

Domesticated Office:
Designing to Foster Team Culture
in Virtual Workplaces

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Abstract

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Remote work enables flexible time and space for *knowledge workers* (i.e. whose jobs involves developing and using knowledge rather than producing goods or services), and it has shown increased productivity compared to working from physical offices (Chavez-Dreyfuss, 2020). However, it challenges the social connection aspect of a workplace. In this study, I present plausible solutions and suggestions on how digital experience can help build company culture in a virtual environment, but also challenge the conventional workplace norms in a domestic space. I wish to open up the discussion of how telecommunication tools change workgroup relationships, and what unconventional workplace norms can evolve from the new situation. I also suggest that because remote working has brought out so many possibilities, future teams should consider allowing different levels of social engagement in workgroups and accommodate different living situations.

**DOMESTICATED
OFFICE:**

**DESIGNING TO
FOSTER TEAM CULTURE IN
VIRTUAL WORKPLACES**

FEI SHAO

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INTRODUCTION

In response to the growing trend of remote working, this thesis project speculates a future where technology remains the main source of workgroup communication for knowledge workers: employees put on Mixed Reality (MR) glasses daily that turn their home into a virtual office. By leveraging the architectural functionality and spatial interaction, digital experience can flow more naturally into employees' routine. However, the tension lies between leveraging physical space and the intrusion into employees' personal space.

Without spaces specifically designed to facilitate social interactions among workgroups, how might we design for workgroup social experience that is suitable for domestic spaces? In order to make recommendations for future design in this field, I conducted secondary research through literature review and competitor analysis, primary research through interviews, exploratory probes and co-design workshops.

1.

THE CURRENT



My Home Office, 2020

Social Interaction in Physical Office Versus Virtual Workplaces

Prior research has shown that office layouts have an impact on forming intra-organizational networks because different spatial layouts facilitate distinct network structures. In particular, space and physical proximity may play a significant role in facilitating tie formation (Sailer & McCulloh, 2012). But without the presence of a physical space, remote workers, especially new hires might find it hard to build the same kind of social ties with coworkers as they would in a physical office. In order to better manage remote teams, companies are creating new team building activities such as virtual lunches, virtual happy hours, team building games, and more. To learn about how workers are feeling about telecommunication, I conducted eight semi structured interviews each lasting 30-45 minutes. For interviewees, I chose people working in technology industries, financial consulting and education located in the U.S. I chose this demographic because they were reported being able to work from home at an efficiency rate of 80 percent or more according to a study at Stanford (The Bright Future of Working from Home | SIEPR, n.d.) and are likely to continue working in distributed locations.

The interviewees have different jobs including software engineer, data analyst, designers and financial consulting agents. 3 of the interviewees joined their current job remotely, others have known their team before transitioning to remote working. I asked about their daily routine at home, their thoughts on how the new normal is changing workplace relationships, things they missed about being in offices, things they wish they could work differently. I also inquired about the items that are most important to them in their home offices to learn more about their physical interactions. In this section I analyzes several key findings based on the semi-structured interviews:

1. Mental fatigue after long hours of video conferences

Through my interviews, the screen fatigue was brought up multiple times. People are not as comfortable with video meetings as with in-person. There is a lot of stress with video conferences and awkwardness around the interaction, and the experience ends up taking more energy than in-person ones. Participant Vanshika and Serena mentioned presentations to teammates or to other groups is harder than usual: “Having to present to team(s) you have never met is difficult as well — with no video on and not being able to read their facial

expressions is very difficult to get clear feedback. (Participant Vanshika, Researcher, first year in their job)” Participant Sara mentions that even social events like happy hour or casual chats that are supposed to be fun and relaxing adds stress to her.

2. Need for workplace presence

People want to feel the presence of a workplace. The knowledge of someone else is present and working is important for workers to stay motivated. Especially for people who do a lot of individual work, the presence of workplace ambiance helps them to stay focused. Participant Patricia uses online platform to find groups to work together virtually because they miss the team aspect of working: “When I’m feeling low and want to work on something else, I’d remember that there is this room of people. And I would scroll back to it, and there would be this grid of people just working on their own stuff. It’s weird and awesome at the same time that we are in this wormhole together. I’ll then go back to focusing on my work.” (Participant Patricia, UX Designer, first year in their job)

3. Lack of mobility

Most people I interviewed work solely at their desk throughout the day. Their reasons varies: Participant Lumi has to stay at her desk all day and avoid going to the living room to stay out of her partner’s camera view: “I do everything at my desk these days, even meals too. My partner works in the other room and is in meetings all day, I don’t really want to disturb him, or accidentally show up in his background.” (Participant Lumi, Financial Consultant, fifth year in their job) Participant Jack stays at his kitchen counter all day because that is the only place he could set up a work station outside of his bedroom.



Other reasons include setup for video calls(cameras, microphones, monitors) constrains them at the table, concerns for messy background, or they just do not see the need to move around. The lack of mobility, and a loss of scenery change also contributed to mental fatigue in the remote working situation.

4. Difficulty perceiving non-verbal signals and social cues

In in-person meetings, most teams are used to communicating through eye contact and subtle body languages as a second channel. Participant Lou mentions that in business meetings, subtle signals are crucial for their teammates to back each other up when needed. But with video conferencing, it is difficult to send and receive non-verbal signals. Former research has also suggested the cognitive overload on nonverbal communication and users work harder to send and receive social cues which creates fatigue (Bailenson, 2021). Second channel communication like Slack or additional meetings is often

used to make up for the loss of information people usually get through external cues like body language or spatial behavior.

5. Disconnection and isolated

From the interviewees, Participant Jerry, Fushi and Kathy are new to their jobs who joined the team virtually. They mention feeling disconnected and untrusted. Participant Jerry says that his manager checks in on him regularly to see his work progress. They find it difficult to connect with the rest of the team and build trust. Even with deadlines met on time, managers would still question the work and effort. But when they are in 'check-in' or 'progress update' meetings all day and their managers know they are 'working', they have no time to work or be productive at all. For employees that have known the team before working remotely, they usually depend on setting small meetings to connect with each other: "1 on 1 discussion have become 10x more important for engagement with co-workers" (Participant Jay, Product Manager, third year in their job)

6. Nonconventional team dynamics

Through my interviews, I see different teams forming various team routines and dynamics: Participant Fushi's team always have their camera off, and she has never seen her teammates' face; Participant Patricia's team only meet once per week, and they have the rest of the time focus on individual work; Participant Jerry's team meet first thing every morning to check in on each other's work progress.

2.

THE PLAUSIBLE



Initial Sketches

Exploratory Probes

I started doing rapid sketches based on the problems and pain points I have addressed through the interviews. These sketches are a documentation of my thoughts and reflect the problem space I'm interested in. They also act as probes to provoke deeper conversations about specific themes. Each of these imaginary products represents a design opportunity. They are all explorations into what the appropriate interactions among remote workgroups are.


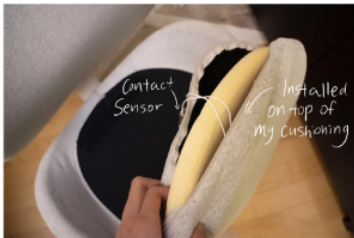


A SMART chair that checks employee presence/
availability to response/ working hour with weight
sensor

The 'smart chair' Concept, 2020

■ + ▲ = Kick under the table
 ● + ✕ = Intense eye contact
 ✕ + ▲ = Pat on shoulder


Have a secret code with your team.

Feedback through tangible interface

The 'Secret Code' Concept, 2020


Take only these and have the meeting everywhere, screen free.



- Double tap to unmute
- Press to raise your hand
- Hold press to exit

The 'Wearable Meetings' Concept, 2020


Don't miss your deadline because of someone else.



Expected response time

The 'Timely Response' Concept, 2020

Press to raise your hand
Press to react



Press to unmute and talk

More natural way to talk.

