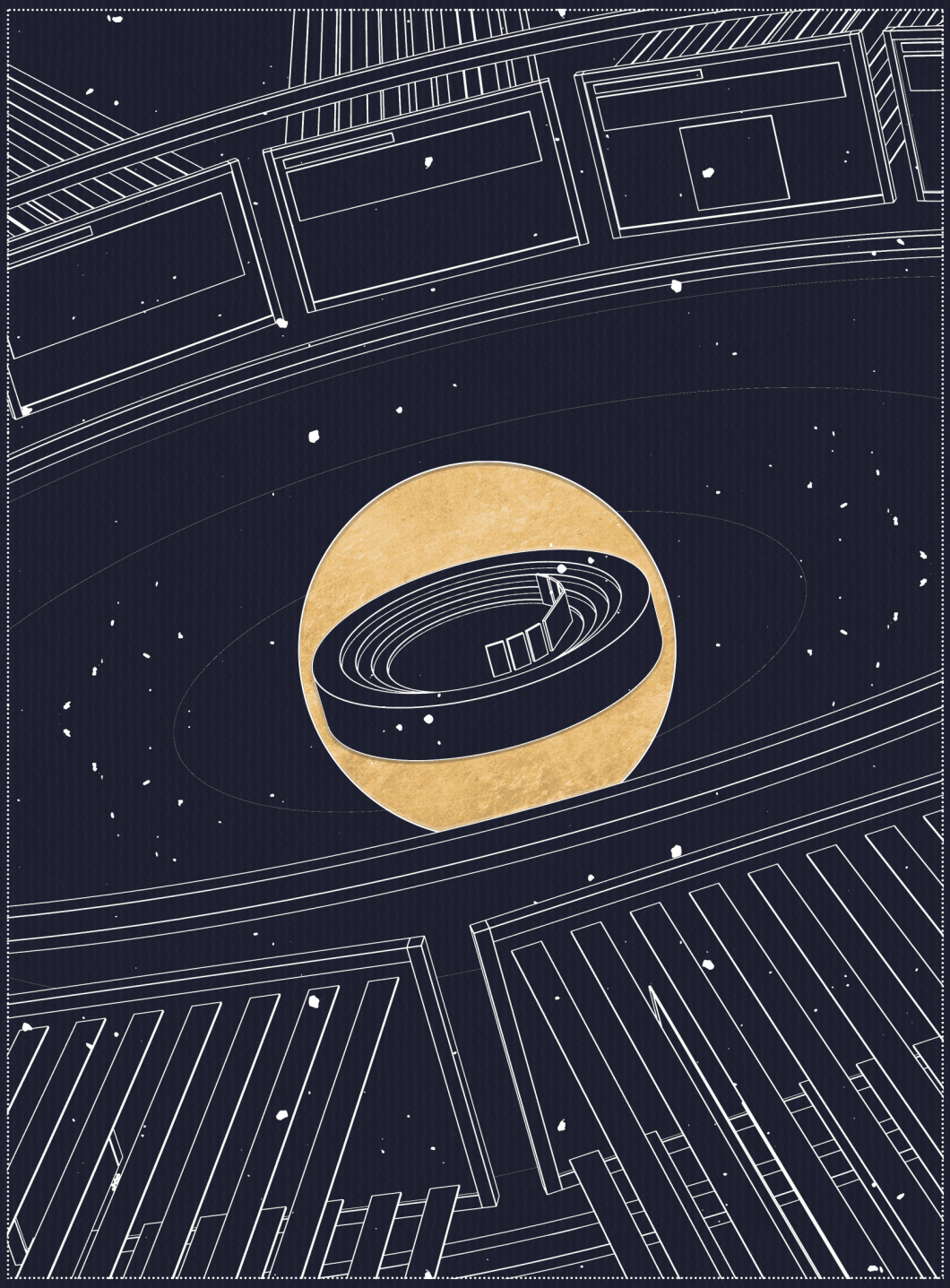
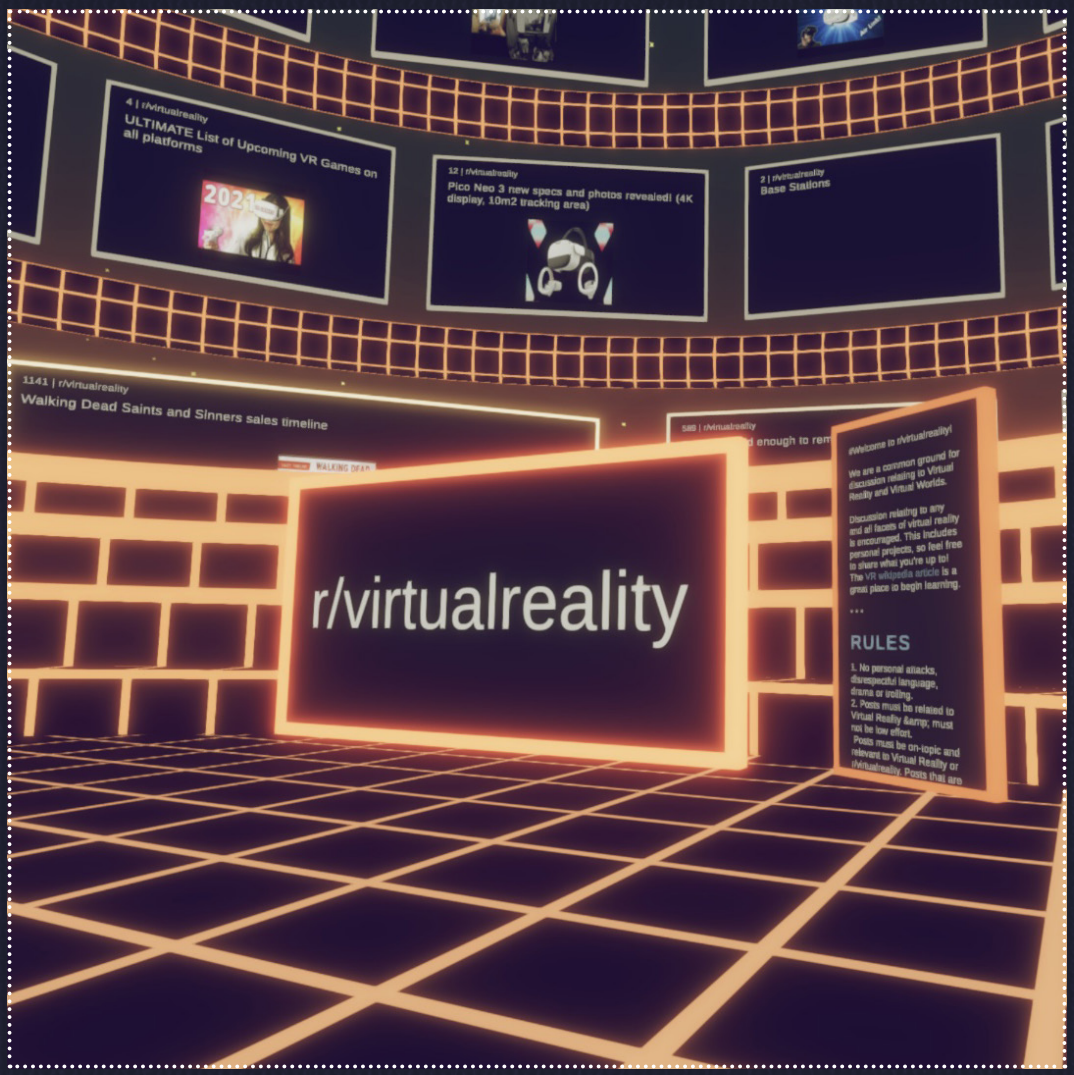


POST.SPACES

VOLUME II: VIRTUAL FORUM SPACE

CONTENTS



Screenshot from within the final version of VR.Reddit

INTRODUCTION

This second volume, titled “Virtual Forum Space”, is focused on the latter half of the thesis project, where I build upon the findings of the earlier VR studies and aim to create an actual VR space that exemplifies some of the design principles that I’ve earlier identified, coupled with a defining concept for the space or app itself.

At the start of the thesis project and in the early period of the second phase, I was concerned with creating a social + educational environment, where users might gather in groups of varying sizes and purposes in the virtual space. This idea was pushed back and forth but ultimately abandoned, as it proved hard to define and added further ‘slipperiness’ on top of the already challenging question of virtual space. The design variants generated during this phase did not go to waste - spatial and relational attributes discovered during these exploratory phases served as a foundation for some of the elements in the final product, as well as the ‘failures’ being a learning experience in and of themselves, revealing defects in certain spatial configurations or concepts.

Eventually, after some discussion and feedback following one of the interim reviews, I settled on the concept for my final space, which was the idea of creating a VR space for a virtual forum. This final concept had a much more clearly defined scope and further afforded unique opportunities to explore and resolve architectural questions about the space, as well as having very compelling reasons for investigation.

In order to keep the narrative streamlined, the first half of this volume will detail the final concept and outcome of the project, followed by a section recording the intermediate iterations where the design and concept moved between various different goals and approaches.

PROBLEMS WITH VR SPACES

From the studies and experimentation during the earlier stage of the project, I identified two primary issues with the design of existing VR spaces, which are mostly real-world imitative.

Firstly, their navigational and spatial layout, being largely anchored in a real-world understanding of physics and movement, can sometimes be difficult to navigate, especially if details such as door sizes and corridors are slavishly adhered to. These spatial elements make little sense in VR and actively hinder the users experience.

Secondly, environmental objects including most furniture and decoration tend to be a non-functional hindrance; users ignore them in favour of attractions which actually serve some purpose within the virtual world. At worst, they become clutter and block users from moving freely.

While there remain other, secondary concerns and possible improvements regarding the design of VR spaces, these two are the primary ones that I chose to focus on. Other concerns would include things mentioned previously such as scale, audio, menus, or realism.

EXISTING VR PLATFORMS

Within the current VR landscape, there already exist several options for peer-to-peer social interaction on the market, which is the original function I was aiming for with the app. While they might be far from perfect given the evolving state of VR technology and behaviour, they are slowly being refined.

However, what is notably missing at the moment is exploration of asynchronous interaction in a VR environment. While the immediate nature of a virtual avatar and voice chat in VR lends itself easily to real-time communication, the spatial nature of VR is also a ripe opportunity for data visualisation and new forms of interaction.

What, then, could a typical forum space look like in VR, and what would be the implications of translating it into a virtual space?

SHARED INFORMATION SPACES

In the current age of online information overload, filtering at some level is necessary to avoid overwhelming the individual user. News articles, forum posts, and social media channels are subject to layers of filtering and customisation that result in the creation of online echo chambers, with both user agency and hidden algorithms shaping how we see the virtual world.

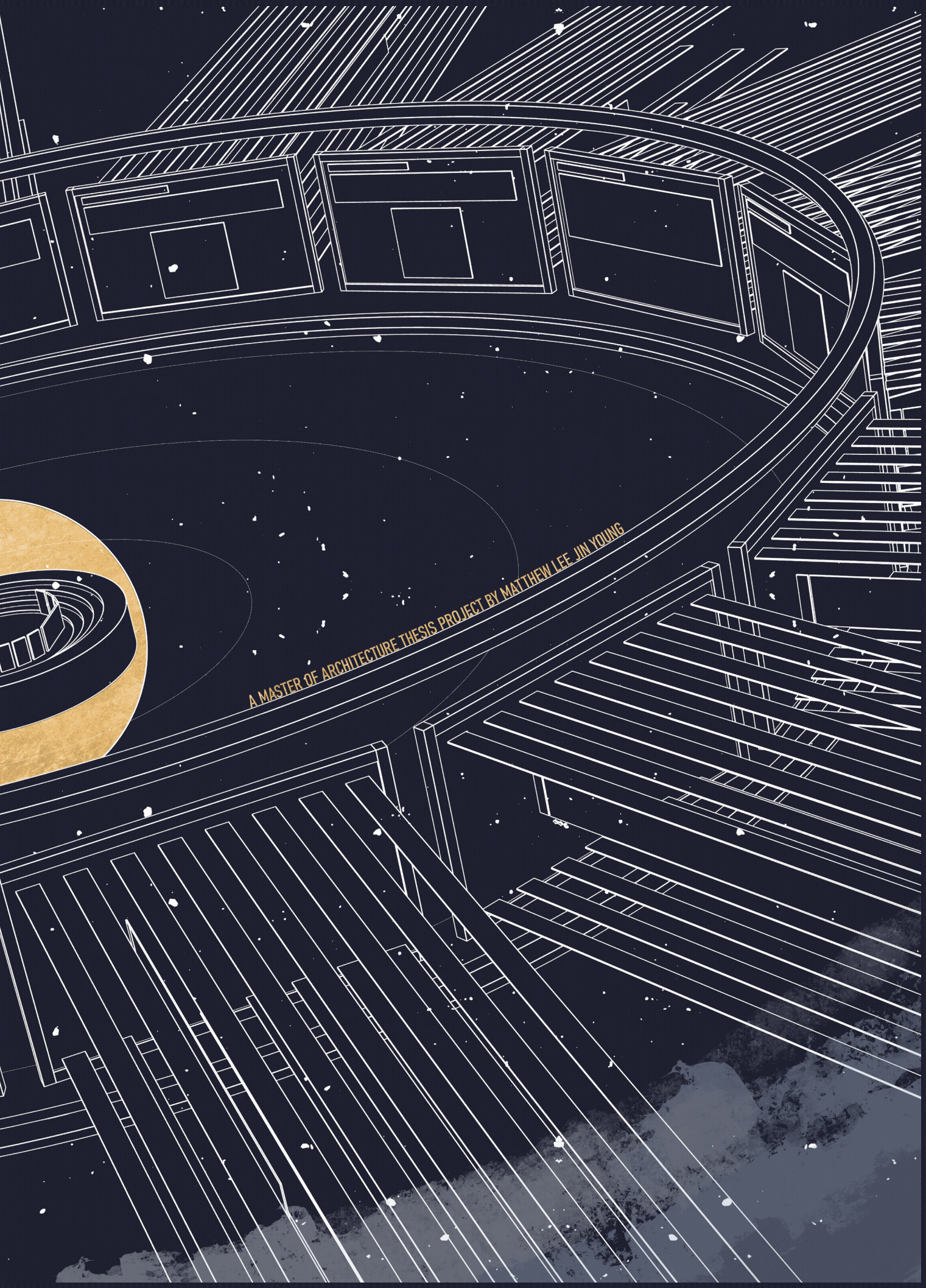
Data is hidden in links, websites, and folders - whether online or offline, the virtual world makes it easy to overlook things that are 'out of sight, out of mind',

By adopting a spatial approach to information-sharing, we anchor information in a shared reality, transforming the way we consume media on the internet. Media can be displayed in a 'physical' manner in VR space, ensuring that multiple users who see each other in the space are viewing the same things at once and experiencing the same content. The array of data in 3D space also grabs the user's attention, making it harder to ignore discussions and posts that are garnering significant amounts of attention and thus taking up more of the virtual space.

Media room in the Windows Mixed Reality 'Skyloft' house

Interactive media walls within the SteamVR 'Summit Pavilion' house


POST.SPACES

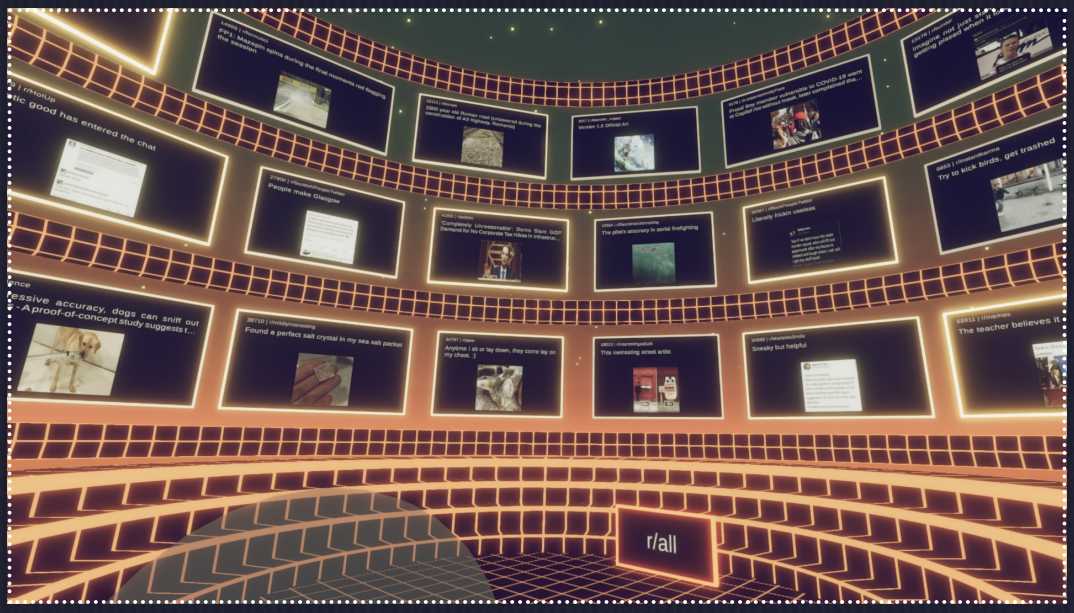

A MASTER OF ARCHITECTURE THESIS PROJECT BY MATTHEW LEE JIN YOUNG

VR.REDDIT

With the use of VR to anchor our online experiences in space, VR.Reddit aims to not only provide a unique virtual browsing experience but also to create a shared space for media consumption and interaction.

