Boundless Collaboration

A post-pandemic vision for distributed teams

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Final thesis report
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" **The most important thing
to realize about the future
is that it's a choice.** "
Brett Victor

Hybrid is here to stay.
New interaction rules are needed.
Let's re-think how to connect
in hybrid environments.

Acknowledgments

What an adventure!

Undoubtedly, this thesis was one of the most intense and challenging experiences of my academic profession, but also one of the most unique and remarkable in terms of research, inspiration and personal growth.

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Andrea Riccio
Delft, 2021

Executive Summary

This thesis describes the design journey that resulted in a post-pandemic vision for distributed teams and the development of a concept to fulfil the lack of spontaneous encounters in hybrid working environments. The research follows two different approaches, the double-diamond and the Dive method and includes extensive literature review, remote user research, future context definition, generative and creative sessions and a final round of ideation, prototyping and testing. The whole process keeps the user experience and interaction at the core of the research.

The project involved a Consortium of three experts in the realms of businesses, people perspectives and technology from three different companies: Muzus, Ford and Miro. Their participation was vital to generate knowledge at the verge of their fields of expertise and evaluate the ideas generated during the different phases of the study.

The initial section of the project was devoted to **understanding the past and the present** by focusing on the effects of forced remote working caused by the pandemic through literature research, interviews with experts, workers and students. This helped to identify relevant gaps in knowledge for further research, as well as potential opportunities for design purposes. The first phase highlighted a new way for workers to perceive remote working, an increased sense of responsibility rising from the work from home practice and an evolved connection with the team. To **approach the future** exploration, a generative session with the experts investigated the insights collected and explored some future scenarios. A series of context factors were used to develop a Future Vision, useful to contextualize the next research steps. Two creative sessions were held to **explore the future** vision and analyse the differences between hybrid and remote. The last design phase was meant to **communicate the future** vision by creating a fictional future Magazine published in 2030 and by designing a vision concept, a physical token that connects workers through a virtual office. A proof of concept of the vision was prototyped, showing that it is possible to create serendipitous encounters and connect dispersed workers by means of a physical token and a video call platform.

In conclusion, the next future will see a rising trend of hybrid workspaces and, in order to keep the work efficient, it is imperative to facilitate collaboration with the help of people and tools designated for this scope, as well as fulfil the gaps of time zones, cultures and expertises.

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Introduction

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Introduction

The historical moments we are currently living in, with the pandemic changing rapidly our lives, present a unique opportunity to find space for development and improvements in many fields.

For almost 40 years, the evolution of new information and communication technologies allowed people to imagine and realize ways to collaborate without being limited by physical boundaries.

Over the years, visions, experiments and technologies have been produced, but the rapid rise of distributed work/from home working never really took off, causing some companies to abandon this practice (Valdellon L., 2015).

When the pandemic hit the world, the need to maintain businesses and social practices has made working from home, and even socializing, a norm, so that almost everybody had to quickly learn new tools and approaches.

"The forced working remotely experiment that nobody asked for" (Mullenweg, 2020) spiked up the learning curve for many people and, eventually, will change the way individuals see possibilities where before there was diffidence. This "forced global experiment" led to growing awareness of the many limits and controversial effects of collaborating remotely (for example, the so-called Zoom fatigue), but has also involved many advantages and benefits.

The goal of this graduation project is to explore the effects on people's experience of collaborating remotely and envision possible futures in which we will embrace this practice and its advantages. It proposes a new approach to hybrid work aimed at facilitating its use and highlighting the focus on human needs.

The Human Factor in Remote collaboration

Over the last 10 years, remote collaboration appeared as an upwards trend, for example, between 2009 and 2019, remote working employees doubled in the US (Raynolds, 2021), showing a rising interest towards digitalisation processes. Nevertheless, remote collaboration experience is still lacking many aspects that users expected from the substitute of their physical interactions.

Although previous issues concerning technical problems have been resolved by a technological and infrastructural evolution (Powell et al., 2004), the sudden need of remote working during the pandemic highlighted even more the deficiencies in the human aspects behind this collaboration practice (Jenkins, 2021).

How to face such deficiencies is still not clear and the solutions available at the moment are mainly addressing productivity as a measure of success, instead of human needs and well-being. Therefore, my research will be directed to bridge this gap.

0.1 Project Aim

" *We'll never probably be the same.* "

Jennifer Christie, Twitter's head of human resources,
interview for BuzzFeed News on the company's workplace practices

Figure 1: Worker at home during pandemic
© Tina Witherspoon / Unsplash

The project's aim is to deliver a vision of a possible future of working and collaborating remotely while keeping human needs in the focus and to inspire the future designers and researchers towards that direction. Moreover, the insights and the output of the research will constitute a significant step forward in the development of solutions aimed at enhancing the workers' experience. Since many companies worldwide are looking at the next phases of this transition, the present research aims to deliver valuable content for them as well, and to direct their efforts towards improving the workers' conditions instead of focusing on a profit-oriented approach.

The project tackles the issue of remote collaboration by using a human-centred design lens and by combining the communication of the findings with a design fiction approach. As a first step, a series of relevant problems and benefits will be identified and combined with the insights gathered from the user studies. Then, a series of design directions embedded in a physical interactive prototype will try to fulfil some user's needs and a future edition of a fictional magazine will communicate the vision to the stakeholders and general public.

0.2 Project Scope & Relevance

Since companies had to keep their business working during the pandemic, the solution was to let their employees work safely from their homes. This imposed condition represents the base for a new opportunity in the field of collaboration within the working environment. As such, the target group of this research is knowledge workers (engineers, designers, lawyers, academics, architects and so on), who are among the groups that most of all changed their collaboration patterns, from in-office life to at-home or hybrid working modality.

Collaborating remotely presents many difficulties in order to achieve an efficient and engaging experience. Studies over the past years (Felstead A. & Henseke, G., 2017) and experiments in company contexts (Bly et al., 1993; Choudhury et al., 2020) already produced a first overview of the topic, but this was limited to a small number of companies with a technological predisposition. Nowadays, due to the global pandemic, many different businesses like law firms, real estate agencies, governments and so on, experienced first hand what it means to collaborate remotely. This highlighted the requirements in terms of tools and infrastructures to work efficiently.

The final results of this research aims to create a breeding ground for insights and directions that can be followed to create the next products, services or strategies for a thriving working environment.

This project is devoted to inspiring towards a vision of collaboration without boundaries of time, location, culture or expertise: Boundless Collaboration.

Given these premises, my initial research question was:

What will the consequences of Remote Collaboration be in the post pandemic future?

THE GOAL

Taking into account the struggles of employees while collaborating remotely during the past year and half, this project has been carried out while keeping in mind the following design goal:

To design a communication medium that facilitates remote collaboration for employees' wellbeing in a speculative future, in order to boost the use of such practice by enhancing its benefits and lessening its disadvantages.

0.3 Project Stakeholders

To investigate the Remote Collaboration domain, I considered 3 perspectives that are at the center of the TUDelft design approach. At the verge of those perspectives, the relations and interactions among them can be used to generate knowledge that goes beyond the singular domains and deals with the complexity of the topic.

People are the core of the Remote Collaboration practice. Remote Workers are the subjects that collaborate remotely, they are not passive actors, but active players that directly experience the consequences of it.

Businesses are the realm where Remote Collaboration occurs. Every company decides about their business model, what tools they will give to the employees, how much they want to spend in facilities and similar. By doing so, they create the conditions for the physical, digital or hybrid collaboration of their employees.

Technologies are the creators of opportunity in the remote realm. The concept of connecting remotely is born with the developments of technologies, and at the base of the remote collaboration there are the infrastructures (internet connection, power availability, etc.), the tools (laptop, microphone, camera, etc.) and platforms (Google Doc, Zoom, Miro, etc.) used to perform different tasks required by the specific job.
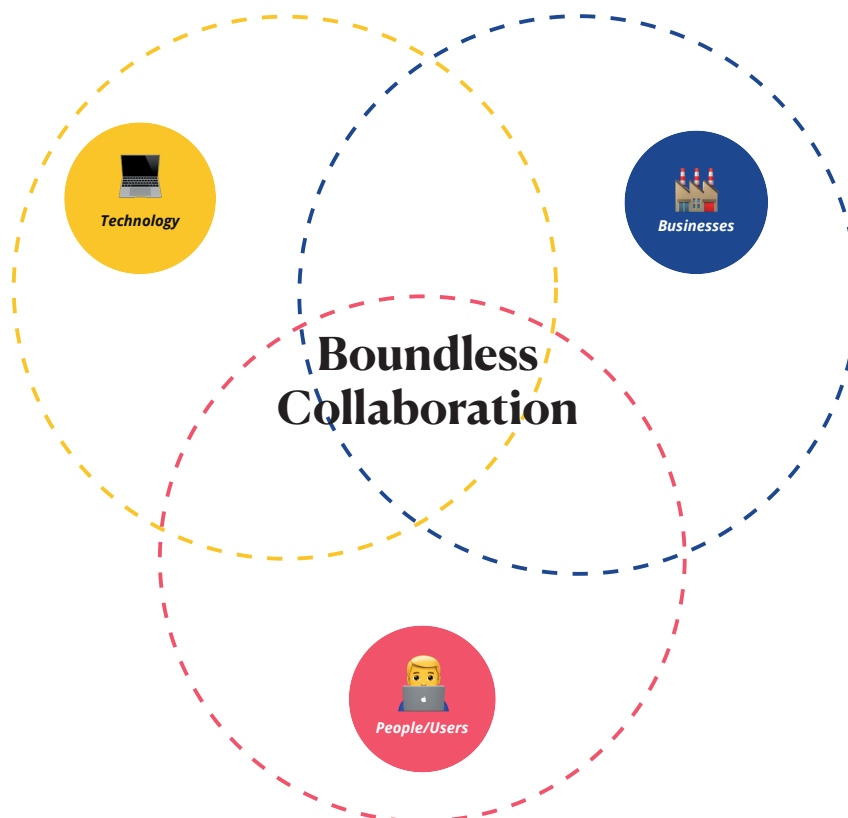

Figure 2: Positioning of the project between technology, business and people perspectives

The Consortium

This project involved a Consortium constituted by 3 experts in the fields of Business, People experience and Technologies. Each member had a fundamental role during the interviews on the topic and during the participation in collaborative sessions, where their interactions could spark each other's interest and engagement. Each participant's expertise was predominant in one of the three fields, allowing them to compensate for each other's knowledge during the different sessions.