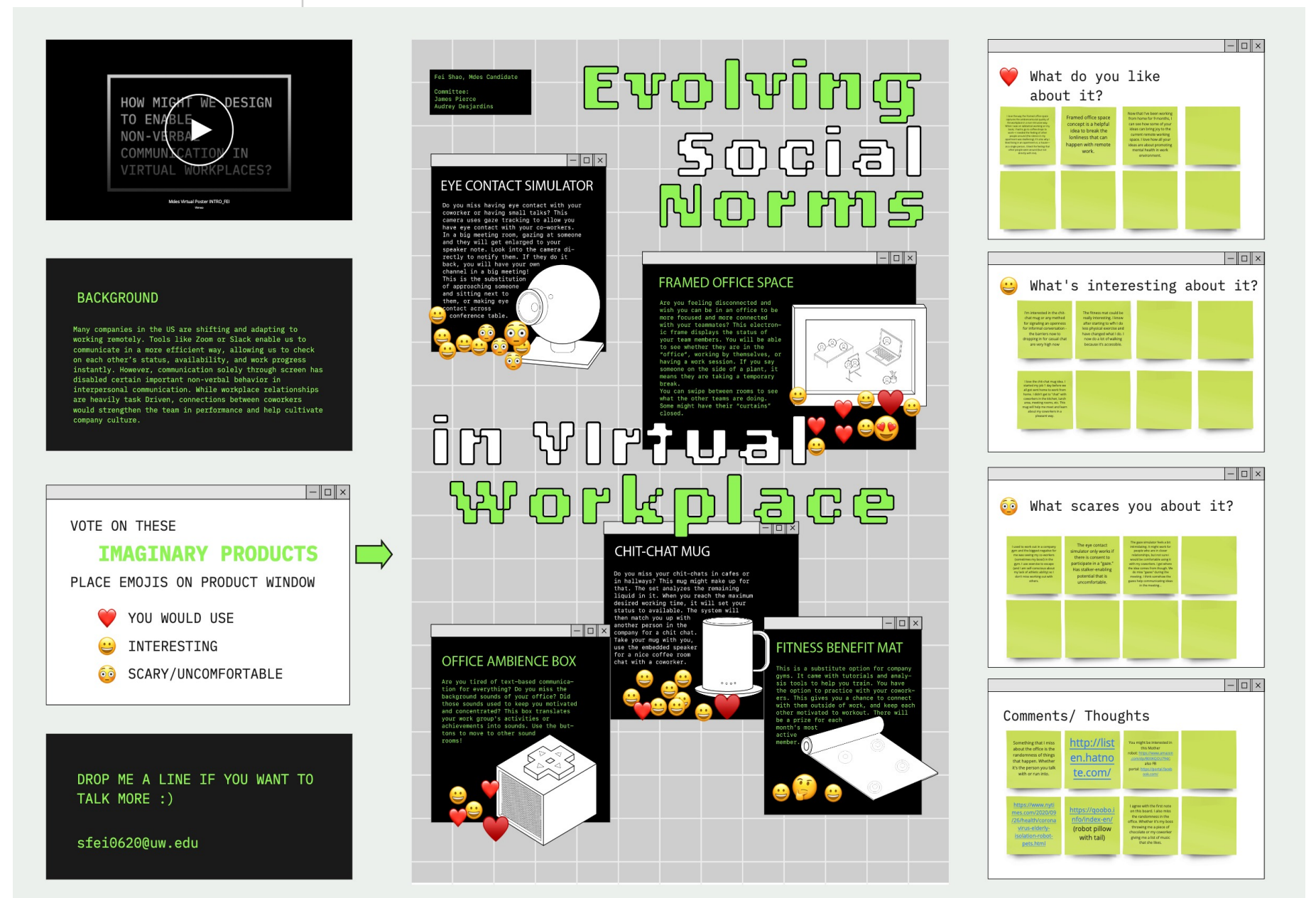
The 'Essential Box' Concept, 2020

I grouped my sketches into different categories and narrowed down to five themes each represented by one object.

In a virtual poster show, I planned a voting activity for these sketches to learn about how people feel about these topics. Participants voted on the objects based on whether they think it's interesting and whether they will use them using different emojis. Some participants wrote written review of the objects, I also talked to some participants at the poster show about how they feel about these objects and documented their reactions. After the poster show, I conducted 3 more follow up interviews with my participants in the first rounds. Through my conversation with interviewees and written feedback, I have addressed design opportunities that are most interesting or needed to the audiences.

The participants in this section are mostly people who work in the design field that we invited from the University of Washington network.

Virtual Poster Show on Miro, 2020



1. EYE CONTACT SIMULATOR: MICRO INTERACTION BETWEEN COWORKERS

Opportunity:

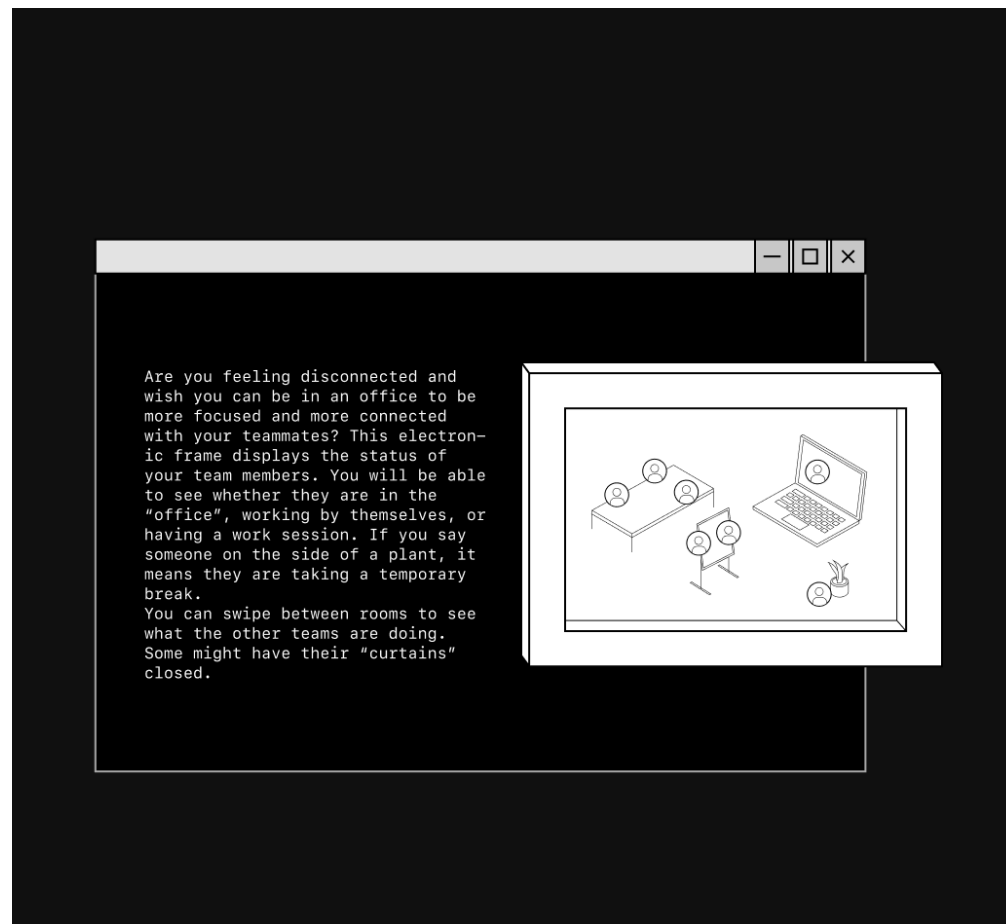
With video conferencing tools, we are only showing our cropped selves. We are not able to make eye contact because we are looking at each other's frame and not the camera itself, and we are not able to show attention even if we want to. It is also impossible to receive signals outside of each other's frames. If you are presenting to a group, even with their camera on, there's no way of telling whether they are looking at you or at their email inboxes. There are opportunities to make up for these more subtle signals through add-ons and sensing technologies.

Reflection:

I created this one because in my interviews, multiple people mentioned they miss being able to make eye contact and interpret signals from it. And it is a challenge for presenters to know their audience's attention level and respond to it. As a result, while most people find this product interesting, apparently they are not quite comfortable with this item. Eye contact seems to be too intimate for the workplace for most people.



