the shutdown of *AltspaceVR* and the transition to new platforms. Many of them expressed

a deep *"sense of loss,"* comparing the closure to losing a *"beloved home"* or community. The emotional attachment to the platform were profound. P6 likened it to having their home *"bulldozed,"* describing it as a *"mental loss"* and emphasizing the sadness of losing a space that "*felt like home."* P2 and P37 noted that many in the community felt genuinely lost, with P7 explaining that for some, *AltspaceVR* was their *"entire social life."* P32 shared that their friendships and focus were centered entirely on the platform. Similarly, P30 and P10 mentioned that they cried because of the closure, with P30 comparing the experience to transitioning between technologies but struggling to find peace due to their friends' distress. P5 and P4 also pointed out the common saddness, as many of them were worried about the future. The emotional loss and sense of displacement following *AltspaceVR*'s shutdown mirror the loss of a home, as described by Anderson (2006).

There were almost two months between the announcement of *AltspaceVR*'s closure and the actual shutdown of the platform. During this time, while some users spent their final weeks on *AltspaceVR*, others began exploring alternative platforms for their transition. I observed that users and creators evaluated various options, including *VRChat, Engage, Spatial, Horizon Worlds, Rec Room*, *Banter,* and *UtopiaVR*. In choosing which platform to transition to, they primarily considered the needs of their communities, the ability to recreate similar experiences, and the platforms' affordances, such as event creation and moderation tools. Since *AltspaceVR* had an event-based community, each group focused on keeping their events alive as they migrated to new platforms. Many users expressed concerns about the challenges of moving to platforms that lacked *AltspaceVR*'s robust event management features. Platforms like *VRChat*, *Spatial*, and *Engage*, though offering unique experiences, posed difficulties for organizing and discovering events due to limited tools or associated costs.

The announcement of the platform's closure triggered anxiety about the fragmentation of established communities. I observed that this uncertainty about where to go next and how to maintain communities concerned the community creators. There was a fear of losing connections and the sense of belonging. P6 and P24 mentioned the loss of a unified *AltspaceVR* community, as different user circles moved to various platforms. Similarly, P29 observed how communities were fragmenting, with users

suggesting different platforms to go, which would further disperse the user base. P5 highlighted the challenge of rebuilding an audience for their events, noting that not all their current followers were transitioning to the same platform. P2 likened losing *AltspaceVR* to losing a sense of community and identity as follows:

"I think a lot of people feel lost. They're getting ready to lose their identity. A lot of people identify themselves as a member of the Altspace community. This is a bad example. But it would be like the church, like the Catholic Church. All of a sudden, you know, we're not going to do this anymore. 2000 years is plenty. Forget it. We're just gonna shut down the entire church system globally. People would freak out and be completely lost. Their sense of community came from the events that they went to associated with their church. And that would all be gone. And that's what's happening, going to events, to be with people, whether it's meditations or concerts or comedy shows or film festivals or Burning Man. People came together from all over the world to have a sense of community. To feel like they're a part of the whole. Altspace being sunsetted takes that away and I guarantee the people that made that decision have never been on the platform. I don't know that for a fact. But I feel that, they looked at numbers on a spreadsheet and that's all." (P2)

Loss, grief, sadness, anger, and anxiety were not the only emotions users expressed. Some shared optimism about continuing their social bonds despite the closure. P5 and P24 emphasized that the friendships and social networks built on *AltspaceVR* would endure across other platforms. P26 shared that their group had already established itself on *VRChat*. Similarly, P5 mentioned the concept of an *"Altspace family,"* which they planned to recreate on platforms like *VRChat* and *Spatial*. P23 felt encouraged by the supportive communities being formed on new platforms. While users like P26 were saddened by the closure, they continued moving forward. P11 and P19 expressed excitement about going to new platforms and building fresh communities; they saw it as an opportunity to meet new people and explore different parts of the Metaverse. Similarly, P3 highlighted the need to expand and create new communities based on the principles they learned in *AltspaceVR*.

As Gavan Wilhite mentioned, *AltspaceVR* lacked a social graph export feature. While users could download their friends' profile data, this didn't help them reconnect on other platforms. Therefore, users adopted new tactics to rebuild their communities,

using tools like social media, *Discord*, and other external tools to stay connected. During farewell-themed events held before the shutdown, interactive boards were created where users could inscribe their user IDs from various platforms (including social VR platforms, *Meta* accounts, and *Discord*) to stay in touch after the shutdown. A creator even built a world specifically for this purpose on *AltspaceVR*, displaying the poignant message: *"The People Behind the Avatar"* (see *Figure 5.90*). This message echoed the sentiment, *"Behind every avatar, there is a real person,"* which became a popular phrase of the closure. It was frequently repeated at various events and mentioned by my participants in interviews. P33 pointed out the "irony" of this phrase, which was originally coined by *Microsoft*:

"'Behind every avatar, there is a human being.' Microsoft said it. When you entered upon the first time, that's what they wrote: 'Remember, behind each other there is a human being.' And it's signed by Microsoft, permanently they forgot about." (P33)



Figure 5.90 A world in *AltspaceVR* designed to help users share their IDs across different platforms, emphasizing "the people behind avatars."

Not only were social connections and community bonds at risk, but users and creators also faced the potential loss of their avatars, worlds, and other digital assets in *AltspaceVR*. *Microsoft* announced that users could download their data before the shutdown. In response, many attempted to preserve their avatars, worlds, and other digital assets as they transitioned to new platforms. However, there were significant limitations.

A key concern among creators was that those who didn't use *Unity* to develop their worlds or assets were unable to export or transfer them to other platforms. P21 noted that having *Unity* templates allowed them to transfer their worlds, if necessary, while P6 expressed frustration at only being able to save parts of their show, rather than the entire world. Meanwhile, P40 chose to record videos of their template-based worlds so that they could use them as a reference to build again. The inability to preserve virtual worlds and assets limited creators' control over their own work and disrupted the virtual communities that had used these spaces for social interaction. P20 added that they refrained to transfer non-template-based worlds to show respect for the original creators.

Avatars, the visual representations of users, could not be transferred to other platforms, and this raised concerns among users. Many users wanted to preserve their *AltspaceVR* avatars because they considered them as important parts of their virtual identity. P7 emphasized that avatars were extensions of their identities; trying to save them was equal to protecting their identities. Users and creators frequently discussed issues of intellectual property and who owns the avatars; *AltspaceVR* had claims over the avatars, and it was tricky to preserve and transfer them to other platforms.

Community leaders and experienced creators played an important role throughout the transition process, where *AltspaceVR*'s collaborative culture became more apparent. They helped users to preserve and transfer their worlds, assets, avatars. A creator developed a website that allowed *AltspaceVR* users to preserve their avatars by downloading them into *Ready Player Me* formats, which are compatible with various virtual platforms like *VRChat* (see *Figure 5.91*). This enabled users to maintain their avatars as they transitioned to new platforms that support *Ready Player Me* avatars. Despite these efforts, it was sometimes impossible to preserve the avatars fully. P34 described the challenges of preserving their avatar to use on platforms like *VRChat* because of technical issues such as missing hair colors or accessories.

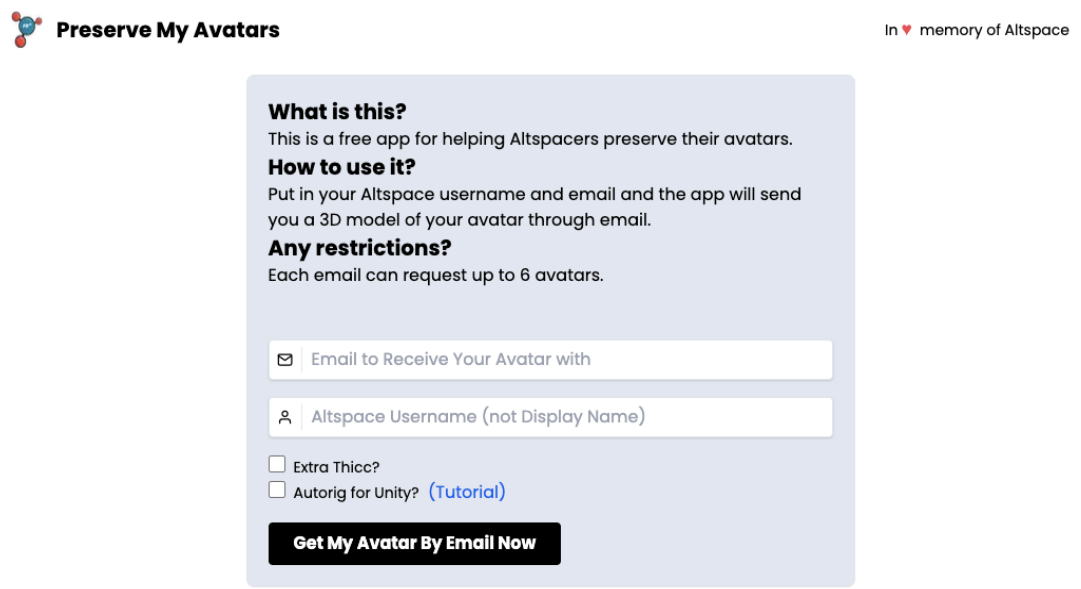


Figure 5.91 A website developed to help *AltspaceVR* users preserve their avatars.

Community leaders and creators also made efforts to preserve worlds and kits. They conducted survey polls during their final events to gather insights on where users were planning to go. Based on this information, they organized instructional events spanning other platforms like *VRChat*. They also established discussion channels in *Discord* and on *Facebook*. They also created informational videos and uploaded them to *YouTube*.

Discord became the central platform of communication and support during this process. Users formed groups on *Discord* like "Altspacers in VRChat," where they provided support during the transition, guided less experienced users, and participated in community-driven discussions. P9 noted that *Discord* was especially useful for tracking community movement across platforms, while P4 expressed relief in knowing that their friendships would remain through other communication platforms like *Discord*, despite *AltspaceVR*'s closure.

"Well, the other thing too, because we're so connected on Discord and other things, I don't see myself losing any friends, and so I'm glad that we have other ways outside of Altspace to communicate." (P4)

While farewell events reflected the emotional bonds that users had formed with the platform, data preservation efforts demonstrated the community's resilience and

adaptability. These efforts highlighted the role of strong community bonds in *AltspaceVR.* As demonstrated with the examples above, users and creators joined forces to re-establish their communities in new platforms. Preserving *AltspaceVR* avatars to be used in *VRChat* provides as a clear example of this continuity, as avatars enabled users to maintain the *AltspaceVR* experience on a different platform. Echoing Proctor (2021), this also exemplifies that digital communities find ways to implement creative tactics- like preserving visual identities- through external tools, even they when they are not allowed to do so.

The preservation of avatars symbolized users' refusal to let go of the virtual identities they had formed within *AltspaceVR*, where their avatars served as unique markers of recognition and belonging. From the perspective of lived space, these tactics can be read as a form of resistance against the constraints imposed by the platform. This mirrors real-world resistance movements, as described by Lefebvre (1996) in *Right to the City,* where communities resist external forces that seek to erase or control their identity, culture, or spatial existence. Through the development of creative tactics for preserving their avatars and digital assets in response to platform strategies, users extended their lived space beyond the platform's closure. Through the lens of Lefebvre's spatial theory, these acts of avatar preservation represent a form of spatial resistance- an affirmation of the lived space in opposition to the conceived space of corporate decisions.

The efforts of *AltspaceVR* users to preserve avatars, worlds, and traditions can also be seen as a metaphorical struggle against the apocalypse. Conceived within the contexts of dystopian narratives, themes of survival in a post-apocalyptic world are carried by the survivors confronting the collapse of their world and trying to rebuild what has been lost in *AltspaceVR*. This process shifts between the despair of a dystopian loss- marked by the fragmentation of community bonds, disruption of cultural practices, and dissolving of familiar environments- and the hope of utopian renewal as users embrace the chance to reimagine their communities in new platforms. Similar to characters in dystopic movies, users mourned the sense of loss while crafted new opportunities. This dynamic depicts tensions between loss and renewal, reflecting how users negotiate the challenges of displacement to construct a good future.

5.5.3. End of the World: The Shutdown of *AltspaceVR*

On March 10th, 2023, at 11.08 am (PST), *AltspaceVR* shut down, and I was there to witness its last moments with the community. During its final hours, I logged onto the platform and spent time interacting with, listening to, and observing users as they said their goodbyes. Several communities organized final events, and over 500 users were online during the final moments. Throughout the last day, I attended multiple farewell events, but in the final moments, I was at the *Zengarden*, *EvolVR*'s meditation space, which was the most crowded event with over 200 participants. Due to space limitations, it wasn't possible to see avatars in different instances, but users expressed their presence through emojis floating above their heads (see *Figure 5.92*). Prominent event hosts and world developers who had contributed to the platform's growth over the years delivered emotional speeches, with some even shed tears as they spoke. Toward the end, the leader of *EvolVR* community invited everyone to join in a collective hug. Close friends embraced and expressed how much they would miss each other.

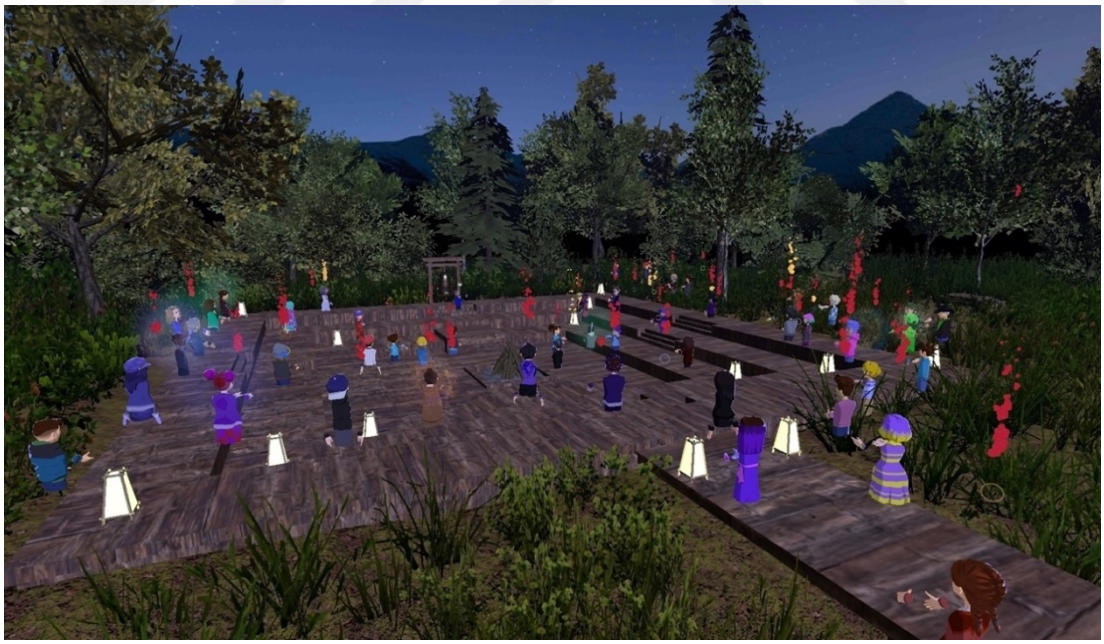


Figure 5.92 The final event at *Zengarden* in *AltspaceVR*, showcasing the emojis of all attendees.

The platform's closure took a few minutes longer than expected. During this time, there was a silence, but I could hear the sobs of users who were crying. Everyone was curious about how the world would end. Would we suddenly disappear? Would the world slowly dissolve around us? Would we be removed from the platform? In my

own experience, users in the world began to disappear one by one. Eventually, we were all ejected from the world and saw this message on our screens: *"Teleport failed. I want to, but I just can't let you into that space."*[43] I attempted to return to the main menu and re-enter *Zengarden*, but I couldn't. Even access to my home space was denied. I couldn't log out either, so I had to shut down and restart my headset. That was the end of the world. The virtual spaces where users had gathered, coexisted, and shared experiences were erased. However, new beginnings awaited, because some of these worlds were about to be reborn on new platforms.

5.5.4. Transition and Adaptation: Virtual Diaspora and Narratives of Migration

After *AltspaceVR* shut down, communities transitioned in different ways. While many tried to recreate their events and worlds on new platforms, they faced challenges finding alternatives that offered similar experiences. Based on my long-term observations on the different social VR platforms, related *Discord* channels, *Facebook* groups, and participant responses, many Altspacers migrated to platforms like *VRChat, Engage,* and *Spatial*. However, these platforms lacked the specific features that made *AltspaceVR* unique for some users.