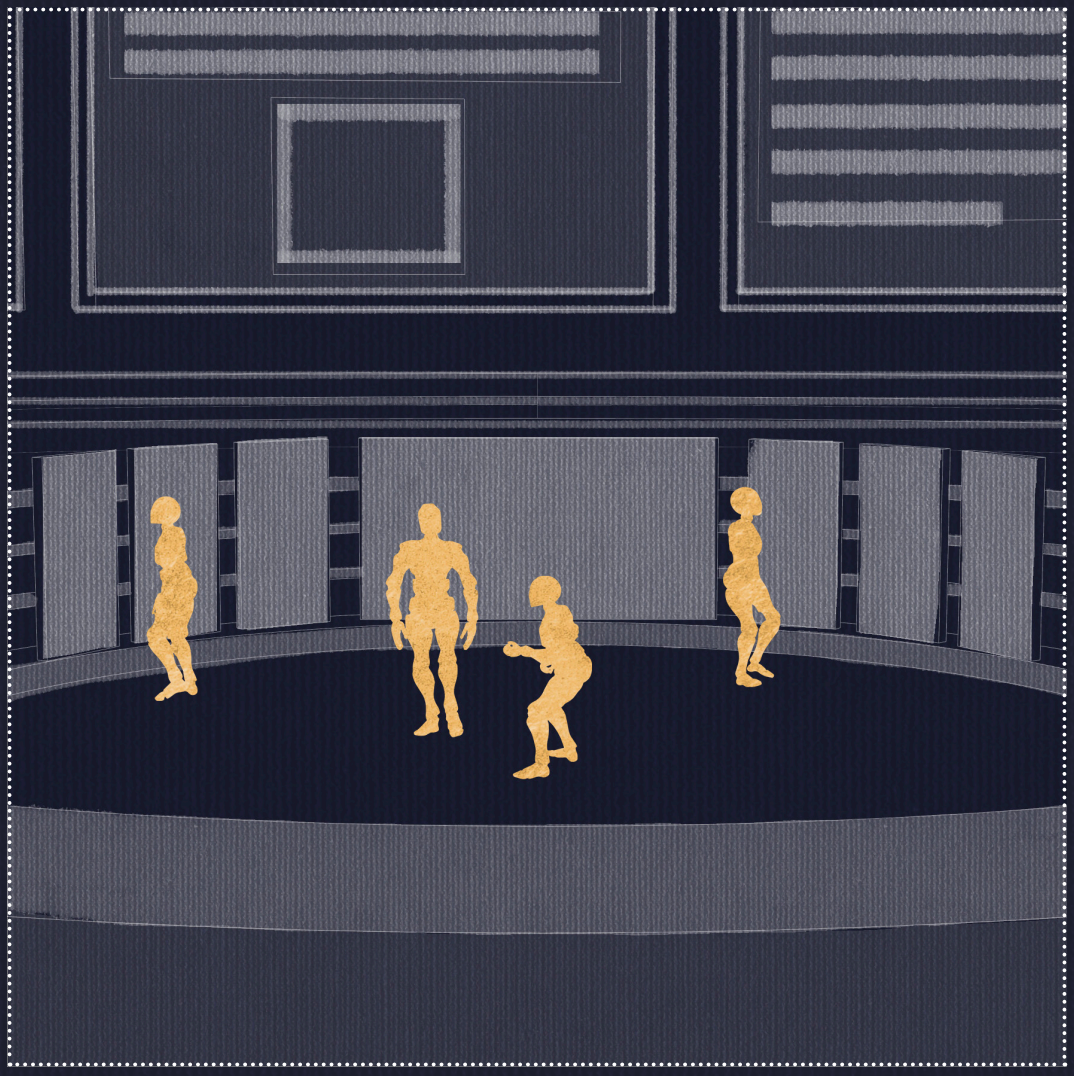
Within VR.Reddit, there exist two layers of interaction: asynchronous, persistent communication on the existing forum layer with text and media, as well as the new layer of real-time, temporal interaction afforded by the virtual space. Not only are users able to view vast amounts of information at once - meta-information such as post popularity, activity, and type can be communicated at a glance through visual and spatial cues - they are also able to interact with other users within subreddits and posts themselves. These interactions can range from incidental meetings with strangers in front of a particular comment, to big planned events using props and custom spaces within the virtual environment.

While the current app is a fully-functional prototype that includes basic functions for browsing reddit, this same approach could be extended with any number of additional functions for browsing or social interaction. Beyond reddit itself, any kind of asynchronous online communication platform such as Facebook, Discord, and Slack, or even workplace functions like sharing BIM models or project drafts, could make use of this approach to create an enhanced virtual experience for their users, especially as VR equipment becomes more affordable and ubiquitous.

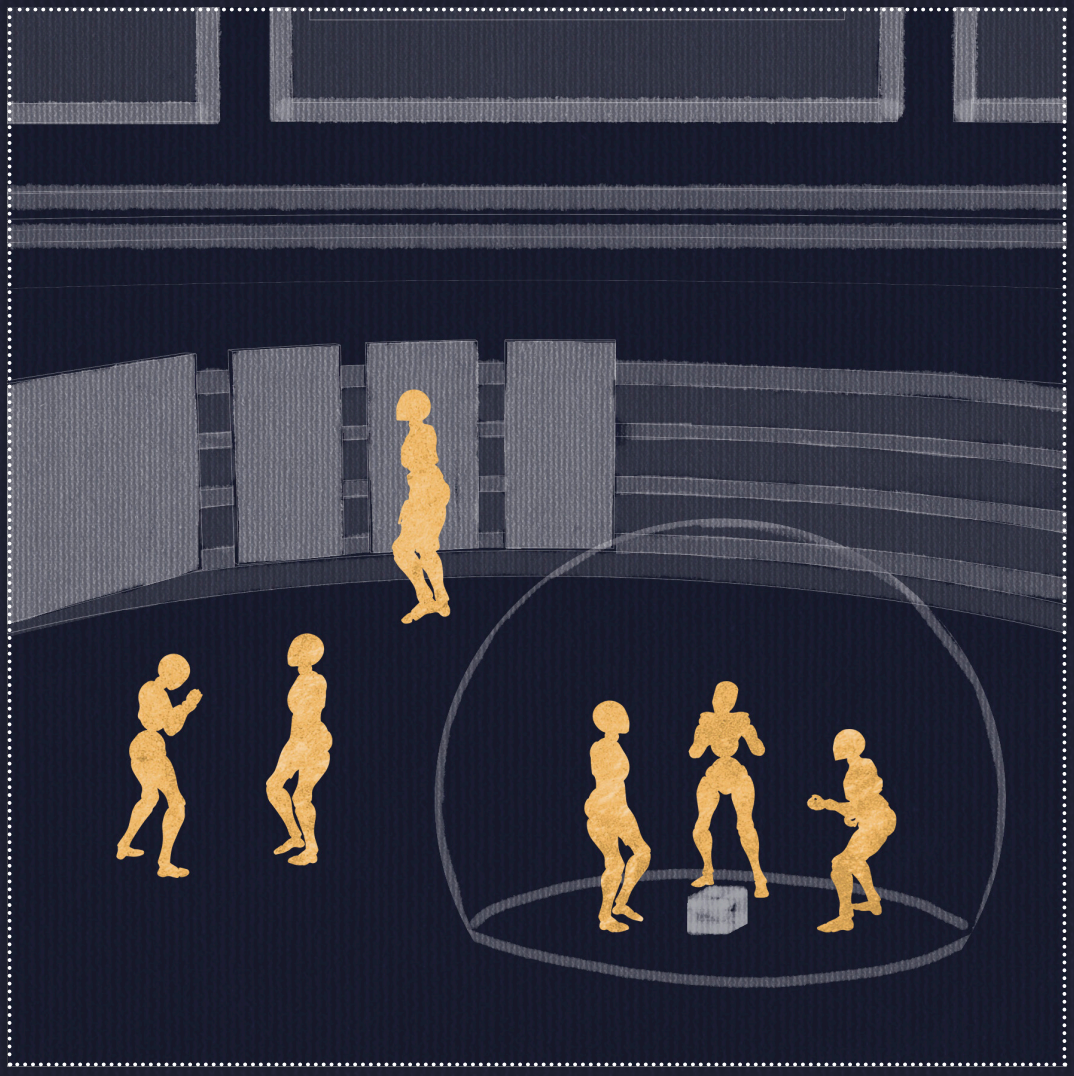


View from the central space looking up at posts

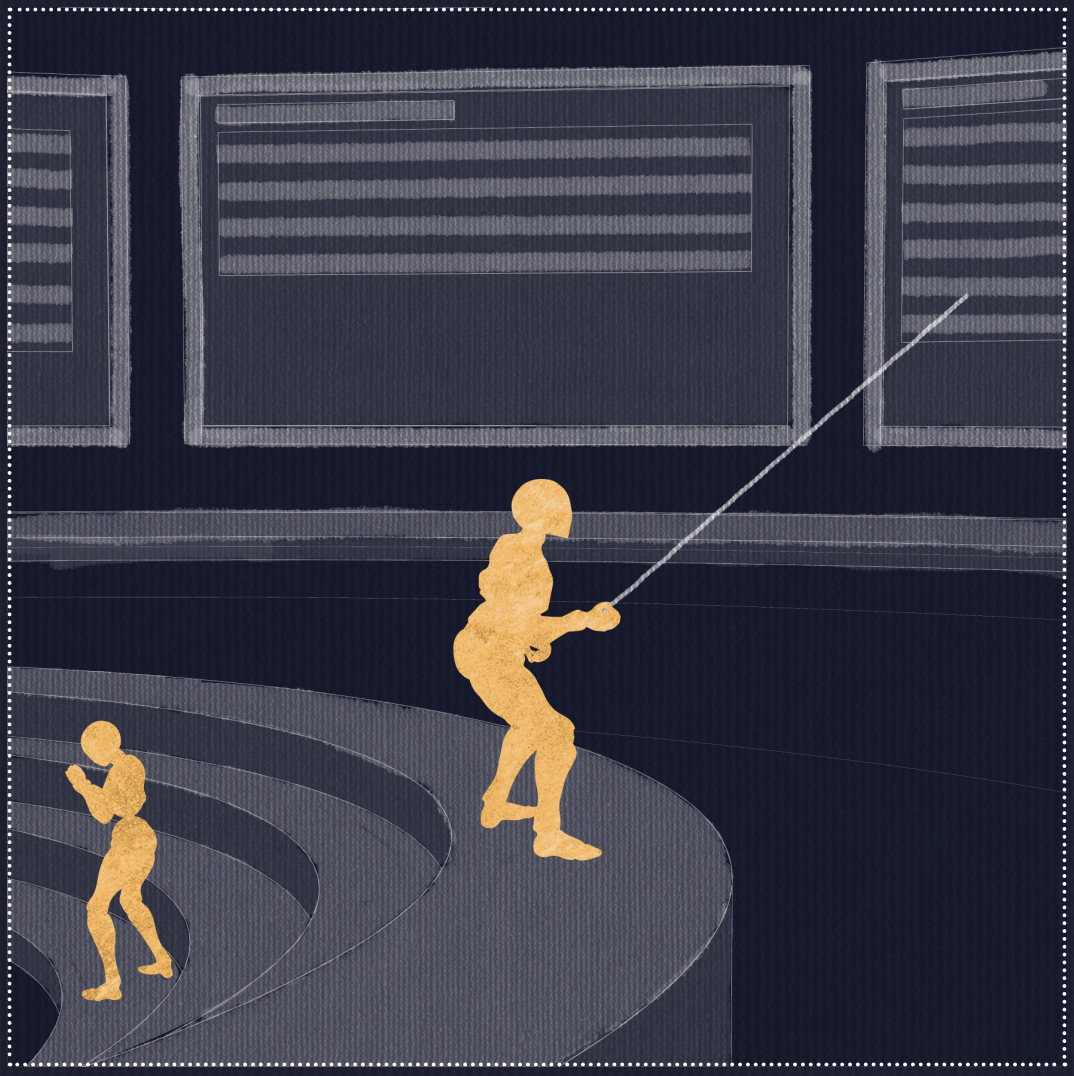
Within a single post threads viewing comments



Drawing of the central platform as a user would experience upoon first entering the space. Around them is information about the subreddit as well as other users within the space. Beyond the platform, post listings loom large and visible.

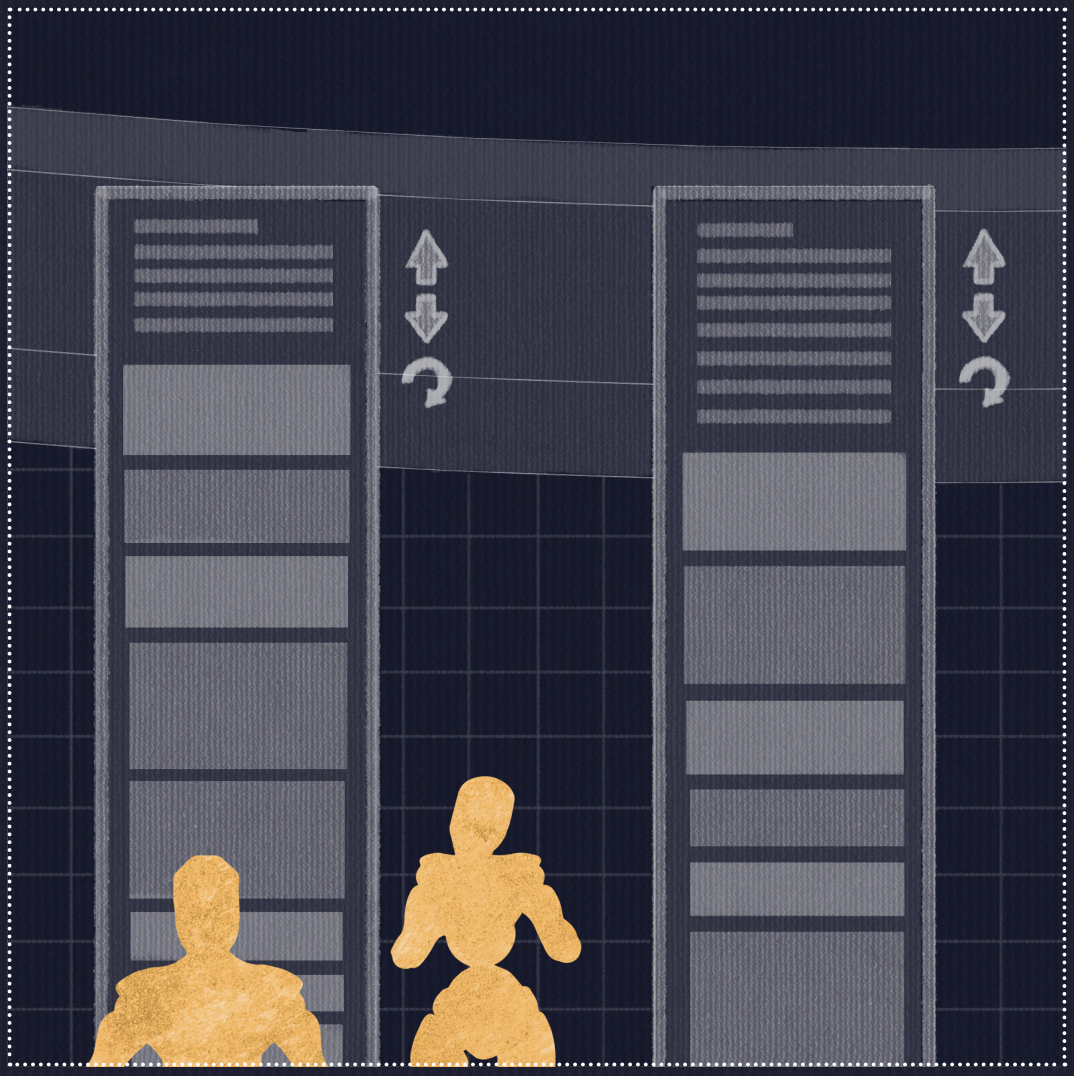


Drawing of users socialising within the central space - reading subreddit information, talking to each other, or interacting within the confines of a restricted bubble.