Probe 1: Eye Contact Simulator



Probe 2: Framed Office Space

2. FRAMED OFFICE SPACE: AWARENESS OF SPATIAL BEHAVIOR

Opportunity:

There is a loss of spatial behavior in telecommunication, such as proximity between people, orientation and awareness of presence. Such signals are all crucial to an office environment and to communication. We used to have rooms where we can see each other from afar but not necessarily engage with one another. Nowadays it is either we don't see the person at all, or they are suddenly in our personal space (within 18 inches). The opportunity lies here to create distance between people in a workplace while making it possible for approaching and having conversations.

Reflection:

Among all five products, this is the most wanted one. Based on people's reaction at the poster show, I found that they would be comfortable using it. It is the reverse of having a picture of your family at work, here you would have a real time picture of your workplace family at home. Future steps for this product would be to figure out how to input information that determines personal status.

3. CHIT-CHAT MUG: RANDOMNESS OF OFFICE SOCIAL EXPERIENCE

Opportunity:

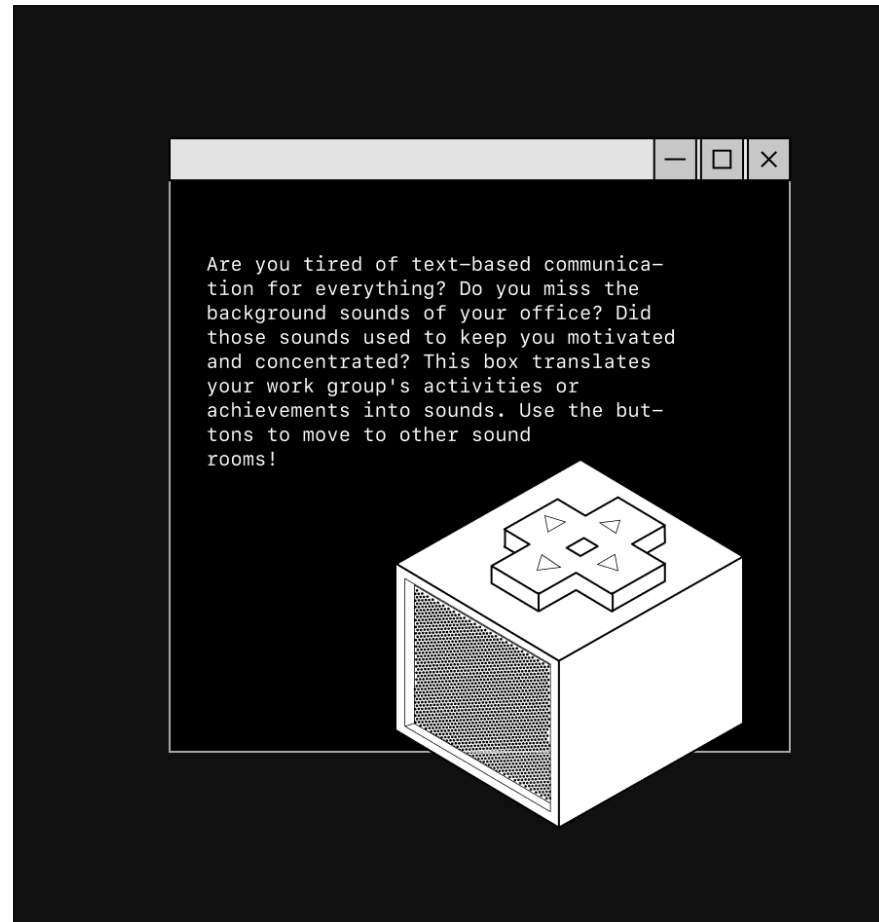
Teleconferencing tools make every meeting within a few clicks. However, the randomness we experience in a space is cut off from it. We have to schedule everything detailed into minutes to live through the day. There seems to be no place for chit chats anymore. And when we do a casual session, because we use the same tool and we still sit at our desk, it feels burdensome while it should be relaxing. The opportunity here is to create a more natural experience for office chit chats.

Reflection:

This is the second wanted item among these products from the poster session. Instead of setting up everything on our schedule, this item allows a more natural way to signal availability using simple sensing technology. It mimics people going on a coffee break in offices and having random conversations by the coffee machine/water cooler.



Probe 3: Chit-chat Mug



Probe 4: Office Ambiance Box

4. OFFICE AMBIANCE BOX: PRESENCE AWARENESS THROUGH SOUNDS

Opportunity:

We used to feel people's presence in multiple ways such as visual, sounds, smells, or touches. In physical offices, we could get a hint of what other people are doing merely through listening. But now with telecommunication, the moment we leave a meeting, the sudden silence throws people off. And we receive almost all the other information through text in a notification. There are opportunities to design a more natural way of receiving these background activities to help feel more connected.

Reflection:

From initial feedback about this product, people find this product intriguing because it uses sounds to mimic an environment. But moving forward, it would be challenging to determine what the sounds should be.

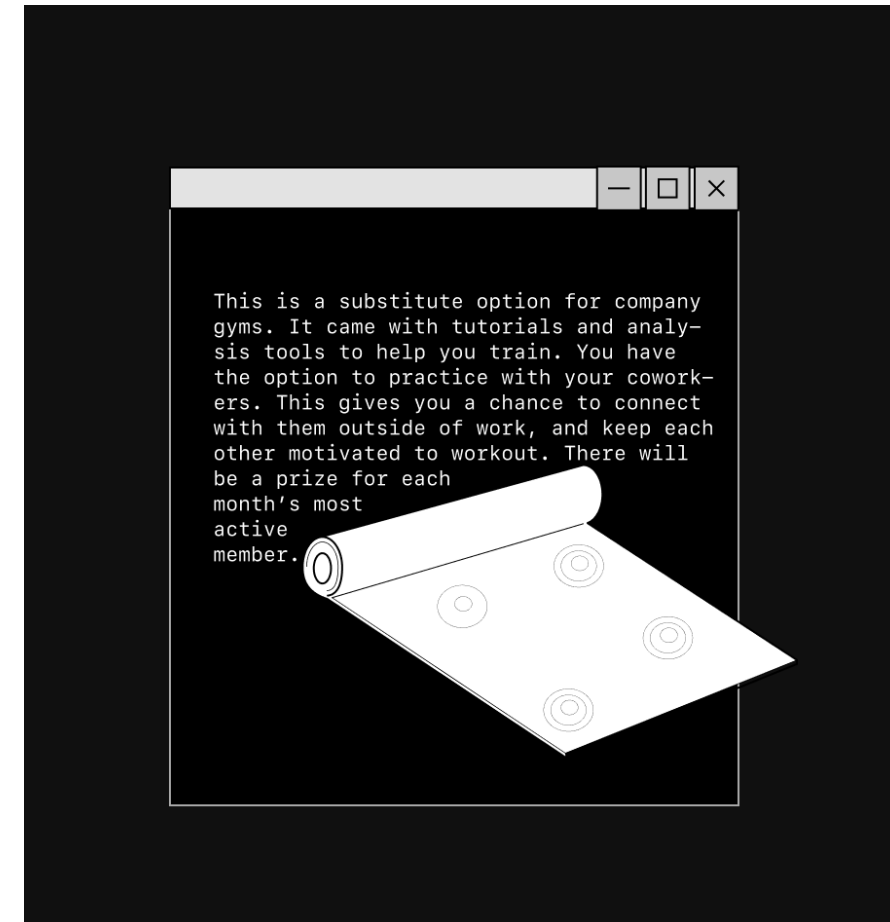
5. FITNESS BENEFIT MAT: PURSUE OF A MORE ACTIVE WFH LIFESTYLE

Opportunity:

People are lacking activities working from home. Most people do everything sitting in front of the desk, and spend more and more money on upgrading their chairs. Employee's health and well-being should be taken more seriously from employers. And with the money saved from renting office places, there should be more money to support home workouts. People always need strong incentives to pursue a healthier lifestyle. And what if employers put small prizes on it?