The 3 members of the Consortium are:

Sanne Kistemaker

Co-founder and general manager of Muzus. She is an expert in the field of Context Mapping, with more than 14 years of experience on how to understand people's needs.

Muzus

The service design agency for societal issues Muzus is focused on the relation and study of real people in their context, delivering solutions with a powerful and a positive impact.

Markus Kees

Project manager and head of the Innovation Group at Ford, works in the field of innovation of collaboration processes on a global scale for more than 10 years.

Ford

Global company active in the field of automotive since 1903, founded by Henry Ford and famous for introducing large-scale manufacturing of cars and large-scale management of an industrial workforce.

Eduardo Gomez Ruiz

UX Research Leader at Miro and expert in the field of the user experience. Over the last years he worked with companies such as Google, Mitsubishi Electric and Uber.

Miro

Miro is the leading online collaborative whiteboard platform, with more than 15 Million users and 95% of the companies from Fortune100 using it.

Due to their busy schedule, the Consortium members have been contacted with far advance in order to book the days to participate in the 2 sessions.

The first session was meant to collect knowledge beyond the immediately explicit or observable, thanks to generative techniques. By letting them express freely via the creation of maps or collages and generating discussions, it was possible to collect information and opinions.

The second session was aimed to let the Consortium ideate solutions to one specific problem in the selected focus and validate

the concepts developed beforehand. Their different perspectives and experiences allowed their ideas to encompass a wide range of aspects and the validation to be grounded to the real value that a new concept could bring to the domain of knowledge workers.

Remote Collaboration was both the topic of my research and the main experience during our sessions. For this reason, during my role as facilitator I designed the sessions by adding small stimuli to investigate the effects between remote participants, other than obtaining from them valuable information.
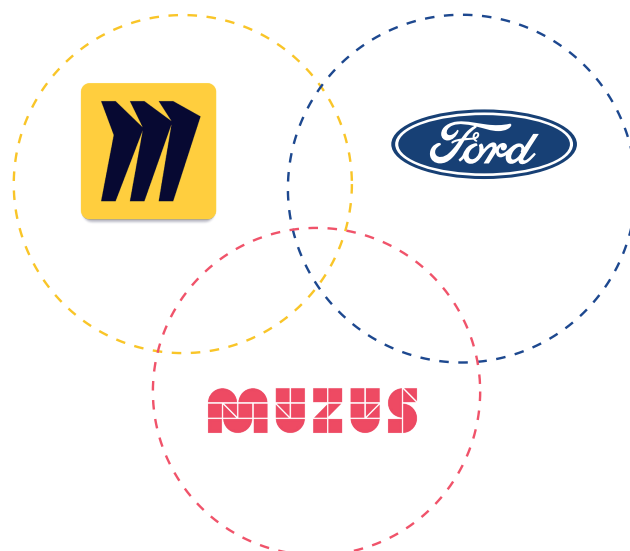

Figure 3: intersection of the 3 company representants

0.4 Approach and structure

To address the project complexity I decided to use a combination of different methods and practices, which I adapted to help me work both on the development and communication of a vision and on a physical design to validate.

1 - The Dive method (Mejia, 2018) is a design-led futures technique that provided me with the framework to follow in order to firstly explore the future with the consortium, and then return to the present and develop a communication medium.

2 - The Double Diamond (British Council, 2019) directed my exploration by organizing the processes of research and development and conducting me through the diverging and converging phases to deliver a concrete solution other than the material to communicate the vision.

Embedded in these 2 processes, different activities have been carried out to achieve specific goals and answer specific research questions:
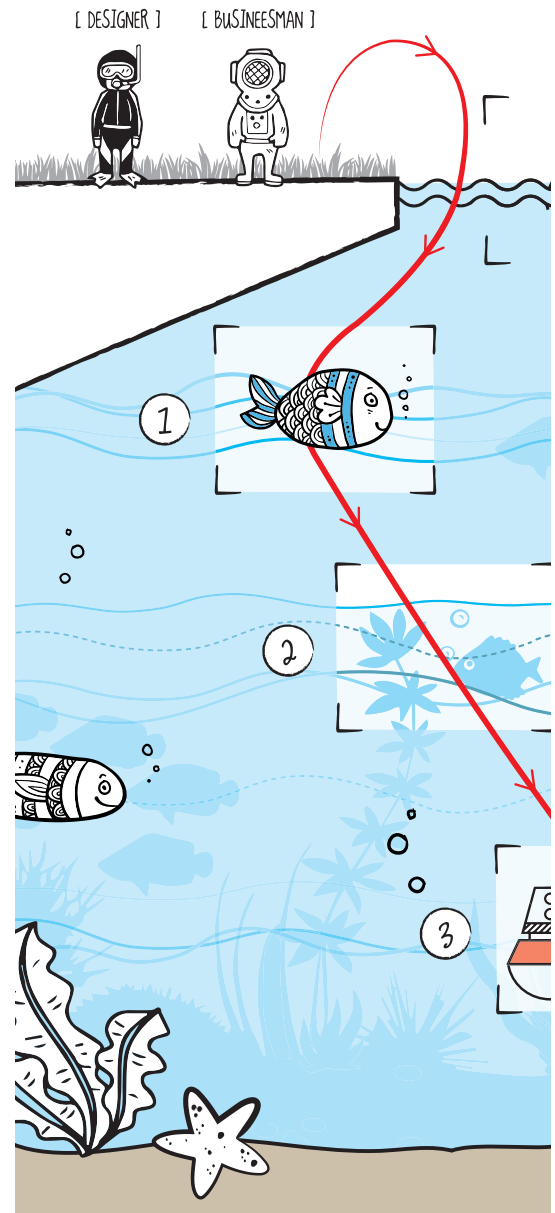

Figure 4: Representation of the Dive method
© DIVE Method / Ricardo Sarmiento Mejia

Method

1

Literature Reveiw

General analysis of the content published about the topic.

Used for:

Broad understanding of the topic under many aspects and points of view of researchers.

RQ (Research Questions)

• What is the remote collaboration perception and which are the current advantages and disadvantages?

• How did the forced remote working experience affect people's way of interacting and collaborating with their team and colleagues?

1

Interview & Questionnaire

First hand information on what the different users experience regarding the topic.

Used for:

User center understanding of the topic and validation of elements from the literature research

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• How people experienced the forced remote working from home?

• How has the interaction with their peers changed?

• What are the advantages and disadvantages of remote collaboration from their own point of view?

• What are the workers' main differences in their daily life ? collaborating with their team and colleagues?

2

Context Mapping

Generative research technique with active user participation.

Used for:

Get to a deeper understanding of what users know, feel and dream to generate data, insights, knowledge and wisdom.

• How will the 2 main conditions (i.e. increased sense of responsibility and evolved connection with the team) and their implications characterise workers' experiences in the next future ?

2

VIP - Vision In Product

Research and development methodology to envision a product from the past to the future

Used for:

Created the contextual framework in the selected domain to produce the future vision

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• How will the work domain be in the next 10 years ?

• What will be the intersection between the trends, the human needs and the world conditions in the employees life in 10 years?

Method

3

Creative Session

Generative technique aimed at generating ideas and solutions to achieve a project goal

Used for:

Let designers and stakeholders express their visions and devise possible future solutions for the given problem

3

Conceptualization

Process of generating ideas for an optimum solution to the design problem

Used for:

Designing 3 concepts and evaluate them with consoritum experts

4

Rapid Prototyping

Iterative approach for idea mockup development and test

Used for:

Produce a working prototype of a small interaction to be tested

4

Design Fiction

Practice aimed at exploring and questioning possible futures by means of speculative scenarios narrated through designed artifacts.

Used for:

Prototype and ideate a narration used to communicate and inspire towards the possible future.

RQ (Research Questions)

• How to create a connection between people that are located in different places?

• How to facilitate multidimensional social interactions between remote colleagues for greater connectedness?

• How the 3 design concepts may work in a real environment?

• What are the limitations and concerns about the 3 concepts ?

• How will people relate with a physical token?

• Does a physical token stimulate the awareness of breaks and transitional moments?

• Are people willing to act in order to activate a random encounter opportunity?

• How can the researched future scenario be communicated to the designers, researchers and stakeholders?

• Does the prototype help to clarify my future vision?

Phases

In total, 5 phases derived from the DIVE method were devised in order to guide the design process through the different research activities:

Understanding the Past and the Present: The first phase was meant to clarify what is the actual state-of-the-art around the topic of remote collaboration and distributed teamwork, as well as the target group's experiences while collaborating remotely. The first diamond was covered in this phase by diverging in the topic and converging toward the results of the research.

During this phase different activities were performed:

First, an extensive literature research was conducted to find results already published by other researchers about the topic and other useful information to frame the domain of remote collaboration. Afterward, a set of 1:1 interviews with a diversified group of subjects (including the 3 experts) was conducted to understand first hand the experiences of the users, not filtered by any other researcher. Lastly, a questionnaire was used to validate the results of the previous activities and find some additional insights by expanding the pool of subjects and focusing on employees.

At the end of this phase, the insights were combined and matched to present an overview of the results.

Approaching the future: The aim of the second phase was to consolidate and prepare the knowledge background for the next steps. This required two main activities:

Firstly, a Context mapping session with the full Consortium of experts, aimed at the validation and the creation of knowledge on the present and possible future of remote collaboration. Secondly, the creation of a Future Context Vision through the VIP methodology. After analysing and interpolating the results of the previous phases, a design direction has been selected, including a design goal and an interaction vision.

Exploring the future: This was the ideation phase, meant to create possible options to address the design direction selected previously. During this phase, the Future Context Vision has been used in two creative sessions. The first session was with Designers, where a hybrid collaborative environment was tested and 3 concepts were developed. The second session with the Consortium was aimed at defining further concept possibilities and validating the 3 concepts previously developed.

Communicating the future: This phase aimed to create the content that will communicate the vision to the future designers, researchers and stakeholders. In order to generate a credible outcome, the desired interaction was developed and tested. Moreover, a magazine was designed with the aim to communicate effectively the final vision synthesised during the previous phases.