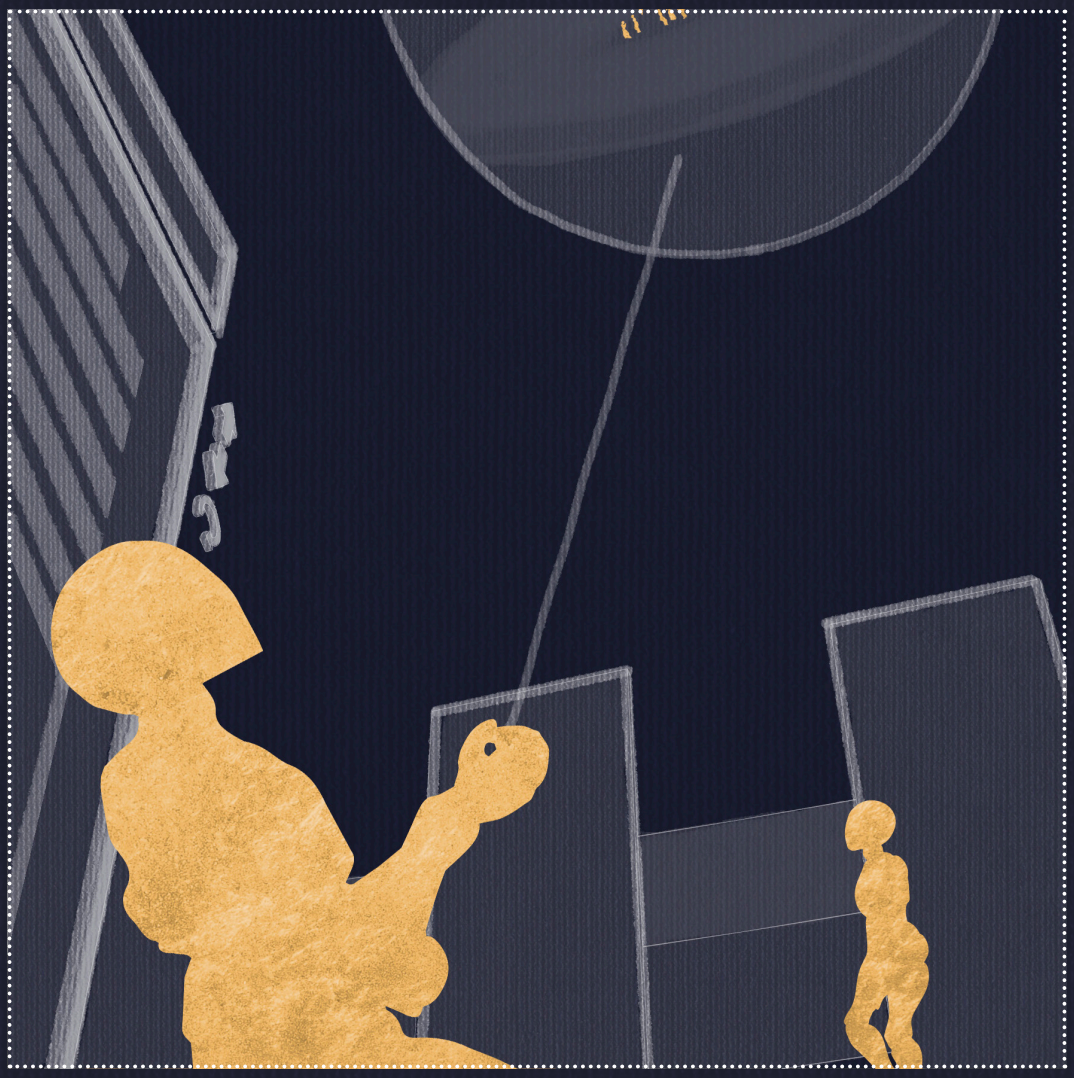


Drawing of user moving from the edge of the central platform to one of the posts via a long-range teleport beam

Drawing of users spread out around the post space - some reading the main post, viewing various comments, or socialising with others.



Drawing of users browsing comments within the post space.



Drawing of a user looking upwards to return to the central space with a teleport beam.

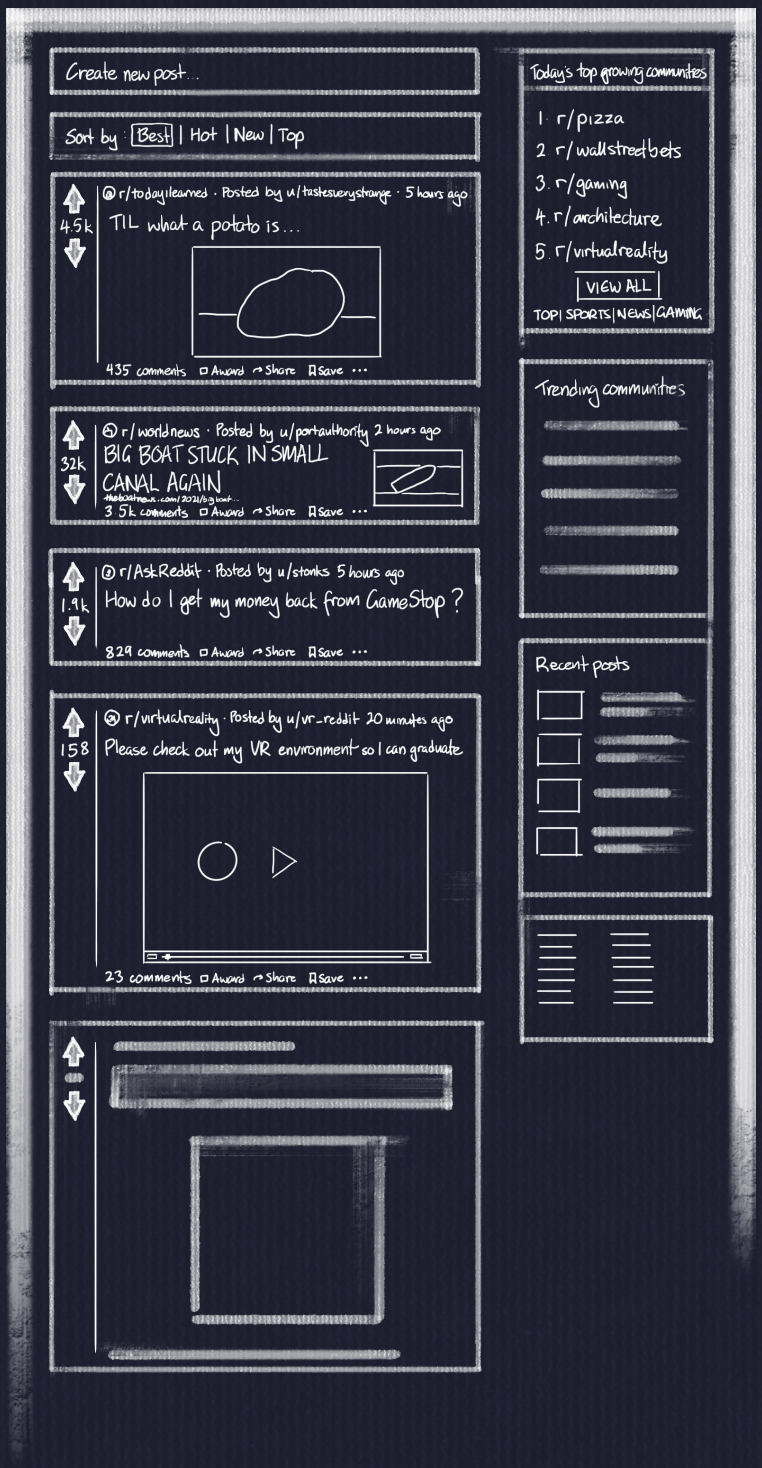


Illustration of typical Reddit forum page, with key interface elements such as post data and subreddits detailed

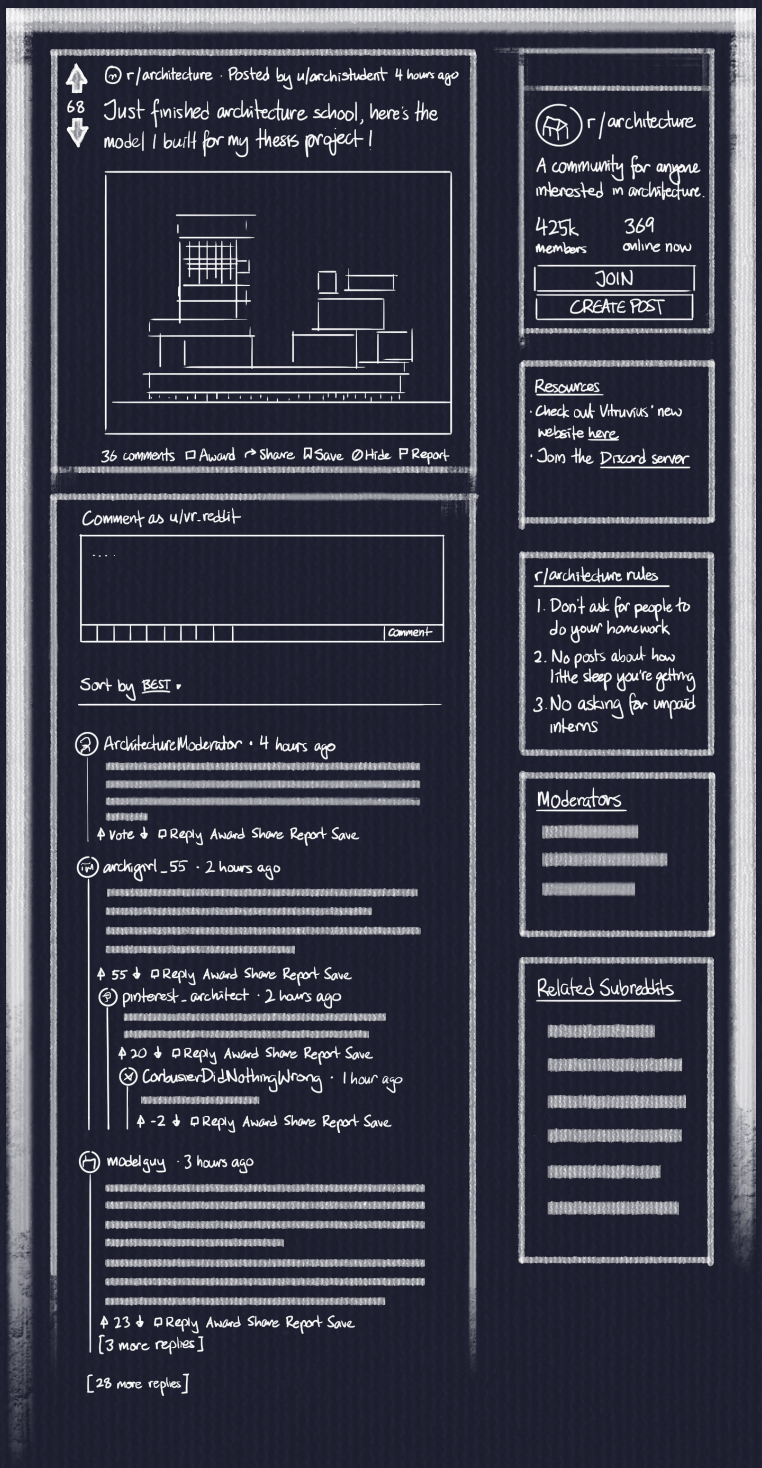


Illustration of typical Reddit post, depicting comment chains and post content, as well as sidebar information typical of most subreddits.

THE FORUM SPACE

The primary forum space represents the 'front page' of the forum, or the post collections of an individual subreddit. Users begin their experience here, starting out in the central social space containing information about the subreddit.

From here, they are able to see all the post listings surrounding the central space, as well as look up and view other available subreddits are 'stars' in the sky.

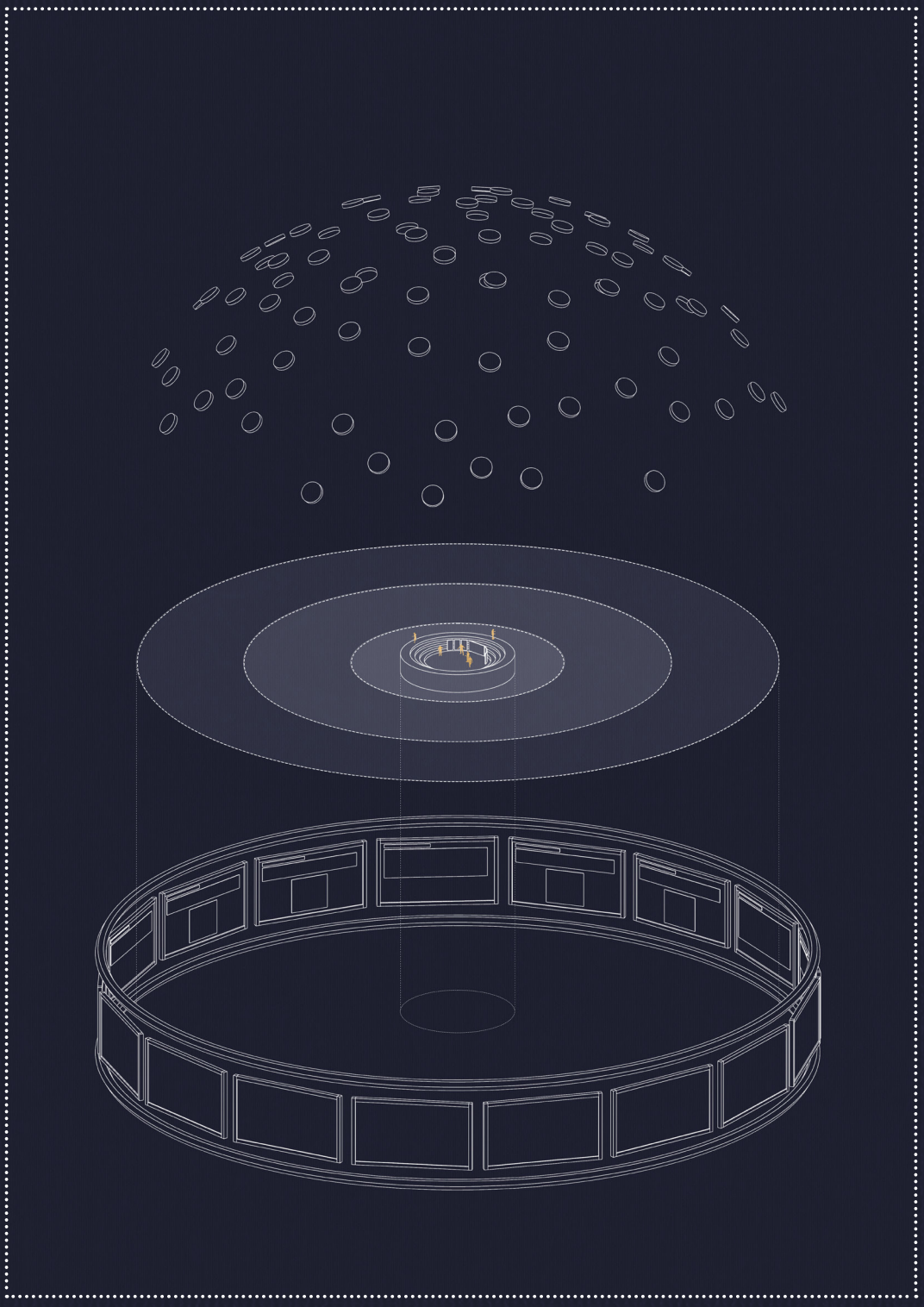
MOVEMENT

Movement in the platform is short-range by default, allowing users to easily move and mingle in the space. When they are ready to travel, they can switch to a long-range beam allowing them to visit posts or other subreddits.

RESPONSIVE PLATFORM

The central space serves as a meta-social space, providing users with a space to congregate and have discussions or social interactions independent of any individual post.

The size of the space scales to the number of user clusters engaged in the space, with activity on the fringes causing the platform to slowly expand further and a lack of activity causing it to shrink.



Axonometric drawing of overall space, depicting central platform, subreddit stars and encircling posts

THE POST SPACE

The individual forum post is envisioned as another shared space within which users can read and experience both the post media as well as its associated comments by other users on the forum. The spatialisation of media into long, almost infinite threads that occupy a space within the virtual world means that users cross paths when viewing content at fixed positions.

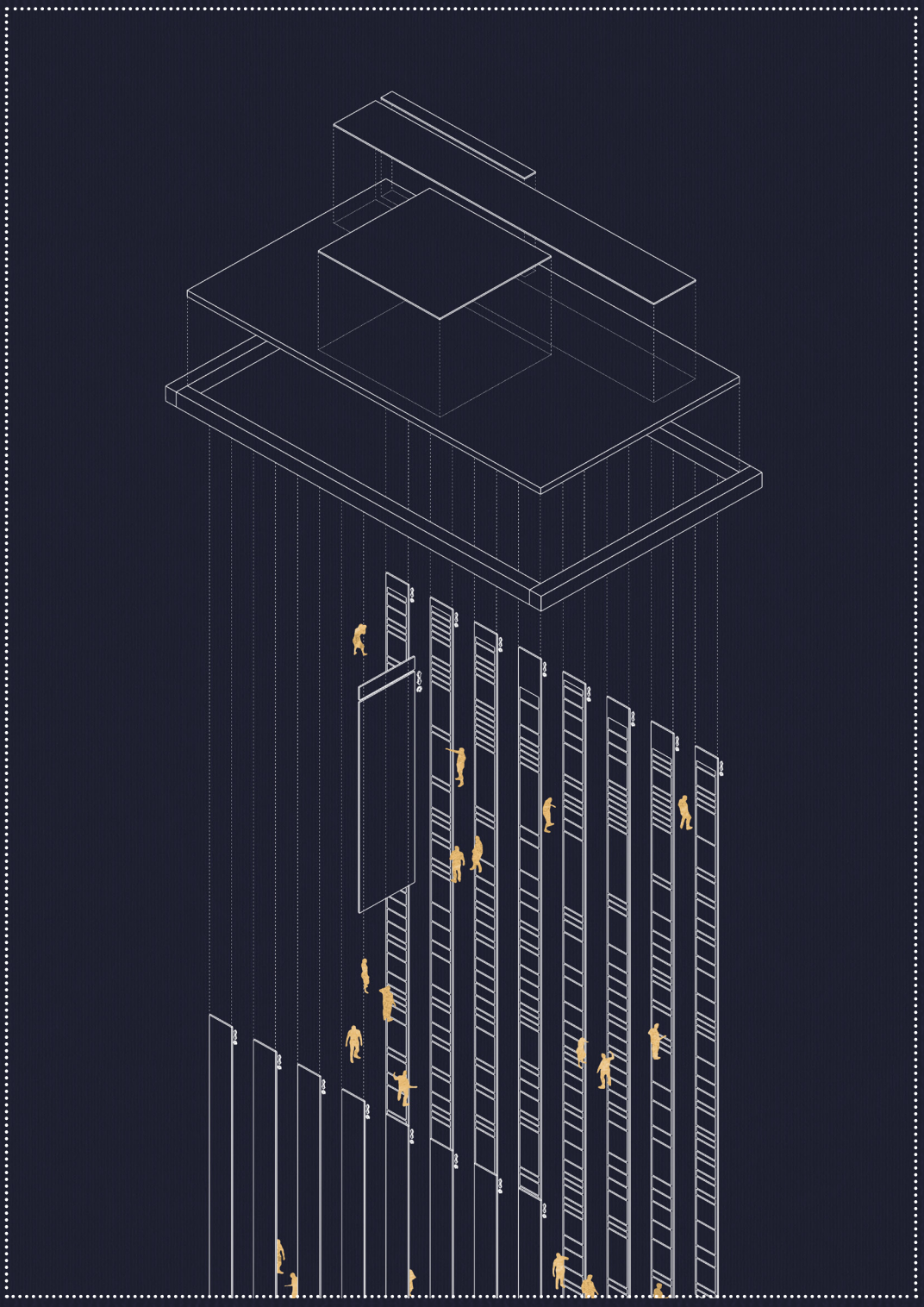
Users browsing the same content might lead to serendipitous interactions, spontaneous discussions that are not preserved in the forum's comment history.