Users encountered technical and social challenges, as well as steep learning curves as they adapted to new platforms that didn't offer the tools that they were used to in *AltspaceVR*. P17 and P20 acknowledged the need to learn new skills, such as building and scripting to adapt new platforms like *VRChat*. P6 and P5 noted difficulties in finding a platform that could replicate all the functionalities of *AltspaceVR*, with P5 specifically highlighting the absence of equivalent moderation tools. P2 noted that none of the alternatives, including *VRChat, Spatial,* or *Engage,* provided a comprehensive event back-end. P12 and P22 emphasized the importance of choosing a platform with a low barrier to entry to encourage event participation, while P9 found organizing events in *VRChat* challenging without an established group. P32 noted that *VRChat*, with its more open and public design, presented a steep learning curve.

[43] The video in the following link captures the last day on *AltspaceVR*, featuring various events and including my personal experience at *Zengarden* during its final moments: https://www.youtube.com/watch?v=u4pozKX23LU.

AltspaceVR's event-based focus and robust moderation tools were key elements that were difficult to replicate. While *VRChat* offered greater creative freedom with robust world-building tools and a larger user base, it posed challenges in areas like moderation and event management. The social dynamics and norms also varied across platforms; it thus required users to adapt and rebuild their communities while navigating different cultural expectations across different platforms.

Although it had its shortcomings, *VRChat* was the most frequently mentioned platform for migration, and a year and a half after the shutdown of *AltspaceVR*, it still hosts many former Altspacers. After the closure, I continued to observe numerous communities as they transitioned to *VRChat*, aiming to understand how they adapted to the new platform. Several users and creators identified that the social dynamics of *VRChat* differed from *AltspaceVR* and presented both challenges and opportunities. P4 described transitioning *AltspaceVR* to *VRChat* as equilavent to moving from one country to another. This again suggests that users were not simply experiencing technical challenges but also learning entirely new social environments in which the norms and behaviors varied from those they had used in *AltspaceVR*.

"Leaving Altspace and going to VRChat is like going from the America to Japan because the social norms and the things over there are just going to be different and we'll create our own like, we have to rebuild those from scratch basically, based on what the platform will allow us to be able to do. And so, I think that's interesting. I think there is VR in general social things, social cues and communication. But I think within VR, within the different platforms, there's even like a subcategory of what's normal and expected there. It is very much like that's like physically we're just moving to a different country, we're still altogether, we are just going to be someplace new... And the best way to do it is, you know, I'm just so glad that we have each other and that we're going to have each other there. But it's going to be very interesting to see what social cues we keep and which ones we lose. Maybe we will." (P4)

Altspacers built "AltspaceVR Memories" and "Altspacers in VRChat" groups, which still remain active on *Facebook*, with members regularly sharing their memories and experiences from *AltspaceVR*. A year and a half after the shutdown, a former *AltspaceVR* user expressed their feelings in the "Altspacers in VRChat" group (see

Figure 5.93), reflecting that they were still having difficulty adapting to the new social dynamics in *VRChat*.



Figure 5.93 A former Altspacer expressing their feelings in the "Altspacers in VRChat" *Facebook* group following the shutdown.

Another common complaint was *VRChat*'s poor compatibility with *Quest* devices, which frequently caused motion sickness. *AltspaceVR* was a fully *Quest*-compatible platform with many users accessing it via *Quest* devices. In contrast, *VRChat* performed better on PCVR and provided a more immersive experience for those with higher-end headset setups. In addition, *VRChat*'s user ranking system posed challenges for users and creators transitioning from *AltspaceVR*. The platform has a paid membership program (*VRChat Plus*) that provide additional features. However, this program classifies users based on their time and experience within the platform. *Figure 5.94* illustrates a world builder's class in *AltspaceVR*, describing the ranking system in *VRChat*. In *VRChat*, "visitors" and "new users" start with restricted permissions, and without spending a substantial time on the platform, they can't reach "trusted user" status. This feature limits newcomers' participation in *VRChat*. For this reason, many Altspacers couldn't upload their worlds to *VRChat*, and they were required more engagement before unlocking its full potential.



Figure 5.94 A world builder describing the ranking system of *VRChat* in *AltspaceVR*.

I also observed that *VRChat* could be challenging for newcomers in terms of avatar creation. I noticed that one of the common help topics discussed in *Discord* groups of Altspacers centered around creating avatars in *VRChat*. Although it offers advanced customization tools, the variety of options makes the platform feel overwhelming for some users. Some users created new avatars with the help of experienced creators, while others brought their *AltspaceVR* avatars into *VRChat*. *Figure 5.95* and *Figure 5.96* illustrate a mix of avatars saved from *AltspaceVR,* which didn't have legs, alongside avatars of *VRChat* in *VRChat*.



Figure 5.95 *AltspaceVR* avatars in *VRChat* 1.



Figure 5.96 *AltspaceVR* avatars in *VRChat* 2.

An important finding of this study was how users migrating to other platforms identified themselves. I found that a significant number of users transitioning from *AltspaceVR* to other platforms began identifying themselves as "refugees." Through farewell videos and events announcing participants' departures, I also explored those users viewed their move to other platforms as a "migration" away from *AltspaceVR*. P11 and P17 described the shutdown as a form of displacement, with users feeling like "digital nomads" trying to adapt to new platforms. P34 acknowledged it as a *"first world problem,"* yet this *"migration"* was real and the emotional and social impact of the closure on the community cannot be understated. The concepts used by users reflect a sense of loss and struggle to find a new virtual home, mirroring experiences of real-world displacement in a digital context. This sense of "virtual diaspora" highlights how users were connected to the *AltspaceVR* community, viewing it not merely as a platform, but as a meaningful social space.

In *VRChat*, many users who had migrated from *AltspaceVR* adopted the label *"a refugee from AltspaceVR"* in their profiles (see *Figure 5.97*). This label functioned as a marker of shared identity, enabling former *AltspaceVR* users to recognize each other when receiving new friend requests. By doing so, they facilitated the re-establishment of social connections and strengthened community ties on the new platform.

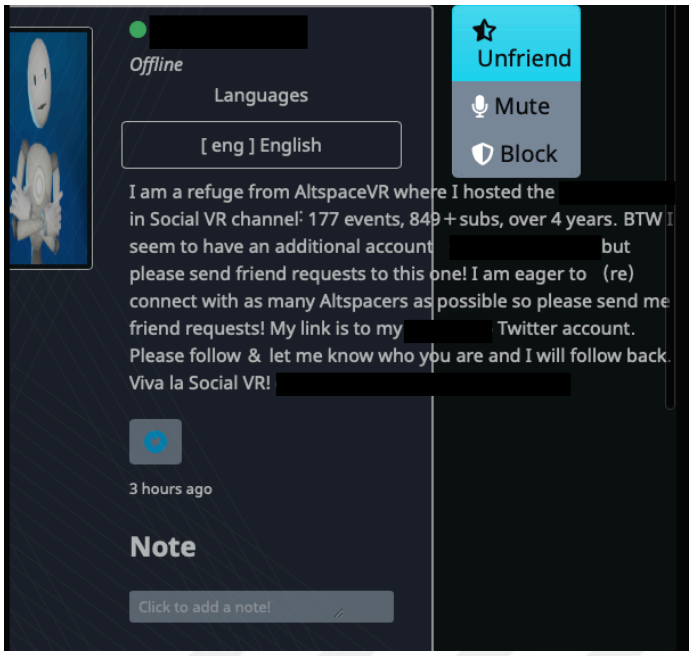


Figure 5.97 *VRChat* profile of a former *AltspaceVR* user identifying themself as *"a refugee from AltspaceVR."*

VRChat introduced the "groups" feature just days before the closure of *AltspaceVR*. Some of my participants interpreted the timing of this new feature as a welcoming gesture from *VRChat* toward the *AltspaceVR* community. Many former *AltspaceVR* users embraced this tool to reconnect with their social networks, which significantly facilitated the regrouping of communities. As illustrated in *Figure 5.98*, some groups organized guided world tours on *VRChat* to help ease users' transition to the new platform.

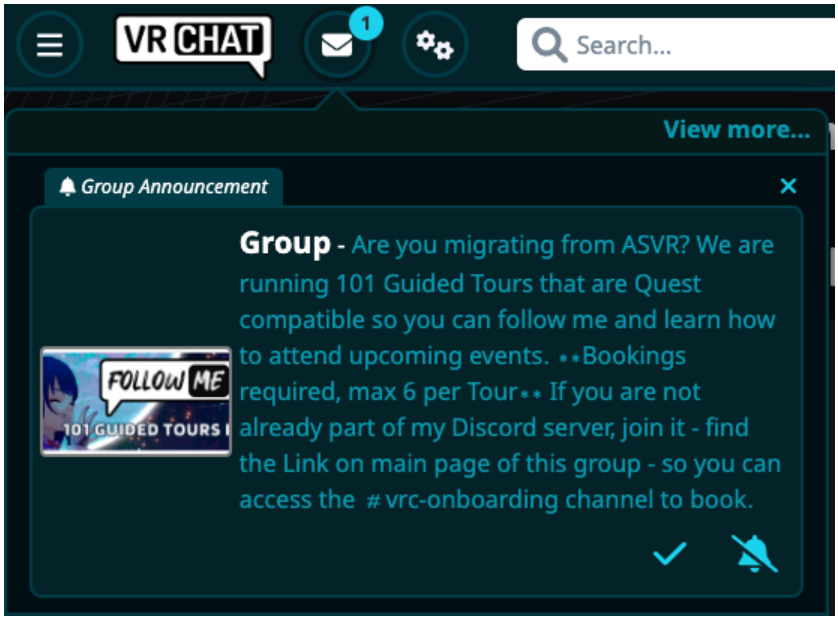


Figure 5.98 Announcement of a guided tour in *VRChat* for users migrating from *AltspaceVR*.

Many users and creators who migrated to *VRChat* established both closed and open community groups within the platform. To join the *Altspace Community Group* in *VRChat*, prospective members were required to share their old *AltspaceVR* username either in the *Discord* or *Facebook* group "Altspacers in VRChat." As illustrated in *Figure 5.99*, the group's description called for *"ex-Altspacers or an Altspace refugee needing a new home."*



Figure 5.99 *Altspace Community Group* in *VRChat*.

This illustrates how users began to integrate into *VRChat*; the emerging patterns of behavior reflect the development of community structures which emphasize "collective membership" within the virtual world (Anderson, 2006). While users were inhabiting new virtual spaces, they maintained shared cultural practices that ensured continuity in the social dynamics of *AltspaceVR*. This shows how community-building efforts transitioned to *VRChat*, where the social bonds of *AltspaceVR* could be rebuilt and preserved. Through this integration, users reimagined their community within the affordances of *VRChat* while retaining the essence of their collective identity.

Altspacers also recreated their "beloved" worlds in *VRChat*, including the iconic *Campfire* (see *Figure 5.100*), *Metavale Park* and *Metavale Park Community Centre* (see *Figure 5.101*), and *Memorial Park* (see *Figure 5.102*). These recreations allowed

former users to revisit familiar spaces that had become symbols of the *AltspaceVR* experience, offering a sense of nostalgia for the communities that once gathered there.

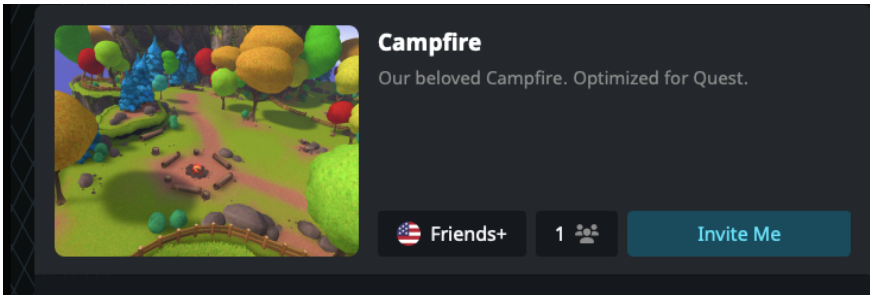


Figure 5.100 Recreation of the *Campfire* in *VRChat*.

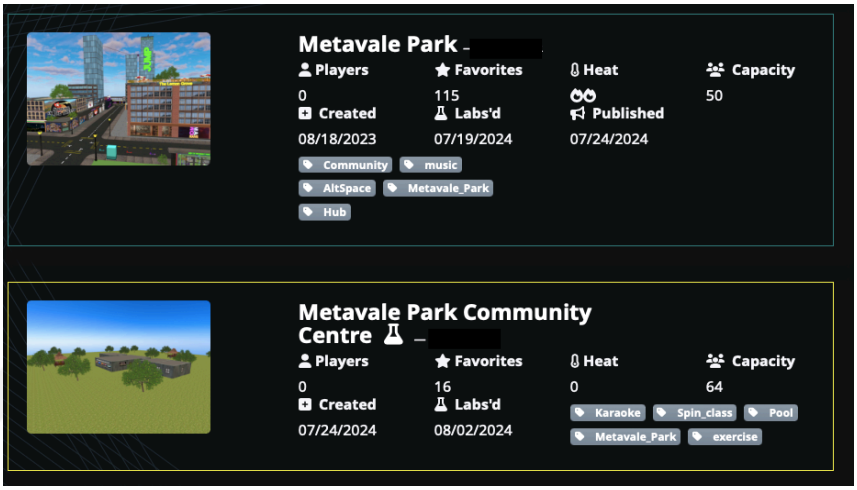


Figure 5.101 Recreation of the *Metavale Park* and *Metavale Park Community Centre* in *VRChat*.

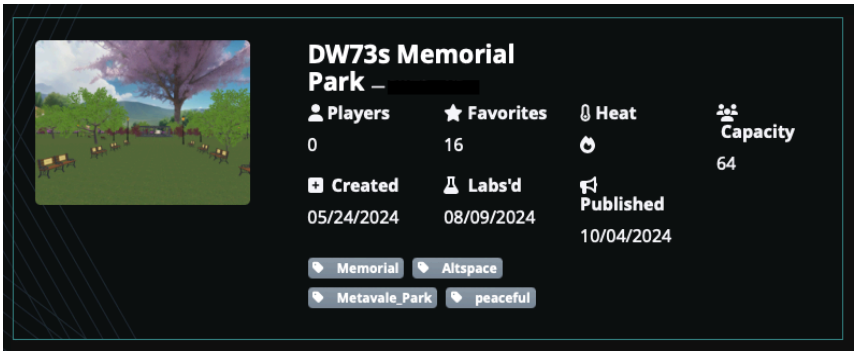


Figure 5.102 Recreation of the *Memorial Park* in *VRChat*.

Former *AltspaceVR* users also created an *AltspaceVR Memorial World* (see *Figure 5.103*) in *VRChat*, which offers portals to worlds that were recreated in *VRChat*. This space serves as a tribute to the original *AltspaceVR* platform, allowing users to revisit and explore some of their favorite worlds that were rebuilt in *VRChat*.

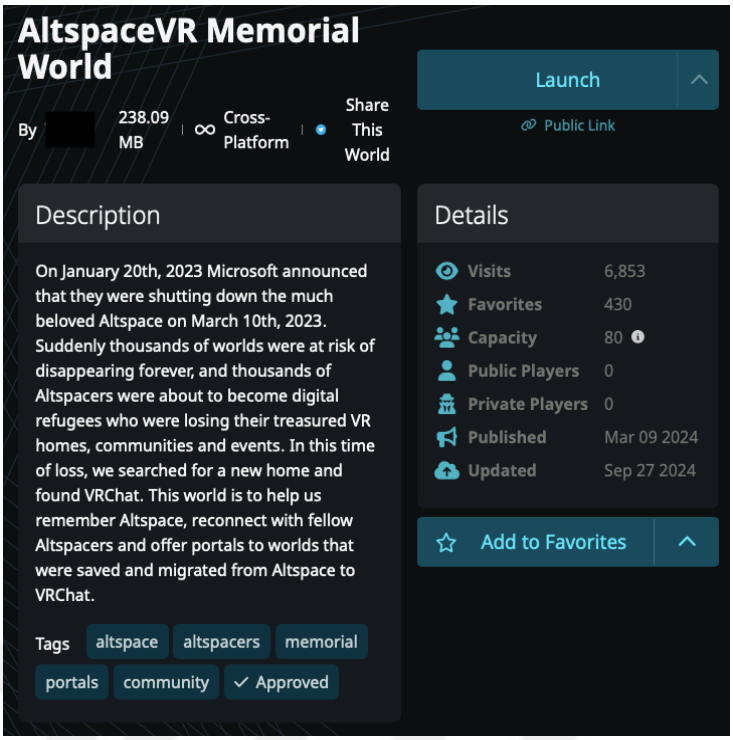


Figure 5.103 *AltspaceVR Memorial World* in *VRChat*.

Creators from *AltspaceVR* also brought their favorite kits to *VRChat* (see *Figure 5.104*). These kits included the video player and the megaphone, both of which event creators particularly valued and missed in *VRChat* due to their absence. The megaphone had been a crucial tool in *AltspaceVR* for managing events and facilitating communication with large audiences.

