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Chapter 3: The Spectrum of Reality: From Virtual Reality to Material World

The Spectrum of Reality: From Virtual Reality to Material World

The spectrum of reality ranges from completely virtual environments to the material world, with a range of mixed realities in between.

Virtual Reality (VR) has been defined as a fully immersive, computer-generated environment that simulates the user's physical presence in a virtual world. VR is typically experienced through a headset and controllers, allowing users to interact with the virtual environment in a highly realistic way. VR can be used in architecture to create immersive walkthroughs of designs and to test various scenarios and design options.

Although the above definition is the traditional one, it is limiting, short-sighted, and can soon become redundant. As technology advances and new methods of perception are developed, our understanding of VR will continue to evolve. For instance, Elon Musk's Neuralink has tasked itself with creating brain-machine interfaces (BMIs) that can create simulated experiences that will make VR goggles obsolete. As such, the definition of VR must be flexible enough to accommodate these changes.

Therefore, a more comprehensive and forward thinking definition is - all simulated arenas and immersive experiences that recursively affect perceptual senses in a way that is not restricted by physical laws and boundaries of spatial geometries. This definition is important because it acknowledges that the virtual reality we speak of is not a juxtaposition of reality, but rather a perception-based reality juxtaposing the material world.

The term Material World (MW) has been chosen quite specifically, and refers to the physical world around us that is made of matter. There are many terms people use to refer to the same thing: reality, real world, physical

reality, etc. But none of these are accurate when looked at through a philosophical and/or scientific lens. Similar to Gilles Deleuze's concept of "virtuality" in philosophy, virtual reality has to be opposed with something that it is not. It cannot be opposed with "reality" because i is also a type of reality, and is therefore also a "real world". It cannot be opposed to "physical reality" because, at least in its current form, VR experiences consist of photons which re physical particles so it is a type of physical reality. The only term which is accurate enough to juxtapose it is "material world" because material is that which is made of matter, and photons (although physical) are not matter. In fact, according to the current Standard Model in particle physics (and quantum mechanics), of the 17 fundamental "particles" that make up all the physical world we know (6 quarks, 6 leptons, 5 bosons),only 2 are massless: photons and gluons. And matter is defined as any substance that has mass and takes up space by having volume, which rules them out. This is part of a very nuanced discourse that leads to the best terminology to juxtapose "virtual reality" being "material world".

Augmented Reality (AR) overlays digital information onto the MW. AR is typically experienced through a smartphone, tablet, HUD, or AR glasses, and it can be used to provide additional information about a building or to showcase how a design will look in a real-world environment. AR can also be used to create interactive exhibits or installations, allowing users to interact with digital objects in a physical space.

According to Paul Milgram, the pioneer of the Reality–virtuality continuum, Augmented Virtuality (AV) is a term used to describe a hybrid of AR and VR technologies. In AV, digital objects are placed within a virtual environment, rather than overlaid onto the MW. This allows users to interact with both material and virtual objects in a seamless way.

Mixed Reality (MR) is a term used to describe environments that combine virtual and material elements, in which both types of elements coexist and interact in real-time. According to Milgram, MR is a continuum that spans the range of environments between fully material (which he calls "real environment"), through mixed reality, to fully virtual environments, in which the material elements are completely replaced by virtual ones and vice-versa. MR environments are currently achieved using special hardware and software, such as head-mounted displays (HMDs) and spatial tracking systems, which enable users to see and interact with virtual and material objects.

Extended Reality (XR) is a catch-all term that encompasses all forms of virtual environments, including VR, AR, AV, and MR. Although, contrary to popular belief, the "X" in XR does not stand for "extended" rather it's a placeholder term for any letter that could later replace it. XR provides a more comprehensive approach to virtual environments, allowing users to interact with digital objects in a range of different environments.

In conclusion, understanding the different types of virtual environments and their applications in architecture is essential for architects and designers who want to embrace the metaverse. VR, AR, AV, MR, and XR each offer unique opportunities for creating immersive and engaging design experiences. By combining the strengths of each of these virtual environments with the MW, architects can create truly transformative buildings and structures that engage users in a variety of ways.

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Chapter 6: The Procedure of a Metaverse Project

The Procedure of a Metaverse Project

In this chapter, we will discuss the different stages involved in a metaverse project for an architectural firm. As the demand for immersive and engaging virtual environments continues to rise, architects and designers are increasingly turning to the metaverse as a tool to showcase their work to clients and stakeholders.

To execute a successful metaverse project, it is important to understand the different stages involved and the various considerations and challenges that may arise during the process. The different stages of a metaverse project are similar to the Plan of Work, which is commonly used in the architecture industry.

Stage 1: Pre-planning, Client Brief and Design Team Formation

The first stage of a metaverse project is similar to any other architectural project. The client brief is the starting point, which outlines the client's requirements, expectations, and budget. The design team is then formed, consisting of architects, designers, software developers, and other relevant experts.