Reflection:

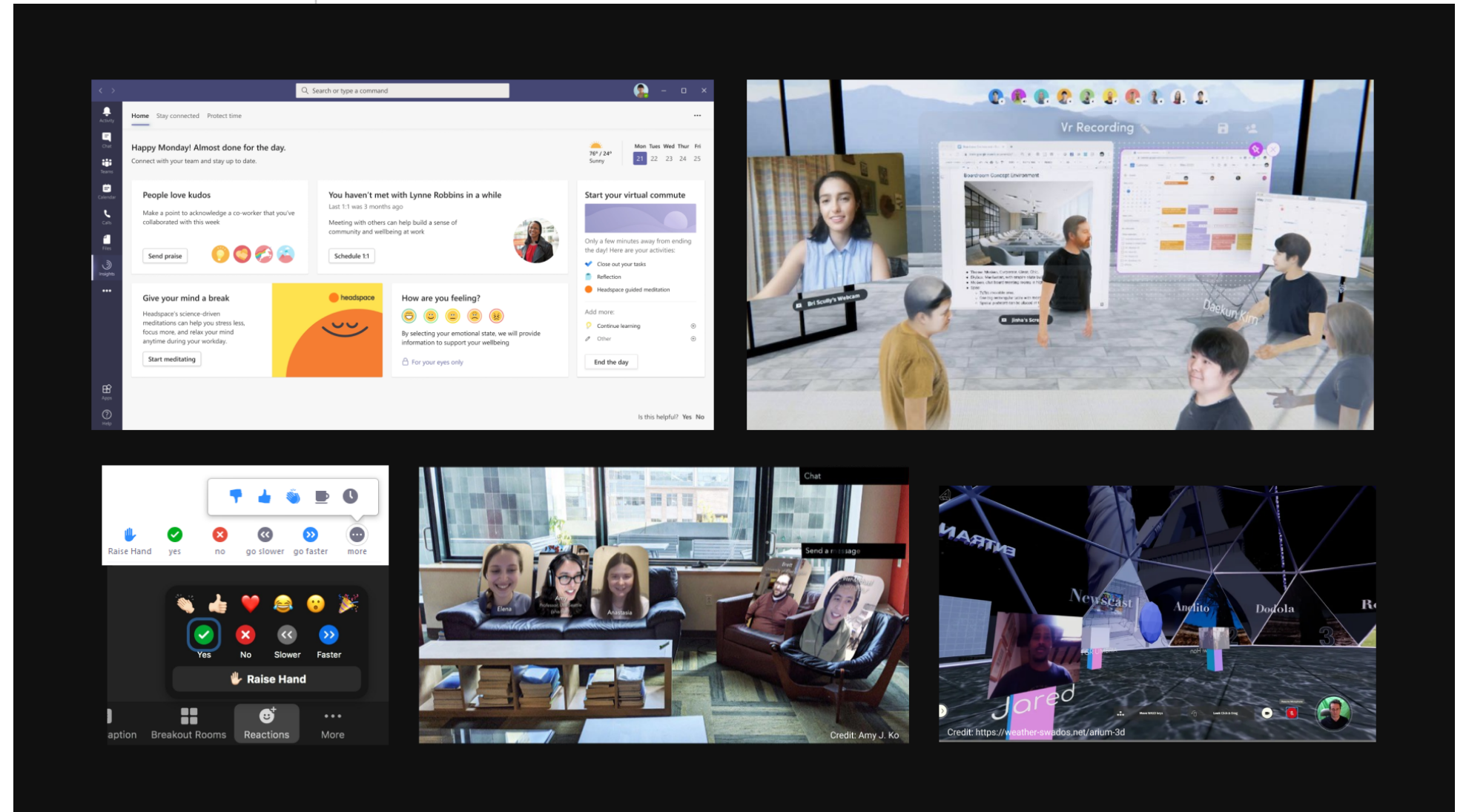
It was interesting to hear about the two sides of opinions on this product at the poster session. This product seems to be not for everyone, since working out with coworkers feels a little awkward to some users. But others were really intrigued by the opportunity to do non work-related activities with their team. And the idea of staying active and increasing mobility makes a lot of sense to most users.



Probe 4: Fitness Menefit Mat

4.

THE PREFERABLE



Screen Shots of Current Products

Competitor Analysis

I conducted competitor analysis on both screen-based tools and also AR/VR tools which is also an evolving trend for remote workers.

I did a comparison for their product features in exchanging non-verbal signals, providing ambience, change of scene, encouraging mobility and whether they can create randomness in social interaction that feels more casual.

Video based products like Zoom and Teams are good at delivering facial expression, and they might even create office ambience by prompting connections between teammates. But it limits users' mobility due to its medium, and everything needs to be scheduled which requires extra actions from users. Slack doesn't do good in delivering real time social signals, but it allows users to perceive in a conceptual way. For instance, different channels represent different scenarios. Even though users are still using the same window, it feels like a scene change. Virtual environments like Arium and Spatial solves a lot of problems with video calls by enabling spatial behaviors. For example, Arium uses blocks to represent body movements and live video feed for their face in a virtual environment. The approach translated most non-verbal signals successfully and allows users to perceive the ambience of the environment.

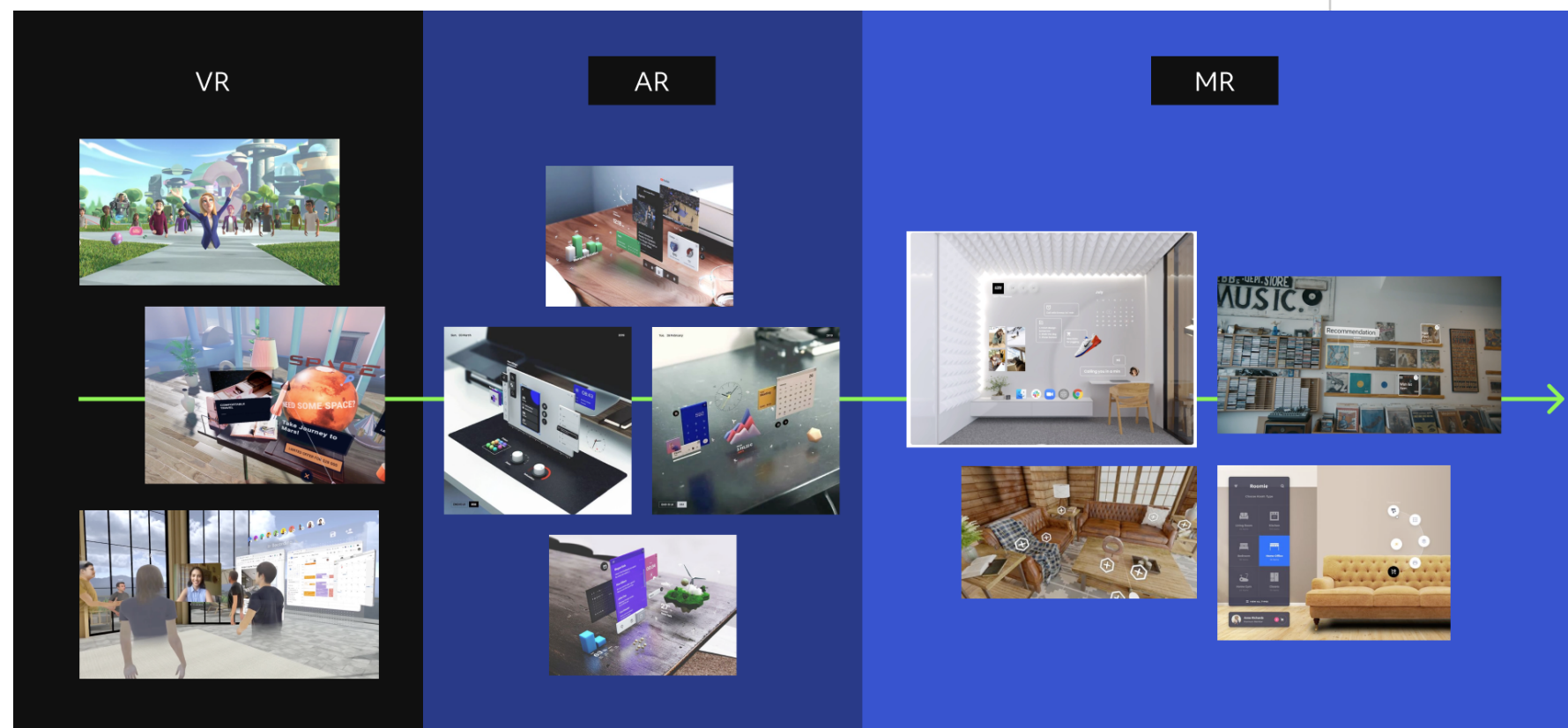
Given that users are working from a relatively stable situation-their home, I see the opportunity to link digital products with physical space. By leveraging the architectural functionality, users will have more natural interactions, increased mobility and less fatigue. And through using digital platforms, users will have an engaging work environment.