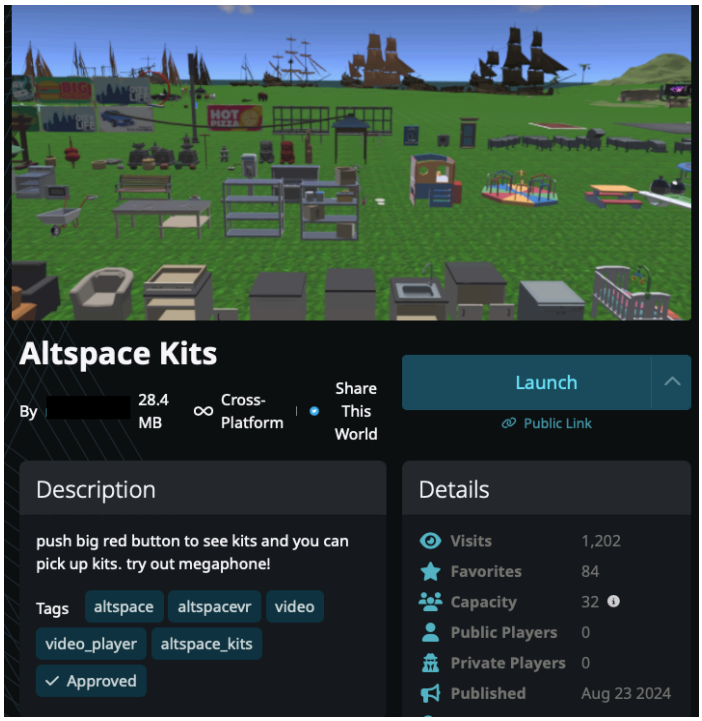


Figure 5.104 A world featuring favorite kits from *AltspaceVR*, recreated in *VRChat*.

Spatial, on the other hand, was initially chosen by many users and creators for its similarities to *AltspaceVR* in terms of features. The platform also runs in-browser, which was another positive advantage. In response to the shutdown, *Spatial* introduced updates specifically aimed at welcoming former Altspacers and adapting the platform to better meet their needs. To assist with the transition, *Spatial* created a community page on its website[44] titled *"How to Migrate Your AltspaceVR Worlds & Communities to Spatial,"* which begins with the following sentences:

"As the news of AltspaceVR's shutdown spreads, the Spatial.io family is happy to extend a warm welcome to the entire AltspaceVR community looking for a home for their virtual worlds. We understand that it's never easy to say goodbye to something that has been such a big part of your life, and we're here to make the transition as smooth as possible." (Spatial)

Similar to *VRChat*, former *AltspaceVR* users have recreated their beloved worlds like the *Campfire* and *Metavale Park* in *Spatial*. However, I observed that these worlds remained largely inactive. Former *AltspaceVR* users faced both technical and social challenges on *Spatial*, and many who initially migrated did not stay long and eventually moved to *VRChat*. For example, P5, who initially migrated to *Spatial* before switching to *VRChat*, explained their reasons for leaving the platform six months after the shutdown. They highlighted the lack of safety features on *Spatial*, such as the absence of stage blockers and features of blocking or reporting disruptive users.

"Spatial had a lot of challenges… Unfortunately, they do not have safety features built into their platform. What I mean by this is that there were no stage blockers to prevent people from running up onto the stage while I was doing my show. There was continual harassment. Also, if you signed in with a guest account versus a registered account, you could not block or report the people who were being disruptive. Someone went into my world when I was not there and wrote racial slurs on the walls and they also added things into the world that were inappropriate. I reported all of this, and the powers were unable to help me. I asked them to do an investigation, and I gave them all the IP [Internet Protocol] addresses that we had and some screenshots to show

[44] The website can be reached from the following link: https://www.spatial.io/blog/how-to-migrate-your-altspacevr-worlds-communities-to-spatial.

them what had happened. They told me they would look into it and did not. I also followed up with them multiple times and they left me with no resolution. I would be trying to broadcast my show, and these people would come into the event and jump up and down in my face while I was on stage. They would interrupt my guest while they were talking, and they would cause a very stressful environment. I had no recourse. It was very disheartening as my show is to help the community. So, I decided to leave the platform." (P5)

Like *Spatial*, *Somnium Space* and *Mona* also invited former *AltspaceVR* users, especially creators, to bring their events and worlds to their platforms. Additionally, a former *AltspaceVR* user developed *Banter* and invited users to join that platform. I couldn't follow the transition to these platforms closely, but from my observations on *Discord* channels, the communities that moved to these platforms struggled to survive.

Regardless of the platform they migrated to, some groups experienced declining attention, while others adapted to other platforms and gained prominence. Social media played an important role in helping creators re-establish their presence and promote their events on new platforms. Several participants stated that they needed to invest more effort into marketing after *AltspaceVR*'s closure. P5 acknowledged the challenge of dedicating more time into promotion, while P23 mentioned that many creators had set up social media accounts, specifically on *Instagram*, to promote their VR activities. P31 highlighted the use of tools like *VR Event Hub*[45] to ensure event visibility and reach across platforms.

I observed that creators, especially world builders, adapted to new platforms faster and more easily- a pattern similar to how individuals with higher education levels and greater expertise are better equipped to navigate transitions, whether physical or virtual. Just as educated migrants leverage their skills, professional networks, and problem-solving abilities to navigate new countries, experienced world builders use their technical expertise and familiarity with design tools to quickly learn new virtual platforms. Both groups demonstrate a high level of learning agility, which enable them to overcome challenges, embrace change, and innovate. This suggests that whether in physical or virtual spaces, successful adaptation is closely tied to knowledge, skills, and openness to new experiences.

[45] *VR Event Hub* can be reached from the following link: https://vreventhub.com.

As Proctor (2021) argued, both conceived and lived spaces deserve equal consideration. Proctor (2021, p.608) emphasizes that *"while the programming of a particular platform allocates the available affordances… the lived space of virtuality of being-in-the-Internet has its own unique affordance: transcendence."* In this context, transcendence involves overcoming restrictions and boundaries of conceived space. *AltspaceVR*'s shutdown provides an example of this concept, where the platform's infrastructure (conceived space) was dissolved, yet the lived space persisted as its users and established communities migrated to other platforms and reproduced their social practices in new settings.

This transition was more than just a move to a new virtual environment; it embodied a form of transcendence, where users recreated their communities, events, worlds, kits, and even avatars. Members of groups gathering in virtual spaces previously characterized by *AltspaceVR* or re-forming new community groups in different platforms exemplify how these platforms enable cultural preservation and support diasporic communities. These recreations and familiar tools helped keep the memory of *AltspaceVR* alive while providing a space for community members to reconnect, sustaining the *AltspaceVR* community culture that had been built over the years.

This process demonstrates how the lived space of virtuality can transcend the limitations of any given platform. Building on Lefebvre (1991), lived space is shaped not only by the platform's affordances but also by "the people behind the avatars," who bring their identities, social norms, and experiences into new virtual environments. The efforts of Altspacers to rebuild their communities, events, and social dynamics on new platforms highlight their ability to navigate between the conceived aspects of different platforms while preserving the lived aspects of their social experiences.

Despite the technical and social challenges of migration, communities collaborated during the transition and adaptation and found ways to overcome these challenges. This further underlines Lefebvre's (1991) and Proctor's (2021) argument that lived space often resists being fully controlled by conceived space. Through continuing social connections and the re-establishing their events and worlds,

Altspacers exemplified how virtual communities can endure beyond platforms. This case highlights that users carry their lived experiences across platforms in order to ensure continuity for their communities.

The concept of "virtual diaspora" further illustrates the lived aspects of the migration between social VR platforms. A lot of Altspacers, self-identified as "refugees," used *Discord*, social media, and other platforms to re-establish their presence on new platforms. In this way, they bypassed the limitations imposed by the closure of *AltspaceVR*'s. This ability, social structures, joint action, and collective memory helped them rebuild their communities in new virtual spaces and thus demonstrated that lived space is inherent in identities, social bonds, and support systems.

Vindenes and Wasson's (2021a) "User-Environment Relation" framework provides an additional layer into the relationship between users and virtual environments, particularly during the transition process. According to Vindenes and Wasson (2021a), the environment is not simply a space that users inhabit; but everything with which they interact- social actors, 3D objects, and events. In this sense, the environment becomes an active element in shaping user experience. This notion is quite relevant in relation to the shutdown of *AltspaceVR*. The migration of users to new platforms required not only a move a new virtual space but also reconfiguration in how they interact with their environment. Altspacers had to adapt their social behaviors, technical skills, and even their avatars to fit the new affordances and limitations of these platforms.

This concept also applies to the recreation of worlds, events, and avatars. The rebuilding of iconic spaces like the *Campfire* and the use of *AltspaceVR* avatars in *VRChat* demonstrates how users were not passive recipients of the new environment. Rather, they actively shaped it to reflect the social dynamics and cultural artifacts of their previous virtual home. This highlights Vindenes and Wasson's (2021a) assertion that users continually reproduce their environment to align with their needs, much like how Altspacers recreated their virtual worlds, events and avatars, transcending platform-specific boundaries in the process.

5.5.5. Reflections and Key Lessons from the Shutdown of *AltspaceVR*

In light of potential platform closures, the shutdown of *AltspaceVR* offered valuable lessons for the future of virtual communities. Key considerations of users and creators highlighted concerns about trust and reliability, the importance of diversification and backup plans, adaptability and resilience, as well as technical and ownership considerations. I believe that these points will be valuable for navigating future uncertainties and building more sustainable and resilient virtual environments.

First, the shutdown raised concerns about the reliability of big tech companies and their platforms. Many users had feelings of distrust and questioned the permanency of virtual platforms. P2 pointed out the fact that all *Microsoft* products could be subject to being taken out at any moment without prior warning, which fostered a lack of trust. P22 reflected that even though they knew *AltspaceVR* wasn't being updated, the closing came sooner than expected, which drove the sense of impermanence. P30 added that other platforms like *VRChat* could be subject to such fates to, thereby further increasing the uncertainty associated with the future of social VR platforms. Participants' distrust towards big tech companies reflects a broader critique of platform capitalism**,** where corporate decisions often prioritize profits over community stability and sustainability (Srnicek, 2017).

One important lesson the participants highlighted was that social VR users should not rely on a single platform; especially creators should diversify their presence across multiple platforms and ensure they had backups of their work to avoid total loss in the event of another platform closure. They also highlighted that creators should maintain control over their assets and to be mindful while depending on specific platforms. For example, many creators are now focusing on portability and ownership of their work. P29 stressed the importance of creating backups and being present in multiple platforms, while P9 and P27 advocated for building worlds in *Unity* rather than using platform-specific tools and templates to retain control over their creations. This emphasis on diversification and backups highlights a user-driven control over digital assets, which echo decentralization and Web3 principles of individual ownership and portability.

Users also emphasized the need to protect their relationships and connections by maintaining a presence across various platforms, rather than focusing on just one. For example, P5 pointed out that users should use multiple platforms so that all social interactions are not concentrated on one platform. In this respect, being present across multiple platforms is a way to create a secure network of connections where the closure of any of the platforms would be less damaging.

Another important lesson learned is the ability to adapt and keep resilience in the face of platform closures. Users and creators had to find their way while transitioning to other platforms, learning new tools, and rebuilding their communities. This adaptability is crucial for communities, especially when considered the rapidly changing technological landscape where virtual platforms can rise and fall quickly. Apart from that, being part of established communities and collaborating with the members of established groups helps reaching resources more quickly than those who were not connected to any community.

6. CONCLUSION

This study explores the evolving landscape of virtual social interaction by examining the social production of virtual space in immersive social VR platforms from the user-environment relations perspective. Grounded in the postphenomenological framework of User-Environment Relations (Vindenes and Wasson, 2021a), it integrates Lefebvre's (1991) Production of Space Theory and spatial triad as a conceptual anchor and incorporates Proctor's (2021) Social Production of Internet Space framework. Through this lens, the study examines the social production of virtual space across three dimensions: Perceived space of affordances, conceived space of programming, and lived space of virtuality. The core argument of this study is that the relationality and intentionality between users and the virtual environment both produce and are produced by these dialectical dimensions within social VR platforms. Using a mixed-method qualitative research design, the study analyzes *AltspaceVR* as a case study to identify relationships within and between these dimensions that provide insight into the interconnected processes that shape immersive virtual spaces.

The closure of *AltspaceVR* during the field study offers a unique opportunity to examine how users adapt and transition into alternative virtual worlds while striving to maintain continuity in their social interactions. This process highlights the social reproduction of virtual space, emphasizing the importance of community bonds, user creativity, and platform-specific features in shaping virtual environments where users interact, create, and engage socially. These findings contribute to a comprehensive framework for understanding how virtual spaces emerge, evolve, and are sustained as socially produced spaces, rooted in the dynamic relationality between users and their virtual environments.

By examining how individual and collective meanings, values, practices, and experiences are encoded into virtual worlds, the study demonstrates that virtual spaces are not mere extensions of physical environments. Instead, they reflect the historical, social, and cultural structures of their users and creators. At its core, this study investigates what it means to exist, create, collaborate, and connect in virtual worlds. Participation in these virtual spaces, whether through the creation of worlds, the formation of communities, or the design of avatars, underscores a drive to make meaning and foster connection, even in the absence of physical co-presence. The experience of creation, crafting, and sharing in virtual environments challenges traditional notions of space, identity, and community, while revealing new avenues for socialization, education, and work in an increasingly interconnected world.

The findings of this study show that social VR is not merely a technological innovation but a social phenomenon that reflects, reshapes, and transforms the contradictions of contemporary life. As such, it demands a critical and interdisciplinary approach that bridges the physical and virtual worlds. Social VR platforms serve as both a mirror and a catalyst for the social production of space, revealing the gaps and fractures in physical social life while offering new possibilities for connection. However, these possibilities are not without limitations, as the immersive nature of social VR can create tensions between virtual and physical realities.

The study explores the dialectical relationship between physical and virtual spaces, demonstrating that social VR is neither a simple extension of the physical world nor an entirely independent realm. Instead, it functions as a hybrid space. This hybridity and fluidity are evident in how users transition between physical and virtual environments, utilizing the unique affordances of each to fulfill their social, emotional, and psychological needs. This relationship between the virtual and the physical will likely become even more fluid as technological advancements further blur the boundaries between virtual and physical space.

Emerging technologies such as AI-driven world generation, haptic technologies, and brain-computer interfaces (BCIs) have the potential to accelerate this transformation. AI-generated virtual environments, capable of adapting in real time to user behaviors and preferences, could redefine VR spaces by shifting from static, human-designed worlds to dynamic, co-evolving environments. Haptic technologies,

which enhance the sensory experience of virtual interactions, can make the virtual feel more tangible, further collapsing the perceived distance between virtual and physical presence. Meanwhile, BCIs many eliminate the need for traditional input devices, enabling direct, neural-driven interaction with virtual environments. These advancements can significantly alter the production of virtual space, allowing for more intuitive, embodied, and personalized forms of engagement. As these technological affordances expand, the fluidity of user-environment relations will likely intensify, leading to new modes of spatial production.

Rosa's (2019) concept of "resonance" provides a valuable approach for understanding why individuals turn to social VR platforms for socialization. His critique of modernity's acceleration highlights how contemporary life, marked by time pressure, disconnection, and the erosion of communal bonds, often deprives individuals of meaningful engagement with their social and physical environments. Social VR platforms offer a new space where individuals can have deeper connections. In this sense, as a "resonant space," social VR facilitates social and emotional bonds that may be lacking in physical life. However, this refuge from alienation is paradoxical: Social VR platforms rely on the same technological infrastructures that contribute to the narratives of "modern disconnection." The immersiveness offered by these platforms can blur the boundaries between virtual and physical realities, raising concerns about the authenticity and sustainability of digital social connections. This tension positions social VR as an intermediary space**,** existing at the intersection of the physical and virtual, the real and the imagined.

Harvey's (1989) critique of alienation under capitalism further deepens this discussion. He argues that modern economic structures disconnect individuals from their labor, communities, and environments, causing social fragmentation. In this context, social VR platforms function as a response to alienation, offering individuals an opportunity to reclaim agency over their social worlds. Harvey's (2001) concept of "spatial fix" is particularly relevant here. Harvey (2001) posits that capitalism resolves crises of overaccumulation by producing new spaces for investment and commodification. Social VR can be understood as such a "spatial fix," addressing the social, emotional, and psychological crises of contemporary life by creating new

venues for interaction, while simultaneously transforming these interactions into commodified experiences under capitalist conditions.