Looking back into the future: This last phase has been devoted to validating the final concept with the Consortium, finalising the material to communicate the vision and the report.
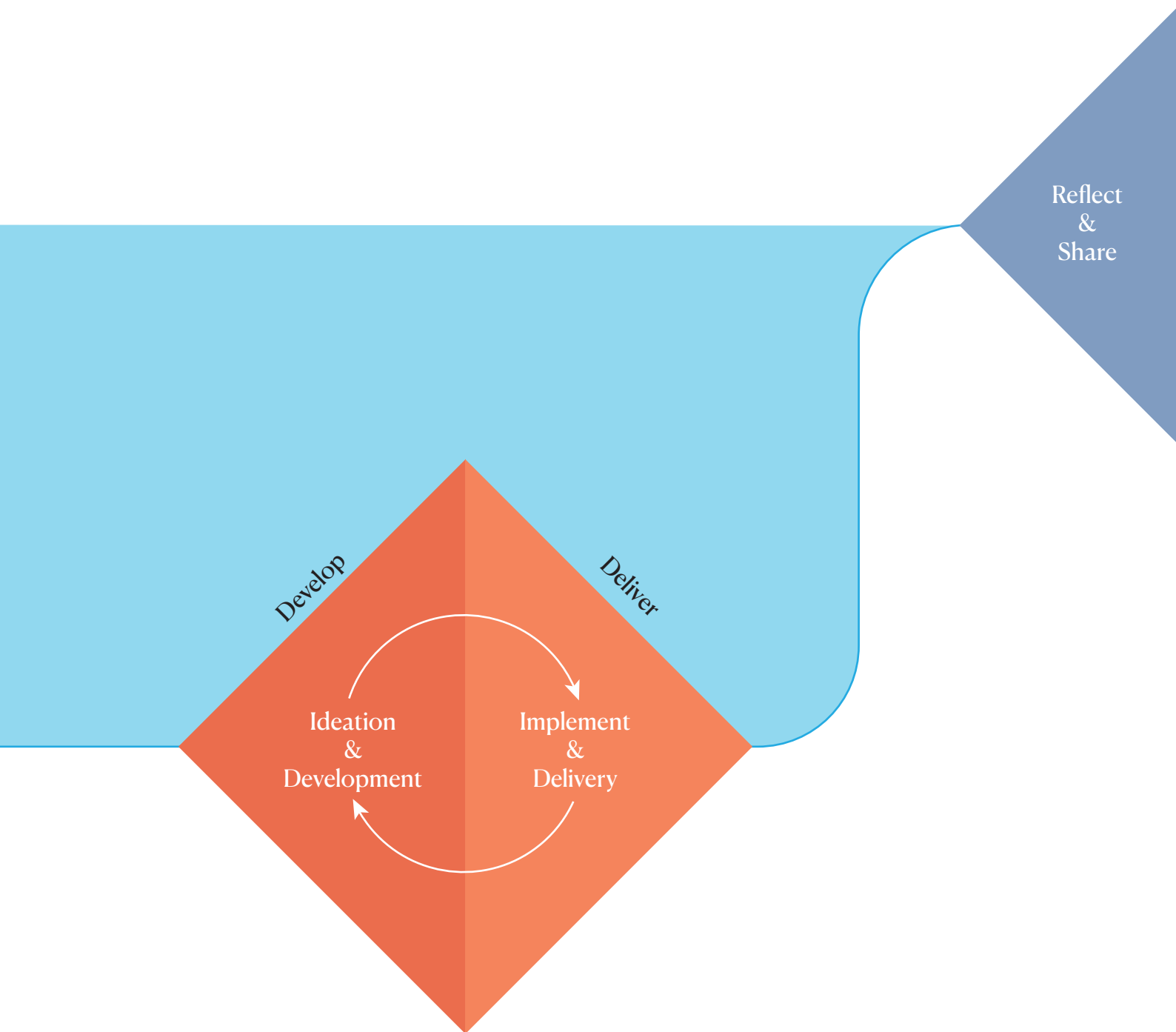
The Present

The Future

Discover

Define

Research & Discovery

Synthesis & Defining

Preparation & Visioning
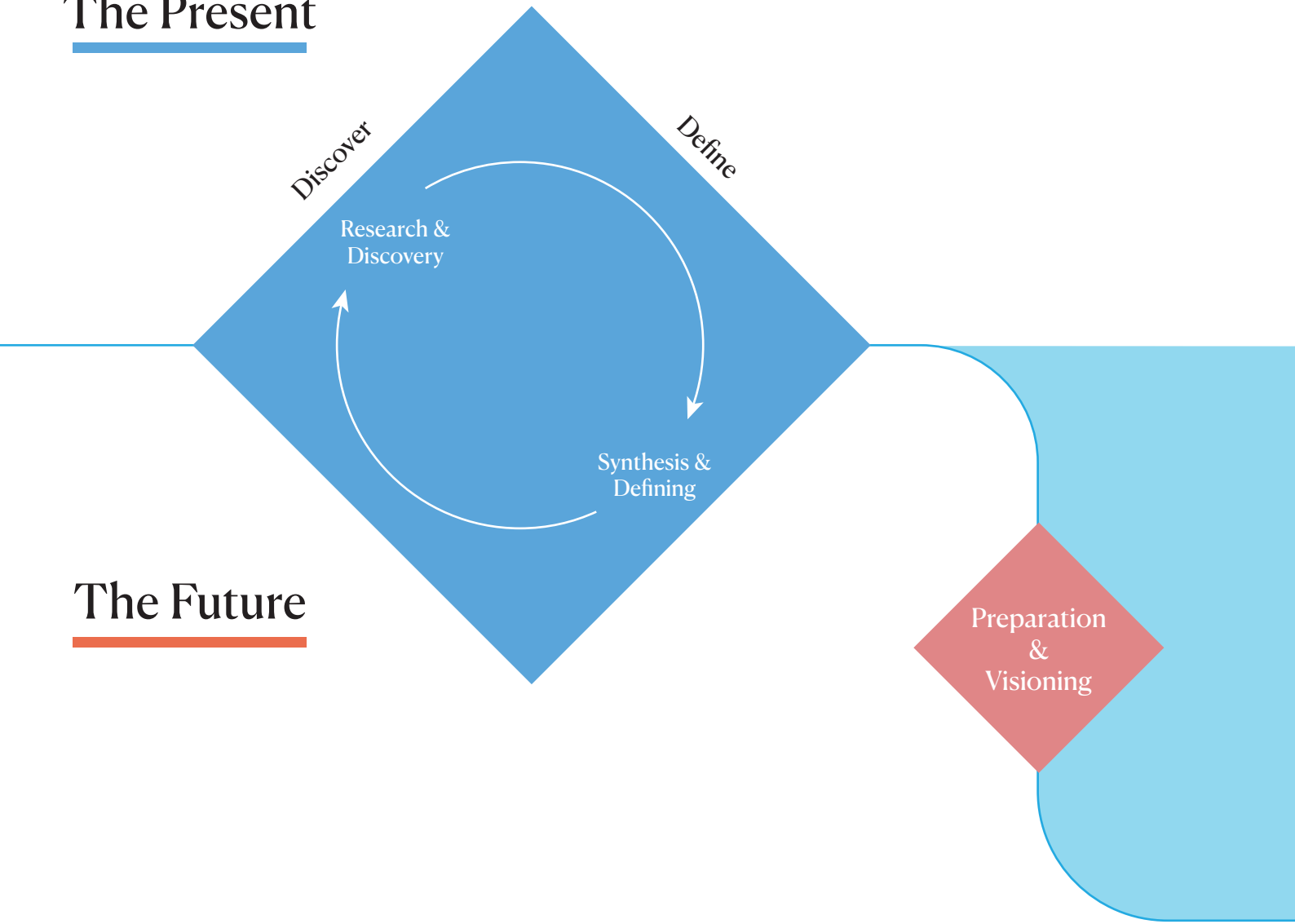
Literature study

Interview

Questionnaires

Generative Session

VIP

**Understanding
the Past and the Present**

**Approaching
the future**

Reflect
&
Share

Develop

Deliver

Ideation
&
Development

Implement
&
Delivery

Creative Sessions

Rapid Prototype
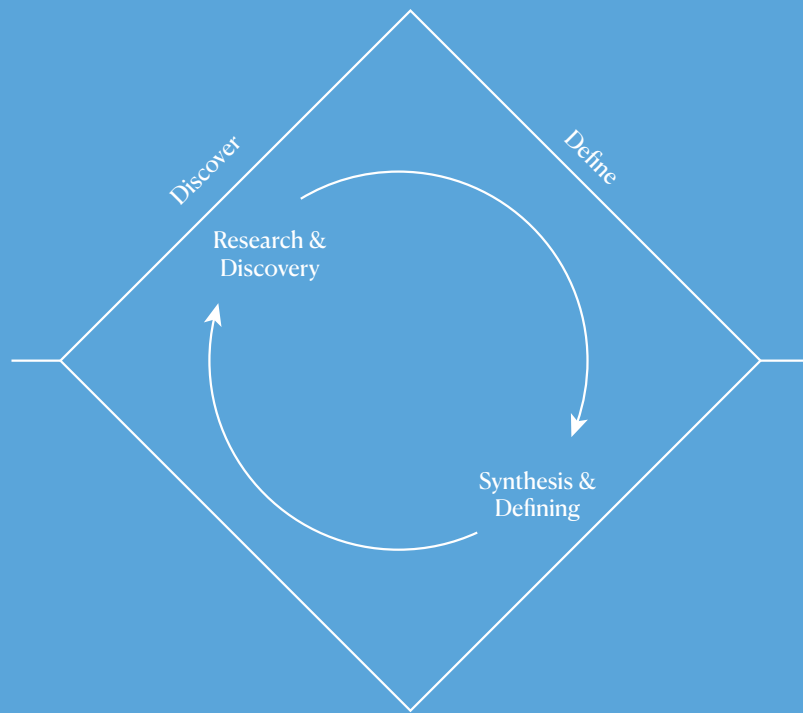
Conclusions

Conceptualization

Design Fiction

Presentation

Validation

Exploring
the future

Communicating
the future

Looking back
into the future

Get a glimpse

The broad research on Remote Collaboration and its effects on workers highlighted three major insights in this chapter: first, a new understanding of what remote collaboration means and the embracing of its advantages, second, an increased sense of responsibility and control within the working context and, lastly, the perception of an evolved connection with the team.

The research activities in this phase of the project consisted in a **(1)** detailed literature review, **(2)** interviews with experts/workers and **(3)** questionnaires. The interviews revealed the quick learning curve experienced by people when the pandemic forced them to transition to digital approaches, but also the fear of isolation and the risk of undermining workers' rights. Questionnaires underlined the feeling of loneliness caused by a complete detachment from a physical connection with your colleagues and the improvement of self-organizational skills.