Real-time popularity and activity surrounding particular comments might be indicated by the presence of other users in the space, whether clustered somewhere in front of the main post or focused around a particular comment.

DATA VISUALISATION

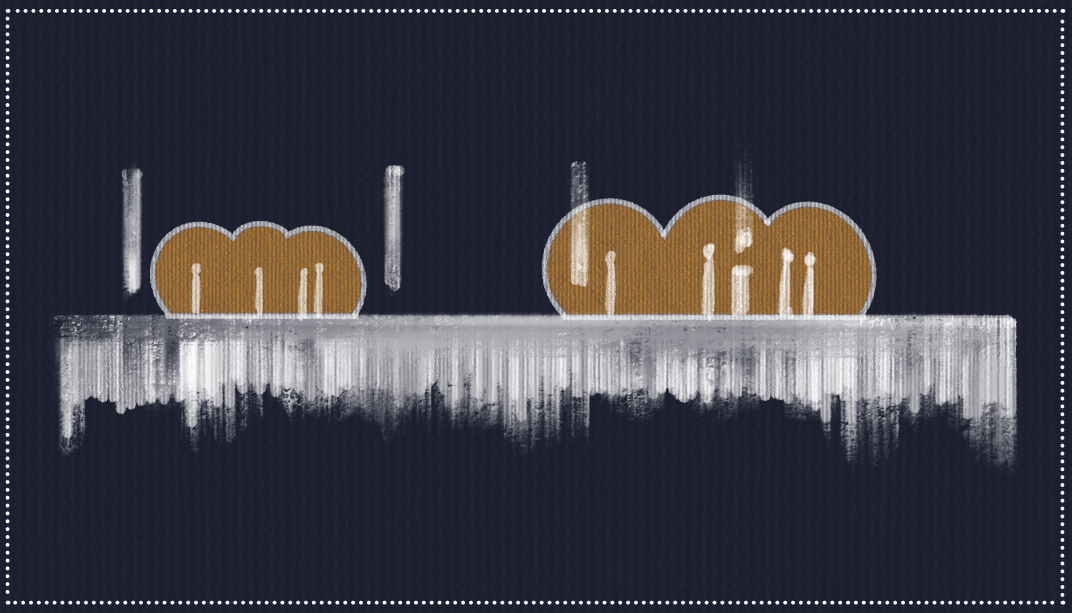
To a viewer in the central space, post covers provide more than just textual information. The brightness of the post outline indicates its relative popularity measured in upvotes, while its size is scaled based on the number of comments, directly influencing the number of positions available for comment threads in the space.

Within the post, upvotes and downvotes are visualised with reddit's orange/blue colours, and comment hierarchy is indicaated by a dynamic grading of a given comment's background.



Axonometric drawing of single post space, depicting exploded post cover, comment threads and central post content

Drawing depicting personal space and isolated shared space.

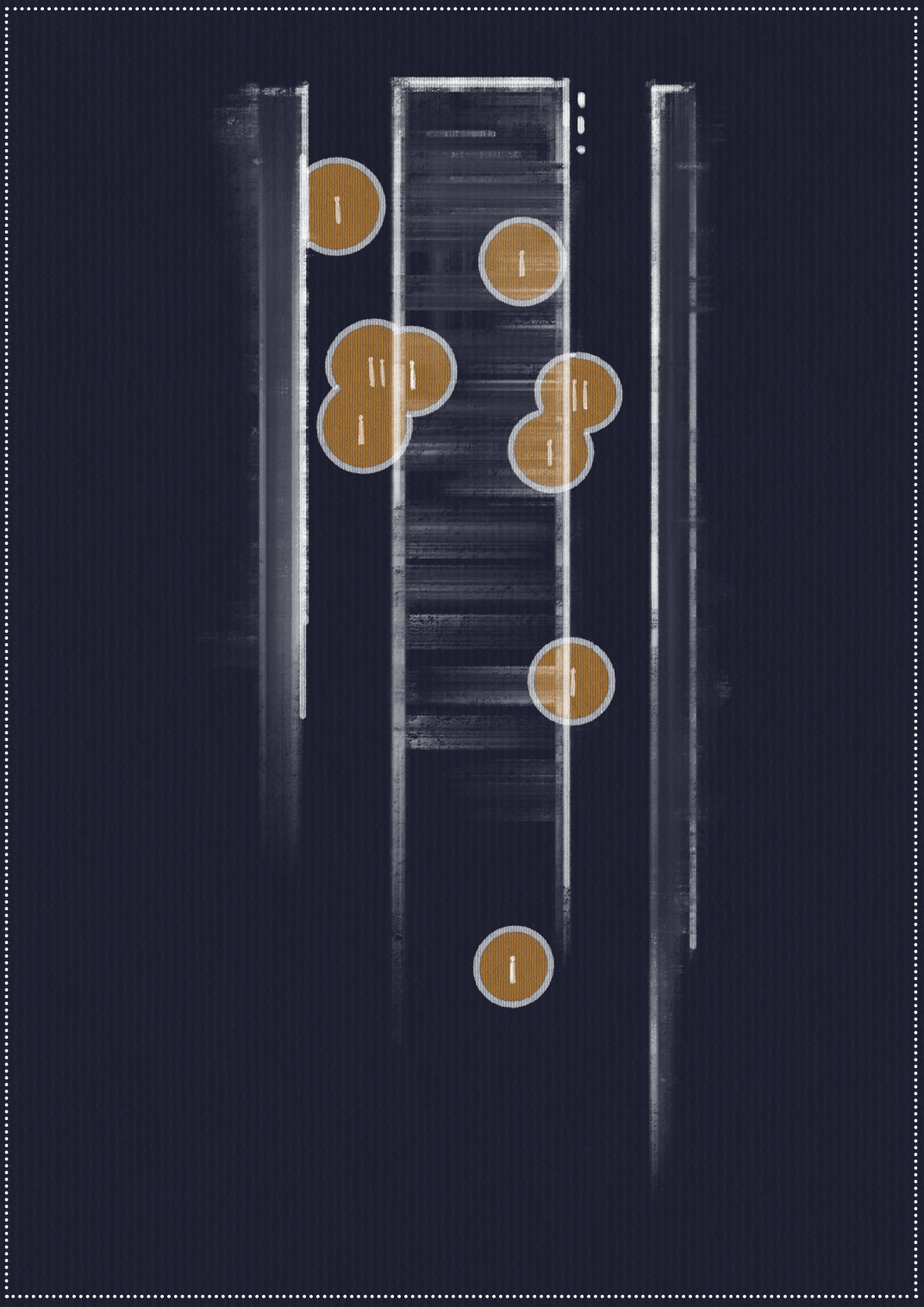


Drawing depicting dynamic confluence of activity at interest nodes.

SOCIAL CONFLUENCE

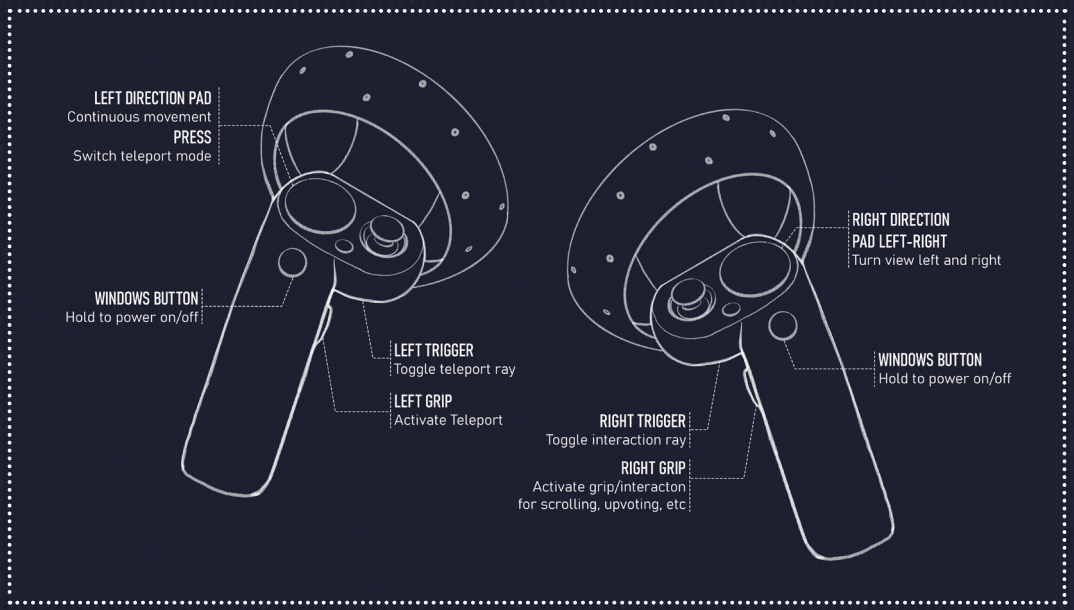
In VR, the lack of any real barriers to movement and the instantaneous nature of teleportation means that the design of physical circulation has a greatly reduced impact on the movement and behaviour of users. In the physical world, spaces might exert a certain draw just by their very existence or particular location in a plan. However, with teleportation, there is no need to linger in or even pass by such interstitial spaces, areas which often serve the purpose of key gathering points or channeling people in a certain direction.

Instead, one could say that the areas of confluence and interest are largely determined by key nodes and places of activity, as well as other users themselves which might serve to attract more people to an existing crowd. Meaningful spaces are thus created both strategically, through the placement of attractor points that lead to natural gatherings, as well as serendipitously, by allowing for an overlap in personal space as users happen to browse the same content. Physical indicators of space such as the central platform then expand dynamically to accommodate the distribution of activity nodes, creating yet more opportunities for space-making and mingling suited to the current level of activity.

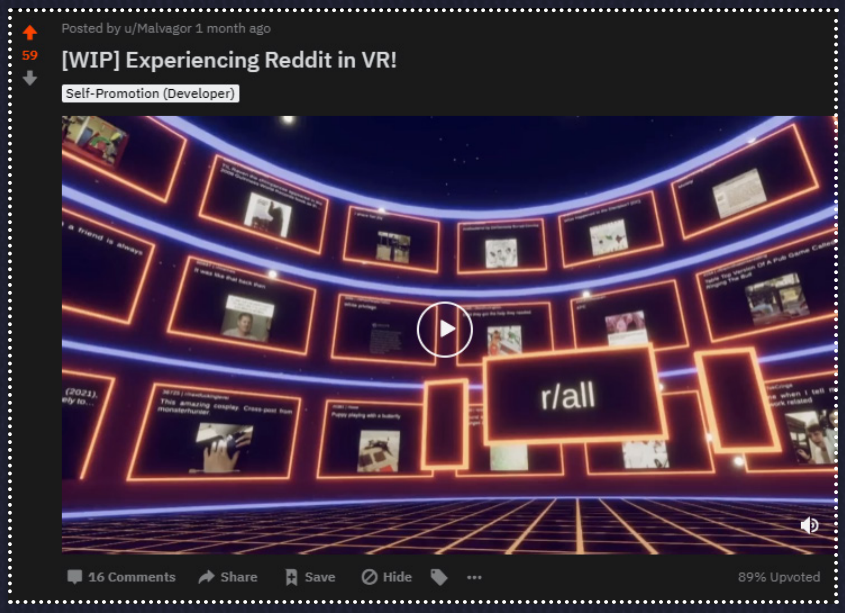


Drawing depicting spontaneous meetings and isolated personal spaces within a comment thread.

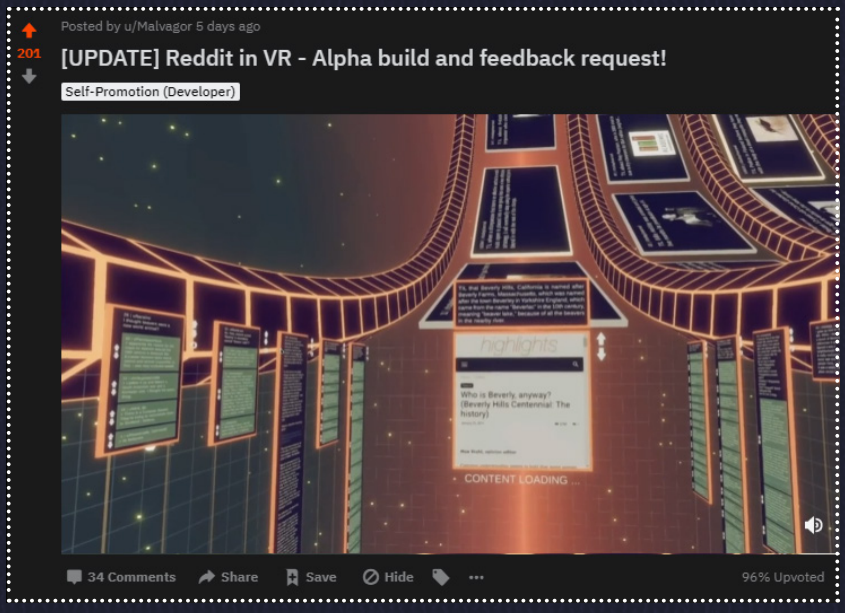
Stylised image of VR.Reddit space



Control scheme graphic included with presentation panels and live demo



First post to the r/virtualreality forum on Reddit in March



Second post shortly before thesis completion in April

ONLINE RECEPTION

As the development of the final app reached a somewhat playable state, I compiled some intermediate video footage of the app and posted it to the r/virtualreality and r/Unity3D forums on Reddit, in the hopes of garnering some feedback and generating interest among people who might be most interested. The two posts received about a hundred upvotes in total and a handful of comments. Generally, the feedback was mostly positive and interested in future progress, although some felt intimidated by the space.

Some of the comments on the first post:

> "This looks awesome. Will try it out."
>
> "It looks intimidating and frightening, just like Reddit.It's great."
>
> "For whatever reason, I just got the mental image of this as a social hub, and there being meme vendors all shouting over each other to get passerby's to look at their meme collections."
>
> "This is actually pretty cool. I don't know if it's a nicer way of browsing through Reddit, but reading posts and comments like you're reading posters in a museum must feel really different."
>
> "Awesome. I'll try this later."
>
> "Oh my... it's weird seeing the least immersive activity I do on my phone when I am lazy (Reddit) in the most immersive medium (VR). [...] Cool concept!"
>
> "This looks pretty cool."
>
> "Cool idea. Text is too hard to read in VR though with current headset resolutions. May be good for watching videos and stuff with other people."
>
> "So cool, it makes it look like another world. Like those animated movies where it shows people going "inside" the internet."
>
> "This looks like a terrible idea. I mean this as a compliment."

About a week before the completion of the thesis project when the app was largely finalised, I made another set of posts on the same forums showcasing the progress and asking for more serious feedback on the build. Again, the response was largely positive, although this time there was a wider spectrum of opinions and some constructive criticism regarding the actual feasibility and appeal of the space.

This time, the post received 200 upvotes and about 25 comments from other users. There were a total of 30 downloads of the provided app release and a couple of online users also responded to the longer feedback survey based on their testing experience.

A selection of comments on the final post:

> "I like it a lot, very reminiscent of the famous VR-internet scenes from Johnny Mnemonic back in the day. Tbh, I think we need more stuff like this, as it gives something unique only possible in VR.
>
> Virtual screens might be more convenient, but then it's really just your monitor with extra steps, and the HMD resolution is directly working against you."
>
> "this looks really cool, it reminds me of JanusXR ^^"
>
> "What are those surface materials? I love them! Such a cool Tron look."
>
> "I think it is one hell of an artistic masterpiece and an amazing showcase of what you're capable of creating. I'm not sure reddit is the best application for VR, but then again, I haven't tried it. It looks great and you're talented, so let's roll with that!"
>
> "Neat stuff! That grab action got me thinking: what about having the feeds come to you? You grab a few subreddits and the posts drift around you like particles. Something catches your eye and you snatch it to read. I think it would chill way to surf, very passive, letting the info wash past you. Anyway, great work!"

> "Keep up the good work!"
>
> "Honestly speaking, browsing reddit in this kind of environment would be uncomfortable for me and give me anxiety."
>
> "This is wild af, I don't know how practical it is, but I absolutely love the creative vision behind it!"
>
> "As someone who's passion is getting stoned in vr and just hanging out, this app looks amazing. Like I love just scrolling through r/listentothis I have just wished it was easier to switch from song to song in vr."
>
> "Looking at posts like this seems really weird to me. Like you just get teleported around and read everything sideways. I like the concept, but i also feel like reading posts shouldn't require teleporting you around"
>
> "It's cool to spacialize a dataset, but at the end of the day, how is this easier or better (or both) then using reddit regularly or through a desktop mirror window in VR?
>
> If you want to do well, you have to fulfil the promise of being better than using reddit through a browser. The other question you have to answer is, why do I need VR for this? You're using laser pointer logic, which is basically a mouse cursor in VR, so you'll want to try to find useful ways to leverage VR in novel ways that have value to a user and would make them want to use reddit in your VR system?
>
> Congrats on taking the first step and just implementing something, that always feels good."