If the architect/firm is also the project manager (which for small and medium projects is advised) then they would also need to develop some crucial documents for the project, including: Whitepaper, Metaverse Execution Plan, Metaverse Scope of Work, Metaverse Standards and Guidelines, etc. Since this is still a fairly new industry with clients still needing more hand-holding, the architect can expect to offer this additional service for most projects, and charge extra (see "Chapter 14: The Ethics and Fees of Metaverse Design" on page 97 for discussion on fees).

The first stage of a metaverse project also involves

the pre-planning and research phase. During this phase, the architectural firm will work with the client to establish the project brief, goals, and requirements for the virtual environment.

The firm will also need to establish the scope of the project, including the features and functionality that will be included in the virtual environment. This may involve researching different platforms, tools, and technologies that can be used to create the virtual environment.

In addition to this, the firm will also need to hold team meetings to discuss the project and ensure that everyone involved has a clear understanding of the goals and requirements. These meetings may involve representatives from different departments within the firm, including design, technical, and management teams, and meetings with other stakeholders/ consultants (see "Chapter 7: Structuring the Right Team for Metaverse Design" on page 57).

Once the project brief has been established and the scope of the project has been defined, the architectural firm and the client will need to sign a contract outlining the terms and conditions of the project. This contract will typically include details such as the project timeline, budget, and payment schedule.

Overall, the pre-planning and research phase is critical to the success of the metaverse project, as it establishes a clear understanding of the project goals and requirements, and ensures that everyone involved is aligned and working towards the same objectives.

Stage 2: Concept Development and Virtual Environment Creation

Once the design team is formed and the contract is signed, the next stage is concept development and

virtual environment creation. During this stage, the team works closely with the client to understand their vision and goals for the virtual environment. The team will conduct research, including site visits and analysis, to gain a deeper understanding of the context and surroundings of the project.

Based on the research and client brief, the team will develop a concept for the virtual environment. This may involve storyboarding, space-planning, and other techniques to convey the overall design intent. At this stage, the team will also determine the necessary tech-stack to create the virtual environment, which may include software and hardware requirements.

Programming and deployment are also key considerations at this stage. If the virtual environment is standalone, the team will need to determine the best approach for web implementation, 3D editor, custom client, and server. They may also need to develop an asset pack, which includes 3D models, textures, images, audio, video, text, UI, and content.

The team may use a variety of software tools and programming languages to create the virtual environment, depending on the complexity of the project and the desired functionality. They will work closely with the client to ensure that the virtual environment aligns with their vision and goals for the project.

This stage is critical in ensuring that the virtual environment is created in a way that is functional, visually appealing, and engaging for the user. By taking the time to develop a strong concept and carefully consider the necessary tech-stack and programming, the team can create a virtual environment that meets the client's needs and exceeds their expectations.

Stage 3: Development and Testing

Once the virtual environment has been designed and the necessary assets and programming have been put in place, the development stage begins. The software is built based on the defined tech stack and specifications, taking into account the hardware requirements for optimal performance.

As the software is developed, it should undergo rigorous testing and quality assurance. This stage is critical to ensure that the virtual environment functions as intended and is free from any bugs or glitches that could affect the user experience.

User experience testing is also important during this stage. The virtual environment should be tested by individuals who match the target audience to ensure that it is intuitive, engaging, and easy to navigate. The design team should take note of any feedback from users and make necessary changes to the virtual environment to improve the user experience.

In addition to user experience testing, technical testing should also be conducted to ensure that the virtual environment performs as intended on the specified hardware and software. Testing should be conducted throughout the development process to identify and address any issues promptly, rather than waiting until the end of development.

Overall, the development and testing stage is crucial in ensuring that the final product meets the client's needs and expectations, providing a seamless and engaging virtual environment for users.

Stage 4: Handover and Maintenance

Once the virtual environment is complete and tested,

it is time for handover and maintenance. During this stage, the virtual environment is handed over to the client, and the design team provides support and training to ensure the client can operate the virtual environment effectively. Ongoing maintenance and updates should also be considered to ensure that the virtual environment remains relevant and up-to-date.

One aspect of maintenance includes events, which can be technical or social. Technical events may require support from the design team, such as event production, operations, customer support, and content creation. Social events may require more creative input, such as art, media, renders, animations, and marketing materials. Both types of events require post-production to ensure that the final product is polished and professional.

In addition to events and post-production, website management and social media management are also essential for maintaining the virtual environment. A website can act as a hub for users to access the virtual environment, and social media can be used to promote events and updates.

By considering these aspects of maintenance and continuing support, the virtual environment can remain engaging and relevant long after the initial launch.

Metaverse projects offer exciting opportunities for architects and designers to create engaging and immersive virtual environments for their clients. By understanding the different stages involved in a metaverse project, architects and designers can better plan and execute these projects, delivering high-quality and engaging virtual environments that meet their client's needs.