1

Understanding the Past and the Present

Introduction

This first phase of my research was driven by a specific research question: how did the forced remote working experience affect people's way to interact and collaborate with their team and colleagues?

In order to better understand the collaborative working experience, I studied the meaning of remote working, the way it relates to the collaboration practice, and the actual solutions around this practice.

The goal of the first phase of my project was to set the focus area and the domain in which I aim to contribute to. By analysing and exploring the existing literature and interviewing relevant people on the topic, it has been possible to create a framework of knowledge to use in order to explore the selected future.
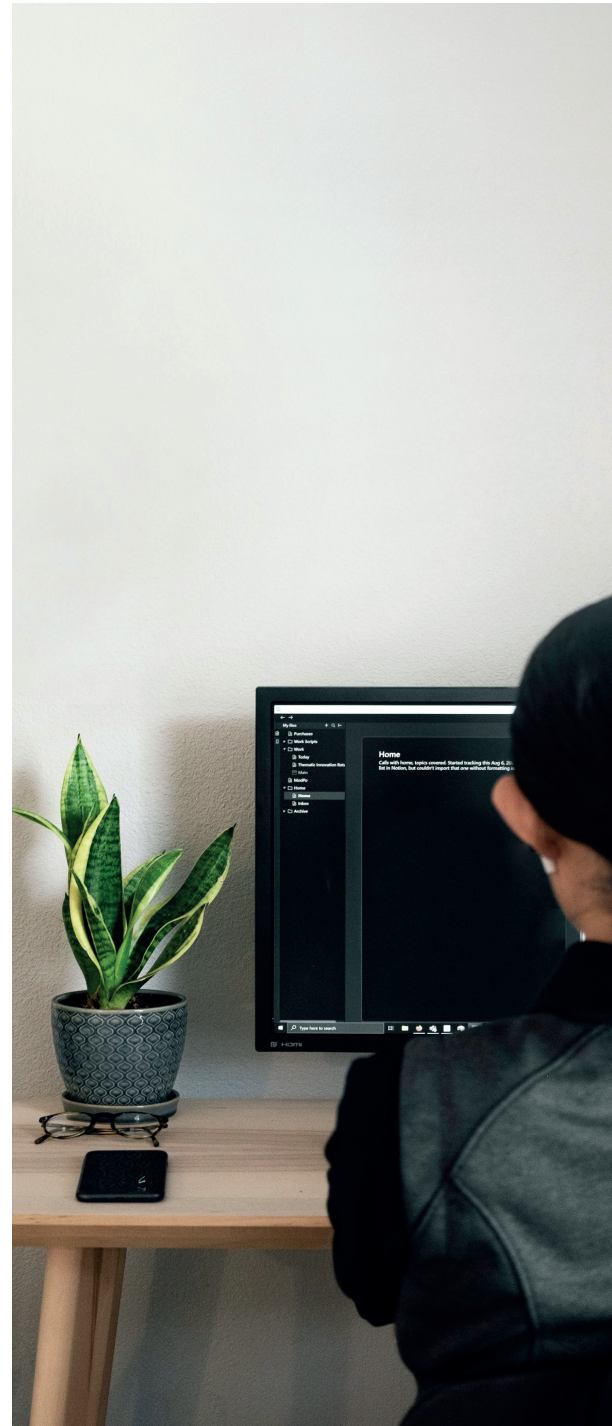

Figure 5: Remote worker
© Nicolas Solerieu / Unsplash

1.1 Literature Review

The first approach to the desk research started by looking at two topics: a large number of studies about the Remote Collaboration practice before the COVID pandemic and a set of new literature published during the COVID pandemic that explores its effects on the workers.

Remote Collaboration before COVID

Working remotely has a long history of evolution through time. Starting from the early 1980s, when IBM installed "remote terminals" in some employees' homes to allow more flexible working experiences (Dishman, 2019), we have seen many different attempts to make Remote Work succeed. Nevertheless, the overall experience of working from a remote location was strongly bound to a set of tasks that didn't require much synchronous collaboration (Avery et al, 2001).

Since then, many researchers have tried to connect different spaces by audio-video means. In 1992, the Xerox PARC group looked into how office dynamics were evolving when connecting two different offices, one in Palo Alto and one in Portland (Bly et al., 1993). Their experiment was called Media Space and was creating a link primarily between two common spaces with camera and microphones, and also from personal computers in the office connected to the network. This experiment brought to a series of meaningful discoveries among which the remote office awareness that such a system was creating between colleagues and the

casual encounters happening thanks to a 24/7 open A/V channel. Moreover, this research aroused reflections about the connection between people in different offices, such as, for instance, the opportunity to sustain working relationships beyond the explicit working task.

With an improvement of the audio-video technologies and the connection infrastructure, many global companies and some smaller ones used these technologies to connect distributed team members and allow remote working arrangements, saving money from facilities and other costs.
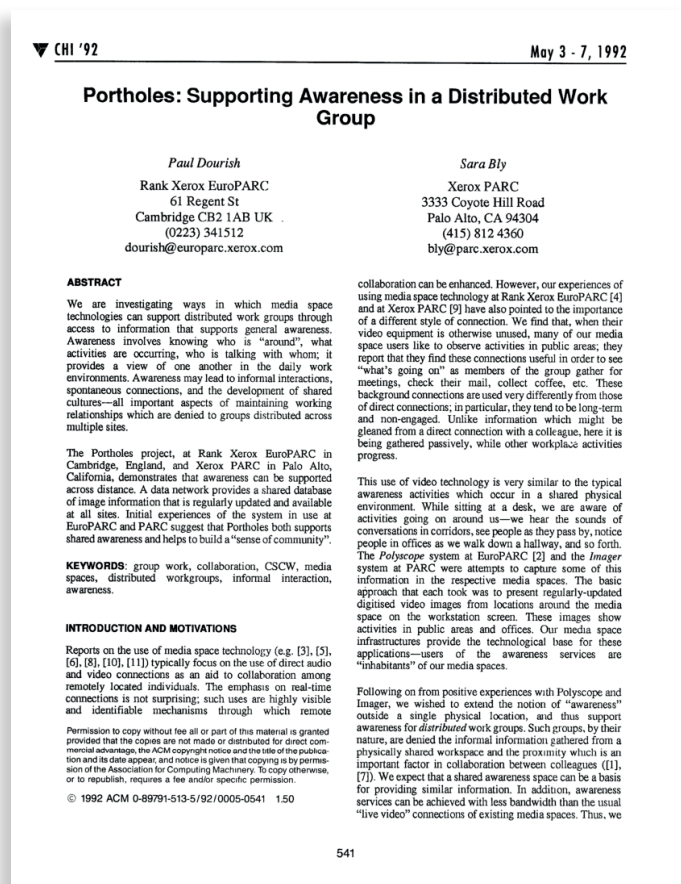

Figure 6: Xerox Parc research about distributed team work, 1992

However, in recent years, we have seen a trend by many companies such as Reddit, Yahoo! (Valdellon, 2015) or even IBM to abandon such practice (Keller, 2017). This is due to the challenge to implement Remote Working in specific working environments and in the need of close contact to share knowledge and enhance creativity (Glaeser, E. 2013).

Remote Collaboration during COVID

When the pandemic started worldwide, workers experienced a drastic change of life and habits, since many companies were unable to transition quickly and effectively to the best remote setting (Bacon, 2020).

In 2020, almost 40% of the whole European workforce performed their job from home as a consequence of the pandemic, compared to only 15% before the outbreak of COVID-19 (Fana et al., 2020). Among all the different working sectors, few of them have the potential to transition to working remotely. Research shows that almost 40% of work across different sectors can be performed remotely in the USA (Lund et al., 2020) . On this matter, an important distinction must be done across the realm of the different countries, regarding the opportunity to work remotely. Advanced economies, for example, have an average of 40% of their country's workforce that can move to remote working, while only 21% in emerging economies can do the same (Lund et al., 2020).

Looking at these numbers gives a clear image of how an already growing trend received a significant boost due to a global pandemic. A great number of small and medium companies that were initially reluctant to make the leap in the remote setting decided to make an attempt, and, some of them, discovered its potential (Adian, 2020).

Figure 7: Father while working remotely © GettyImages

Consequences of Remote Working: Pros & Cons

Working from home is clearly becoming a more known and experienced practice, especially due to the COVID-19 pandemic. This new working condition indeed comes with advantages and it is widely perceived as a benefit for the worker experience. However, as frequently happens, it also encompasses drawbacks. The following categories reflect the aspects found so far within the realm of consequences for the worker and clearly embed both advantages and disadvantages of remote working practice.

Efficiency & Engagement

Many researches highlighted the enhanced performance and job satisfaction while working remotely (Gajendran & Harrison, 2007; Powell et al., 2004), due to the pandemic, the number of employees available to continue this approach in the future increased substantially, but even with a valuable benefit for the employers, some

Pros

- Enhanced performance
- Job satisfaction
- Company cost benefit

Cons

- Distraction
- Technological failures
- Less engagement

reports still show reluctance to accept it (PWC Report - The COVID-19 Remote Working Experiment).

Different factors, among which **(1)** the distractions coming from the environment, **(2)** the flaws of technology, or even **(3)** the mindset of not being ready for focusing at home, create a less engaging experience for some workers, who belong to that portion of employees more willing to join the office again.

Autonomy & Flexibility

The workers' autonomy increased exponentially with the possibility of **(1)** working from wherever they wanted, **(2)** avoiding commuting, **(3)** saving time for other activities, **(4)** being at home with their family and reorganising some of the time from working to other duties during the day, as well as finalising the work duties according with a personal time schedule (Jenkins, 2021).

On the other hand, this autonomy led to consequences such as **(1)** anxiety from work duties due to extra needs of showing engagement, **(2)** difficulties at balancing life and work time, **(3)** disappearance of the office hours boundary, and even **(4)** a worsened attention at home compared with the office focus (Deloitte, 2020).

The core of the remote working practice is the flexibility it gives the workers. The possibility of connecting to their work from

coffee machine. All these aspects are difficult - if not impossible - to experience in a remote environment.

The dispersed teams are already facing this issue since many years: companies tried a wide use of tools and practice to connect remote and diversified teams, from chat tools like Hip-chat or Slack to face-to-face connection apps like Squiggle or Sneek (Seiter, 2014), but it seems that each of them has a different experience - while GitHub was born and powerfully survives in a fully dispersed configuration, companies like Reddit or Yahoo! decided to downsize the number of remote employees (Valdellon, 2015).