	Zoom Video conferencing tool	Teams Video conferencing + collaboration tool	Slack Messaging tool	Spatial Productivity tool in virtual environment	Arium Exhibition tool in virtual environment	Ohyay Video conferencing
Facial expression	✓	✓	✗	✓	✓	✓
Physical proximity	✗	✗	✗	✓	✓	✗
Gesture	✓	✓	✗	✓	✓	✗
Ambiance	✗	✓	✓	✗	✓	✗
Change of scene	✗	✗	✓	✓	✓	✓
Mobility	✗	✗	✗	✓	✗	✗
Randomness	✗	✗	✓	✗	✓	✗

Comparison of Product Features

Design in Mixed Reality (MR)

My research was focused on evolving social norms in the virtual workplace, and how it is connected to the lack of non-verbal signals. After doing the competitor analysis, I realized that MR is the most suitable way for my thesis. Here are a few reasons why I chose this approach:

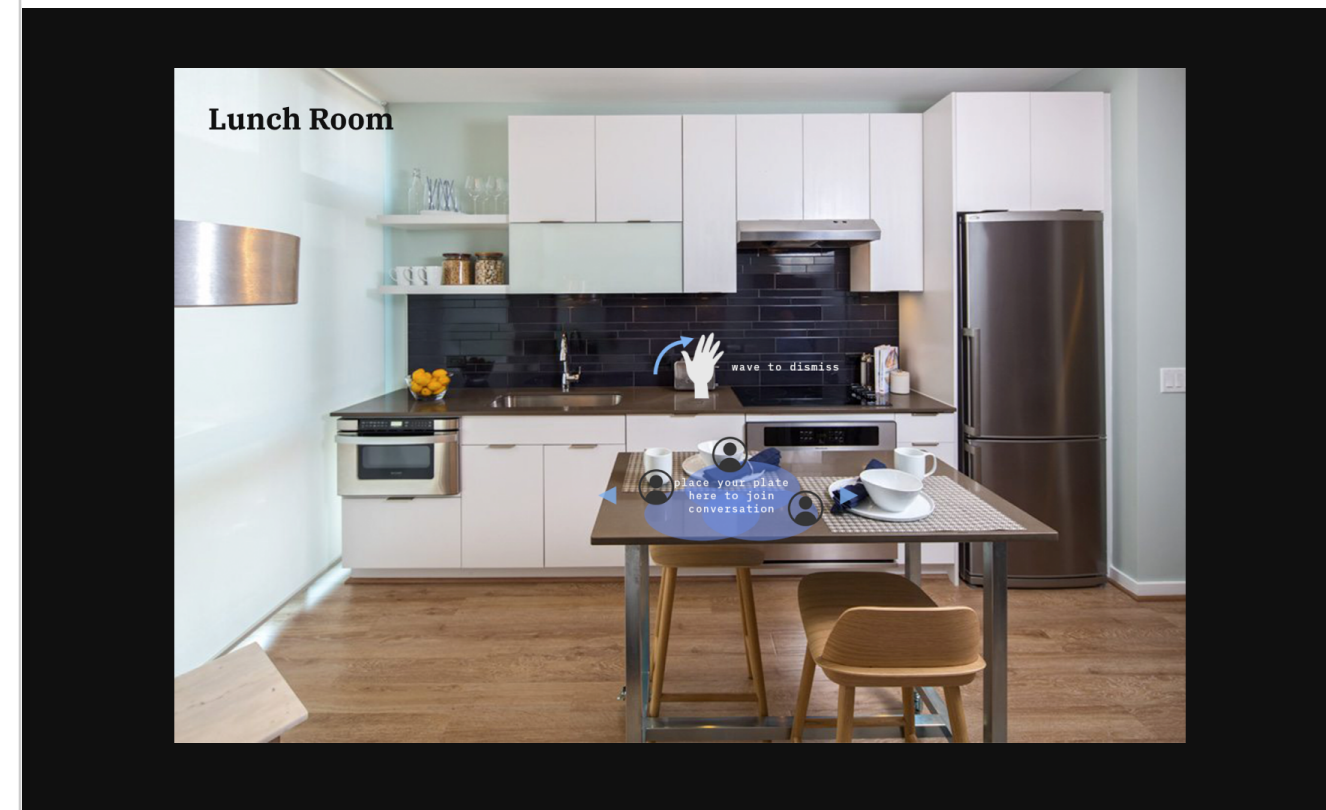


1. MR enables spatial interaction, users would be able to perceive non-verbal signals like physical proximity and body language in telecommunication.
2. This approach leverages existing space at home as interfaces. By using architectural functionalities, users would be able to have a more natural workflow.
3. This approach also allows live visual reflection on office activities, which would increase employee's sense of connectivity and social presence.

In this section, I present a few sketches by asking ‘what if’ questions to envision how social interaction can be transferred more naturally virtual office at home. These concepts are focused on bringing back the casual social interactions that happens in workplaces.