Overall, the relatively high engagement with the post and the diverse responses given showed that the idea behind project successfully captured the imagination of many users, despite some qualms with the practicalities and some aspects of the implementation. Given a longer development period to iron out the issues and bring the app more in line with actual user expectations, it is likely that the app might actually see real use beyond its beginnings as an academic experiment.

FUTURE WORK

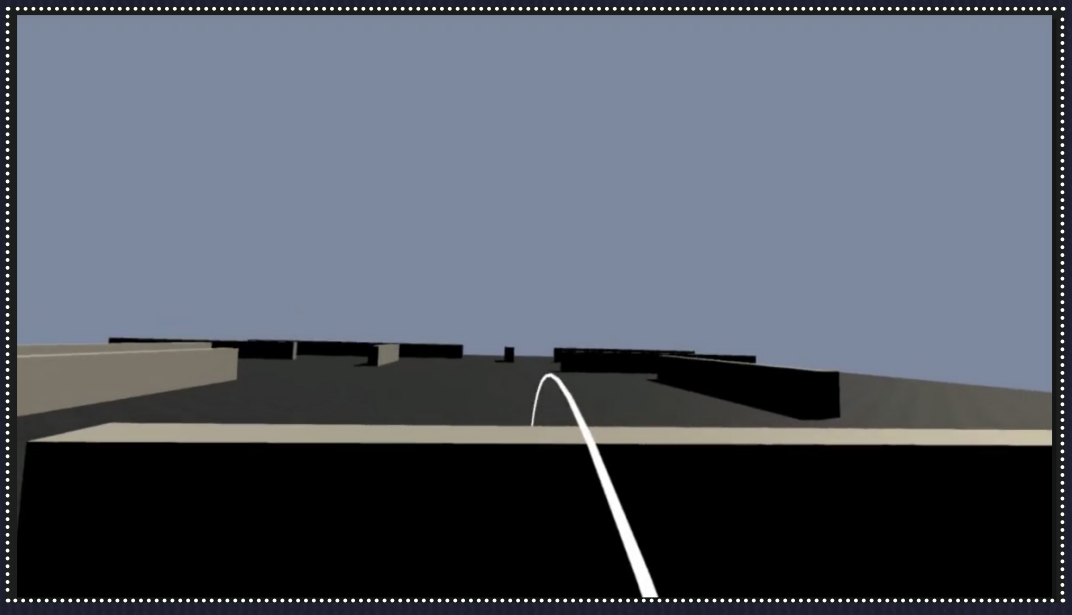
Beyond the conclusion of this thesis project, it's possible that I might work on the app further for a commercial release given the positive reception to the promotional posts. However, it is to be stressed that the app itself is more of a proof of concept outcome of the thesis project, rather than an end in itself.

Ultimately, my goal with this project was to question the current state of design of VR environments, experiment with viable design strategies and best practices, and push the envelope regarding how we design spaces in virtual reality moving forward. Hopefully, this work serves as a starting point or inspiration for others to follow the same path of questioning and innovative spatial design in VR. These same approaches could be applied to many other platforms and virtual spaces, moving beyond real-world preconceptions of space to create novel experiences and means by which we interact with each other and the world.

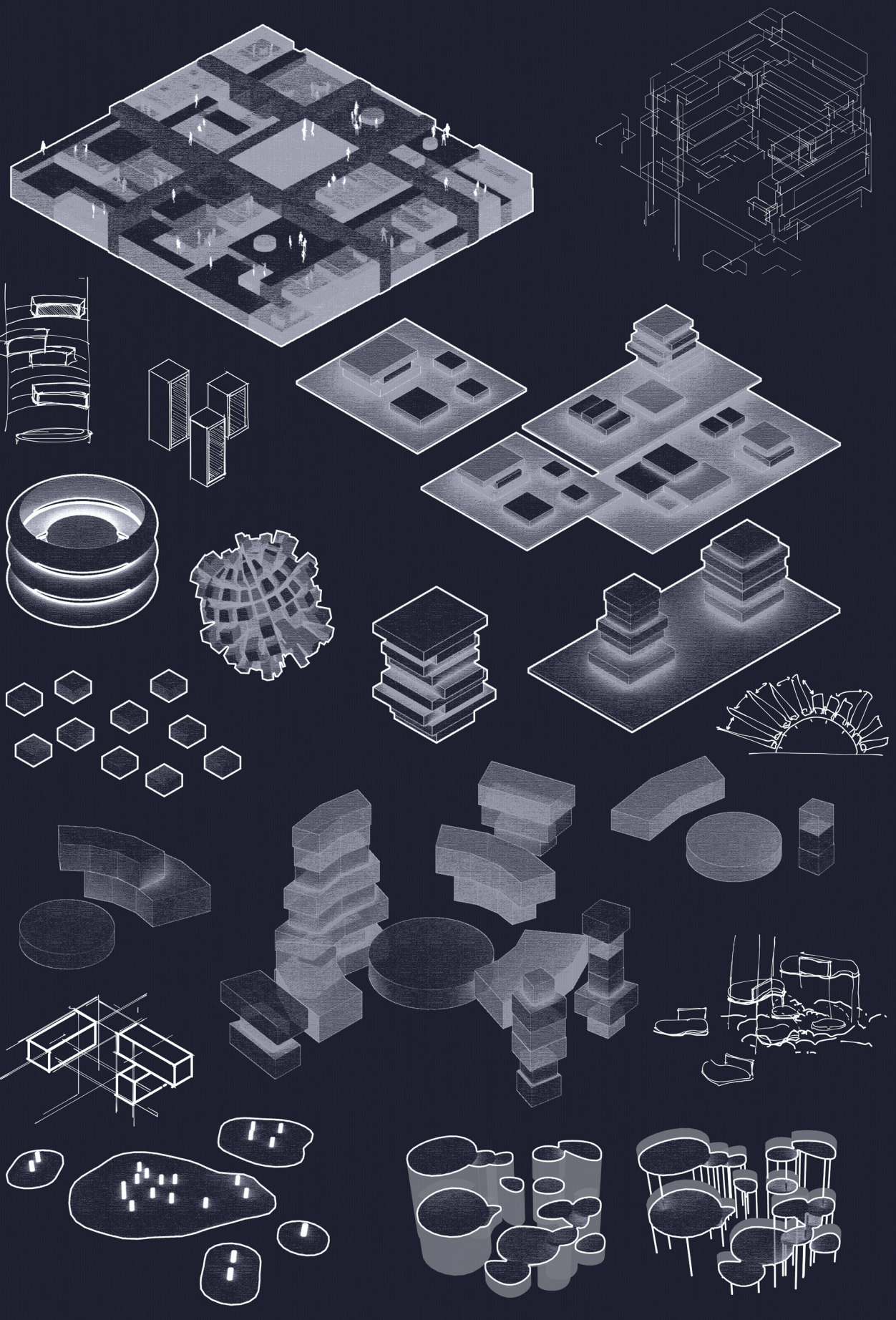
DESIGN PROCESS

As the design process for this project was decidedly non-linear and went through many revisions of the concept and approach, the various bits and pieces of the design process have been left till last for readers who might be curious about any explorations along the way that might have fed into the final design.

The bulk of these iterations were predicated on the general idea of designing a general purpose social space with a degree of responsiveness and immersion that took advantage of the VR medium in new ways. These attempts helped to clarify not only the ideas and configurations that worked, but also those which did not work as well in the VR medium - principles such as adjacency between spaces being a detriment to accessibility rather than an asset, due to the nature of movement in VR.

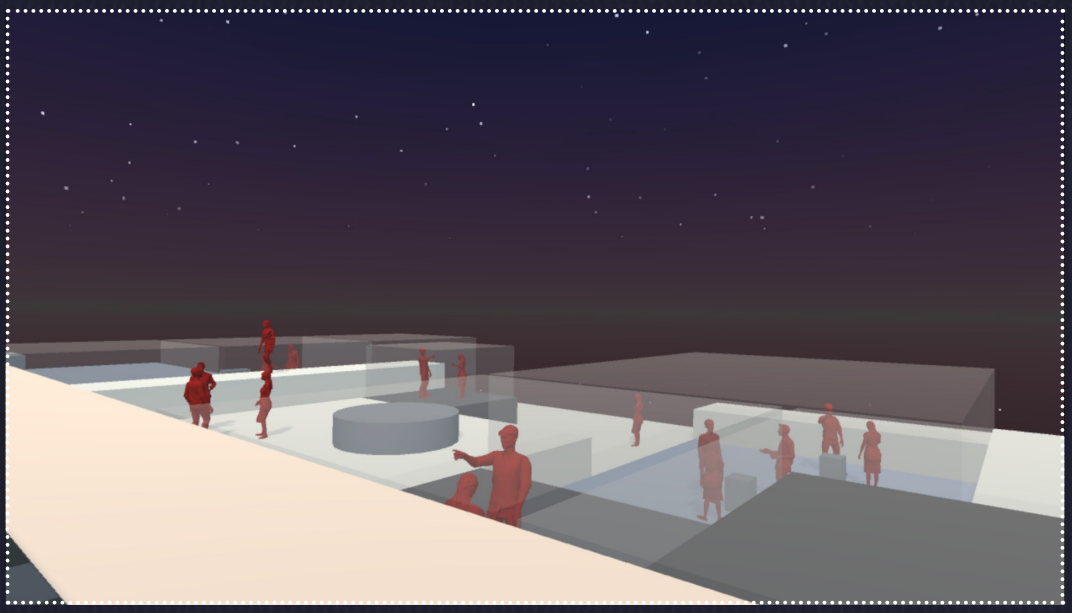


Very, very early VR prototype in Unity, just to get the ball rolling

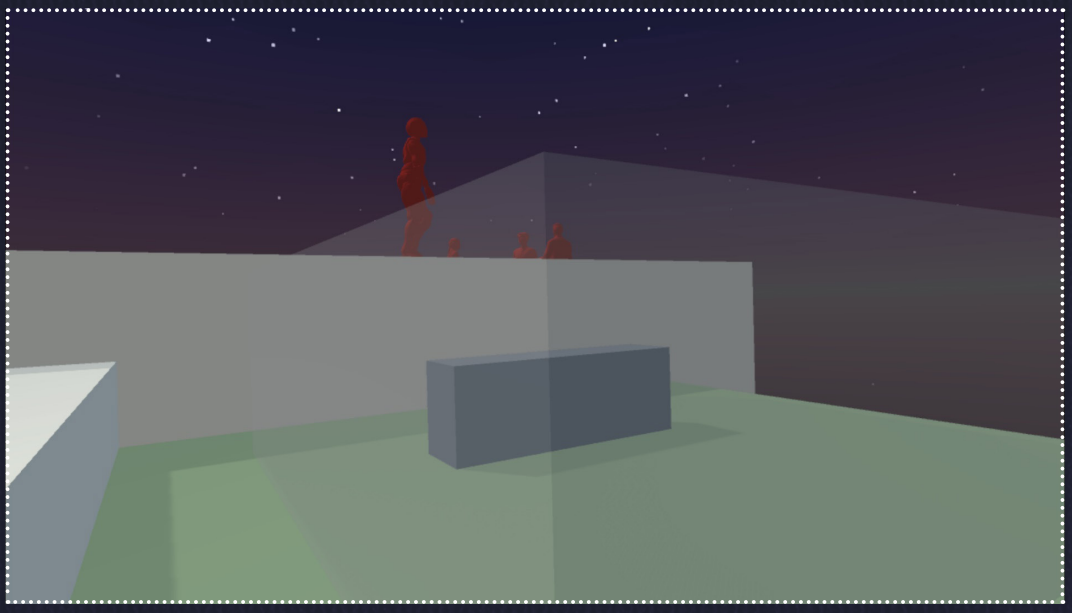


ITERATION.SPACES

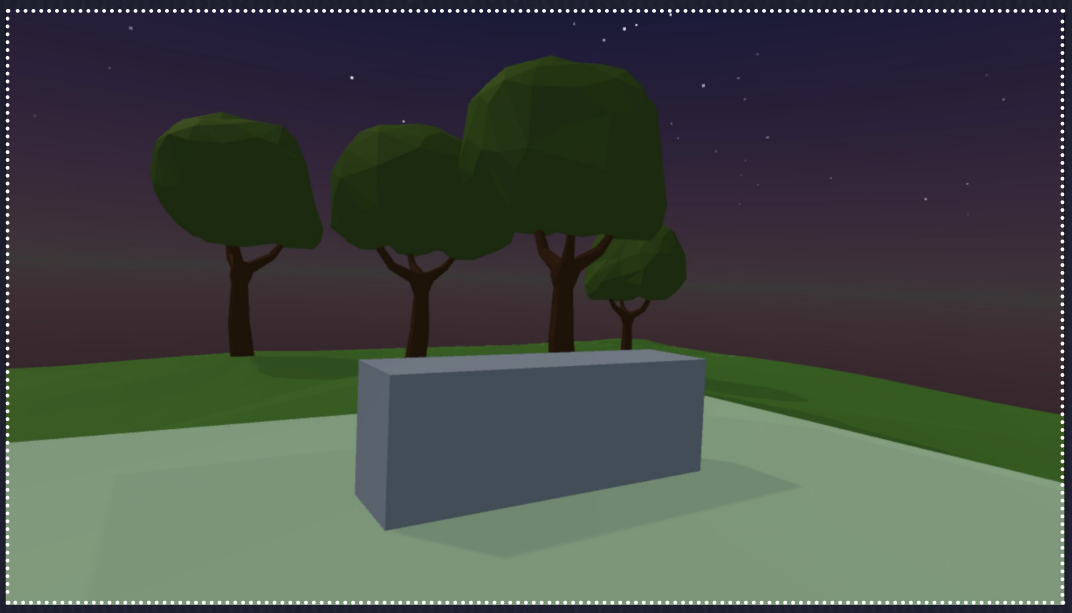
“Hyperspatial”, the first proper design iteration realised after the early tests in the first stage of the project.



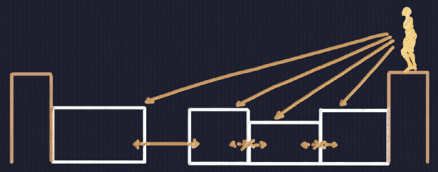
Use of level changes and porous room typology to provide ease of movement and views across the landscape.



Special trigger room that seemingly transports the user to another dimension.

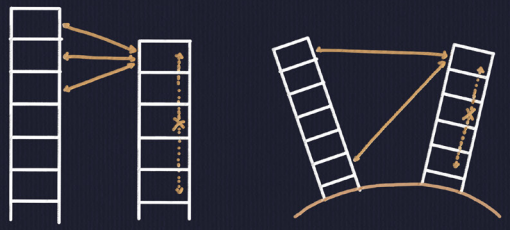


“Alternate dimension” mechanic that triggers when the player enters a particular space, hiding all other objects.



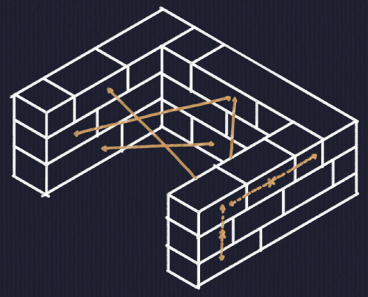
OVERLOOK

The use of elevational differences to organise space in VR is an extremely impactful design strategy, as movement and interaction is largely determined by line of sight. Higher platforms are not only more prominent, they also offer a vantage point for ease of navigation. However, lower spaces are inevitably harder to traverse.



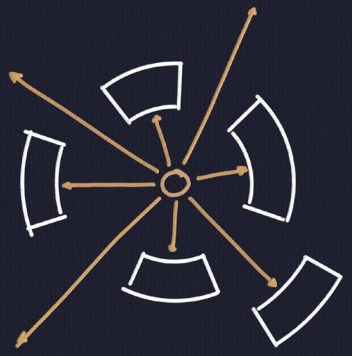
TOWERS

Towers appear to offer a clear means of grouping spaces into clusters that resemble real-life usage - however, the use of teleportation in VR means that distant rooms become unintuitively much easier to reach than adjacent spaces above or below.



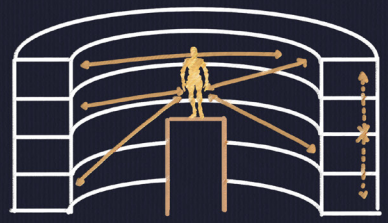
COURTYARD

A courtyard typology makes use of the lines-of-sight principle of VR movement to expose room faces to each other, allowing for more interaction between spaces. There remain some dead corners due to the rectilinear form, and the issue with adjacent rooms being hard to reach is exacerbated by the compact form of the block structure.



RADIAL

By radially organising a series of towers, vantage points are provided for travel between the various rooms. There is a clear hierarchical organisation focused towards the center of the arrangement, but once the user travels away from the center, the hierarchy of spaces and their accessibility from various vantage points starts to fall apart.



PANOPTICON

The so-called 'panopticon' arrangement still does not solve the issue of adjacent-space access, but it provides optimal access and views between the various spaces and a central space. This layout assumes an equal hierarchy and is vertically scalable to add more levels.