In fact, connecting employees over a digital medium is not an easy task. Many platforms try to do so by recalling some of the characteristics of the in-office experience, such as the awareness of the colleagues' activities or the random encounters (here organized by a bot), by carrying them to the digital environment (e.g., Sococo.com, donut. com). However, the whole digital environment

wherever they want and the possibility to work in their personal time frames is a powerful element of positive feedback on this practice. However, many knowledge workers or people that put collaboration at the very base of their practice, may find themselves constrained and overwhelmed by the number of online meetings carried out. The high flexibility then may find a challenge in the tight and stressful planning of the daily meetings and the dissolved time in between, that existed in the office and created some cushion between the other duties (Reisenwitz, 2020)

Connections

To live the office life does not only mean to commute to the workplace, to work in your cubicle, to eat at the company canteen and use the office printer; it also means to meet colleagues, to find out new things while having a walk outside your workplace, to meet someone in the elevator or to randomly engage in a conversation at the

creates boundaries for real connection between employees, limiting moments of real talks and deeper interaction that may occur during an unplanned encounter.

Moreover, the connection between different workers seems to be the motor of innovation and is affected by the large number of spontaneous interchange and physical contacts happening among different employees of companies. As the Silicon Valley example shows (Moretti, 2013), especially in the early days of the Valley, the great added value of being there came from the interaction of workers across different companies. In the last decade, with the reality of bigger corporations, interactions take place within the company in environments that may be seen as "temples to collective creativity" built to facilitate interpersonal connections (Glaeser, 2013).

Culture

Companies face another issue while transitioning to the remote collaborative practice, that is the disconnection from the

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Pros

• Managers improved communication with employees

• Increase of trust within the company culture if action are taken

• Feeling of community while remotely employed

Cons

• Feeling of distance from company culture after a quick remote transition

• Lack of connection with company

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company culture. A study from Sull and Sull (2020) shows that some of the employees feel distant from the company identity and mission, when they miss interactions with the people in the physical working environment. This element arose especially due to the pandemic, since it brought to the digital platforms companies that were totally unprepared about how to connect their employees online and how to create a bond with the company while they were Working from Home. To fulfil those needs, for example, well established remote companies such as Miro, provide physical gift boxes or awards in order to connect their employees with the company (Milleway, Linkedin Post, 2021).

On the other hand, big and more structured companies showed an increase of trust in the company culture rated by the employees. This happened due to different factors, among the others the availability to communicate with managers and senior roles, to understand the problems among the employees. This quality has demonstrated to increase the bonding with the company culture (Sull & Sull, 2020).

Tools & Practice

The shift to remote working is based on the development of the IT sector in the last 30 years. For this reason the importance of the right tools and of a well laid out infrastructure is a concern for every company that wants to allow their employees to work remotely (KRC Research, 2018). As surveys show, the use of proper tools in the environment of Remote Working raises productivity on collaborative tasks, (Dahik et al., 2020) and highlights the need for a particular attention while setting up the digital workspace.

Pros

- Digital collaboration tools raise productivity
- Digital and physical tools helps efficient collaboration

Cons

- Tools are not helpful without the right surrounding infrastructure
- Wrong practices may lead to tools inefficiency

However, not only the tools and infrastructure are fundamental for a successful transition. A correct organisational practice, like a clear division between work and personal time or to let top managers set the example, has shown to have huge consequences on employer satisfaction and productivity (PWC Report - The COVID-19 Remote Working Experiment). The tools themselves are useless if individuals do not acquire and maintain a certain practice while using it: for example, even the best document sharing application is useless in a collaborative environment when a good communication practice is not in place or not followed by the team members (Deloitte, 2020).

Working Environment

The working environment is a further element that shows both positive and negative aspects for remote workers. The freedom of choice of your own environment is considered a great value when transitioning to Remote Working. The possibility of working from a different city, while travelling, the participation in a call when commuting, or even the freedom of being at home, taking care of your own family and still being able to work on your tasks are indubitable perks. (Courtney, 2020) On the other hand, some of those benefits come at the detriment of other problems which are not present in the office. Examples are the internet connection and speed, the presence of distractions at home or in public spaces, the lack of proper hardware such as screens, keyboard or mouse, but also the lack of proper furniture such as a good chair while spending many hours in front of a screen, and so on (Deloitte, 2020).

Pros

- Freedom of working environment choice
- Travel working
- Time with family

Cons

- Faulty working set-up
- Distractions at home

Despite the pandemic creating a sudden shift to the home workplace, with many workers struggling to adapt in an environment that was not ready or suited for Working from Home, the different working environment still created a series of advantages for the worker that are reflected in previous research (PWC Report - The COVID-19 Remote Working Experiment).

Workers' Rights

The transition to a remote or mixed working methodology seems to be mostly in favour of the workers, but not all that glitters is gold. The convergence between the workers and their employers is a win-win situation when everyone gets the best out of this transition, but how difficult it may be? Some companies banned the practice because it was not suited for their team, but many companies that are now forced to work remotely due to COVID noticed that this can lead to a big amount of expenses to save, for example office rent with all the connected bills and furniture costs, business travels, commuting compensations or lunch tickets (Silvermann, 2020).

Nevertheless, in a Remote Working setting, all this can come at the expenses of the worker, who is in charge of setting up his house with a good internet connection, the proper screen, a comfy chair, a large enough table, he has to take care of all the meals, the coffee, the tea and so on. Moreover, the number of hours spent, due to the lack of commuting and the

time saved thanks to this practice can be used to work more (Maurer, 2020).

In addition, there is a chance of inequality between different countries' cost of life, or on the insurance policies and benefits of the worker hired remotely. Some applications already exist to fix this problem, such as Remote.com, that provides a full series of services connected with hiring employers from all over the world (payments, taxes, insurance, etc.).

Although remote working seems like a great solution for workers, it still represents a risk for those sited in less advanced economies, where, for example, the already existing trend of relocating business services from developed countries might consolidate the inequalities of benefits and salaries and exacerbate conflicts among service providers (Messenger & Ghosheh, 2010).

Pros
- Workers can have worldwide support
- Companies saves money

Cons
- Workers may be subjects to a reduction of their benefits
- Saved commuting hours are replaced by more dense work duties

1.2 Interviews

To get information about the remote working experience directly from the source, 13 interviews were held. This provided a richer overview of what the forced work from home experience has been for different types of workers. 6 of them were interviewed on a structured Miro board and 7 were interviewed in an informal conversation that dealt with a broader range of topics with a set of guiding questions (see Appendix B) asking if their actual activities involved remote collaboration and what was their opinion about that experience.

Participants

A wide range of knowledge workers (e.g. English professors, architects, sales and marketing employees) were interviewed to create a complete understanding of the consequences of forced remote collaboration. Among the 6 structured interviews, 3 were with the consortium experts.

Setting

The structured interviews happened online for about one hour, while the informal interviews ranged from telephone calls to video conferences and lasted between one and three hours.

Tools

A Miro board was used for the structured interviews with a list of activities that were meant to let the tacit knowledge and experience of the participant be communicated.

Data

A rich amount of data became available after the interviews, with a total of 16 hours of conversation and 6 boards with material produced by the participants. The conversations were transcribed and some quotes were extracted and analysed singularly when necessary, then clustered according to similarity of topic and meaning (Appendix B).

Demographics
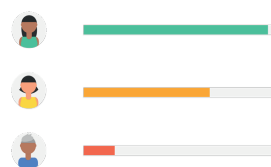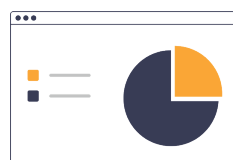
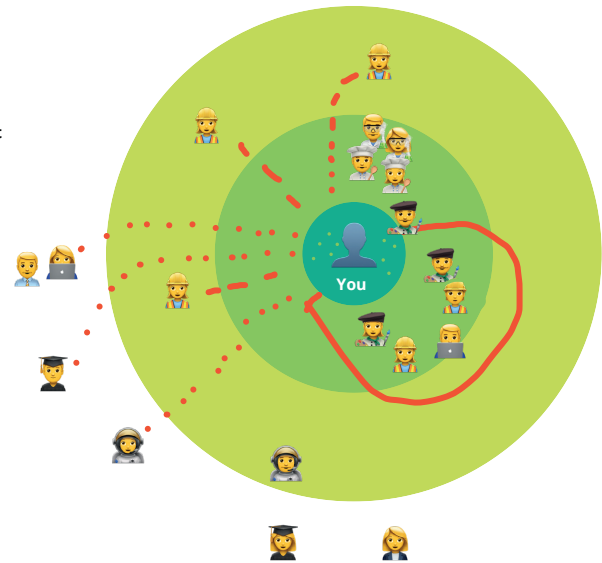| Participants	Gender	Age distribution	Nationalities
13	5 Females 8 Males	18 to 62	Dutch, Canadian, Italian & German
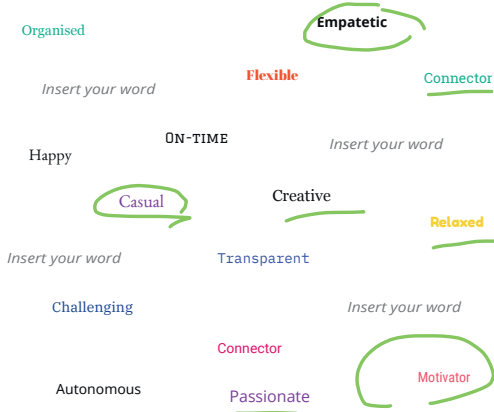
Figure 8: Sensitising board filled during one interview

Findings

The outputs from the interviews unlocked many insights on the impact of Remote Collaboration on workers (see Appendix B for the full list). Three of them appeared to be the most relevant for the purpose of this project:

The new team relationships cause lack of trust and miscommunication

The teams' transition to remote environments changed the relationships between Remote Workers, from hierarchy flattening to difficulties in communication and loss of trust and shared ground. Companies are affected by those changes in everyday practice and connection with their employees.

"So that's one of the challenges: the lack of trust, the lack of shared ground, and therefore potential misunderstanding and inefficiencies." -E.

We communicate and interact without emotions in time of remote collaboration

The small interactions that happen in the office or around the workplace disappeared with the full remote working transition. The type of communication in the online environment lacks emotions and to be effective needs planning beforehand.

"It is what makes it human, why so many people have problems with the way we are working now, you can be busy for an entire day, seeing a lot of people but have no social interaction" - S.