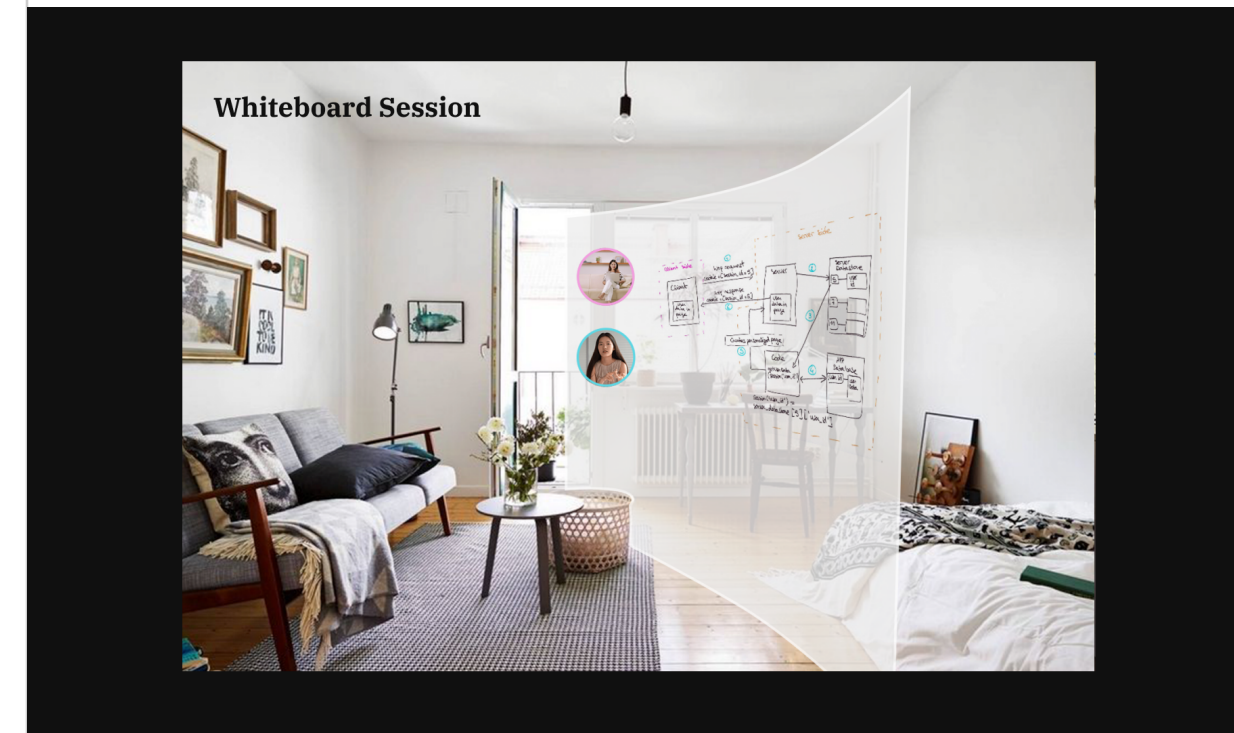
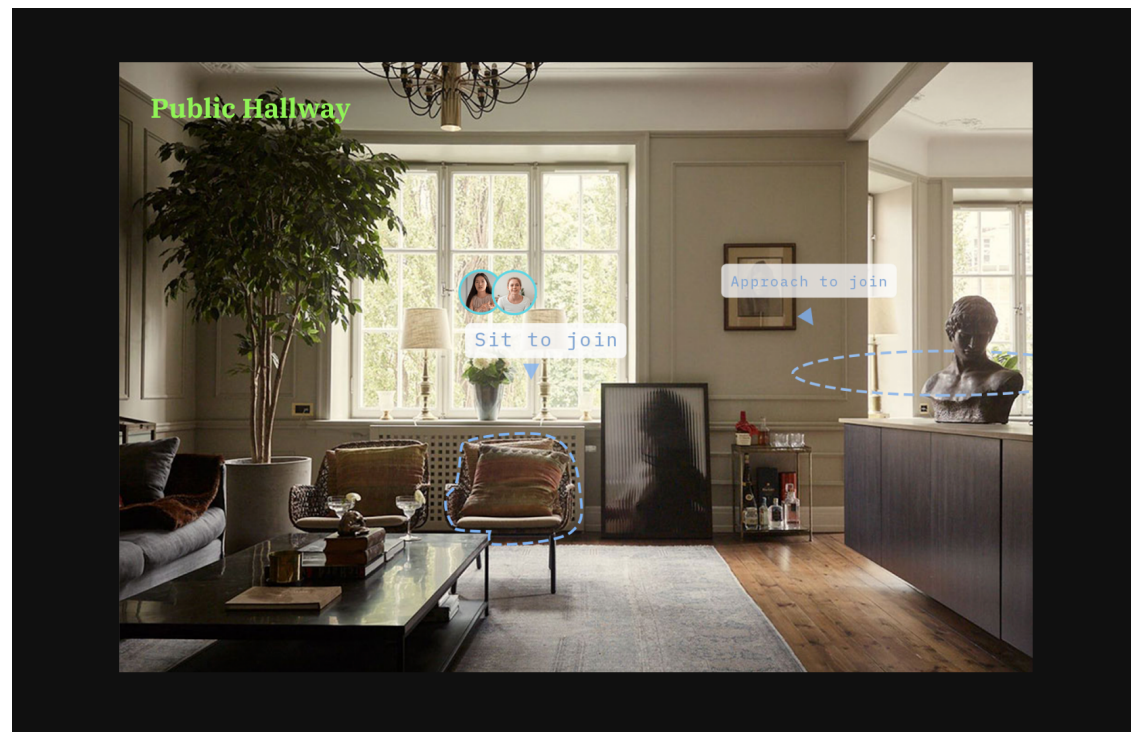
1. What if we can have a virtual lunchroom where we can view who is in the room and join the conversation if we want to?

Users would designate certain spaces in their home to use as ‘lunchrooms’. When they join the room with their MR glasses, they would be able to see on-going group conversations and decide whether they would join. They can also change groups by waving hands in different directions to scroll. Or they could wave up to dismiss and have their lunch break by themselves.



2. What if we can have a virtual public space where we can join spontaneous conversations?

Users would designate certain spaces in their home to use as 'public space' in their virtual workplace. The systems will match them randomly to other people/groups in the company for a casual chat. They can decide whether they want to join by approaching or waving to dismiss.

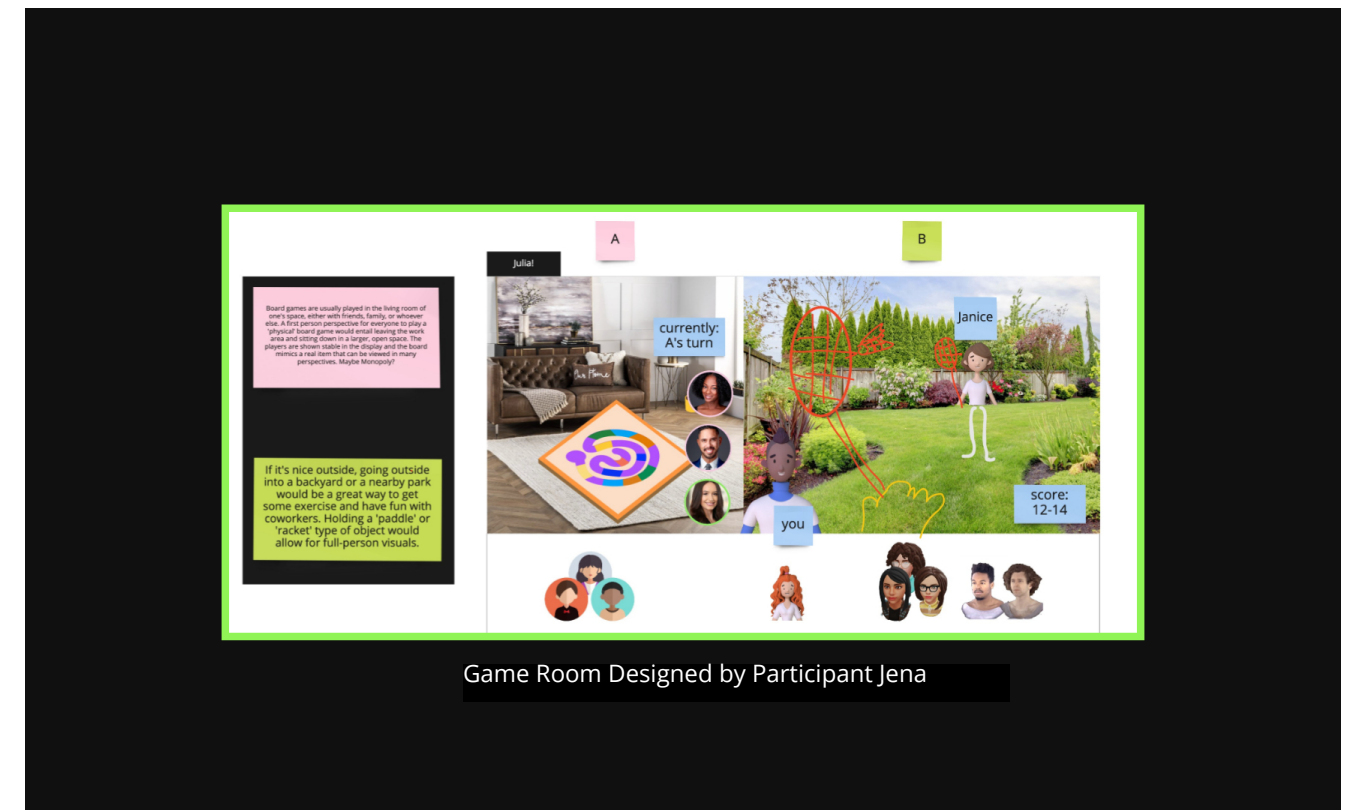


3. What if we can turn our limited space into a multi-reality hub where we can separate our personal life and work life better?

Even users who live in small apartments could turn their home into a workspace by using MR. There would be a visual block on personal items like bed, dirty clothes, etc and replace it with work appropriate visual contents.

Co-design Workshops

I had a clear direction in design at this point, which was to design virtual rooms for remote teams that can host different types of activities. It's difficult for me to decide what is suitable for the users. So I did 3 co-design workshops to create these experiences together with potential users who have more experience with both remote working experience even before the pandemic, and have some experience with VR/AR technology.



I directed 3 separate workshops with 8 participants in total. I recruited these people from personal networks, Facebook groups, and LinkedIn connections. The participants all have remote work experience for more than a year, had experience or clear knowledge of VR/AR, 3 of them are in management roles.