A collection of spatial organisation diagrams, distilled after trying out various formal experiments in VR to assess their viability. Ultimately, most arrangements have some kind of trade off, but the same few underlying principles apply to all of them. The use of teleportation for movement results in line-of-sight being of highest concern, notably resulting in unintuitive conclusions regarding distance and accessibility.

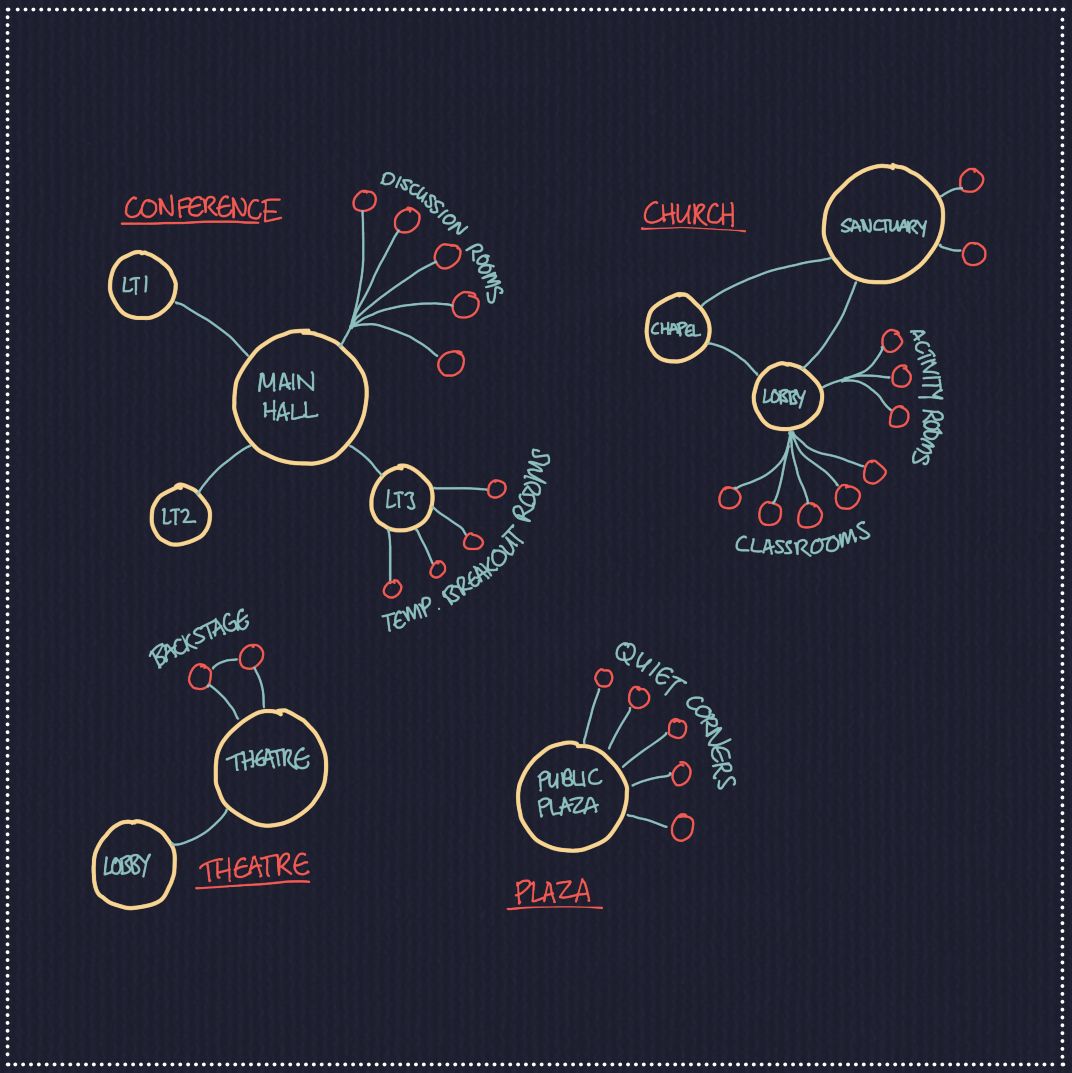
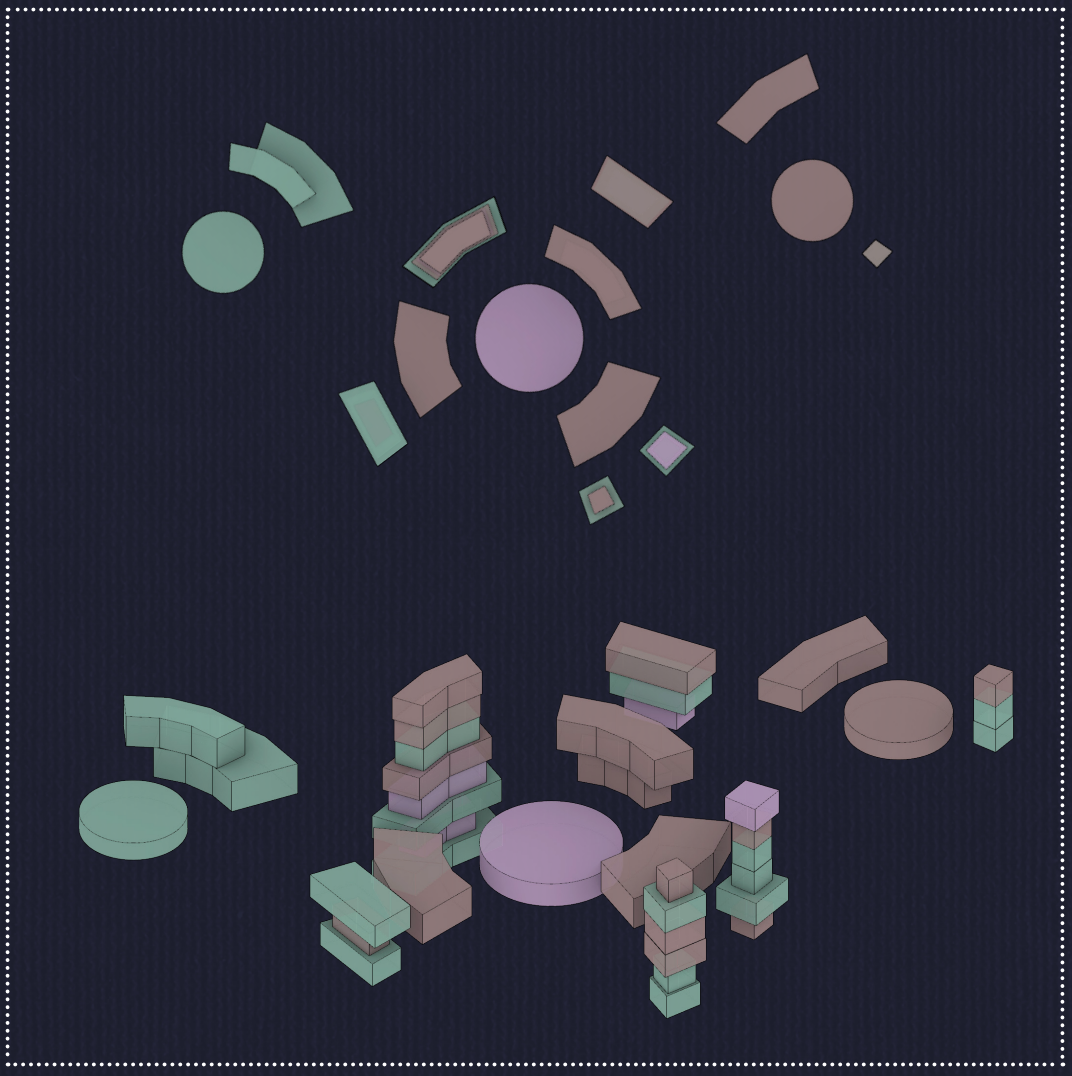
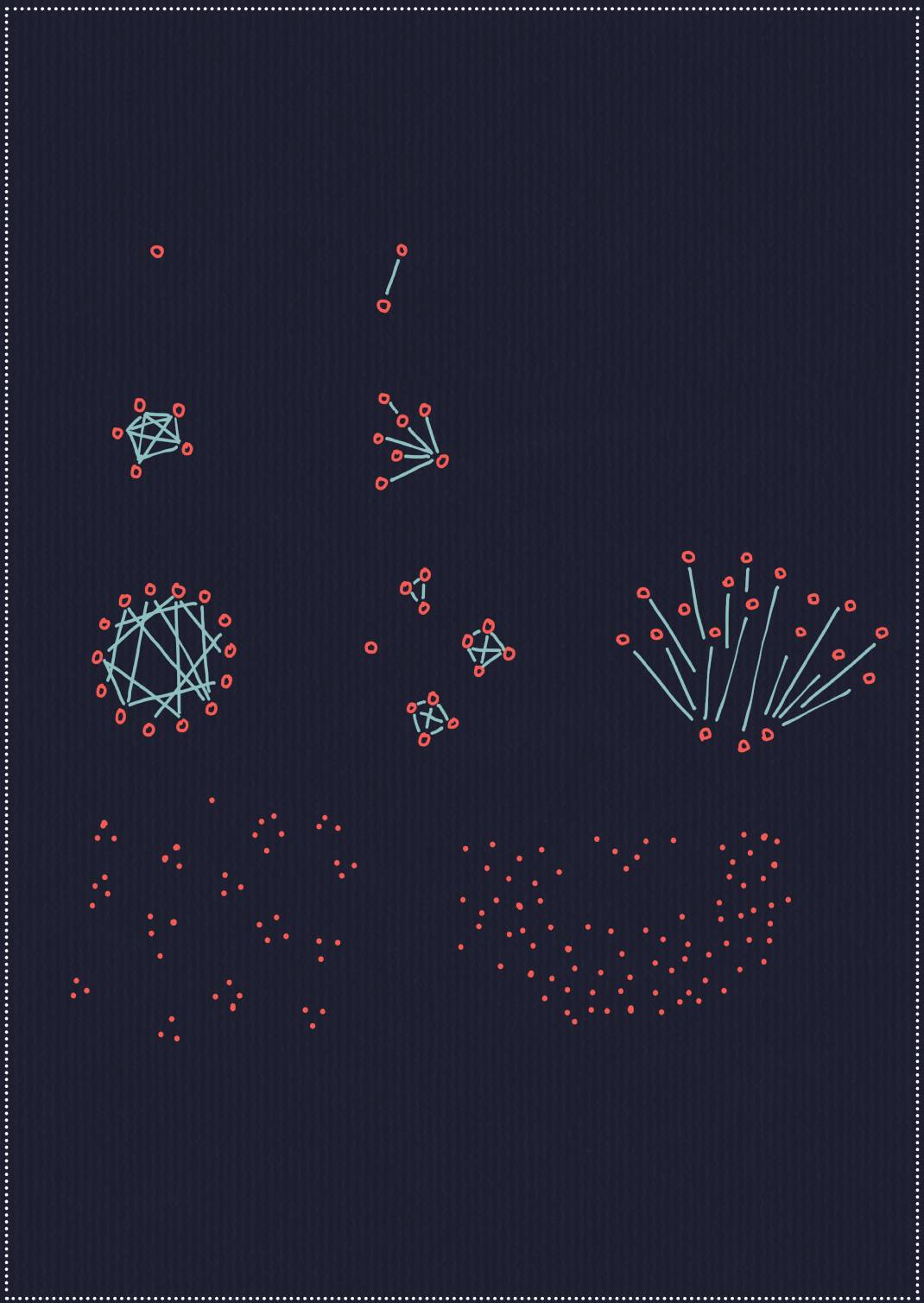


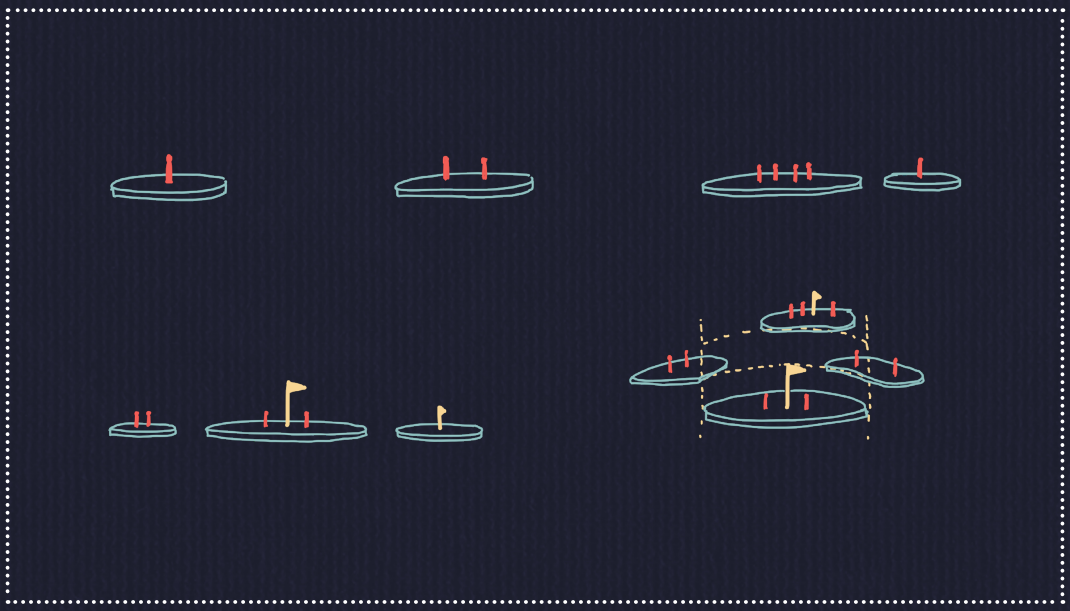
Diagram exploring radial organisation of social spaces



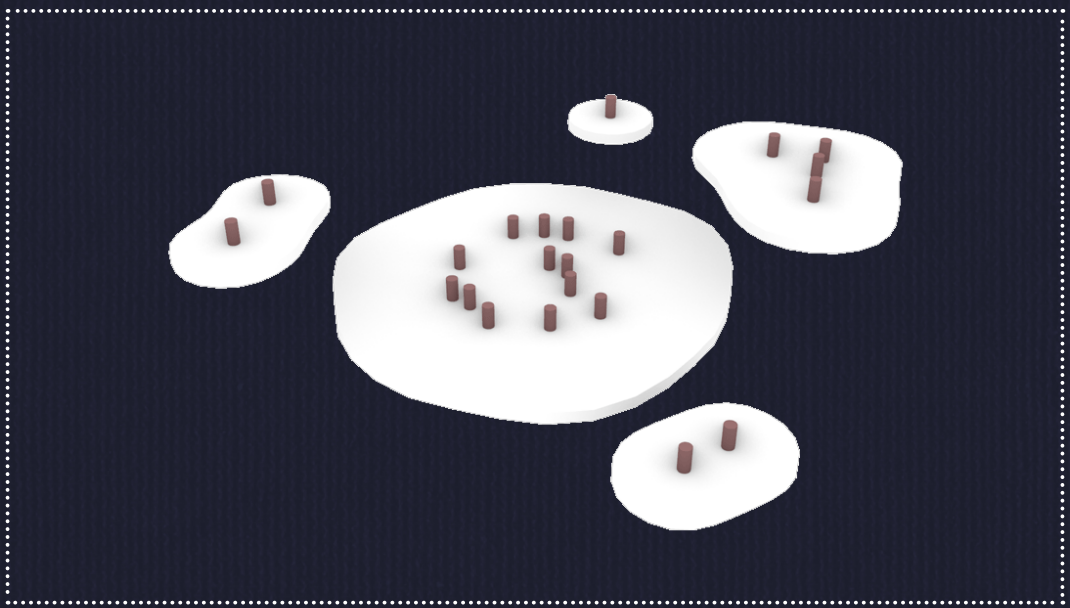
Radial towers scheme - intended to have a high degree of accessibility from the radial layout as well as a hierarchy of spaces from center to further out of the rings



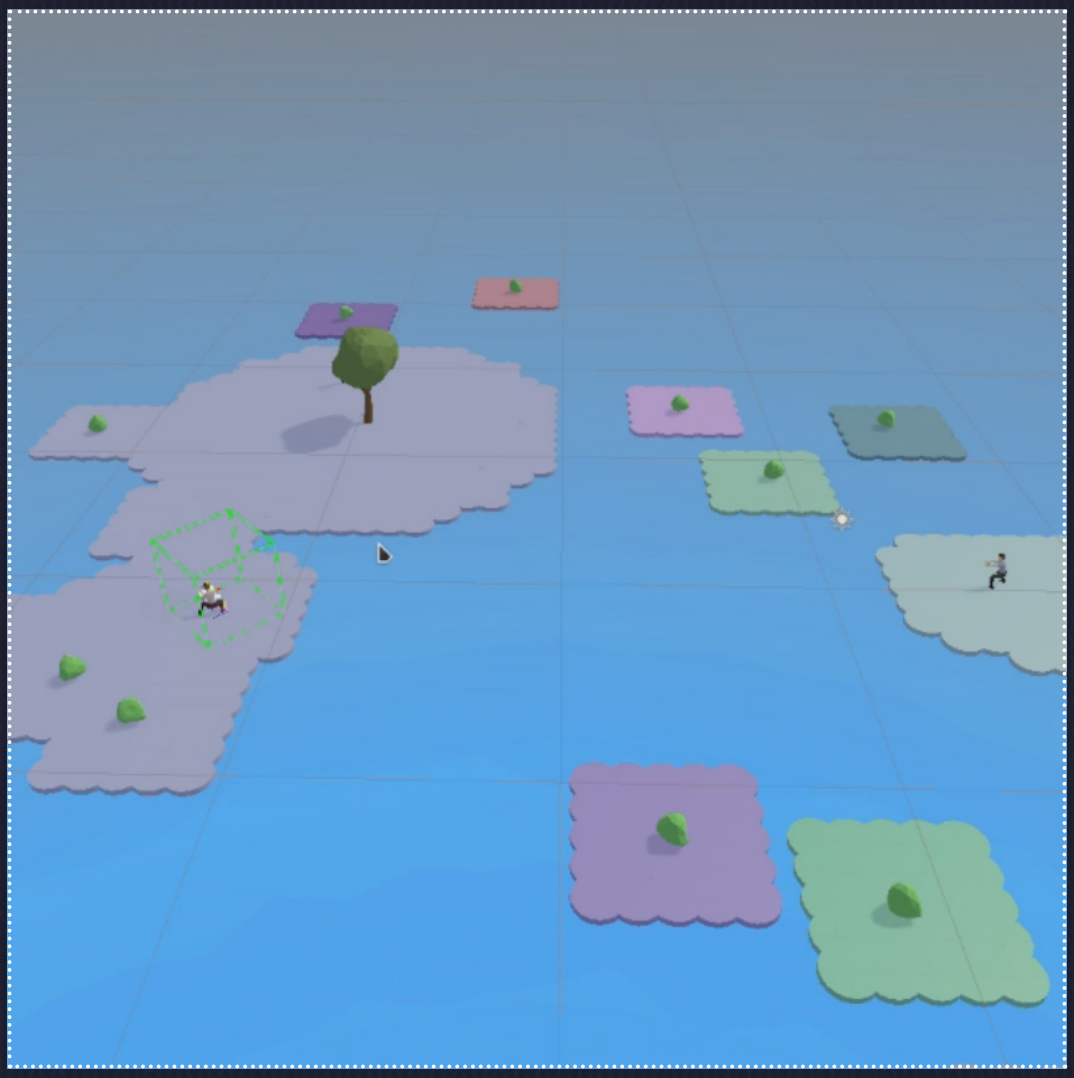
One of the concepts for a while was to design social spaces that might be responsive to the behavioural patterns of users in the space. This was eventually implemented in a very limited extent with the dynamic adjustment of the central subreddit platform.