Self-awareness and responsibility enable many positive conditions

Self-awareness and the feeling of responsibility can be motors of advantages in a remote working environment. The freedom of selecting your own environment and the planning are powerful medium to positive conditions.

"An important trust relationship arises. Not being controlled, but checking the goals...you have responsibility to do well, and in parallel there are less contrast points." - F.

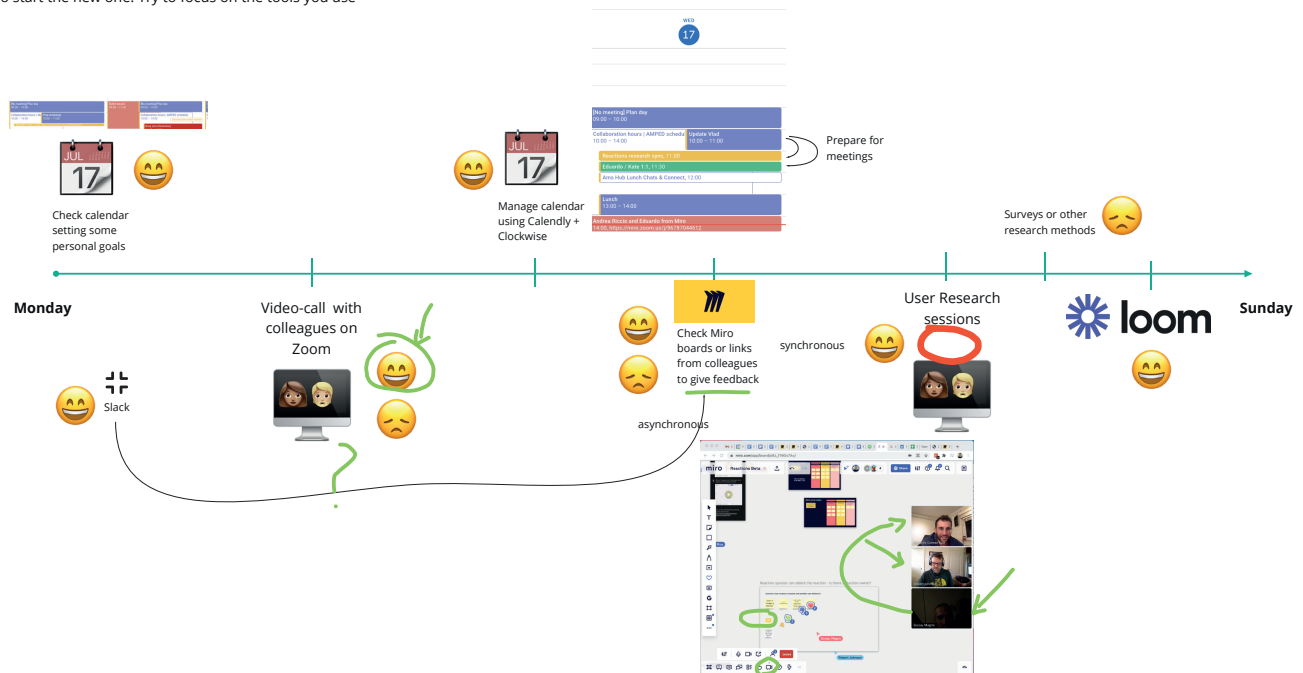**Figure 9:** Interview with Eduardo Gomez Ruiz, April 2021

Figure 10: Sensitising board filled during one interview

1.3 Online Survey

An online survey was conducted In order to get a broader overview about the topic of working remotely. The aim was to compare the answers with the insights gained during the interviews and the literature to check for gaps, inconsistencies and validations.

A total of 14 open questions (Appendix B) were based on the insights collected so far in the previous section and ranged from the improvement of organizational skills, up to the evolved relationship with their teams.

The online survey was made using Google forms and participants were recruited through friends networks, Linkedin and Whatsapp, to get as many respondents as possible from remote workers.

Findings

Among the different open questions there were relevant and complete answers, confirming some of the findings from the previous two phases and giving more insights on what aspects to focus on and explore more (see Appendix B for the full list).

By analysing the answers from the respondents, the following insights can be drawn:

Q: What are the aspects that you miss the most from working in the office?

79% of the answers pointed out the missing social interactions

Most of the participants felt a lack of moments of connections with other colleagues, including lunch, coffee, or chit chat. What felt to be missing the most were the moments of exchange, having a tête-à-tête with a colleague and talking about a question, a doubt or a project right away, on the spot.

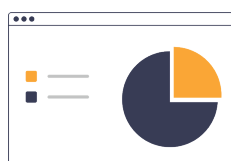*"Human contact with colleagues." - Participant 20*

"Networking, confrontation, basically all human interactions." - Participant 25
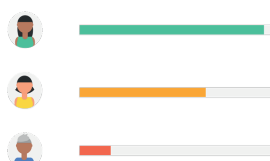
Demographics

Participants
41

Gender
23 Females
18 Males

Age distribution
19-29:   29
30 - 49:   9
50 and above: 3

Occupation
20 employees
7 students
6 freelancers
8 academic employees

Q: What are, according to your personal experience, the advantages of collaborating remotely?

41% stated that less commuting and more flexibility was the main advantage

29% said that they are more focused while working remotely

Some of the advantages of working remotely are related to the saved time previously used to commute, the opportunity to organize your own schedule and increased flexibility.

 At the same time, 1 every 3 participants stated that they are more focused at home, but also working more due to this aspect.

"More focused work, less disturbing with irrelevant questions, no noise in the office (big problem for me), easier to focus / execute creative tasks myself; no time lost on commuting to the office or the client" - Participant 39

Q: Please also list the disadvantages, according to your personal experience.

88% of the answers pointed out the communication problems and/or loneliness feeling, increasing bonding problems

Almost all the participants agreed that the main problem while working remotely is the communication between them and their colleagues. This lack of communication creates a wide range of problems, from misunderstanding, up to feeling of loneliness, and overall increasing bonding problems.

"Less personal interactions, non-work-related conversations are very limited" - Participant 14

"Loneliness, kind of depressing, not always in the mood, and i bet the others feel this too" - Participant 31
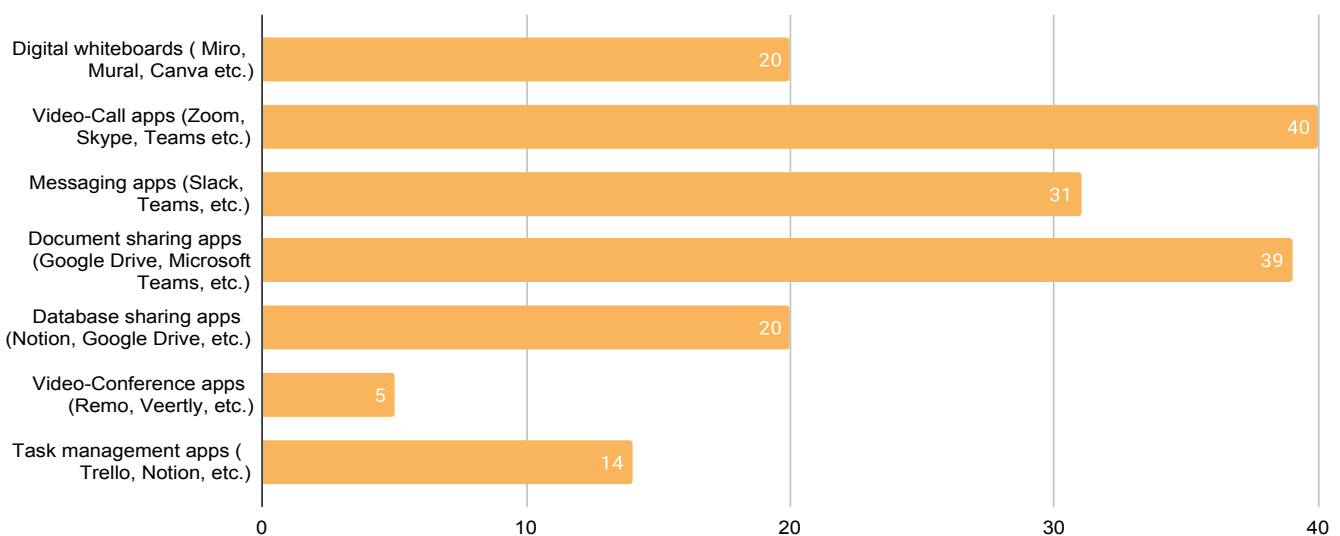

Figure 11: Platforms used by the 41 participants while working remotely

1.4 Chapter Insights

The perception of Remote Working

Remote working has been for a long time a well accepted practice among companies, and a growing trend long before the pandemic. However, for most companies worldwide, such a practice has been regarded as an unfeasible option, mainly because of the underlying difficulties to implement it in a meaningful and practical way, but also for the risk and the fear of losing productivity and control over the employees.

Now, because of our forced experience of Working from Home we found ourselves in that social experiment that nobody asked for. Since the beginning of the pandemic, companies not only had to trust their employees, but also had to rely on their employees' self-managing skills, as well as improve and/or provide the right IT ecosystem. This trust has been well accepted by workers that increased their skills and productivity, felt in control over their schedule and activities and gained the freedom to take care of their family or other tasks over the day, feeling in control and empowered.

While before the pandemic the concept of working from outside the office has been considered a solitary activity generally attributed to freelancers, with few contacts with supervisors or colleagues, now, the shift to the possibility of collaborating while in different places appears legit to us knowledge workers. This represents the real shifting point from Remote Working to Remote Collaborating. But what will happen next ?

Generally, such large-scale changes take many years to become a commonly accepted practice. However, due to the pandemic restrictions, people had to experience this opportunity first hand and decide whether they wanted to embrace this change or reject it. According to the data gathered from the literature and the user research, it appears plausible to expect that, in the near future, employees of the knowledge sector will be more likely to get a job with the possibility of working remotely (Castrillon, 2020). This circumstance will induce a large number of companies to migrate towards the Remote Working practice to retain talents. Moreover, according to what appears to be the workers' will, the hybrid work environment will become a reality soon, for many companies right after the pandemic will be over. This will force a whole new set of norms and social rules to be created, together with technologies, that will facilitate this process.

Different perspectives on Remote Collaboration practice

The different information gained in the first phase of this research not only showed a shift in the overall perception of the work from home, but also some interesting perspectives about the practice of remote collaboration.

From a deeper analysis of the data, 2 main conclusions emerged, with a total of 8 patterns defined as sub-conditions.