Overall, the insights from this study suggest that social VR platforms will continue to play an important role in shaping the social fabric and the ways people connect in virtual worlds. As XR technologies advance, understanding and navigating this hybrid reality will demand new frameworks. This study lays a foundation for future research and offers nuanced insights into the evolving landscape of social VR platforms and the Metaverse. It highlights the transformative potential of virtual spaces as sites of social practice, cultural production, and emotional engagement, while also calling attention to the challenges of power dynamics, commodification, sustainability, and inclusivity. As XR technologies increasingly influence human interaction, one of the key challenges for researchers, designers, and policymakers will be ensuring that these virtual environments foster inclusivity, equity, and meaningful engagement.

6.1.Summary of Key Findings

The key findings of this study reveal how perceived affordances, conceived programming, and lived virtual experiences intersect to shape the social production of virtual spaces. These findings also emphasize the processes of social reproduction in addressing challenges such as platform closures and user migration. The key findings are organized and presented through an analysis of intra-category and inter-category code relationships within the data.

Intra-category code relationships refer to the connections and patterns identified among codes within the same code category. To analyze these relationships, I conducted an examination of the coded data in each category and focused on instances where codes co-occurred and interacted within the context of participants' experiences. This analysis aimed to uncover the interdependencies that define each category. *Figure 6.1* provides a summary of the intra-category code relationships for each code category.

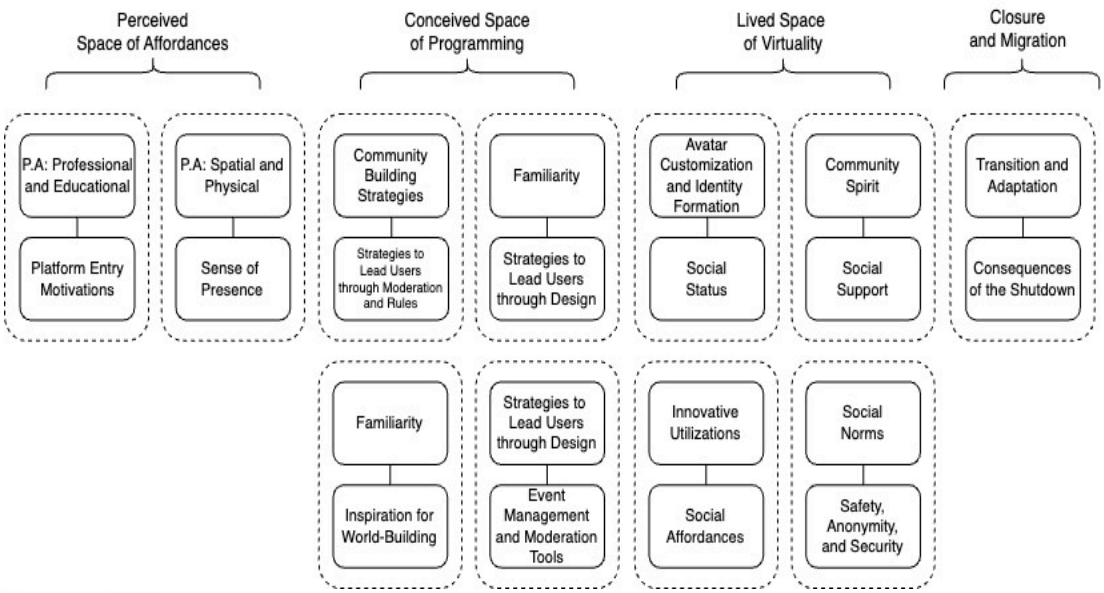


Figure 6.1 Intra-category code relationships.

The relationship between "Perceived Affordances: Professional and Educational" and "Platform Entry Motivations" underlines the ability of the platform to attract users with professional and educational motivations. Professional development opportunities and educational events were among the most common reasons for joining the platform identified by participants. This connection shows how perceived affordances shaped the motivations of the users, positioning the platform as a place for activities related to learning and professional growth. Similarly, the relationship between "Perceived Affordances: Spatial and Physical" and "Sense of Presence" demonstrates how the platform allowed users to transcend physical boundaries and engage in meaningful interactions. The sense of presence and immersion provided by VR enhanced these spatial and physical affordances and enabled users to participate in diverse social experiences.

The relationship between "Community Building Strategies" and "Strategies to Lead Users through Moderation and Rules" underlines the role of moderation and community standards in developing social cohesion within virtual communities. This shows that clear guidelines help ensure that communities operate smoothly and respectfully, promoting an environment fostering positive interactions. The relationship between "Familiarity" and "Strategies to Lead Users throguh Design" shows how familiarity was a key design strategy employed by creators to effectively guide users. Similarly, the relationship between "Familiarity" and "Inspiration for

World-Building" shows that creators often drew inspiration from either real-world or well-known designs to inspire world-building, showing how familiarity influenced the creativity of user-generated worlds. Additionally, the relationship between "Strategies to Lead Users through Design" and "Event Management and Moderation Tools" underscores how design and event management complement each other. While strategic design features make event management effortless, robust moderation tools help manage events smoothly.

The relationship between "Avatar Customization and Identity Formation" and "Social Status" reveals the key role of avatars both in self-expression and in social positioning, with an emphasis on how customization allowed users to reflect their identities and create a standing within the community. The relationship between "Community Spirit" and "Social Support" shows that a strong sense of community was key to foster mutual support among users, which also reinforced their social bonds. The relationship between "Innovative Utilizations" and "Social Affordances" underlines how innovative, unique, and creative uses of the platform were important in unlocking novel social affordances. Finally, the relationship between "Social Norms" and "Safety, Anonymity, and Security" shows that clear social norms played an important role in maintaining safe and secure virtual spaces.

Lastly, the relationship between "Transition and Adaptation" and "Conseauences of the Shutdown" highlights how the platform's closure led users to transition to new platforms while navigating its emotional, technological, and practical challenges.

Apart from the connections and patterns identified among codes within the same code category, inter-category code relationships reveal the connections between different code categories. This analysis was conducted using the "code co-occurrence analysis" feature in *Atlas.ti*, which generates a matrix highlighting instances where two or more codes appear together in the data. Frequent co-occurrence indicates that there was a potential connection between these concepts. This analysis underscores the interplay between the perceived, conceived, and lived dimensions of virtual spaces, illustrating how these aspects are interconnected in various ways. Additionally, I examined the relationship between "Closure and Migration" code category and other

categories. *Figure 6.2* provides a summary of the inter-category code relationships among these code categories.

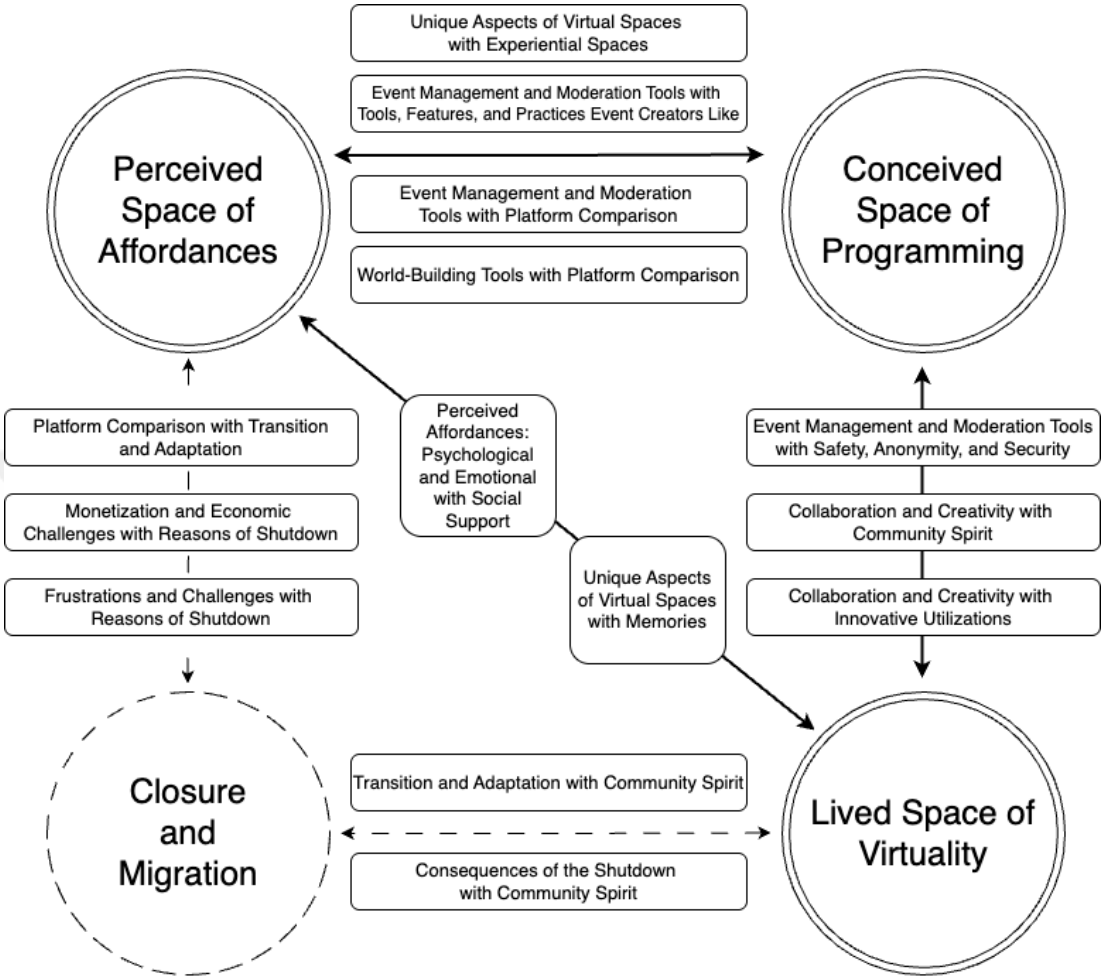


Figure 6.2 Inter-category code relationships.

Between the "Perceived Space of Affordances" and "Conceived Space of Programming" code categories, there was a dynamic interplay on four different dimensions. The relationship between "Unique Aspects of Virtual Spaces" and "Experiential Spaces" highlights that the unique aspects of virtual spaces provided unique sensory and interactive experiences beyond physical boundaries, enabling the creation of user-generated experiential spaces. The relationship between "Tools, Features, and Practices Event Creators Like" and "Event Management and Moderation Tools" indicates that event creators highly valued the tools available for organizing and moderating events. The relationship between "Platform Comparison," "Event Management and Moderation Tools," and "World-Building Tools" reveals that platform comparisons tended to both praise

and criticize *AltspaceVR*, highlighting its strengths and weaknesses. While the platform was praised for its robust event management and moderation tools, its world-building capabilities often led creators to explore other platforms for more advanced tools.

Between the "Perceived Space of Affordances" and "Lived Space of Virtuality" there was a dynamic interplay on two different dimensions. The relationship between "Perceived Affordances: Psychological and Emotional" and "Social Support" highlights how social support mechanisms on the platform strengthened participants' perceptions of its psychological and emotional affordances. The relationship between "Unique Aspects of Virtual Spaces" and "Memories" shows that the unique aspects of these virtual spaces often translated into meaningful memories for users.

Between the "Perceived Space of Affordances" and "Closure and Migration," there was a dynamic interplay on three different dimensions. The relationship between "Platform Comparison" and "Transition and Adaptation" shows that users compared various platforms for their appropriateness during the migration process, with priority given to those that would offer similar event management tools like *AltspaceVR*. The relationship between "Monetization and Economic Challenges" and "Reasons for Shutdown" underlines the role of monetization issues like the lack of a creator economy, as critical factors in the closure of the platform. The relationship between "Frustrations and Challenges" and "Reasons for Shutdown" further reflects that the notions users' identified as frustration or challenge about *AltspaceVR* likely played an important role in the platform's closure, such as monetization issues, technical limitations, and frequent updates.

Between the "Conceived Space of Programming" and "Lived Space of Virtuality," there was a dynamic interplay on three dimensions. The relationship between "Event Management and Moderation Tools" and "Safety, Anonymity, and Security" highlights the role of robust moderation tools and event management in creating and maintaining safe virtual spaces. The relationship between "Collaboration and Creativity" and "Community Spirit" illustrates how collaboration fostered co-creation and strengthened community bonds, while also cultivating a sense of

belonging. Similarly, the relationship between "Collaboration and Creativity" and "Innovative Utilizations" is indicative of how creative collaboration expanded the boundaries of what users could achieve within the platform. Although there was no significant interplay between the "Conceived Space of Programming" and "Closure and Migration" code categories, the decision to close the platform was a conceived act, imposed by the platform itself. This decision contributed to users' distrust of platforms, particularly *Microsoft*, indicating an underlying connection between these two dimensions.

Between the "Lived Space of Virtuality" and "Closure and Migration," there was a dynamic interplay on two dimensions. The relationship between "Community Spirit" and "Transition and Adaptation" underlines the crucial role that the community played in facilitating the migration process. Similarly, the relationship between "Community Spirit" and "Consequences of the Shutdown" reveals how the closure of *AltspaceVR* disrupted the cohesion of the community, yet at the same time created resilience and adaptability amont its members.

In summary, key findings of this study demonstrate the complex relationships between perceived affordances, conceived programming, and lived virtual experiences in the social production of virtual spaces. By exploring both intra-category and inter-category code relationships, the study highlights how virtual spaces are socially produced through dynamic user-environment interactions. Together, these findings form a foundation for the theoretical, methodological, and practical contributions and implications that follow this section.

6.2.Contributions and Implications

6.2.1. Theoretical Contributions and Implications

This study addresses a gap in the theoretical examination of social VR, offering new insights into its evolving dynamics within digital culture and immersive virtual environments. By integrating Lefebvre's (1991) Production of Space and spatial triad with postphenomenological perspectives, it advances discussions on the social production of virtual spaces, emphasizing the complex interplay between social and

technological dimensions. This interdisciplinary approach bridges the domains of technology, society, space, and design and contributes to a more comprehensive understanding of how virtual spaces are created, inhabited, and experienced.

Building on Lefebvre's Production of Space theory, Proctor's (2021) Social Production of Internet Space framework, and Vindenes and Wasson's (2021a) exploration of technologically mediated User-Environment Relations, the study explores the dynamics of virtual space as a socially produced phenomenon. It examines how users' practices, identities, and interactions shape virtual environments, moving beyond technical and practical considerations to explore the relational processes that underline social production and reproduction. It also contributes to discussions of media migration and virtual diaspora, providing an analysis of community resilience in the context of platform transitions, exemplified by the shutdown of *AltspaceVR*.

Furthermore, by exploring how gestures, micro-movements, and verbal and non-verbal cues mimic real-world social behaviors and even extend them in different forms, the study explores the dynamics of embodied interaction and sense of presence. It also illustrates how embodied gestures and collaborative actions foster intimacy, social presence, and meaningful connections across physical distances. This exploration aligns with theories of embodied interaction and mediated presence, demonstrating the potential of VR's in facilitating social interaction and emotional connection.

By integrating these theoretical perspectives, the study provides a comprehensive framework for understanding the social production of virtual spaces, emphasizing their transformative potential as sites of social practice, cultural production, emotional engagement, and social innovation. This perspective positions social VR platforms as a social phenomenon, shaping how individuals and communities interact and co-create in digital contexts. *Figure 6.3* summarizes the theoretical foundations and the relations between them, along with their implications within the interdisciplinary framework of this study.

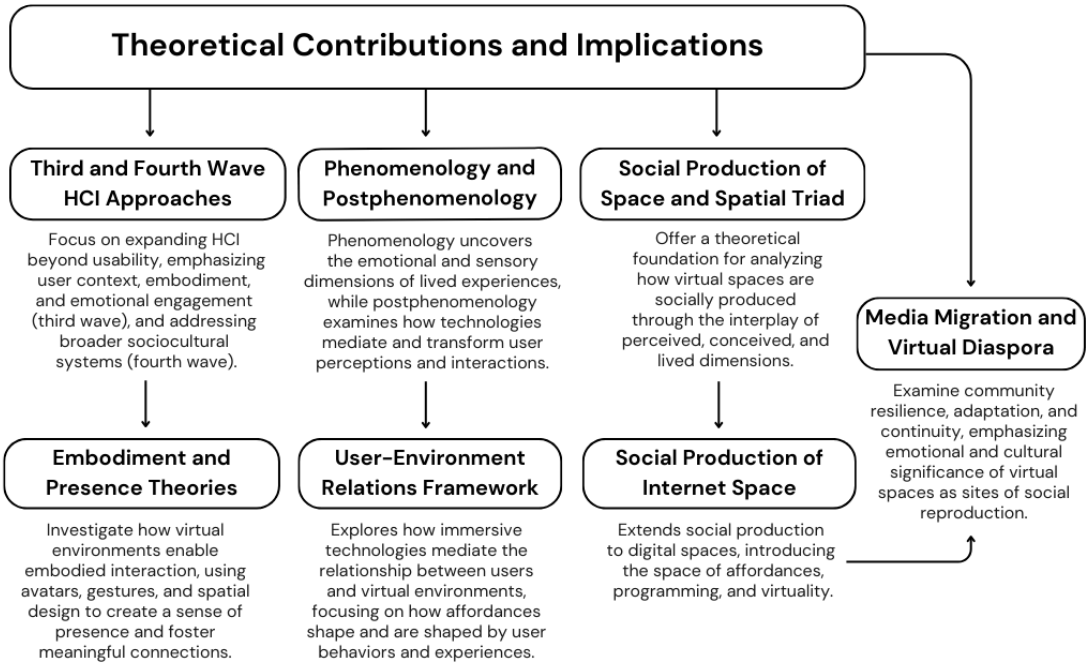


Figure 6.3 Theoretical contributions and implications.