Objectives:

1. Design virtual team activities that are suitable for home space.
2. Find appropriate visual representation of people that exchange non-verbal signals naturally.
3. Learn more about people's expectations and interests.

In these workshops, I directed the participants to imagine themselves in a future where they are continuing working remotely, and they are wearing MR glasses on a daily basis. We first did a sharing on what they are currently doing/planning in remote teams to connect with their co-workers. From there I encouraged them to imagine what team-building or social events there could be in the future with the new platform and different living situation. Before moving to building their own virtual activities, I asked them to walk around their home and think about where they want to be physically that feels appropriate and comfortable for them. I also encouraged them to think about different types of non-verbal signals. They voted on 4 types of nonverbal signals including facial expression, body gestures, physical proximities and external factors like clothes. Based on how important those are to the participants, they voted using different color dots and their thoughts behind it. After they have picked a room as their canvas and chose the visual representation of people, I gave them a creator's sheet that contains visual elements to help them imagine the scenario. Then they went into a work session where they created their own virtual team building activity.

VR games are usually played in the living room of an open office with friends, family, or whoever is a first person perspective for everyone to play a board game would be great. It would be great to have the work area and living space in a larger, open space. The aim is to have a space that can be used for many purposes. Maybe Monopoly?

It's nice outside, going outside to a backyard or a nearby park would be a great way to get me exercise and have fun with workers. Holding a 'paddle' or 'racket' type of object would allow for full-person visuals.

Julia

A

currently: A's turn

janice

you

score: 12-14

Avatar icons: 3D avatars with arm gestures, 3D avatars with more detailed facial expressions, Real time 3D figure mimicking real people

Game interface: Data graphs about their non-verbal reactions, Video playing, Music, Board game, Video game, Other views, Better ideas

Luca

chat with 'person next to me' Activities that don't require me to move a lot. Watch Movies/Listen Music Sit down to start/stand up to leave Talk about work mostly

Avatar icons: 3D avatars with arm gestures, 3D avatars with more detailed facial expressions, Real time 3D figure mimicking real people

Game interface: Data graphs about their non-verbal reactions, Video playing, Music, Board game, Video game, Other views, Better ideas

Wendybagel

Story: My coworkers and I are meeting socially for the first time. Things are a bit awkward as we first sign on and are waiting for others. We comment on and interact with the cute fantasy creature, who does tricks or other special effects (maybe has funny dialogues). Meanwhile special environments/fantasy music is playing (not popular music). We decide to try the games that are available, and we have fun trash-talking each other as we do a scavenger hunt to beat other work teams. There is some kind of prize for the winners. :)

Avatar icons: 3D avatars with arm gestures, 3D avatars with more detailed facial expressions, Real time 3D figure mimicking real people

Game interface: Data graphs about their non-verbal reactions, Video playing, Music, Board game, Video game, Other views, Better ideas

Name

Story:

Avatar icons: 3D avatars with arm gestures, 3D avatars with more detailed facial expressions, Real time 3D figure mimicking real people

Game interface: Data graphs about their non-verbal reactions, Video playing, Music, Board game, Video game, Other views, Better ideas

Matt

Showing a meeting between a business talking about a C++ coding software.

Avatar icons: 3D avatars with arm gestures, 3D avatars with more detailed facial expressions, Real time 3D figure mimicking real people

Game interface: Data graphs about their non-verbal reactions, Video playing, Music, Board game, Video game, Other views, Better ideas

Name

I would love to sit in my kitchen and have music playing and "hang out" with my coworkers. We used to listen to music in the office so I think that would bring us together again. I had a music generator software that I used to have three people sitting at the bar table. To have three more sit had to have three coworkers feel close to me even if they aren't there. The kitchen setting is a nice room since I have like kitchen are places to spend time with others.

I can already picture one of my coworkers asking me to grab a stronger drink and share a few laughs. We would all be laughing and if I could see others laugh as well as them seeing me it would truly feel like we were all back together in person but not. I would enjoy presenting the others verbal signals because that would honestly make me feel normal again.

Avatar icons: 3D avatars with arm gestures, 3D avatars with more detailed facial expressions, Real time 3D figure mimicking real people

Game interface: Data graphs about their non-verbal reactions, Video playing, Music, Board game, Video game, Other views, Better ideas

Task

Story:

Avatar icons: 3D avatars with arm gestures, 3D avatars with more detailed facial expressions, Real time 3D figure mimicking real people

Game interface: Data graphs about their non-verbal reactions, Video playing, Music, Board game, Video game, Other views, Better ideas

Joe

Story: I'm checkin in with Jake to see his progress, this is his view seeing me pop in, while playing an AR game

Avatar icons: 3D avatars with arm gestures, 3D avatars with more detailed facial expressions, Real time 3D figure mimicking real people

Game interface: Data graphs about their non-verbal reactions, Video playing, Music, Board game, Video game, Other views, Better ideas

Final Result of Co-Design Workshops

At last, the group each shared their story and talked us through their design. And the others offered feedback on how they feel about the design. Here are some highlights from my learnings in the workshops:

1. Most people choose places outside of their workstation to build their virtual activity. Many choose the living room because of the open space, some choose their yard for gaming that requires more movements.

2. Most people find facial expressions the most valuable non-verbal information for them, physical proximity and body language are also often rated high importance. They often choose facial expressions with one other choice when asked what the 2 most important non-verbal cues are. The second choice is most likely to be dependent on their personal experiences.

3. Everyone votes facial expressions as 'very important' non-verbal cues in in-person interactions, but not everyone chooses the avatar option that would reflect that when asked to build their own experience. The majority of people go with profile pictures or 3d avatars with a cartoon feature. Some expresses that they feel more comfortable and less stressed hiding behind a 'filter', knowing they are not being watched. Others say they do not necessarily need to see their coworkers' facial expressions in these more casual situations.



Wine Tasting Experience Designed by Participant Judy

4. Different teams are establishing their own team building rituals. Compared to the first round of interviews where people were still figuring out what to do, people are slowly established rituals based on the team preferences. Participant Dylan's team, for example, do lunch chats every Monday and Friday to check in to see how everyone is doing, what are people working on, and just give people a chance to have more casual conversations. Participant Jessica's team does virtual events like taking cooking class together, or even working out together.

5. Another pattern is people are relying more on games in team building, many have mentioned they do games with their teammates to get to know them outside of work. Some build their scenario playing games, specifically participants with more experience in AR/VR expect to have more gaming experience.

5.

THE AMBIVALENT FUTURE

In this section, I produced a film presenting a fictional future to show both design opportunity and challenges the conventional norms in workplace social interactions: do we need to reconstruct the office experience at home? Do the norms still apply when people are staying in their home space? Should there be a different way?

Link to film: <https://www.youtube.com/watch?v=m0CEg07XLXw>



Fictional Living Situation of the Character Bob

In a future where the majority of knowledge workers continues to work from their domestic space where they wear MR glasses to work daily:

Bob is a new hire that is not too interested in socializing with people at work. He lives in a small town in southern California. He just wants to get the work done and get paid. Upon his onboarding, he opted in for only casual chats and gaming. For the first few times the system prompted him to connect with others, he dismissed them. But he decides to take a coffee break eventually. When he is at the water cooler, he sees the motivation board where people write notes to show appreciation to coworkers. He sees that there's a new one for him and it's from Matt, the VP of operation. As he reads it, Matt calls in for a chat.

He decides to pick up the call. Matt asks about how his day has been going and whether he has used the system before. He answers 'no' so Matt invites him to join them for a happy hour. However, Bob is not too motivated about meeting new people. Matt still offers to send an invite anyways which felt pushy to Bob. After picking up the invite from his table and seeing the profile of other invitees, Bob decides to give it a shot because he finds common interest with Kent. Bob walks out of his house to take a break from the office stress and sighs. During the happy hour, Bob sees two people's projection on his tea table, and as they start talking towards him, their projection enlarges. The distance made Bob feel uncomfortable. He was then introduced to Kent who also likes video games... At the end, Bob is really stressed out and exhausted by socializing with this new group, he wonders if he will need to do that to 'blend in' with the rest of the team as well...