1 **Increased sense of responsibility**

Competence & Autonomy

This first condition recalls two of the fundamental human needs as devised by Pieter Desmet (Desmet, 2020), which are competence and autonomy. Mainly regarded as a positive condition, the increased sense of responsibility is caused by the possibility to be free to select your schedule, to work from a place of your choice, to have more time for your family, and, additionally, to see a flattening of the hierarchy, followed by the perception of everyone being on the same level through the screen. On the other side of the coin, some people fail to manage this category of consequences properly, not being able to organize their schedule in a healthy way and losing control over their work-life balance.

The sub-categories emerged in this cluster are:

Self-managed time schedule - Need for freedom of decision

Workers want to decide their own schedule, they love flexibility and look for that in an employer, after experiencing the benefits during the pandemic even more.
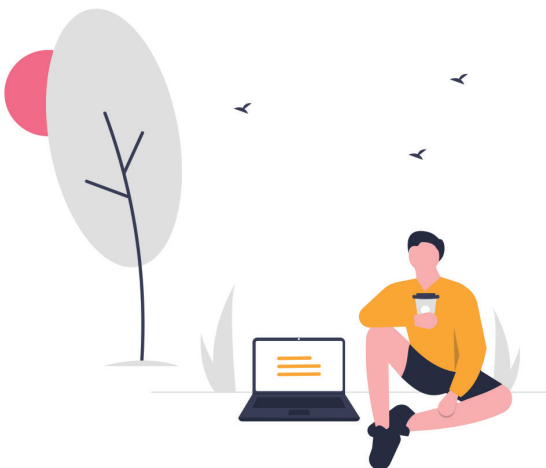
"Looking after the house, family life and working life are more integrated, the disadvantage is that I always feel I have my children now and I can't work, but I can also have time to do family duties." - S.

Figure 12 - 22: Working-related illustrations
© Katerina Limpitsouni / Undraw

Boundless working time - Need for achievement

Every freedom requires some control. The flexible time schedule frees the working time from boundaries, forcing the worker to decide when to stop, and if the wish to accomplish a task is too big, it may become difficult to balance life and work.

"Saturday and Sunday me and the vice-director try not to connect or contact each other for work, we self imposed it, otherwise it is a non-stop week, so I have to force myself into not working over the weekend." - B.

Working environment selection - Need for environmental control

To select where to work, allow the worker to travel, to go to his favourite coffee shop or just to work from home, the important thing is the freedom to decide.

"Travel working means to live better, smart working is making things better, but you can do more. You can spend your free time always in new places, during your break going out and discovering something new, connecting with new people." - F.

*Colleagues hierarchy flattening - Need for individuality*

The new remote setting forces managers to establish a goal-oriented relationship with the employees. This tends to flatten the hierarchy and improve responsibility. The need for individuality refers to the chance to assert the workers' uniqueness and identity.

"An important trust relationship arises. Not being controlled anymore, but checked about the goals, you have responsibility to do well, and in parallel there are less contrast points." - F.

Evolved connection with the team

Community & Relatedness

Compared with the previous one, the connection aspect has suffered a substantial change that negatively affected workers on a deep level, causing also lack of trust and a feeling of disconnection with the company's identity. Elements like the feeling of working together or the small, serendipitous interactions that we have in the office disappeared and were replaced by a filled schedule of meetings and working interactions. This is connected with the loss of bonding, feelings of loneliness and even mental issues. However, on the other hand, the possibility of being connected with colleagues and talents from all over the world became really easy, as much as the opportunity to connect instantly with everyone within reach. That appears to be a real advantage for many workers.

The sub-categories emerged in this cluster are:
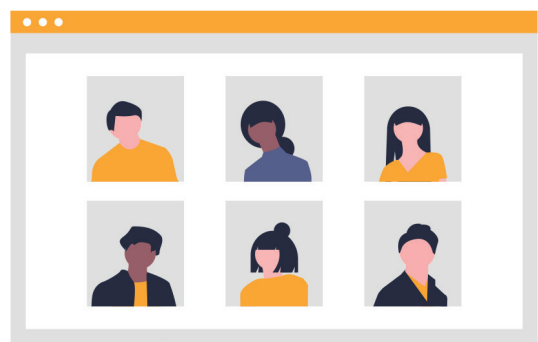
Missing feeling of working together - Need for affiliation (group identity)

Working with your colleagues represents more than just doing your tasks, it is a part of people's life, filled with moments of fun, light hearted chit chats and even awkward moments, that create bonding and camaraderie.

"It is different, for collaboration I think it is different, it is very nice to be also physically together with a team, different cultures and different disciplines." - S.

Disappearance of small interactions - Need for social support/emotional support

There are many moments when serendipitous interactions happen, and those moments, even if small and subtle, let people look for advice, expand their knowledge about new things or even open up with someone talking about concern.

"When you press leave, it's finished, and you are all alone again." - S.

Fruitful engagement with colleagues worldwide - Need for affiliation (group identity)

Collaborating remotely brings a huge advantage: being able to connect with everyone, everywhere in every moment. This connection represents the gate for a modern global identity.

"Then the advantage is that you can connect virtually with everyone, regardless of distance. And you can have the same moment and meet people from different parts of the world with different times, so you have that scale, which is interesting." - E.

Missed connection with your company identity - Need for Rooting (tradition, culture)

Co-workers that have problems communicating tend to decrease trust and alignment, and if those problems happen with managers, the company bonding becomes loose.

"So that's one of the challenges, the lack of trust, the lack of shared ground, and therefore potential misunderstanding and inefficiencies." -E.

Over the past decades many attempts to improve workers' experience in dispersed teams have been made. Solutions like Xerox Parc investigated the realm of workers' engagement and feelings, while more recent companies' experiences like GitHub developed strategies to improve workers' bonding in a remote environment with successful results. However, the majority of the companies worldwide are small and medium sized, still in the digitisation process, and the pandemic showed how unprepared for this change they are. Employees are sustaining the consequences of this sudden change and they should be the one in the focus if we want to embrace the benefits of the digital revolution, keeping the human side in the spotlight. Due to the insights gathered during this phase, a shift in the scope of the project occurred towards a more social perspective in the working environment.

Preparation
&
Visioning

Get a glimpse

The process of approaching the future scenarios revealed the rising importance of the digital/physical duality and highlighted the fundamental role of empathetic connections when creating experiences in an hybrid office environment.

In this phase, three main activities were carried out: **(1)** a first session with the Consortium aimed at receiving feedback on the insights gathered so far, **(2)** the creation of the future vision through the Vision In Product methodology and **(3)** the definition of the design goal.

2

Approaching the future

Introduction

The second phase of my research had the goal to look in the direction of the speculative future limited by the domain (Working Environment) and the time frame (2030), collect context factors and create a vision in the preferable future direction.

Research questions

- How will the 2 main conditions (i.e., increased sense of responsibility and evolved connection with the team) and their implications characterise workers' experiences in the next future ?
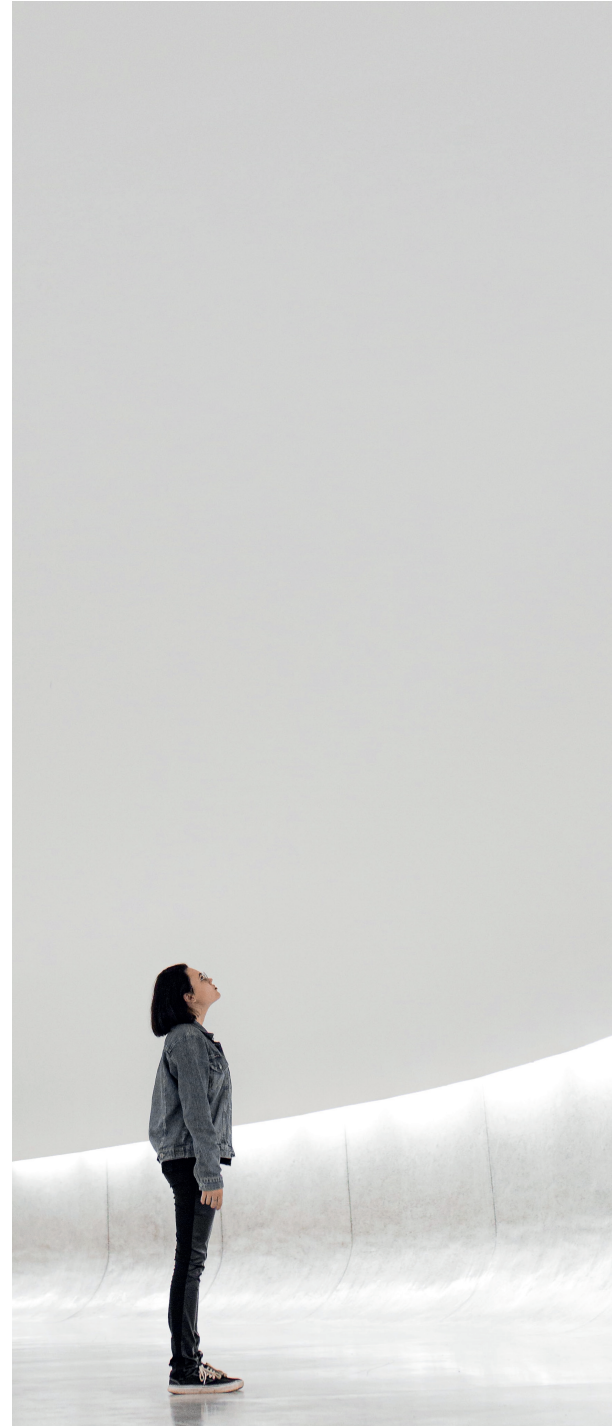

Figure 23: Looking at the future
© Guilherme Stecanella / Unsplash

2.1 Generative Session

A first joint session with the Consortium experts meeting each other online for the first time was held on the 16th of April 2021. This session primarily aimed to collect knowledge regarding the more general scope of the working environment and focused on the remote experience connected with some future scenarios, such as a company get-together and a new employee being introduced to the company practices.

This session followed the context mapping methodology (Sander & Stappers, 2012) in order to let the participants express their latent and tacit knowledge about the topic.

Prior to the session

Sensitising booklets

One week before the session, the participants were asked to fill a booklet with the aim of collecting information about their vision of the working environment and sensitising them to the session to come.

Insights

The first part of the pre-session booklet focused on convivial moments, since, during the interview sessions, those moments were stated as relevant to create bonding, interaction and trust with colleagues. It appears that lunches and coffee breaks with colleagues create a strong bond and especially an acquaintance of the other person not just related to the job-environment topics. Moreover, the convivial moments in person were related to more relaxed times, stronger bonding and better communication, but also with less efficiency.