6.2.1.1.The Social Production of Virtual Spaces

Social VR platforms like *AltspaceVR* exemplify Lefebvre's (1991) concept of space as socially produced through user practices. These platforms evolve from their conceived forms- structured and regulated by developers- into lived spaces filled with personal, cultural, and collective meaning. Users possess the unique ability to create virtual worlds, 3D assets, and various events, and this enable them to craft entirely new spaces that reflect their identities, visions, desires, and communities. Beyond this creative potential, users reinterpret and reshape pre-designed virtual environments by embedding their identities, values, creativity, and shared experiences, merging conceived frameworks with socially enriched constructs. This transformative capacity highlights the relationship between the perceived, conceived, and lived dimensions of virtual spaces, presenting them as fluid, socially and culturally dynamic, and collaboratively co-created environments.

User engagement in virtual spaces reveals a multifaceted dynamic. On one hand, these environments sustain familiar design principles, social norms, structures, and rituals, maintaining continuity between physical and virtual interactions. On the other hand, they foster experimentation and innovation, allowing users to create and explore new forms of social interaction and sensory engagement. This balance of familiarity

and creativity underscores how VR extends human interaction and sensory boundaries. Social VR platforms like *AltspaceVR* exemplify this by enabling users to transcend physical limitations in their creations, experiment with alternative identities, and establish new social norms, structures, and communities, while simultaneously presenting structural and technical limitations.

Vindenes and Wasson's (2021a) User-Environment Relations framework provides a comprehensive foundation for understanding the interactive, dynamic, and embodied relationships users establish with space in social VR platforms. It emphasizes the relational interplay between users and environments mediated by technology, aligning closely with Lefebvre's (1991) spatial triad, which enables the analysis of these interactions through the dimensions of perceived space, conceived space, and lived space. Proctor's (2021) framework on the Social Production of Internet Space expands on these dimensions by addressing their counterparts in digital environments, contributing to a deeper understanding of the social production of virtual spaces through the perceived space of affordances, the conceived space of programming, and the lived space of virtuality**.**

Proctor's definition of affordances as relational and context-dependent complements this framework by illustrating how user agency reshapes conceived aspects of digital platforms through creative adaptation. For example, affordances of social VR platforms enable users to create and manipulate virtual environments creatively. However, platforms also impose structural constraints within the conceived space of programming. For example, limitations like restricted avatar designs can hinder self-expression. The findings of this study showed that balancing flexibility and restriction in programming was essential to provide users an opportunity to engage virtual spaces in meaningful ways. Spaces of virtuality highlight the power of users to co-create meaning in virtual environments, which often transcend and repurpose technical frameworks of the platform's underlying programming. These spaces serve as emotional and symbolic arenas for users to connect and collaborate, ultimately contributing to the production of socially and culturally meaningful virtual spaces.

The ability to create and shape spaces is complemented by users' role in producing and sustaining value within virtual platforms. Drawing from Gehl (2014)

and Proctor (2021), the study highlights users' dual roles as both consumers and contributors of social VR platforms. Platforms like *AltspaceVR* are maintained through user-generated content, where users navigate overlapping roles as creators, collaborators, and community leaders, aligning with Toffler's (1980) concept of the "prosumer" and Bruns' (2008) idea of "produsage." This blurring of production and consumption raises critical questions about ownership and the commodification of user-generated content, reshaping the relationship between users and platforms. While users drive the cultural and social vitality of these spaces, they also operate within the constraints of the platform's technical and economic frameworks, often facing limitations on content ownership and creative autonomy. In social VR, the interdependence between digital communities and the infrastructures that sustain them becomes evident, raising broader concerns about how platforms operate, generate profit, and govern their user base. While social VR fosters new modes of sociality and community-building, it remains shaped by corporate interests, algorithmic governance, and power structures that risk reinforcing existing hierarchies rather than democratizing participation.

Building on de Certeau's (1984) notion of 'tactics' and 'strategies,' this study explores how users of social VR platforms navigate and respond to the constraints imposed by the conceived space. In this context, users demonstrate innovative utilizations of the platform's tools, developing agency to overcome technological constraints. This process is further enriched by postphenomenological concepts of technological mediation and multistability, offering insights into the adaptive and creative ways users navigate these challenges. The findings exemplified how tools originally designed for specific functions, such as mirrors for self-viewing or emojis for expression, were creatively repurposed by users to enable innovative new practices. These practices illustrate the ways in which multistability enables technologies to serve multiple purposes based on user needs. For example, gestures like virtual hugs exemplify how users co-create meaningful connections through embodied interactions. Avatars, extensions of users' physical bodies, enable embodied interactions in redefining spatial practices and blurring the boundaries between presence and absence within the virtuality of experience (Vindenes and Wasson, 2021a).

This creativity and adaptability are particularly important in how social VR platforms offer safe spaces for marginalized groups, including LGBTQ+ communities, enabling them to express identities and practices often suppressed in physical spaces. Unlike physical environments, where exclusion and discrimination are prevalent, social VR empowers these communities to reclaim agency over their social worlds and build spaces that reflect their cultural and political aspirations. This aligns with Lefebvre's (1991) argument that space is a social product, shaped by the struggles of those who inhabit it. In social VR, the production of space becomes an act of resistance, as marginalized users challenge heteronormative structures and create inclusive environments that embrace diversity.

AltspaceVR exemplifies a site where personal and collective identities converge. Users personalize virtual spaces with artifacts, photos, and designs that reflect their aspirations, embedding personal meaning into these environments. Collaborative housing projects and diverse designs further enrich these spaces, while rituals infuse emotional and symbolic meaning into virtual interactions, creating lived spaces that resonate with both individual and collective significance. This participatory culture reflects Lefebvre's (1991) concept of differential space, which resists homogenization by embracing diversity. Differential space emerges from conflict, as marginalized individuals assert their right to space and resist forces of domination. As Acena and Freeman (2021) highlight, these platforms allow users to express their identities freely and connect with like-minded communities, fostering inclusion.

The analysis of social VR as spaces of agency and identity expression also connects with Harvey's (1973; 2008) work on spatial justice. Harvey argues that marginalized groups face challenges in claiming space within capitalist and heteronormative environments. Social VR platforms, in contrast, function as "counter-spaces" where these groups reclaim agency and create environments that reflect their unique needs and identities. Research on LGBTQ+ communities using social VR to form inclusive spaces further underscores the transformative role these platforms play in challenging the dominance of physical spaces.

This idea of social VR as a space of resistance aligns with Sennett's (1970) notion of "productive disorder" in urban spaces. Sennett contends that cities thrive

when they embrace diversity, ambiguity, and conflict, fostering creativity and innovation. In a similar vein, social VR platforms act as spaces of productive disorder, where users experiment with new forms of identity and sociality, challenging rigid norms and cultivating environments that encourage fluidity and diversity. This mirrors Lefebvre's concept of differential spaces, where users resist homogenization and actively shape their social worlds to reflect their diverse lived experiences.

Beyond serving as spaces of resistance and inclusion, social VR also holds significant therapeutic potential, particularly for socially anxious or isolated individuals. By placing users in a low-pressure environment to interact with others, social VR platforms allow users to form meaningful connections without the stress typically experiences during face-to-face communication. This aligns with Zamanifard and Robb's (2023) findings, which demonstrate that social VR can foster emotional well-being by providing accessible and supportive environments for individuals who struggle with social anxiety or isolation. Future research should continue to explore these possibilities, focusing on how social VR can help reduce social anxiety and provide emotional support for diverse individuals. By leveraging the unique affordances of VR, such as anonymity, customization, and immersive interaction, social VR platforms have the potential to become powerful tools for mental health and well-being, complementing traditional therapeutic approaches.

Moreover, the study examines the indicators of social status and power within virtual environments. Drawing on Bourdieu's (1986) social and cultural capital concepts, it reveals how network-based privilege and platform-specific skills such as world-building, event hosting, and avatar design establish symbolic capital that shapes recognition and prestige. While these markers challenge determinants of status tied to physical appearance or economic background, they also perpetuate inequalities through exclusivity, avatar appearance-based judgments, and group dynamics, reinforcing Lefebvre's (1991) lived spaces as arenas of ongoing power negotiation.

Finally, *AltspaceVR*'s integration into broader ecosystems reflects Proctor's (2021) concept of the space of virtuality. Proctor (2021) argues that virtuality transcends the boundaries of conceived space and enables users to expand the platform's potential across different platforms. In many social VR platforms like *AltspaceVR*, community-building efforts extend across platforms like *Discord*,

forming a “communicative ecology” (Alcala et al., 2023). Alcala et al.’s (2023) metaphors are relevant in this context, where immersive platforms serve as “stages” for interaction and supportive tools act as “theaters” for organization. This multi-platform approach challenges platform-centric designs and supports advocating for interoperability and user agency to foster digital ecosystems. This approach also aligns with Lefebvre’s (1991) representational space, showcasing user agency in reshaping environments as sites of innovation.

The closure of *AltspaceVR* and the subsequent migration of its communities to different platforms reveal the fragility of virtual spaces and their dependence on technological infrastructures. These disruptions expose the power dynamics embedded in the production of virtual spaces, as users negotiate their social lives within the constraints of corporate and algorithmic governance. However, they also highlight the resilience and creativity of users, who develop strategies to sustain their communities despite platform instability.

AltspaceVR’s shutdown served as a case study demonstrating how users maintain continuity by recreating their environments, preserving avatars, and extending interactions across different platforms during migration. This process aligns with Lange’s (2022) concept of media migration and Boellstorff’s (2008) notion of virtual diaspora, which captures the emotional and cultural dimensions of digital displacement. The persistence of these communities reflects Anderson’s (2006) idea of imagined communities, as displaced users reestablish collective belonging despite spatial and technological disruptions. Sennett’s (2008) emphasis on resilience is meaningful in this context. Sennett (2008) contends that urban communities adapt to change through improvisation and craftsmanship. Similarly, the migration of *AltspaceVR* users to alternative platforms reflects this adaptability, as they reconstruct social spaces and networks in new environments. In this sense, users function as “digital craftsmen,” reshaping virtual environments to meet their evolving needs and aspirations. The closure reveals the agency of users in resisting disruption, maintaining social ties, and asserting creative control over their virtual environments. Together, these findings provide insights into the development of sustainable virtual communities that support continuity, social reproduction, and cultural preservation during transitions.

6.2.1.2.Embodied Interaction and Social Presence in VR

Building on the insights of third-wave and fourth-wave HCI paradigms, this study emphasizes how embodied interaction in social VR transcends the Cartesian dichotomy of mind and body. Postphenomenological perspectives foreground the intertwined nature of body, space, and technology in immersive environments, where embodied actions such as gestures and micro-movements are essential for co-creating and navigating social interactions (Dourish, 2001). As discussed in the theoretical framework, these embodied interactions form the foundation of meaningful engagement in virtual environments and are central to the social production of space.

Embodied gestures, micro-movements, and user behaviors in VR recreate the nuances of typical social interactions in real-world, allowing verbal and non-verbal cues to foster intimacy and shared presence. For example, according to Kilteni et al. (2012), personal embodiment shows the way avatars extend the physical body movements of users in supporting self-representation and identity formation. Social embodiment, as supported by Barsalou et al. (2003), underscores how actions like waving during virtual greetings establish trust and coherence, reinforcing the performative aspects of embodied interaction.

The study also emphasizes the importance of environmental embodiment, where the architectural and sensory design of VR spaces mediates user interaction and engagement. Examples include the practices of mirror-dwelling and customizing an avatar to reveal the users' capabilities to integrate the physical and virtual self as one, reinforcing the body ownership illusion. These allow the user to identify and build a sense of self in the digital space, merging both physical and virtual into cohesive representations of self. This confirms Li et. al.'s (2001) perspective on mediated presence, where virtual interactions resemble direct experience characteristics.

VR's ability to enhance embodied interactions extends to the introduction of a "sixth sense," blending physical and virtual sensations to extend the phenomenology of presence. Simulated touch or disabling personal space bubbles exemplify VR's capacity to mimic and even enhance physical intimacy by combining tactile, emotional, and sensory dimensions into immersive experiences. These interactions

underline VR's potential to redefine interpersonal dynamics, fostering deeper emotional connections and innovative forms of social engagement.

The concept of presence is foundational for the production of virtual spaces, as described by Berger (2020), including telepresence, self-presence, and social presence (Lee, 2004). Telepresence, or the sense of "being there," is facilitated by VR's vividness and interactivity, supported by Steuer's (1992) concept of representational richness. Spatial audio, high-definition visuals, and haptic feedback enhance user engagement in VR and allow users to perceive and act within these environments as if they were real. Self-presence is achieved through personalization like avatar customization, which, as Ratan and Hasler (2009) argue, increase users' emotional and cognitive connections to their virtual identities. Social presence, emphasizing the relational dynamics between co-present entities in a shared space, enhances mutual presence and group cohesion, with features like gaze tracking and synchronized gestures contributing significantly to perceived authenticity of virtual interaction (Biocca, 1997).

Real-time avatar interactions with avatars reinforce social behaviors, such as maintaining personal space and using polite communication. These behaviors provide continuity between physical and virtual social norms, increase user engagement, and strengthen emotional bonds. However, the study also mentions a limitation of using NPCs in virtual environments: While NPCs can simulate social interactions, they lack the emotional depth which is critical for authenticity of virtual experience. This underlines the irreplaceable role of real users in meaningful virtual experiences. Future research can examine how developments in AI-driven NPCs may enhance social presence through the addition of emotionally intelligent interactions that complement human connection.

User comfort and accessibility are key in the success of social VR platforms. Minimizing disorientation and offering optimal user experiences are integral parts of any VR experience. Design elements such as easy, ergonomic navigation, clear horizons, and stable spatial structures help users navigate in virtual spaces. In this sense, creators' commitment to inclusive design principles such as prioritizing intuitive interfaces, avoiding overstimulation, and balancing immersive aesthetics with

usability provides a model for creating virtual environments that meet diverse user needs and prevents discomfort. By adopting these principles, platforms remain accessible while appealing to a wide range of users.

Differences in user preferences and practices further underline the importance of inclusive design principles. While younger users may seek experiential and gamified interactions, older users often value community-building, participatory rituals, and familiar spaces. This diversity highlights the need for various interaction styles and social preferences in VR design. Therefore, designers should find a balance between abstraction and familiarity. These insights resonate with research supporting universal design principles and emphasize the importance of inclusivity and accessibility to accommodate diverse and demographics and physiological needs.

As a result, this study underscores the foundational role of embodied interaction, presence, and usability in the success of VR experiences. By placing user comfort and accessibility first, allowing for authentic social contact, and enabling innovative practices, social VR platforms can merge physical and virtual interactions in meaningful ways. These findings suggest that as a medium, VR experiences hold great potential for embodied interaction, social presence, and emotional connection.

6.2.2. Practical Contributions and Implications

This section presents the study's practical insights, which provide recommendations for platform providers, marketing specialists, developers, creators, users, and other stakeholders of social VR platforms. *Figure 6.4* depicts the practical contributions and implications derived from this study.

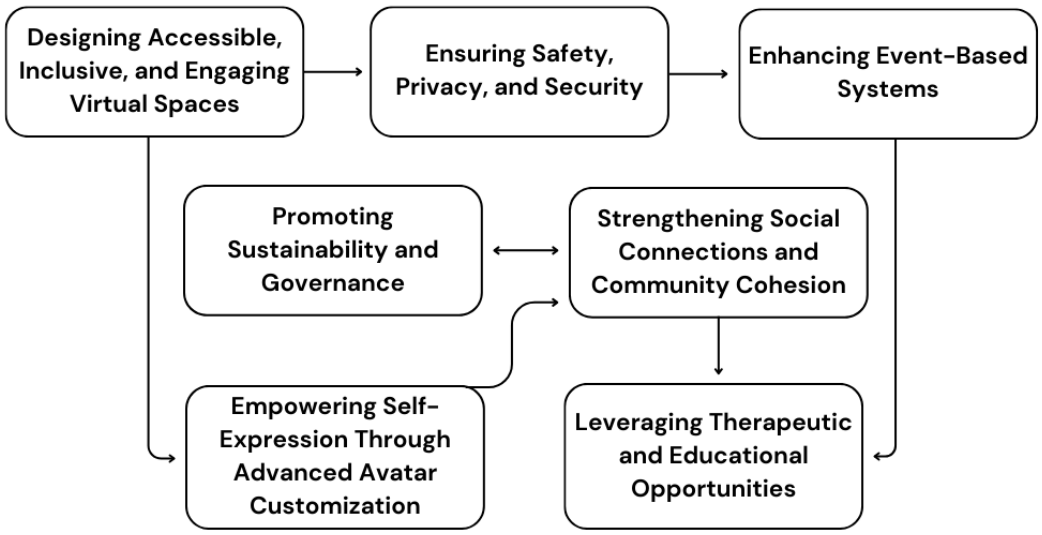


Figure 6.4 Practical contributions and implications.