From film 'Domesticated Office'
The name Cooli: Inspiration from the fictional company 'Hooli' in the TV show 'Silicon Valley', meant to resonate with names of new technology companies

Suggestions to Future Design for Remote Teams in Mixed Reality (MR)

Based on my research through competitor analysis, semi-structured interviews, exploratory probes, co-design workshops, I concluded 6 suggestions for future design for remote teams in MR. I have also applied these suggestions in the former story which I will refer back to as example.



Virtual office at home
From film 'Domesticated Office'

1. Be aware of the proxemics, allow different levels of distance that feels appropriate to different situations.

In the story, Bob designated his living room as his 'work area'. But even in a small studio apartment, there are different levels of privacy areas. For example, areas affiliated with sleeping might feel too intimate for business meetings for the majority. And if the boundary is not well established and respected, employees might find it hard to relax in that area after work.

2. Reduce actions needed to send and receive non-verbal signals by incorporating gestures, movements or voice commands.

Reducing the efforts needed to send and receive nonverbal messages unleashes cognitive loads and mitigate mental fatigue. In the story, by grabbing the mug, the system automatically set Bob to available for casual chats, which is why he got a call-in from Matt when he is was making coffee.

3. Establish boundaries between personal space and work-space at home, avoid invading personal life.

Working from home blurs the line between personal life and professional life. To avoid employee burndowns, personal life needs to be protected from intersecting too much with work. While the working hours are more flexible and spread out the day, and time might not be the metric for evaluating work in the future, boundaries need to be established to help keep a healthy work-life balance. The division might be time based, location based, self-set, etc. In the story, when Bob step outside his house to take a sigh and the virtual contents all disappear is where the boundary was set in Bob's home.



The system prompt Bob to take a break and encourage him to connect with Anna
From film 'Domesticated Office'

4. Encourage movements and change of scene.

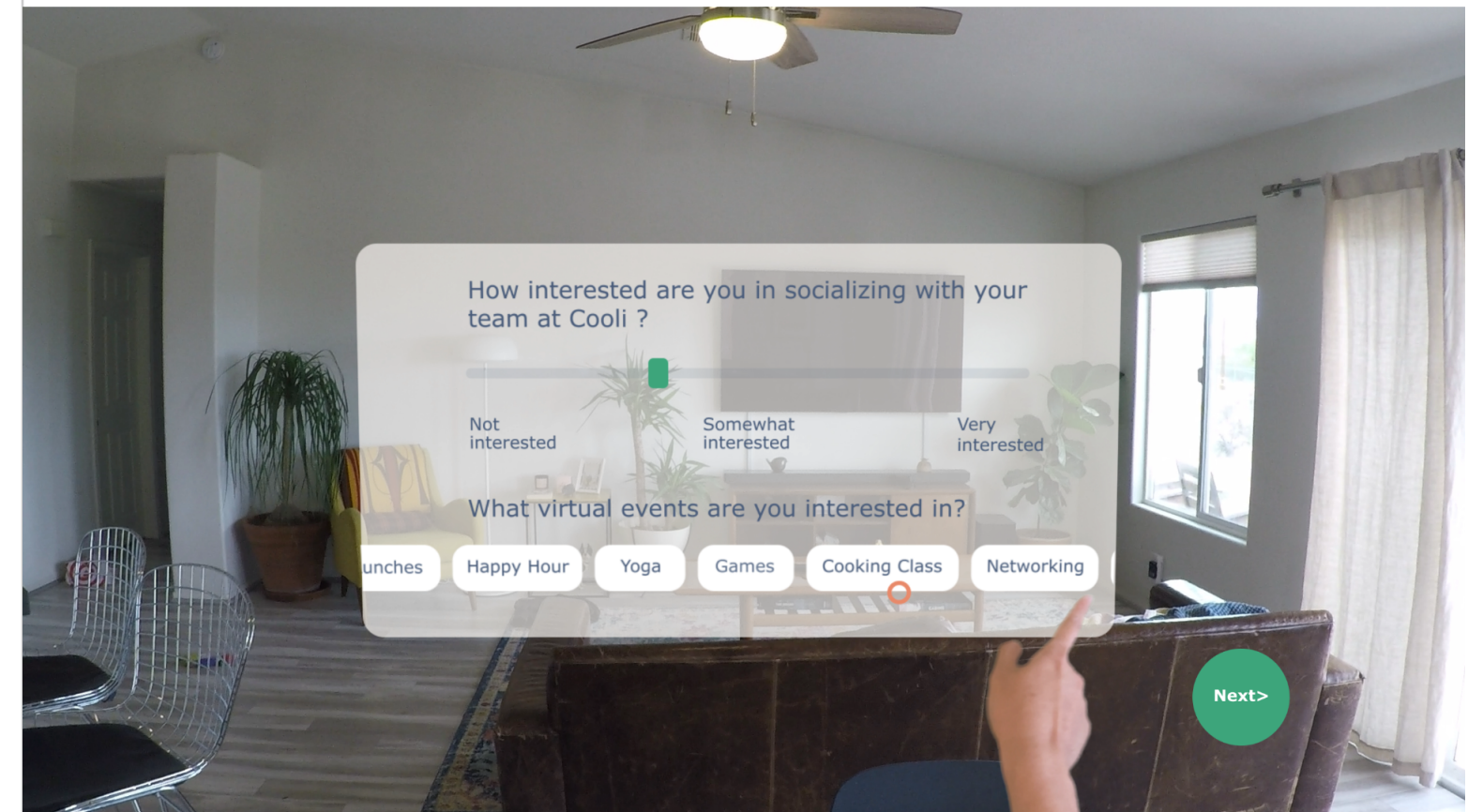
In the story, when Bob was sitting for long, the system prompted him to take a break and encouraged him to chat with Anna. While he was not interested in talking with Anna, he decided it was time to take a break. Long hours of immobility results in mental fatigue. In permanently remote teams, encouraging team members to be more active will help employees' wellbeing in the long term. And with more change of scenery, employees will get more mental breaks.

5. Create different scenarios for different types of communication.

Users should be able to feel the difference between being in a business meeting versus a casual chat with a few coworkers. In Bob's home, all social related activities are designed to happen outside of his workstation. While this might not be an option for people with smaller apartments, designers will be able to create different scenarios that feel appropriate for different types of activities by leveraging physical space and thinking about body orientations.

6. Keep different types living situations, lifestyles and personalities in mind, allow different levels of social engagement at work.

People working from home have significantly different situations. Some live alone, some with families, pets. It gets complicated when multiple people are working in shared spaces at home. Through my research, I have also found that many remote workers are planning on relocating to places with less living expenses. And one of the advantages of remote working is they get to be anywhere in the world. But it might result in team members working from different time zones. Some might even move to the desert like Bob in the story, and there sure will be more introverted people that would prefer less social engagement at work like Bob. Designers should offer a flexible system that can be inclusive for different types of living situations, lifestyles and personalities.



Bob setting up social engagement preferences
From film 'Domesticated Office'

6.

CONCLUSION

Through my research and design work, I have made actionable suggestions for future designs for remote teams in MR. The suggestions are based on my findings through interviews, designing exploratory probes and presenting them to potential users, and co-design workshops. Furthermore, aside from showcasing generalized design principles, the story aims to point out that individual experience can vary from one another depending on their living situation and personal preferences. While designers can provide flexible systems to help cultivate team cultures, it comes down to executive decisions to decide what kind of team culture they want to build. In a permanently remote team, employers need to consider different types of lifestyles and living conditions and accommodate accordingly. It is not fully the employee's responsibility to adapt to this new way of working and the invasion of their domestic space. It takes both the employees and the employer to establish a healthy team dynamic. The team must decide what they value the most and what they need in a remote worker. Some teams need to be highly socially engaged with each other, some do not. Some teams might not need to see each other's faces at all and live in different time zones. Therefore, as designers we can only offer a flexible platform to accommodate different team dynamics, but it is not our place to decide what is right or wrong for different teams.

Further research is needed to address different categories of teams and synthesize what are the established norms that could help cultivate specific types of team dynamic and its relation to productivity.

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