Concept diagrams for flexible "blob" space, where instead of constructing specific spatial conditions, users generate fields which shape space around them and interact with other users



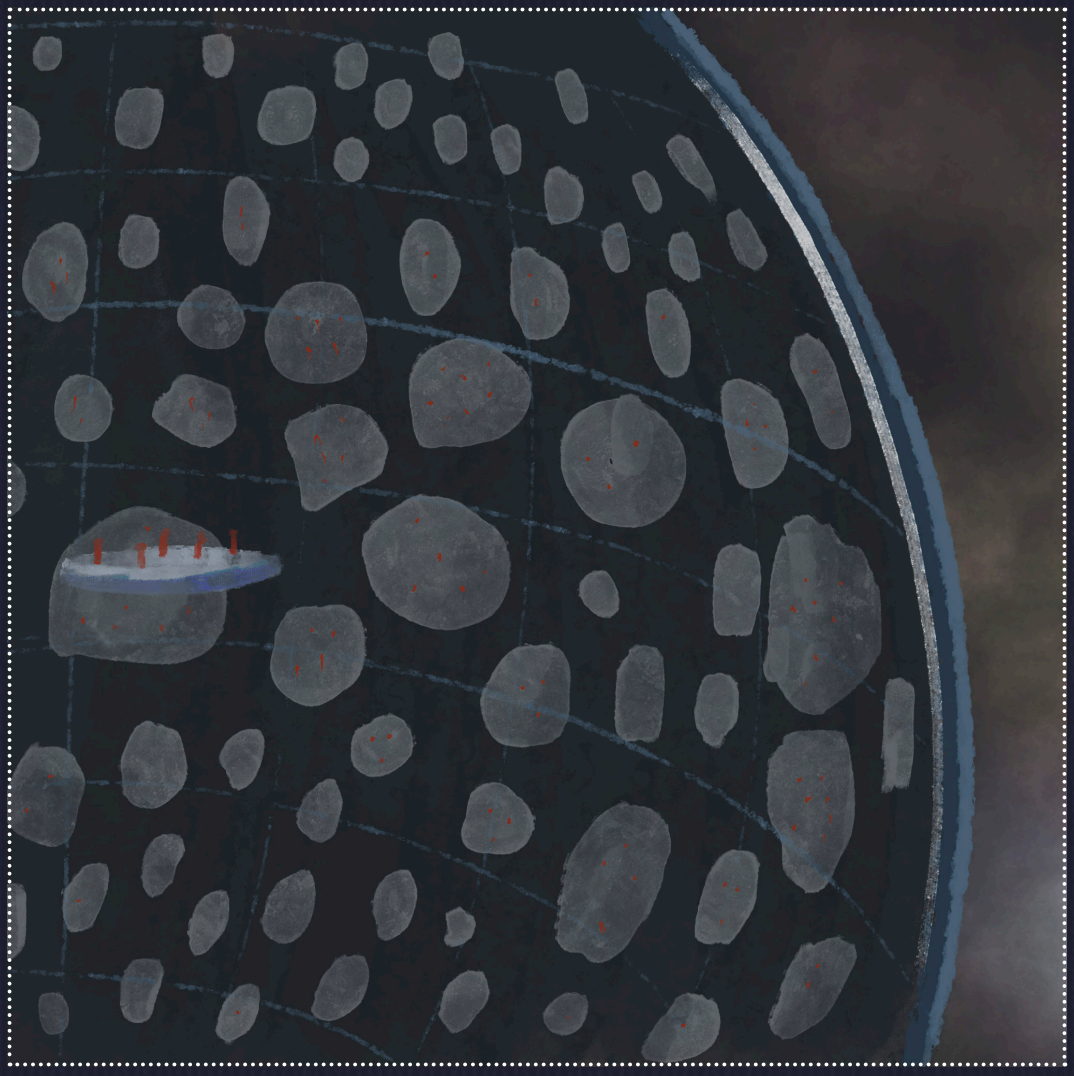
Animated test done in Rhino/Grasshopper demonstrating movement and dynamic adjustment of platforms



Multiplayer test with 'blob world'

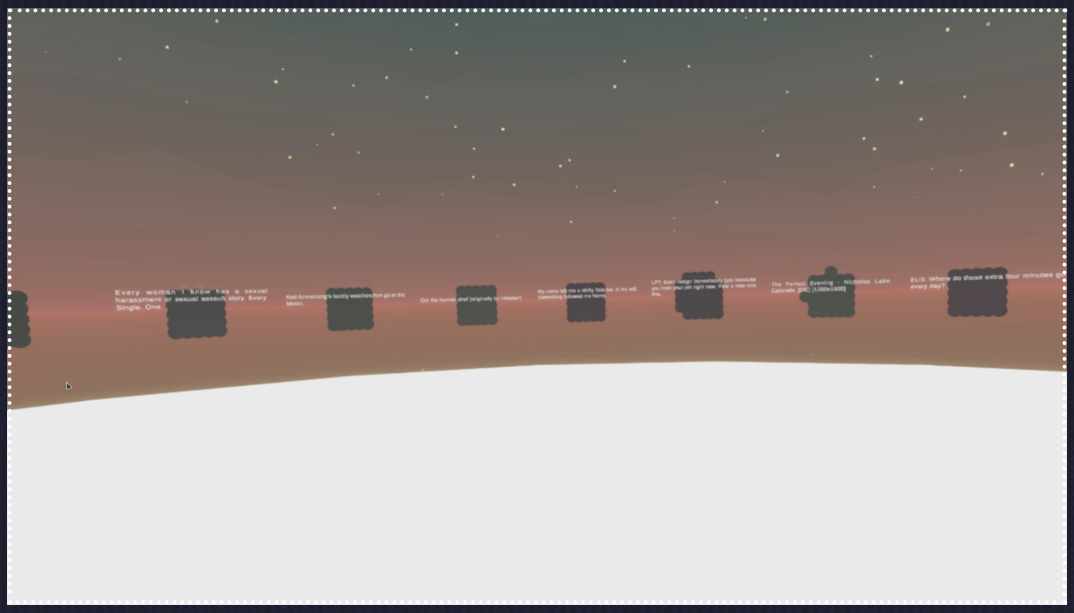
Concept art for responsive blob platforms - exterior space

Concept art for responsive blob platforms - interior space

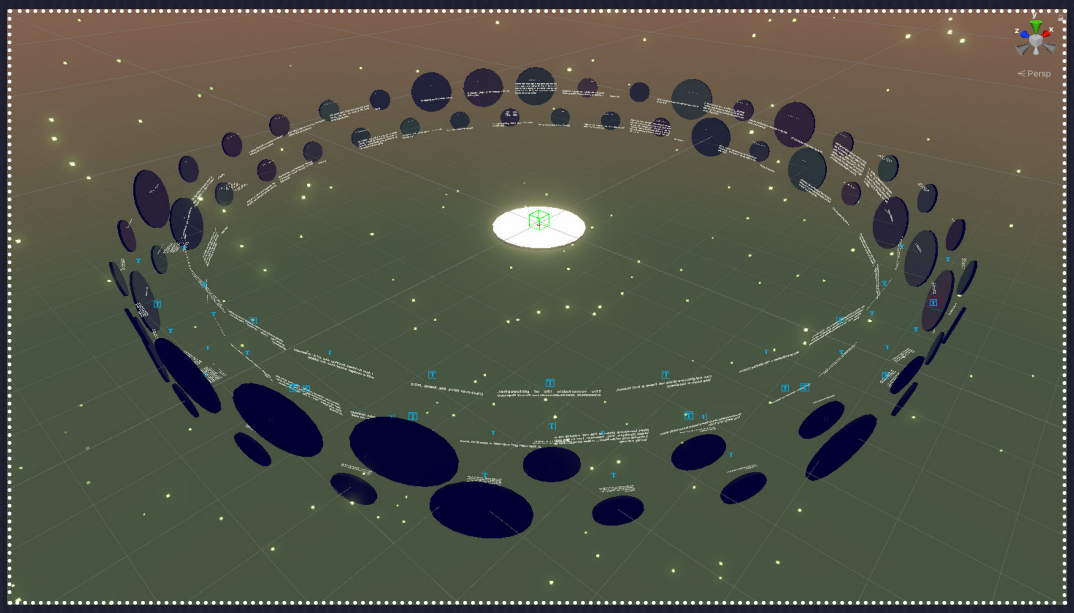


Early concept art for forum concept

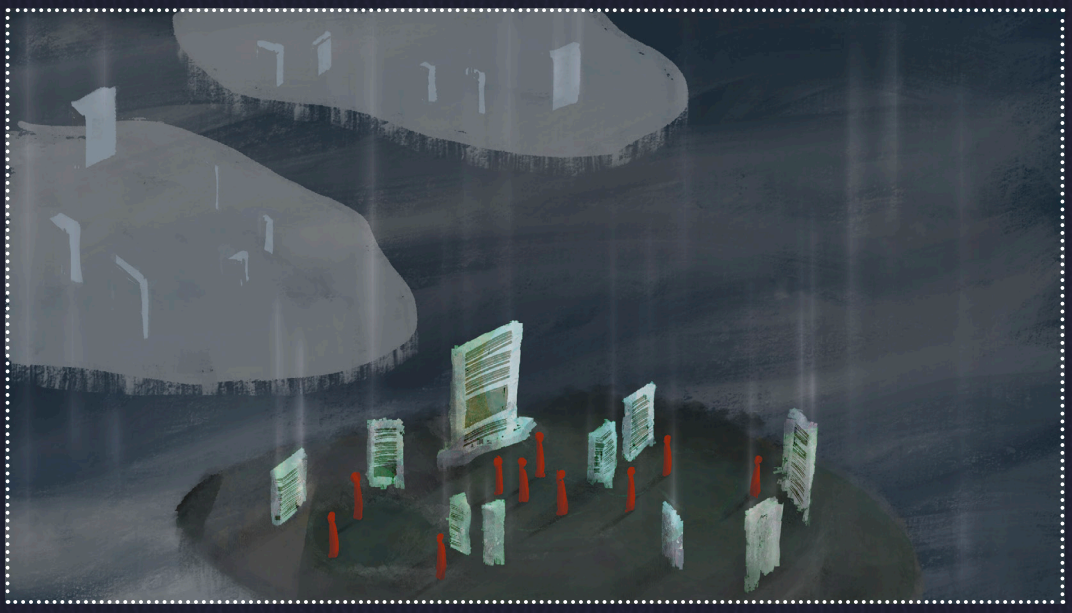
Early concept art for forum concept



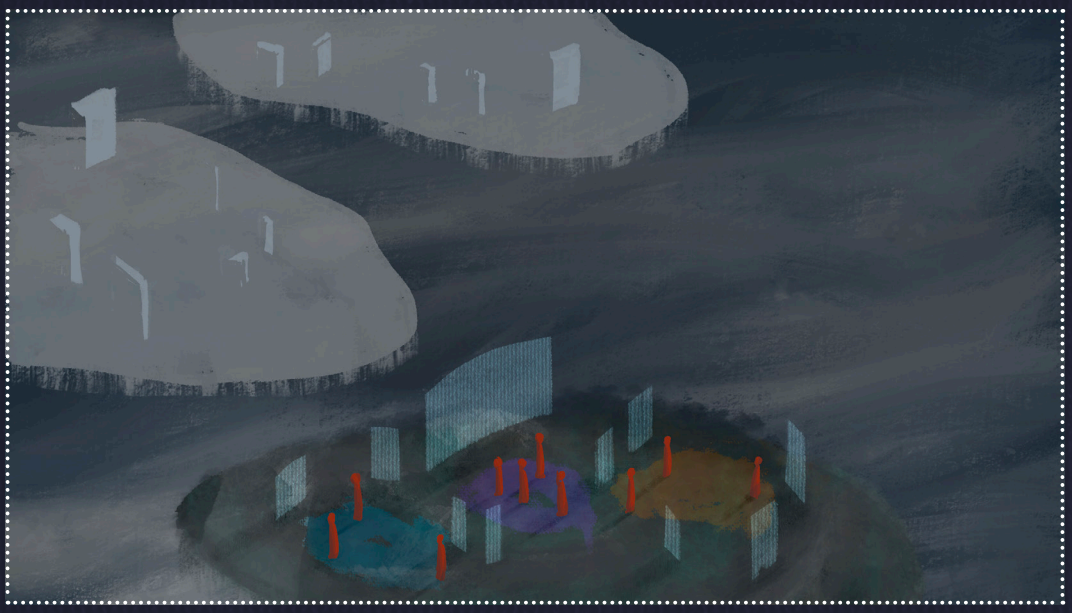
First iteration of forum design in Unity