6.2.2.1.Designing Accessible, Inclusive, and Engaging Virtual Spaces

The creation of an inclusive and engaging virtual environment requires a holistic approach that integrates accessibility, intuitive design, universal usability principles, and technical considerations. Inclusive design elements include ergonomic hardware, simplified visuals, and accessible tools for older users, neurodivergent individuals, users with disabilities, and those prone to motion sickness or sensory discomfort. Additionally, platforms that have multi-platform accessibility, offering both VR and non-VR options such as 2D modes, increase inclusivity and broaden participation. Hardware compatibility with a wide range of devices and integration with non-immersive platforms allow diverse users to connect the platforms.

Seamless onboarding features like intuitive interfaces, accessible tutorials, and "guest modes" play a critical role in attracting and retaining users by reducing entry barriers and enhancing usability. Clear navigation systems and streamlined account management make platforms approachable, especially for first-time users. Additionally, designers need to balance realism with abstraction to create immersive yet comfortable environments. Familiar spatial cues such as floors, walls, paths, signposts, and visual landmarks help users easily navigate, feel stable, and maintain orientation in virtual environments. Considering the preferences of various users, such as older users' preference for familiarity and younger users' desire for novelty, ensures that virtual spaces appeal across different demographics.

Familiar and recognizable design elements further enhance user engagement in virtual environments. For example, formal seating arrangements are well-suited with lectures and conferences, while dynamic lighting and open layouts foster social interaction. Avoiding loud sounds, flashing lights, and overly complex visuals ensures comfort and accessibility for users. In addition, expanding the capacity of worlds would allow for more inclusive meetings because instance limitations often cause social fragmentation and lead to a break of unified interactions.

Technical updates must prioritize backward compatibility to avoid disruptions. Platforms should be mindful of balancing innovation with stability, as these are crucial for maintaining trust and consistent engagement. Iterative design processes supported by usability testing and feedback integration allow platforms to better evolve alongside their users' needs. The integration of built-in performance monitoring tools also allows creators to handle usability issues in user-generated worlds efficiently.

6.2.2.2.Ensuring Safety, Privacy, and Security in Social VR

Ensuring safety, privacy, and security is vital aspects of social VR platforms. Measures such as AI-driven moderation, customizable privacy settings, and clear community standards help mitigate disruptive behavior and foster secure interactions. Collaborative safety practices, including user-driven moderation and reporting mechanisms, further empower creators to maintain safe environments effectively.

Platforms must also consider age restrictions, implement personal space bubbles, and provide tools to block disruptive users, all while prioritizing the protection of vulnerable groups, such as children. Additionally, moderators, particularly those handling sensitive issues like harassment or mental health concerns, should receive proper training. Transparent data policies, along with features like selective pseudonymity, biometric security, and identity verification, strike a balance between user anonymity and accountability. By adapting to evolving legal standards and implementing compliance systems, platforms can protect user rights while fostering trust.

6.2.2.3.Strengthening Social Connections and Community Cohesion

Social VR platforms thrive on meaningful social connections, and tools like realistic eye contact, responsive gestures, emojis, symbolic elements, and social catalysts all play crucial roles in deepening emotional engagement and enhancing interaction. To foster inclusivity and cohesion, it's essential for platforms to establish consistent community standards across all social VR environments. Collaborative tools, shared spaces, and community-driven initiatives help strengthen social bonds, while projects such as communal housing templates and collaborative design options encourage collective participation. Recognizing and rewarding contributions through badging systems, co-hosting credits, and mentorship programs further motivate user engagement. Additionally, platforms should acknowledge the importance of third-party communication tools like *Discord* and actively support community continuity beyond the platform by offering features such as exporting social graphs, easy friend-finding tools, and integration options that facilitate connections across different virtual spaces.

6.2.2.4.Enhancing Event-Based Systems

Event-based systems are central to user participation and community activity in social VR platforms. For maximizing the event experience, platforms should implement advanced event management tools, including robust moderation features like stage blockers, megaphones, web-projectors, event calendars, discovery tools, personalized notifications, and instance management.

6.2.2.5.Leveraging Therapeutic and Educational Opportunities

Social VR platforms offer promising opportunities for mental health by providing accessible and cost-effective solutions to diverse range of users. Support groups, peer-led programs, meditation sessions, and trauma-focused discussions can provide valuable support to individuals in need. However, the ethical and safe implementation of these programs requires collaboration with mental health professionals and the development of robust ethical guidelines considering the nature of interactions specific to social VR.

Moreover, in the field of education and professional development, immersive training modules and virtual classrooms hold transforming potentials in learning paradigms. Social VR platforms like *Engage* and communities such as *Educators in VR* exemplify the potential of social VR to empower learners and professionals, fostering global exploration, connection, and collaboration. Platforms should innovate tools promoting collaboration and engagement for educational and professional development.

6.2.2.6.Empowering Self-Expression Through Advanced Avatar Customization

Advanced customization options for avatars allow users to express themselves authentically in virtual environments. Features such as photo-based avatar creation, non-humanoid designs, and hybrid avatars cater to diverse preferences, while cross-platform avatar migration and wardrobe histories strengthen identity continuity. Platforms should prioritize accessible avatar customization tools to ensure inclusivity and empower users to personalize virtual identities.

6.3.2.7. Promoting Sustainability and Governance

While social VR platforms have empowered users to connect, collaborate, and communicate across the globe, the consolidation of power in the hands of a few companies raises important questions about access, equity, and the privacy of data-driven virtual environments. For example, platform policies are often dictated by corporate interests, prioritizing profit over user needs and exacerbating inequities. Governance models should be transparent and include structures like Public Benefit Corporations (PBCs).

Addressing these issues requires a holistic approach in platform design and governance. Platforms should prioritize sustainability by focusing on asset preservation, community continuity, and cross-platform interoperability. Integrating tools for exporting avatars, worlds, and digital assets are important to mitigate the disruptions caused by platform closures, as seen in *AltspaceVR*'s shutdown, where users struggled to preserve their virtual identities and connections. Additionally, the

lack of standardized digital identities and protocols limits users' ability to maintain their communities and assets when platforms shut down. Therefore, collaboration among tech companies to create interoperable standards for digital identities are vital to foster an interconnected Metaverse. Further, monetization strategies that empower creators, such as ticketing systems, virtual asset sales, and subscription models, can support long-term sustainability. Partnerships with businesses for events can complement these strategies and provide diverse revenue streams.

6.2.3. Methodological Contributions and Implications

This study explores immersive virtual spaces using a mixed-method framework. It integrates multi-platform ethnography, a user-centered approach, and both phenomenological and postphenomenological analyses to provide a comprehensive understanding of these evolving environments.[46] *Figure 6.5* highlights the methodological contributions and implications of this study.

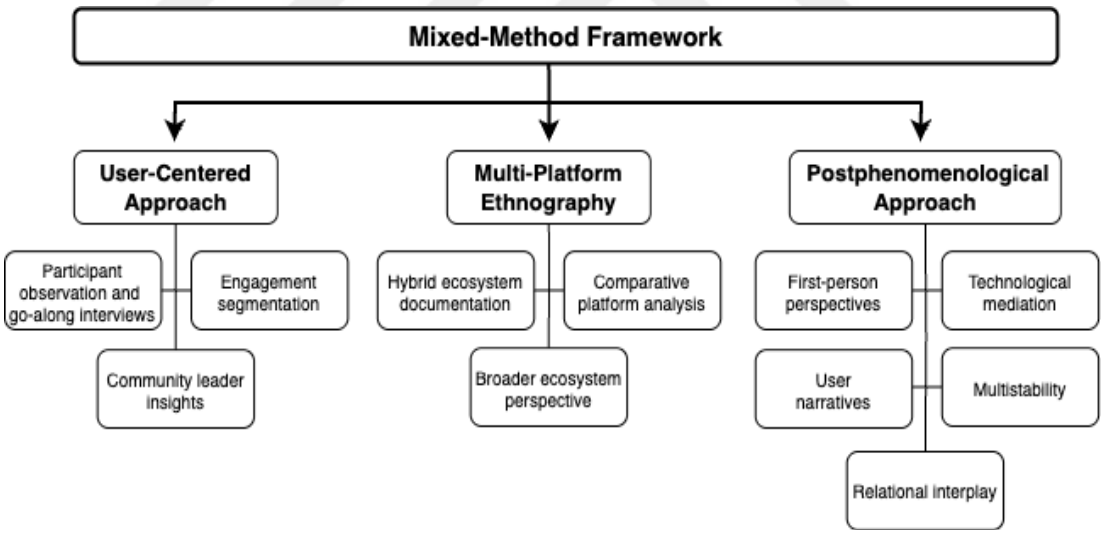


Figure 6.5 Methodological contributions and implications.

The study highlights the value of mixed-method approaches in social VR research by combining qualitative and VR-specific practices to enrich the research process. Participant observations, go-along interviews, and online interviews were utilized to generate nuanced insights into user behaviors and experiences. This

[46] Researchers seeking further details on the application of my methodology can refer to the following section entitled "Reflexivity in Virtual Ethnography: Suggestions, Challenges, and Limitations," where I provide an in-depth discussion of my methodological approach and the useful insights that I gained throughout the process.

combination of methods integrated visual, auditory, and interactive data, enabling a comprehensive exploration of social VR environments and user-environment relations.

Go-along interviewing proved to be a particularly valuable method in this study. This participatory approach combines interviews with ethnographic observation (Garcia et al., 2012; Harvey, 2024; Amaya et al., 2024). Garcia et al. (2012, p. 1402) emphasize that go-along interviews align with participatory research methods, which prioritize an iterative, participant-guided data-sharing process. While this study did not fully embrace participatory research, where participants act as co-researchers shaping the research design and outcomes, it incorporated the participatory aspects inherent in go-along interviewing. Conducting interviews within participants' virtual environments allowed for deeper insights, demonstrating the potential of participatory approaches in social VR research- particularly in generating results that benefit both researchers and the communities involved.

Moreover, the study relied on qualitative methods because ethnographic observations and interviews were more ideal to understand the complexity of user-environment relations in immersive VR, the social production of virtual spaces, and the interplay of individual and collective practices. However, the findings also showed the potential value of integrating quantitative methods in future research. For example, surveys measuring participants' emotional well-being or community belonging could provide a greater understanding on the psychological and social impacts of virtual environments. Therefore, researchers might consider using a mixed-method approach blending qualitative and quantitative analysis to offer a holistic perspective on social VR experiences.

6.2.3.1.Multi-Platform Ethnography

A multi-platform ethnographic approach was central to this study. I extended the research across various social VR platforms along with *AltspaceVR*, including *VRChat*, and external tools like *Discord* and *Facebook*. This approach documents interactions within hybrid ecosystems, captures the interconnected nature of virtual communities, and explores how they sustain themselves, adapt, and evolve across

different contexts. Comparative platform analyses also provided insight into the platforms' social, technical, and competitive dynamics, offering a more comprehensive view of the social VR landscape. These emphasize the importance of considering the broader ecosystem in research practices.

6.2.3.2.User-Centered Approach

The user-centered approach formed the basis of this study, which focused on the different roles users take on social VR platforms, such as world creators, event creators, and general users. This segmentation helped document varying patterns of engagement, challenges, and priorities. This approach provided a way to address diverse user needs. Engaging with community leaders as key informants, along with a substantial number of participants comprising experienced users, enhanced the depth and relevance of the research.

The extended participant observation and go-along interviews were at the core of the user-centered approach, as these allowed me to observe users in their own contexts. A balance of subjective user narratives with objective data collection in virtual worlds provided a comprehensive view of user practices and design elements. This approach is important to assure that research outcomes reflect the lived realities of user groups contributing to user-centered design and analysis frameworks.

6.2.3.3.Phenomenological and Postphenomenological Approach

This study employed both phenomenological and postphenomenological approaches to explore how users experience virtual spaces and how technology mediates those experiences. While the phenomenological approach highlighted personal and emotional dimensions of virtual engagement, the postphenomenological perspective explored the mediated interplay between users and virtual environment. Together, these methodologies helped analyzing how virtual spaces are both shaped by and actively shape their users and provided a holistic perspective on the relationship between users and immersive virtual environments.

The phenomenological approach focused on grasping the personal dimensions of users interacting with virtual spaces. By analyzing the first-person perspectives of users, the research showcased the emotional and psychological aspects of users' experiences. This is further enriched through narrative methodologies, which focus on the subjective meanings users attach to their interaction. Analyzing user-generated worlds also provided insights into the cultural and social values embedded within these virtual environments.

The postphenomenological approach further investigated how VR technologies mediate and reshape user perceptions. This perspective moved beyond individual experiences to investigate how platform-specific features and technological affordances influence users' experiences. Such an analysis was based on the concept of multistability, which underlined the flexibility of technologies to serve a variety of user needs in different contexts. By analyzing how these affordances mediate interactions, the study highlighted the co-constitutive relationship between users and the technological frameworks of social VR platforms.

6.3.Reflexivity in Virtual Ethnography: Suggestions, Challenges, and Limitations

Being a qualitative researcher on social VR platforms has been a challenge for me. That led me to write the section on reflexivity, one that does not just recognize challenges and limitations but reflects upon how these experiences shaped and transformed my methodology. Hopefully, this iterative process of adapting and refining my approach will also help other researchers through virtual ethnography in social VR environments.

Researchers should consider several challenges and limitations before entering the field. Firstly, when starting research on a social VR platform, everything can capture a researcher's attention- from the built environment to interactive objects, avatars, practices, and activities. This can be overwhelming in the research process, especially for those who are not used to virtual environments. During the first days of observation, I recorded everything that I saw. The data became too much to handle and analyze. This experience taught me the importance of being selective and intentional

in my observations. I recommend researchers to narrow the focus and concentrate on certain dimensions.

To get more meaningful data, I changed my approach and started by considering the space from the creators' perspective, thus critically analyzing what they might have focused on while designing virtual spaces. Then, I explored users' practices: How they interacted with the space and each other. Considering what the creators might have meaningfully emphasized and analyzed users' interactions allowed me to focus on more data. My third step was to note my thoughts, emotions, and feelings. Reflecting on how these spaces made me feel allowed me to empathize with users. Also, the interaction with participants increased my awareness of my role as a researcher and influenced my perspective. This iterative process of learning was important in developing a more systematic and focused method of collecting data, which was so necessary in the large and complex virtual environments.

6.3.1. Navigating Technical and Social Challenges of Ethnographic Research in VR

Studying space and observing user practices in VR proves to be much more challenging than conducting similar research in real life. One of the primary difficulties stems from technical limitations. For instance, taking observation notes while wearing a VR headset is almost impossible. I overcame this difficulty through recording my own voice to transcribe later instead of taking notes. However, this approach brought a new challenge: A speech bubble appeared above my avatar's head whenever I spoke in a virtual world, indicating that I was physically talking at that moment. This visual cue disrupted the natural environment because some users realized that they were being observed and began to look at me suspiciously. Once I noticed that the speech bubble was making users aware of my speech, I modified my approach. In smaller environments, I sometimes couldn't record my voice at all, which made it harder to take detailed notes after leaving the field. Because the awareness of my presence could raise concerns about potential biases, as users might alter their behavior if they knew they were being observed. Moving around a room, standing in a corner, looking around, and talking to myself in VR was as awkward as it would in

real life. This also created a challenge in interacting with users while recording my voice, which often disrupted my concentration and focus.

The researcher's discomfort with the VR headset can pose a long-term challenge to the research process. Extended periods in VR, equivalent to those in physical environments, may not be feasible. Some go-along interviews lasted approximately two hours, and for a researcher not used to spending such extended periods in VR, it can be quite challenging. Alongside the headaches and nausea experienced over time, managing multiple factors simultaneously became overwhelming. In my experience, cognitive load was high, and making observations beyond an average hour was challenging. Yet, as advised by some users, I found that using a head-strap facilitated prolonged VR use. Therefore, I recommend researchers to use a head-strap for extended VR observations, although it does not provide a complete solution.