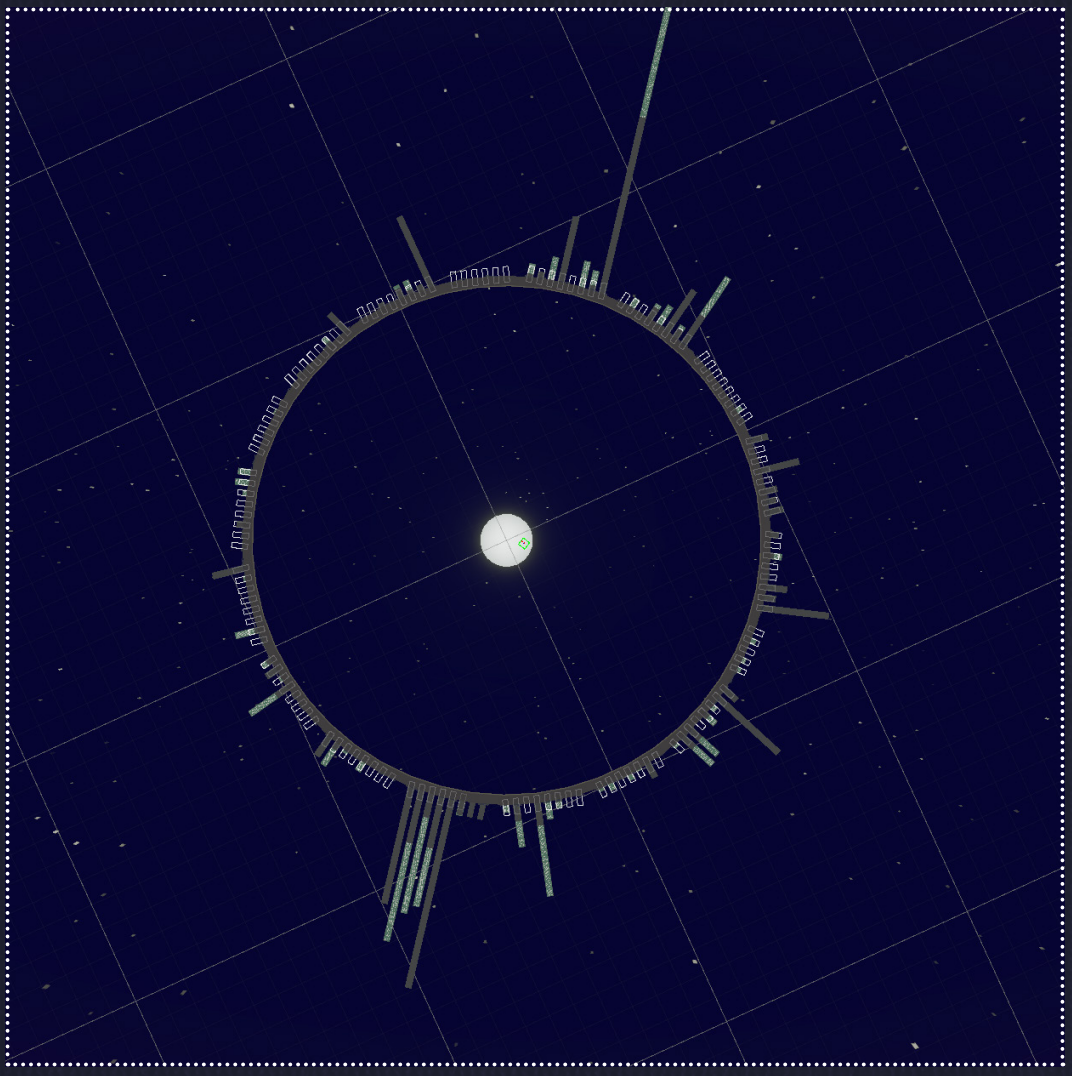
VR.Reddit testing



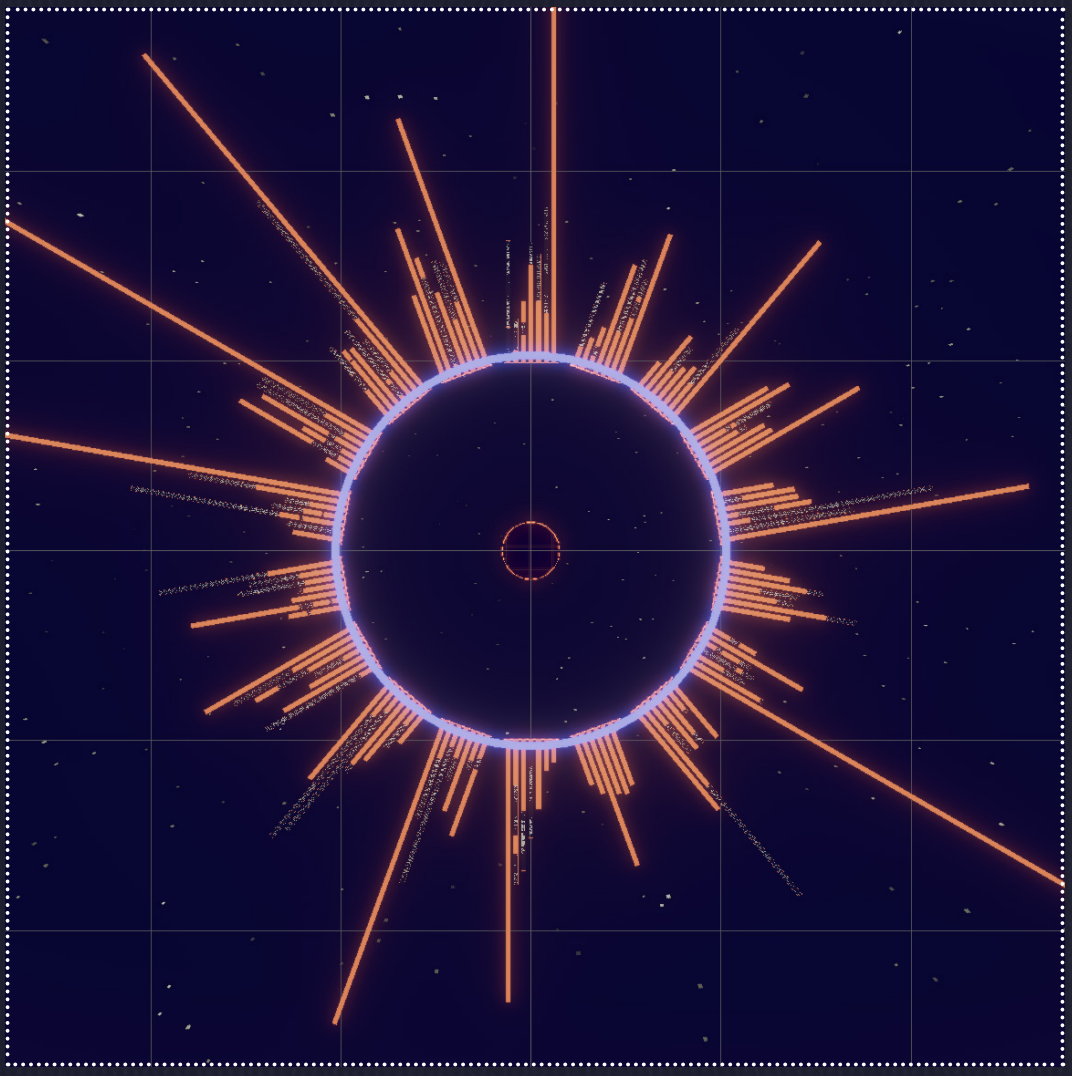
Forum comment concept art



Forum comment concept art

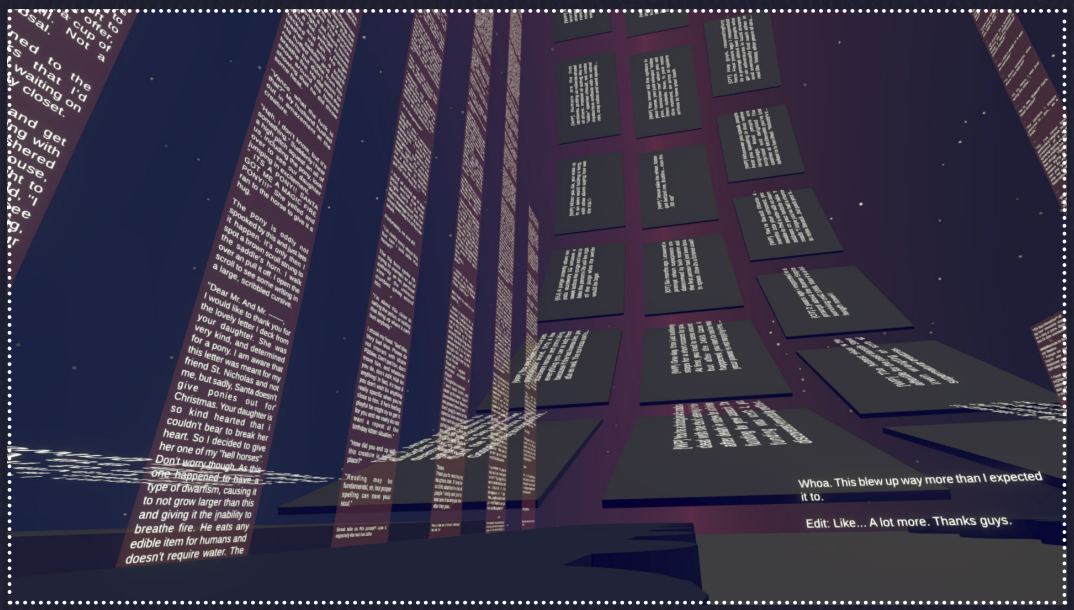


Plan view of early iteration with comments extended

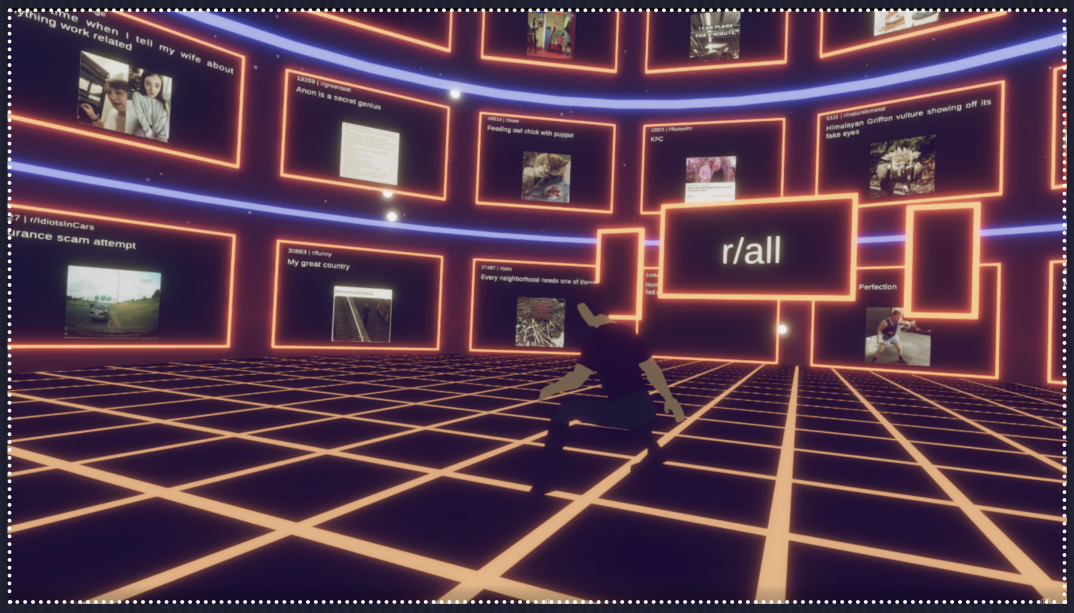


Plan view of later version with comments extended

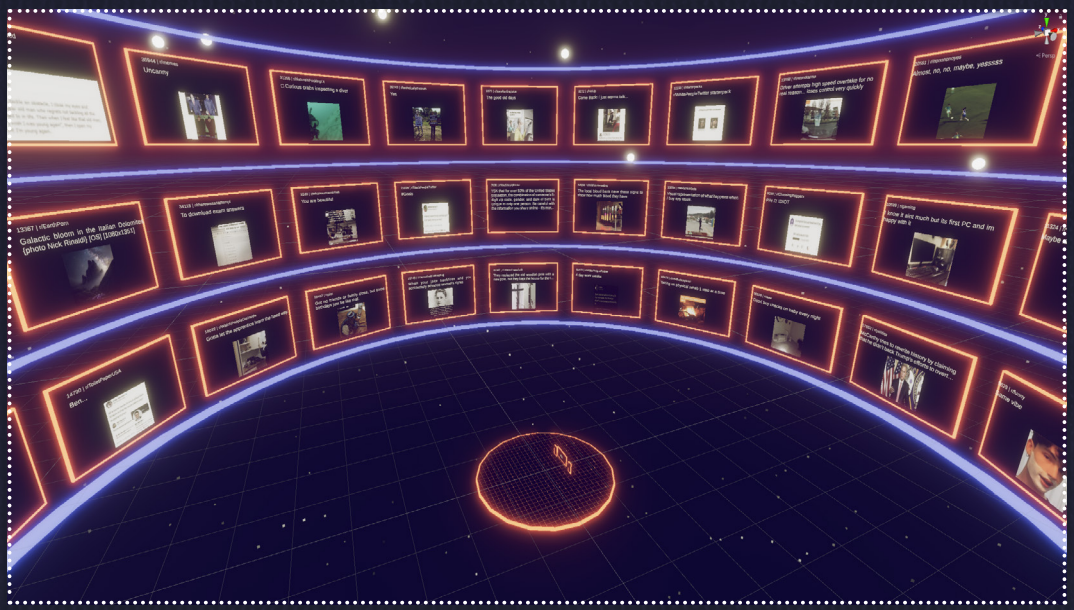
Early Reddit testing



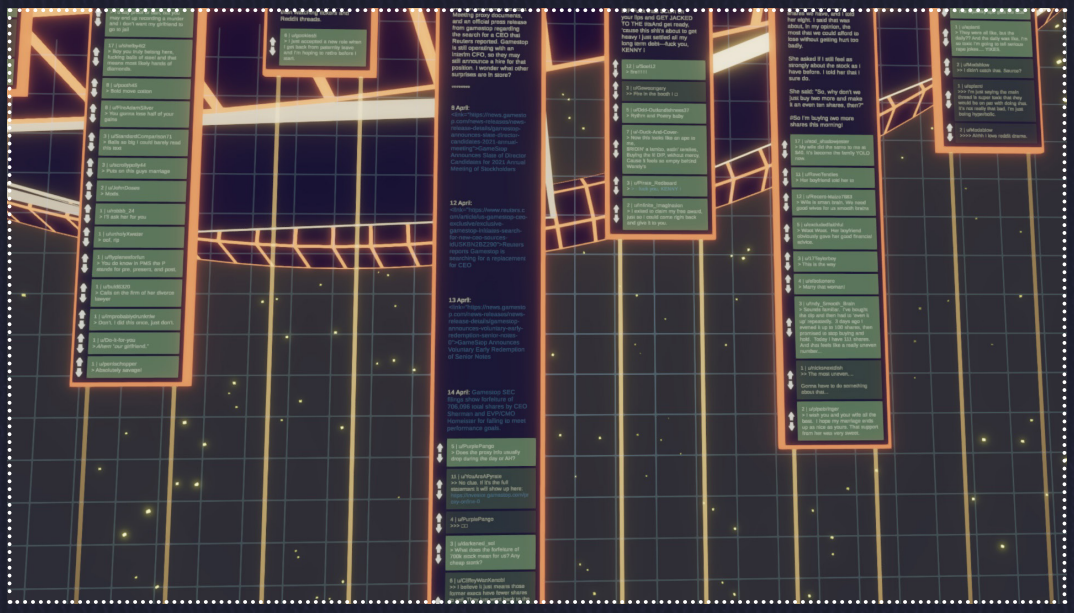
Early Reddit testing



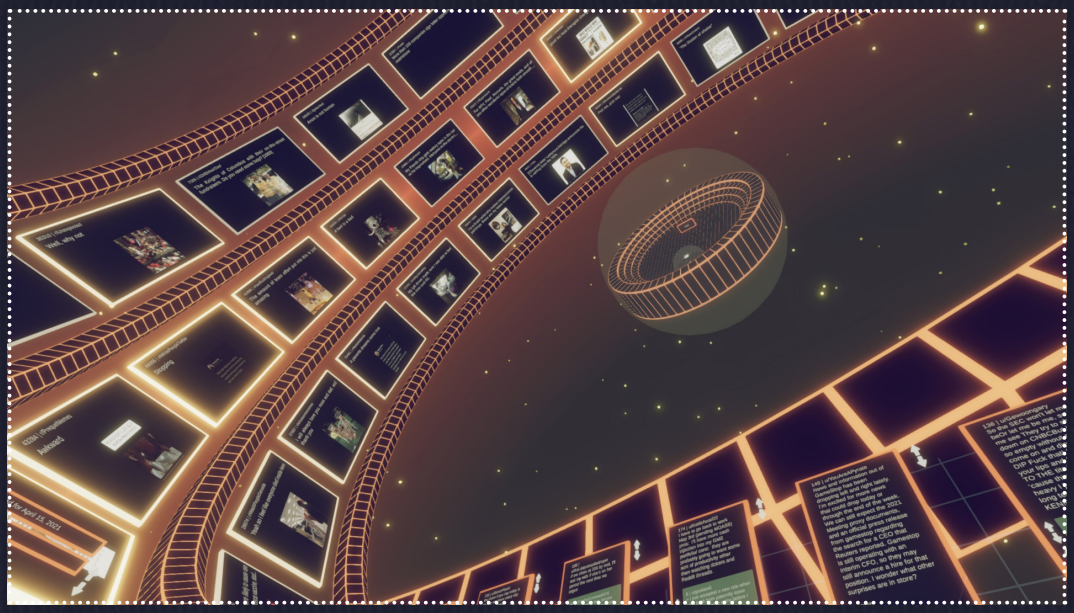
Multiplayer testing



Wide view of intermediate version

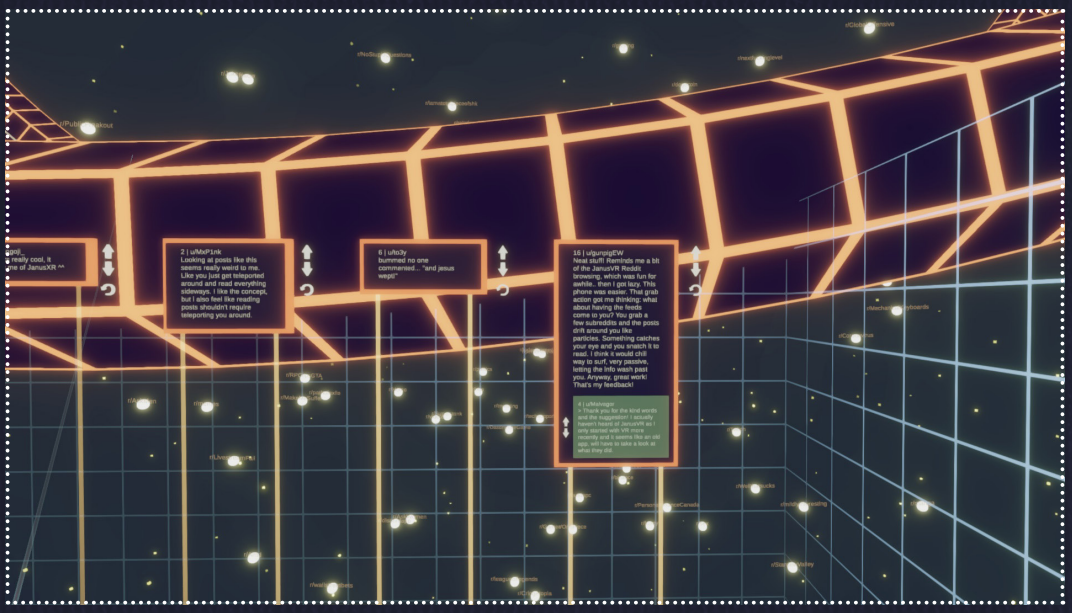


Comment thread views



View of center space and ring

Looking up at subreddit stars



Viewing individual comments