There are several limitations stemming from the lack of experiment control in VR. A researcher only has conversations' rhythms, verbal and non-verbal interactions, environmental features, and textual data. Avatars can teleport in and out of the world, and this makes monitoring users' navigation and movement quite challenging. Besides, to communicate verbally with other users in a virtual world, it is necessary to share the same environment with them. However, one cannot know whether others in the same space are actively listening or hearing. There is no indicator showing it. Yet, non-verbal behaviors of users can provide clues that others are currently listening (through observing the use of real-time hand-arm gestures, faked eye movements, or the use of emojis and gestures). In addition to these, some people remove their devices and leave the virtual environment, but their avatars remain visible on the platform. In such a situation, it is difficult to understand if the user is actively present (online) or not. Another important limitation starts from device interoperability among users. Despite most users employ VR headsets, the diverse devices connecting them to the platform can influence their experiences and the researchers' ability to make consistent observations.

One major challenge is navigating time zone differences. As a researcher based in Turkey, I had to adjust my schedule to waking up around 3.00 to 6.00 a.m. to observe user activity, as most of the user base is concentrated in the United States. Language

barriers also posed a limitation. Although social VR platforms are international, my communication was limited to English and Turkish, excluding non-English-speaking users, such as those speaking Spanish or Chinese. This limitation narrowed the diversity of the research sample.

Transcribing the interviews further magnified these challenges. Some of my participants were non-native English speakers, which made parts of the interviews difficult to understand. Also, factors such as the rapid movement of avatars in VR and background noise introduced by participants' environments caused unclear recordings. These can be overcome if researchers work in pairs: One to conduct the interactions and participant interaction while the other researcher is responsible for recording quality and monitoring the environment to capture data that is usable.

The digital divide further intensifies this issue. As devices and infrastructure are not universally provided, the only participants who are able or willing are early adopters who can afford technology and have access to these platforms. These users often shape both cultural and normative values of the virtual spaces and embed them in the design and social practices involved therein. However, these experiences are not representative of all users. This raises critical questions about the inclusivity of social VR platforms and the greater accessibility of XR technologies. Besides, this study focused on the experiences within social VR platforms but did not address the external dimensions surrounding these environments, such as socio-economic conditions, policy frameworks, and infrastructure disparities. Future research can investigate how external factors influence the adoption and evolution of social VR platforms.

Finally, as a researcher based in Turkey, I faced specific regional constraints. Most of my participants were in the United States, as the largest user base for these platforms resides there. Limited accessibility to VR devices in Turkey and regional restrictions, such as *Horizon Worlds* being unavailable, made it impossible to conduct this research locally. This underscores the urgent need to ensure that the future of virtual worlds integrates diverse perspectives and is not exclusively shaped by a privileged few with access to these technologies.

There are also several limitations stemming from the demographics' validity and the privacy concerns. Ensuring demographic validity in social VR platforms is almost impossible because it is challenging to collect accurate data. For example, a male user may use a female avatar and alter its appearance. Besides, users often join platforms using pseudonyms and can change it at any moment. According to my observations, users do not reveal their identities on the platforms' *Discord* channels or *Reddit* forums too. Since users can present themselves as they desire, the only possible way to deduce their age and gender is their voices. As a result, I was unable to account for demographic differences among my participants.

Although the long-term participant observation process across different platforms demonstrated the potential of longitudinal studies to capture long-term changes in user behaviors, psychological impacts, and the evolution of digital cultural practices, the anonymity of users poses significant challenges for researchers (Galloway, 2011), particularly for those seeking to track a group of users over an extended period. For instance, re-encountering the same user is uncertain unless they are added to a friend list. Based on my experience, some user groups were unwilling to include new members in their community due to privacy concerns. This makes it challenging for researchers to socialize and find participants within the platform. In light of these challenges, I recommend researchers consider adding responsive users or groups to their friend list or connecting with them through external online groups like *Discord*. Being a part of communities for a long time and earning their trust can also be a solution for conducting research over extended periods.

Technical issues can directly impact field studies in social VR, such as trouble logging in, joining worlds, or audio issues. Given the frequent updates to social VR platforms, controlling such technical problems is nearly impossible for a researcher. Therefore, I advise researchers to have a backup plan in the field. For example, if a researcher scheduled a meeting with a participant in social VR but encounters a technicalproblems, the interview may need to be conducted in another platform. Additionally, it is quite necessary to visit the meeting venue beforehand, especially for go-along interviews in VR, to identify potential technical and social issues that could disrupt the interview. Researchers should be proactive to ensure the continuity of the research process.

6.3.2. Innovating Research Practices in Response to Platform Dynamics

The constant changes that happened with the updates, glitches, and shutdowns of social VR platforms were demanding for continuous adjustment of my research practices. Among many others, the shutdown of *AltspaceVR* was the most impactful challenge, which urged me to reconsider my research process and implement a new plan. Instead of considering this shutdown as a limitation, I welcomed the shutdown as a chance to navigate through the themes of media migration, virtual diaspora, and community adaptation in ways that enhanced the scope and understanding of my study. The shutdown of the platform was particularly challenging for me as an ethnographic researcher. Upon learning about the platform's closure on closure January 21, with the scheduled for March 10th, I was awaiting approval from my institution's ethics committee to start interviews. In the first days following this news, I thought about how to navigate this situation and proceed with the research. Having connected with the platform over two years, I was deeply saddened by its shutdown. However, as a researcher, I had to conduct research relevant to the present scenario.

As I listened to users' sentiment and observed users' sadness regarding the shutdown of this platform, I realized that the shutdown itself provides a new perspective to social production and reproduction of space. Especially, users defining themselves as "refugees" and framing this situation as a "migration" highlighted the significance of their connection with the platform and the importance of their social lives within it. After incorporating the platform's shutdown as a new dimension of the study, I started spreading recruitment messages as fast as possible. I used *Discord* channels I was already a part of and reached out to community leaders to ask for their help. This also points to the flexibility required in the research design regarding social VR platforms. More than diversifying research on multiple platforms to reduce the effect of a possible shutdown, contingency plans in data collection would include backup communication channels that could be used. Furthermore, retaining relationships with participants across different platforms helps to maintain continuity in the process of research. This will also embed a multi-platform approach in the research methodology. By doing so, researchers can keep their data safe and gather information on how users would navigate through, adapt to, and use different social VR platforms.

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APPENDICES

Appendix A

Observation Spreadsheet

The observation spreadsheet is organized into four main sections: *Primary Information*, *Participant Observations*, *Thoughts and Feelings*, and *Analysis*. The contents of each section are detailed below:

1. **Primary Information:**
   - Date
   - Start and end time
   - Duration
   - Number of users (in events/worlds)
   - Event/world/meetup name
   - Public/private setting
   - Indoor/outdoor/not defined space
   - Context and narration: Purpose of the space.

2. **Participant Observations:**
   - User Characteristics, Personalities, and Roles: Demographics, personality traits (e.g., introverted, extroverted), and user roles (e.g., moderators, speakers, audience).
   - Devices in Use: Devices users connect with (e.g., VR, PC).
   - User Traffic: Frequency of users entering, leaving, and staying in the space (e.g., low, moderate, high).
   - Policy, Rules, and Norms: Guidelines, registration, and moderation policies in the space.
   - Affordances and Features: Observable affordances and features based on activities and spatial practices.
   - Use of Space: How and where users gather, their positioning, and interpersonal distances
   - Movement and Navigation: Locomotion types (e.g., walking, teleporting) and spatial navigation (e.g., limited, directed).
   - Built Environment: Social dynamics influenced by spatial features (e.g., landscape, architecture, design).
   - Vibe and Atmosphere: General mood of the environment (e.g., formal, friendly, dark, informal).
   - Audial Details: Soundscape of the space (e.g., volume, ambient noise, object sounds).

- Interactive Objects: Objects in the space that are interactive, decorative, or functional.
- Social Catalysts: Objects or elements that encourage social interaction and facilitate connections.
- Rituals and Habits: Regularly repeated actions, beliefs, symbols, and social events in the space.
- User Interactions: Verbal and non-verbal interactions, including gestures, emojis, body language, and social dynamics.
- Frequency of Interactions: Rate of social interactions between users (e.g., low, moderate, high).

3. **Thoughts and Feelings:**
   This section captures the researcher's personal reflections on how the space, event, or activity made them feel and the reasons behind those feelings.

4. **Analysis:**
   In this section, the researcher critically examines the following aspects:
   - Affordances, social practices, and the materialization of experiences.
   - How familiar cues are represented in the space and how users interpret them.
   - Spatial design features that encourage or inhibit social interaction.
   - How space design influences user navigation and movement.
   - Verbal and non-verbal interaction styles, patterns, and behaviors within the space.
   - Repeated activities, behavioral patterns, and consumption habits.
   - Social affordances and collaborative activities initiated by users.

Appendix B

Interview Questions

1- Online interview questions for event organizers

1. Can you tell me about yourself? Where are you from, what is your job, and what are your degrees and qualifications, etc.?
2. What is your area of expertise in social VR platforms? What role do you take on as an event organizer?
3. Which social VR platforms do you actively use as a user? On which social VR platforms do you organize events? Why or why not?
4. How long have you been working in this field, and how many events have you organized on social VR platforms until now?
5. Do you earn money or gain any financial income from this work, or do you do it as a hobby? Why or why not?
6. How do you use the platform(s) as an event organizer? What type of events do you usually organize? Can you provide specific examples of the events you've organized before?
7. Do you usually work alone or with a group of people? How do you typically share tasks if you work with a group of people?
8. How do you choose the event venue when planning or facilitating events? Do you organize events at the world templates offered by the platform(s), or do you use worlds built from scratch? If you use the templates provided by the platform, what criteria do you consider when choosing among them, and how do you customize them? If you prefer spaces built from scratch, how does this process proceed?
9. Are there any features or elements of the platform(s) that you particularly enjoy or find useful while organizing or facilitating events? Why?
10. How do virtual worlds' spatial characteristics like scale, environmental design, lighting, atmosphere, and interactivity impact how events unfold within them?
11. Do you have any strategies or approaches to shape the behavior, interaction, or activity of users participating in the events you organize? If yes, please provide examples of how these strategies have been effective.
12. How would you describe the user profile of the events you organize? Do you have any insights into the demographics, interests, or motivations of your community?
13. Do you believe the platform(s) has the potential to make a positive social impact in people's lives? If yes, how?
14. What are your thoughts on safety in virtual worlds, considering other factors such as privacy, anonymity, or security? How do you address these issues in your events?
15. To what extent do the rules and policies of the platform(s) shape, restrict, or contribute to your work?
16. In a virtual world where you participate as an event organizer, what capabilities or features do you typically have that differ from those given to the users? If you adjust user abilities, how do you do it?
17. What is the most challenging aspect of your work? Why? What developments do you think would make the most difference in how things work in your field?

18. How did you feel when you heard the news that *AltspaceVR* was closing and what did you do first?
19. How does the closing of *AltspaceVR* affect you and your community?
20. What other social VR platforms have you tried to find a new home since you heard the news? Where do you plan to migrate? And how do they compare to *AltspaceVR* in terms of community and social engagement? Have you been able to recreate or find your events, communities, and experiences on other platforms? If yes, how? If no, why not?
21. What have you learned from this experience, and how would you approach a similar situation in the future?
22. What do you envision for the near future of social VR, and what role do you see social spaces and communities playing in it?

2- Online interview questions for world creators:

1. Can you tell me about yourself? Where are you from, what is your job, and what are your degrees and qualifications, etc.?
2. What is your area of expertise in social VR platforms? What role do you take on as a creator?
3. Which social VR platforms do you actively use as a user? On which social VR platforms do you create projects? Why or why not?
4. How long have you been working in this field, and how many projects have you created in social VR platforms until now?
5. Do you earn money or gain any financial income from this work, or do you do it as a hobby? Why or why not?
6. How do you use the platform(s) as a creator? What do you create? Can you provide specific examples of the things you've created before?
7. Do you usually work alone or with a group of people? How do you typically share tasks if you work with a group of people?
8. How do you create your projects? Do you create from scratch or use the templates provided by the platform(s) and then customize them? Why or why not?
9. Are there any features or elements of the platform(s) that you particularly enjoy or find useful in your projects? Why?
10. What inspires or influences your creations? Are there themes that fuel your works?
11. How do you first conceptualize what you are creating? Do you think in terms of material dimensions like its form, layout, and design, or more abstract dimensions like its social and cultural meanings? Or both? If you consider abstract dimensions, what are your strategies for implying social and cultural meanings in your projects? Can you explain with specific examples?
12. What do you think about creating familiar clues transferred from the real world to the virtual world? Do you think virtual worlds should simulate reality?
13. How do you think design shapes users' experiences in virtual worlds? Do you have any strategies to guide users' perceptions, behaviors, and interactions in a certain way? If yes, can you explain with specific examples?
14. To what extent do the rules and policies of the platform(s) shape, restrict, or contribute to your work?
15. Do you conduct user experience testing in your projects? If yes, which methods do you use?

16. Have you ever observed instances where users engaged with your creations in a novel or unforeseen manner that you did not anticipate? If yes, can you provide specific examples of such cases?
17. In a virtual world where you participate as a creator, what capabilities or features do you usually have that differ from the ones given to the users? If you adjust user abilities, how do you do it?
18. What are your thoughts on safety in virtual worlds, considering other factors such as privacy, anonymity, or security? How do you address these issues in your projects?
19. What do you think about users' growing expectations to design their social contexts through easy-to-use in-world creation tools? How do you evaluate opportunities and threats in this regard?
20. What is the most challenging aspect of your work? Why? What developments would make the most difference in how things work in your field?
21. How did you feel when you heard the news that *AltspaceVR* was closing and what did you do first?
22. How does the closing of *AltspaceVR* affect you and your community?
23. What other social VR platforms have you tried to find a new home since you heard the news? Where do you plan to migrate? And how do they compare to *AltspaceVR* in terms of community and social engagement? Have you been able to recreate or find your worlds, communities, and experiences on other platforms? If yes, how?
24. What have you learned from this experience, and how would you approach a similar situation in the future?
25. What do you envision for the near future of social VR, and what role do you see social spaces and communities playing in it?

3- Online interview questions for users:

1. Can you tell me about yourself? How old are you, where are you from, and what is your job, etc.?
2. How long have you been using social VR platforms?
3. Which social VR platforms do you actively use? Where do you spend most of your time? Why or why not?
4. How do you connect to social VR platforms – through a VR headset, a desktop computer, or another device?
5. Can you tell me about your experience using the platform(s) in everyday life? For example, when do you typically log on to the platform(s), what draws you to it, what activities do you engage in, and how much time you spend on average?
6. What are your favorite features, tools, objects, or elements that you use most frequently and find useful or enjoyable, and what are some of the challenges or frustrations you've encountered? Why?
7. What are your favorite events or worlds that you enjoy spending time in and regularly visit? Why?
8. How do you decide to enter an event or a world? For example, do you consider the type and content of the event or world, its organizers, the number of active users inside, etc.?
9. Are there any spaces you don't prefer to spend time? If yes, what are they and why?

10. Do you have a private space in the platform(s) where you spend time? If yes, can you describe what this space means to you and what you do there?
11. How do you think a world's spatial characteristics like its scale, environmental design, lighting, atmosphere, and interactivity affect your experience in it? Can you provide some examples?
12. What do you think virtual worlds represent or symbolize? Do you see them as real places, fantasy worlds, or something else?
13. How are your experiences in virtual worlds similar or different from your real-world experiences? For example, are there things you are familiar with from the real world? Or are there things that virtual worlds provide you to experience that would not be possible in the real world?
14. In what ways virtual worlds reflect or challenge your cultural values and social norms? Why or why not?
15. Do you feel comfortable and safe in virtual worlds in general? When do you feel comfortable/uncomfortable the most? Why or why not?
16. How important are anonymity and privacy in virtual worlds for you? Do you have any tactics or practices for preserving them? If yes, what are they?
17. What does your virtual body (i.e., avatar) look like? Do you change the appearance of your avatar or add new accessories often? Why or why not?
18. Can you describe how your virtual body makes you feel?
19. Do you think that you can fully express yourself and interact with others and the virtual environment naturally and intuitively in the platform(s)? Why or why not?
20. Do you have a group of friends you regularly meet on social VR platforms or a social community you feel you belong to? If yes, how often do you meet, where do you meet, and what are your favorite social activities?
21. Have you ever had a close relationship or felt in love with someone you met on social VR platforms? If yes, can you tell me about this experience?
22. Do you keep in touch with your online friends outside of social VR platforms? If yes, what do you do together, different from your interactions in the platforms? If not, why?
23. Are there any factors you consider when approaching or avoiding unknown users in a virtual world? Potential factors can be related to the visual appearance of avatars, gender, age, or ethnicity. How do such factors influence your decision to approach or to move away from an unknown user?
24. There are personal, cultural, historical, and societal factors that can relatively contribute to a person's social status in a social environment, such as education, profession, affiliation, family background, income, and physical appearance. In your experience, what factors determine or contribute to a person's social status in a virtual community? Can you provide examples?
25. Do you think that social VR platforms support your social needs and have a positive social impact in your life? If yes, in which ways? If no, why not?
26. What do you think about designing your social contexts through easy-to-use world creation tools? Are you interested in creating your own virtual environments?
27. How did you feel when you heard the news that *AltspaceVR* was closing and what did you do first?
28. How does the closing of *AltspaceVR* affect you and your community?
29. What other social VR platforms have you tried to find a new home since you heard the news? Where do you plan to migrate? And how do they compare to *AltspaceVR* in terms of community and social engagement? Have you been

able to find your worlds, communities, and experiences on other platforms? If yes, how?
30. What have you learned from this experience, and how would you approach a similar situation in the future?
31. How do you see social VR platforms evolving in the near future? Do you have any suggestions for how the platform(s) could be improved or enhanced? If yes, what are they?

4- Go-along interview questions for users:

1. Can you tell me about yourself? How old are you, where are you from, and what is your job, etc.?
2. How long have you been using social VR platforms?
3. Which social VR platforms do you actively use? Where do you spend most of your time? Why or why not?
4. How do you connect to social VR platforms – through a VR headset, a desktop computer, or another device?
5. Can you tell me about your experience using the platform in everyday life? For example, when do you typically log on to the platform, what draws you to it, what activities do you engage in, and how much time you spend on average?
6. Can you show me some of the features or tools you use most frequently and some of the challenges or frustrations you encounter, and explain why you think this way?
7. What are your favorite events or worlds that you enjoy spending time in and regularly visit on the platform? Why?
8. What does this space mean to you? Can you tell me your memories and past experiences about this space?
9. How do you decide to enter an event or a world? For example, do you consider the type and content of the event or world, its organizers, the number of active users inside, etc.?
10. Are there any spaces you don't prefer to spend time? If yes, what are they and why?
11. Do you have a private space in the platform where you spend time? If yes, please invite me there now and describe what this space means to you and what you do there.
12. How do you think a world's spatial characteristics like its scale, environmental design, lighting, atmosphere, and interactivity affect your experience in it? Can you provide some examples?
13. What do you think virtual worlds represent or symbolize? Do you see them as real places, fantasy worlds, or something else?
14. How are your experiences in virtual worlds similar or different from your real-world experiences? For example, are there things you are familiar with from the real world? Or are there things that virtual worlds provide you to experience that would not be possible in the real world? If yes, can you show me examples?
15. In what ways virtual worlds reflect or challenge your cultural values and social norms? Why or why not?
16. Do you feel comfortable and safe in virtual worlds in general? Can you show examples of when you feel comfortable/uncomfortable the most? Why or why not?

17. How important are anonymity and privacy in virtual worlds for you? Do you have any strategies or practices for preserving them? If yes, what are they?
18. Does your virtual body (i.e., avatar) in the platform look like you? Do you change the appearance of your avatar or add new accessories often? Why or why not? If possible, can you show me the appearance of your previous avatars?
19. Can you describe how your virtual body makes you feel?
20. If there was a mirror in the world we meet, I asked the user to look at it and then asked: "How do you feel when you look at the mirror and see your reflection on it?"
21. Do you think that you can fully express yourself and interact with others and the virtual environment naturally and intuitively in the platform? Why or why not?
22. Do you have a group of friends you regularly meet on the platform or a social community you feel you belong to? If yes, how often do you meet, where do you meet, and if possible, can you show me your favorite social activities?
23. Have you ever had a close relationship or felt in love with someone you met on social VR platforms? If yes, can you tell me about this experience?
24. Do you keep in touch with your online friends outside of social VR platforms? If yes, what do you do together, different from your interactions in the platforms? If not, why?
25. Are there any factors you consider when approaching or avoiding unknown users in a virtual world? Potential factors can be related to the visual appearance of avatars, gender, age, or ethnicity. How do such factors influence your decision to approach or to move away from an unknown user?
26. There are personal, cultural, historical, and societal factors that can relatively contribute to a person's social status in a social environment, such as education, profession, affiliation, family background, income, and physical appearance. In your experience, what factors determine or contribute to a person's social status in a virtual community? Can you provide examples?
27. Do you think that social VR platforms support your social needs and have a positive social impact in your life? If yes, in which ways? If no, why not?
28. What do you think about designing your social contexts through easy-to-use world creation tools? Are you interested in creating your own virtual environments?
29. How did you feel when you heard the news that *AltspaceVR* was closing and what did you do first?
30. How does the closing of *AltspaceVR* affect you and your community?
31. What other social VR platforms have you tried to find a new home since you heard the news? Where do you plan to migrate? And how do they compare to *AltspaceVR* in terms of community and social engagement? Have you been able to find your worlds, communities, and experiences on other platforms? If yes, how?
32. What have you learned from this experience, and how would you approach a similar situation in the future?
33. How do you see social VR platforms evolving in the near future? Do you have any suggestions for how the platform(s) could be improved or enhanced? If yes, what are they?

Appendix C

A Comprehensive Summary of the Codes

Code No.	Code Category	Code Name	Code Definition	Sub-themes of the Code
1.	Perceived Space of Affordances	Frustrations and Challenges	This code captures various difficulties encountered on the platform.	- Platform instability - Accessibility and onboarding issues - Challenges in content creation - Social disruptions and disruptive behavior - Hardware issues and motion sickness
2.	Perceived Space of Affordances	Monetization and Economy	This code includes various methods of income generation, and the challenges faced in monetizing activities.	- Economic opportunities and challenges - Non-monetary forms of compensation - Community-based support systems
3.	Perceived Space of Affordances	Participant Profiles	This code encompasses various demographic characteristics, interests, and behavior and engagement levels of participants in events and worlds.	- Demographics and interests - Behavior and engagement levels
4.	Perceived Space of Affordances	Perceived Affordances: Material and Economic	This code encompasses perceived material and economic advantages of the platform.	- Overcoming economic barriers - Real-life limitations and virtual solutions
5.	Perceived Space of Affordances	Perceived Affordances: Professional and Educational	This code encompasses perceived professional and educational advantages of the platform.	- Networking and professional oppotunities - Educational uses and knowledge exchange - Creative and artistic expression
6.	Perceived Space of Affordances	Perceived Affordances: Psychological and Emotional	This code encompasses perceived psychological and emotional benefits of the platform.	- Social support and community - Reducing social anxiety and building confidence - Personal development and mental health support - Safe spaces for vulnerable users
7.	Perceived Space of Affordances	Perceived Affordances: Spatial and Physical	This code encompasses perceived spatial and physical advantages of the platform.	- Accessibility and inclusivity - Convenience and adaptability - Overcoming geographic limitations

				- Enhanced social and cultural experiences
8.	Perceived Space of Affordances	Platform Comparison	This code encompasses comparative experiences on various social VR platforms.	- Features, strengths, and limitations of various platforms
9.	Perceived Space of Affordances	Platform Entry Motivations	This code encompasses initial reasons for joining the platform.	- COVID-19 pandemic closures - Event-driven interests - Professional and educational motivations - Curiosity and tech interest - Creative and artistic exploration
10.	Perceived Space of Affordances	Sense of Presence	This code explores various elements that enhance a sense of presence.	- Spatial presence - Social presence
11.	Perceived Space of Affordances	Tools, Features, and Practices Users Like	This category encompasses preferred tools, features, and practices for users.	- Moderation and security tools - Exploration and interaction options - Creative tools and functions - Accessibility and inclusivity - Event management and participation - Community-building and connection
12.	Perceived Space of Affordances	Tools, Features, and Practices Event Creators Like	This category encompasses preferred tools, features, and practices for event creators.	- Moderation and security tools - Event management features - Versatility and adaptability - Accessibility and inclusivity - Creative customization - Community-building and connection
13.	Perceived Space of Affordances	Tools, Features, and Practices World Creators Like	This category encompasses preferred tools, features, and practices for world creators.	- Accessibility in world building - World-building tools - Creative freedom and flexibility - Iteration and testing processes - Community collaboration
14.	Perceived Space of Affordances	Unique Aspects of Virtual Spaces	This code encompasses unique elements, characteristics, and experiences specific to virtual environments.	- Unique interactions and capabilities - Limitless creativity - Accessibility and inclusivity - Safety
15.	Perceived Space of Affordances	World Entry Criteria	This code encompasses various factors and	- Social factors - Content and interest-based factors

			motivations for joining virtual worlds.	- Design and environment factors - Purpose-driven participation
16.	Conceived Space of Programming	Collaboration and Creativity	This code encompasses cooperative and creative activities in virtual spaces.	- Collaborative building and creation - Knowledge sharing and tool access - Educational and professional collaboration
17.	Conceived Space of Programming	Community Building Strategies	This code encompasses methods and approaches used to foster and sustain an engaged community.	- Ownership and identification with community - Audience participation and interactivity - Continuity through follow-up and engagement - Establishing safe and inclusive spaces
18.	Conceived Space of Programming	Conceptualizing World-Building	This code encompasses methods and strategies for conceptualizing and designing virtual worlds.	- Spontaneous, free-form creativity - Structured, intentional creativity
19.	Conceived Space of Programming	Event Management and Moderation Tools	This code encompasses features for organizing and managing events.	- Tools for event management and moderation - Security and safety features
20.	Conceived Space of Programming	Experiential Spaces	This code explores virtual spaces designed for unique and imaginative experiences.	- Exploration and adventure experiences - Creative freedom - Artistic expression
21.	Conceived Space of Programming	Familiarity	This code encompasses the role of familiar cues in virtual spaces.	- Use of digital twins - Importance of familiar settings
22.	Conceived Space of Programming	Instance Management	This code encompasses managing single or multiple instances within the platform.	- Strategies for instance management
23.	Conceived Space of Programming	Inspiration for World-Building	This code encompasses sources of inspiration for creators.	- Real-world and abstract influences - Personal stories and emotions - Feedback from the community - Navigating technical challenges
24.	Conceived Space of Programming	Private/Home Spaces	This code encompasses perspectives on creating and personalizing private spaces.	- Personalization for a home-like feel - Hosting friends and gatherings - Private spaces for intimate relationships - Collaborative decoration and building
25.	Conceived Space of Programming	Strategies to Lead Users through Design	This code encompasses approaches and strategies used by world creators to	- User guidance through design and layout

			guide users within virtual worlds.	
26.	Conceived Space of Programming	Strategies to Lead Users through Moderation and Rules	This code encompasses approaches and strategies used by event creators to guide users within virtual events.	- User guidance through moderation strategies and rule-setting
27.	Conceived Space of Programming	Task Distribution	This code encompasses methods for delegating tasks among team members.	- Role specialization - Collaboration and teamwork
28.	Conceived Space of Programming	User Experience Testing	This category encompasses practices for testing and optimizing user experience.	- Informal testing with select groups - Observational methods in user testing - Formalized testing improvement
29.	Conceived Space of Programming	World-Building Tools	This category encompasses tools and resources for virtual world creation.	- Navigating the learning curve - Tool usability and accessibility
30.	Lived Space of Virtuality	Avatar Customization and Identity Formation	This code explores how avatars express identities, preferences.	- Alternative personas and escapism - Reflecting real-life identities - Anonymity and freedom of stigma - Customization preferences - Social connections, and identity consistency - Emotional attachment to avatars
31.	Lived Space of Virtuality	Community Spirit	This code encompasses emotional bonds and community unity.	- Belonging and emotional connection - Role of events in community building - Shared, community-built worlds - Support networks and collaboration - Inclusivity
32.	Lived Space of Virtuality	Innovative Utilizations	This code encompasses unique, unexpected, and innovative ways users repurpose, adapt, and creatively utilize.	- Problem-solving creativity - Unintended or novel uses
33.	Lived Space of Virtuality	Intimate Relationships	This code encompasses development of close relationships.	- Formation and growth of romantic relationships - Acceleration of emotional bonds and friendships
34.	Lived Space of Virtuality	Maintaining Connections Beyond the Platform	This code encompasses ways of staying connected outside the platform.	- Predominant use of *Discord* - Use of social media and messaging

35.	Lived Space of Virtuality	Meanings of Virtual Worlds	This code encompasses different interpretations of virtual worlds.	- Worlds as extensions of self and home - Escaping reality and creating alternatives
36.	Lived Space of Virtuality	Memories	This code encompasses significant and meaningful experiences.	- Noteworthy or memorable experiences
37.	Lived Space of Virtuality	Rituals	This code encompasses ceremonial, cultural, historical, religious, emotional, and commemorative activities.	- Ceremonial practices - Cultural and historical celebrations - Religious observances - Emotional and commemorative rituals
38.	Lived Space of Virtuality	Safety, Anonymity, and Security	This code encompasses opinions, concerns, and tactics on maintaining safety.	- Views on security and emotional well-being - Tactics for safety, privacy, and security
39.	Lived Space of Virtuality	Social Affordances	This code encompasses social interactions and customs developed by platform users.	- Creative self-expression - Emojis and non-verbal communication
40.	Lived Space of Virtuality	Social Norms	This code encompasses practices and etiquettes developed by platform users.	- Adapting of real-world norms - Emergence of new, platform-specific norms
41.	Lived Space of Virtuality	Social Status	This code encompasses factors shaping individual recognition and influence.	- Social dynamics and roles - Personal attributes - Avatar design and appeal - Contributions to community and creations - Time spent - Expertise and knowledge
42.	Lived Space of Virtuality	Social Support	This code encompasses community-driven support methods.	- Emotional and mental health support - Support groups and community events
43.	Closure and Migration	Consequences of the Shutdown	This code encompasses the emotional, social, and practical impacts of the platform's closure.	- Emotional responses - Community fragmentation - Issues of trust and platform reliability
44.	Closure and Migration	Reasons of Shutdown	This code encompasses perspectives on the platform's closure.	- Popularity and user engagement concerns - Business and financial decisions - Operational and technical challenges - Critiques of corporate decision-making
45.	Closure and Migration	Lessons from the Shutdown	This code encompasses key insights and takeaways from the shutdown.	- Importance of diversification and backup planning
46.	Closure and Migration	Transition and Adaptation	This code encompasses diverse experiences in	- Transition and adaptation process

			transitioning to other platforms.	- Platform-specific learning insights - Efforts to preserve assets and rebuild communities
47.	N/A	Future of the Metaverse	This code encompasses speculations on the future evolution of the Metaverse.	- Challenges in economics and monetization - Technological advancements and hardware - Social and community dynamics - Regulatory and legal frameworks - Vision for future possibilities

Appendix D

Glossary

Affordances: The qualities or properties of an object or environment that enable an individual to perform an action. In virtual spaces, affordances refer to the interactive possibilities available to users.

Communicative Affordances: The potential for communication and social interaction within a virtual space, including features such as messaging, voice chat, gestures, and avatars that facilitate user connections.

Create-ability: The capacity for users to create, modify, or personalize aspects of a virtual space or object, often through tools or programming provided within a platform.

Environmental Affordances: The affordances provided by the virtual environment itself that enable or constrain certain actions, such as movement, interaction, or modification within the space.

Familiar Cues: Signals or elements within a virtual space that users recognize from real-world experiences or cultural norms, aiding navigation, interaction, and socialization.

Perceived Affordances: The affordances that users recognize or interpret as possible actions within a given environment, shaped by their prior experiences, expectations, needs, and contextual cues. This concept focuses on how users identify and utilize these affordances, influencing their interactions, experiences, and social practices in virtual spaces.

Social Affordances: The relationship between an object's attributes and a group's social dynamics that facilitates specific types of interactions among its members.

Social Catalysts: Factors or elements within a virtual space that encourage or trigger social interaction, collaboration, or the formation of relationships among users.

Social Production of Space: Drawing on Lefebvre (1991), the social production of space refers to how individuals and communities actively create and shape virtual spaces through social interactions, cultural practices, and lived experiences.

Social Reproduction of Space: Drawing on Lefebvre's (1991) perspective, social reproduction of space refers to the continuity and reinforcement of social norms, practices, and relationships in new virtual environments.

Social VR Platforms: A subset of virtual worlds that emphasize real-time, immersive social interaction through virtual reality.

User-Environment Relations: Drawing on Vindenes and Wasson (2021a), user-environment relations refer to the interactions and connections between users and their virtual environments.

Virtual Environment: A broad term for any digitally constructed space where digital interactions and experiences take place.

Virtual Space: A more specific type of virtual environment that is intentionally designed for user engagement, navigation, and social interaction. Virtual spaces often have defined structures, interactive elements, and immersive qualities that enable users to participate in various activities.

Virtual Worlds: A subset of virtual spaces that are persistent, computer-generated environments where users interact in real time, often through avatars.

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