The second part of the booklet focused on the importance and the power of collaboration. In this section a clear perception of the importance of diversified teams as well as the fun factor while collaborating were stated as the most relevant aspects for a powerful collaboration. Moreover, issues like the lack of communication are a major problem for negative collaboration experiences.

Context Mapping

is a way to involve users as experts of their experience in design processes and gain tacit knowledge.

Emotional toolkit and Cognitive toolkit are techniques often used in Context Mapping to elicit memories from the past, make interpretations and connections or imagine future experiences by performing a creative act.
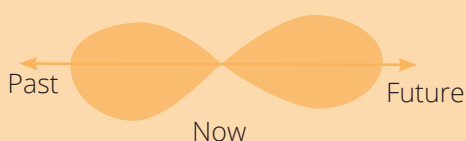

Figure 24: Path of expression © Sanders & Stappers

During the Session

Main Structure

The session was structured in 3 main parts:

The first was an open discussion about some extracts of the sensitising booklets, in order to create awareness and address some of the concepts already tackled.

The second part was the completion of an emotional toolkit aimed at communicating what kind of relation exists between the experience of the employee and his senses.

The third part consisted in a cognitive toolkit to discuss two scenarios in the present and in the future, according to some specific context factors.

Figure 25: Generative session with the Consortium, May 2021
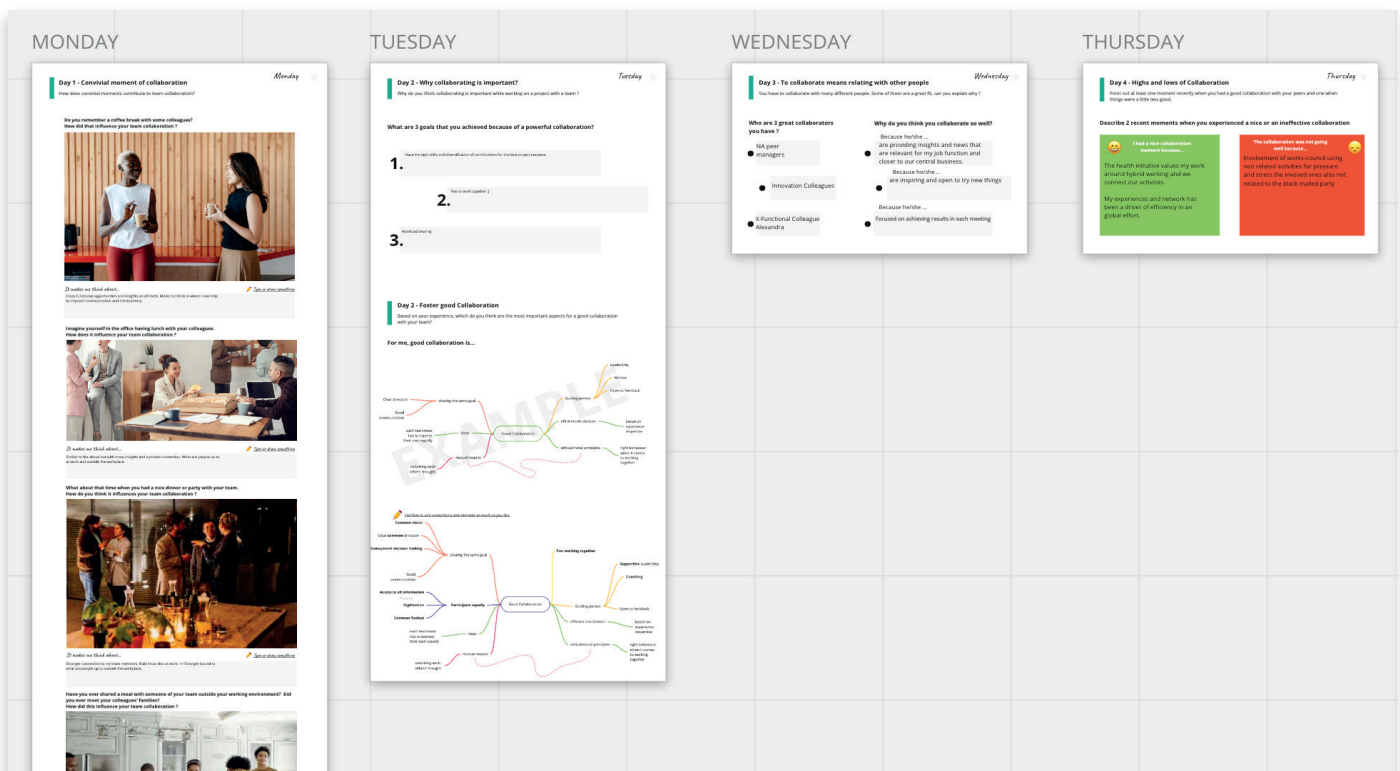

Figure 26: Sensitising booklet filled by one of the Consortium member before the session.

Insights

Over the different topics tackled, some patterns in the discussion aroused, resulting in the creation of 5 clusters (see appendix C for details). Three of them are particularly meaningful in this context:

The Physical/Digital balanced duality will be the future direction to follow

The online activities covered a full spectrum of options, including bonding activities such as drinks, parties, on-boarding of new employees and so on. This whole new category of activities embeds advantages and disadvantages of the digital possibilities. There will be a drive to keep some of the characteristics of the online and embed them in everyday activities.

"On the other hand, we have many digital drinks as well, and in our team they are really preparing this very well, so we all try to have that experience and then it's very easy to also invite many other people. For example, former employees, or former trainees, or, you know, partners with whom we collaborate...it's easier to also involve more people, so this I think is the benefits of this online, fun experience." - S.

Express freely and create trust are mutually related

The online medium carries a different expression mechanism compared to the face-to-face one. In person we tend to express our opinions freely, while online we feel more limited. Online mediums embed social mechanisms and technical difficulties that slow down the creation of spontaneous conversations.

"Offline is much more enjoyable for me. The smell of a coffee, I normally take long breaks with colleagues, just to chat about life and the coffee is important. They're more spontaneous like, oh, we randomly decide to do or arrange something." - E.

Autonomy and freedom need discipline and colleagues

Over the great benefit of autonomy and freedom of self-management achieved thanks to the WFH practice, an important element that stands out is the amount of discipline needed to keep the efficiency and a healthy life. The colleagues' interactions create a leverage for the implementation of good practices and a healthy work-life balance.

"You need to have more discipline in digital environments, to plan your breaks, like in the office, someone comes along - do you want lunch, let's go to lunch! - Right here, no one is coming, saying ``let's go for lunch''" - M.

2.2 Future Scenario Definition

Creating the Future Context

After the broad research on the topic and the first approach to the future from the Consortium, an exploration of the future context has been performed by taking inspiration from the VIP method (Hekkert & Van Dijk, 2011). This method involves the use of context factors in the selected domain to create a structure of the future context and, subsequently, a framework in which it is possible to define the design concepts that may be valuable for such futures.

Domain and Time-frame

To start the process of creating a future vision, a clear domain needs to be determined as it provides the scope for the future context. In order to find meaningful context factors the domain should not be too broad, while at the same time keeping it broad enough to allow innovation to arise. This is why the appropriate domain and scope for this project is Global Working Environment.

In order to envision a time-frame where the consequences of the pandemic will be ingrained in society, the focus was on the year 2030. This aligned with many technological, societal, and cultural visions that provided information about the next 10 years. Nevertheless, some past visions concerning the timing and trends for the implementation of remote practices may be less relevant at the present day as they were not taking into account a global pandemic.

Figure 27: Walking towards the future of work © Tom Parkes / Unsplash

Context factors selection

In order to collect relevant context factors, there was a selection among the information gathered in all the previous phases, and additional information coming from different sources. A total of 90 context factors have been collected, those factors include a large series of fields, such as technology, economy, psychology, etc. The complete list of factors collected is available in (Appendix C).

The factors have been organized following 4 main categories:

Context Factor Categories

Developments

Quantitative phenomena that are currently changing or expected to change in the near future (e.g., remote workers number will continue to grow after the pandemic - context factor 3).

Trends

Changes in tendencies in the behaviours, values or preferences of people (e.g., by 2030, employees will move from working on a computer to working on a mixed laptop/virtual reality environment - context factor 9).

Principles

These are constant over longer periods of time. Immutable laws or general patterns that can be found in human beings or nature (e.g., having fun is a powerful element to create bonds - context factor 54).

States

A surrounding world condition that will probably not change in the near future. Stable at the moment of observation (e.g., IT security is ranked first concern for both consumer and enterprise use of new tech - context factor 22).

Context cluster and narrative

The collection of the factors per se is not enough to define the future context. In order to understand the way the selected factors relate with each other, a series of scenarios has been structured. The goal of those scenarios was to find patterns by understanding the overarching narratives among context factors while preserving their richness. By clustering the factors, 8 different scenarios emerged to form the so-called "super-condition" of the future world. Such super-condition is a realistic view of what is expected to happen in the future (Hekkert & Van Dijk, 2011). The detailed clusters can be found in appendix D.

Framework

Once the previous steps are completed, it is possible to have a better understanding of where the direction to which the future of working is pointing: the **future cones** in the domain selected is now clearly visible and it is easier to decide which is the designer's preferred future on which this project aims to focus on.

In order to create the desired framework, the previous clustered context factors have been organized in a two axes matrix following two main dimensions: Social Response and Geographical Distribution.

Future Cones

Based on the 'futures cone' model by Hancock and Bezold (1994) used to portray alternative futures, Joseph Voros (2003) distinguished between four classes of alternative futures to help organize and clarify the range of possibilities. These are possible, plausible, probable, and preferable futures.
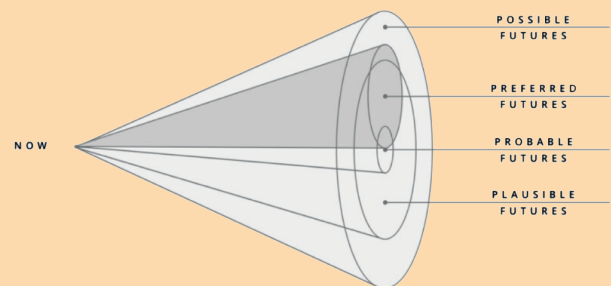
Figure 28: Future cones representation © Joseph Voros, 2020
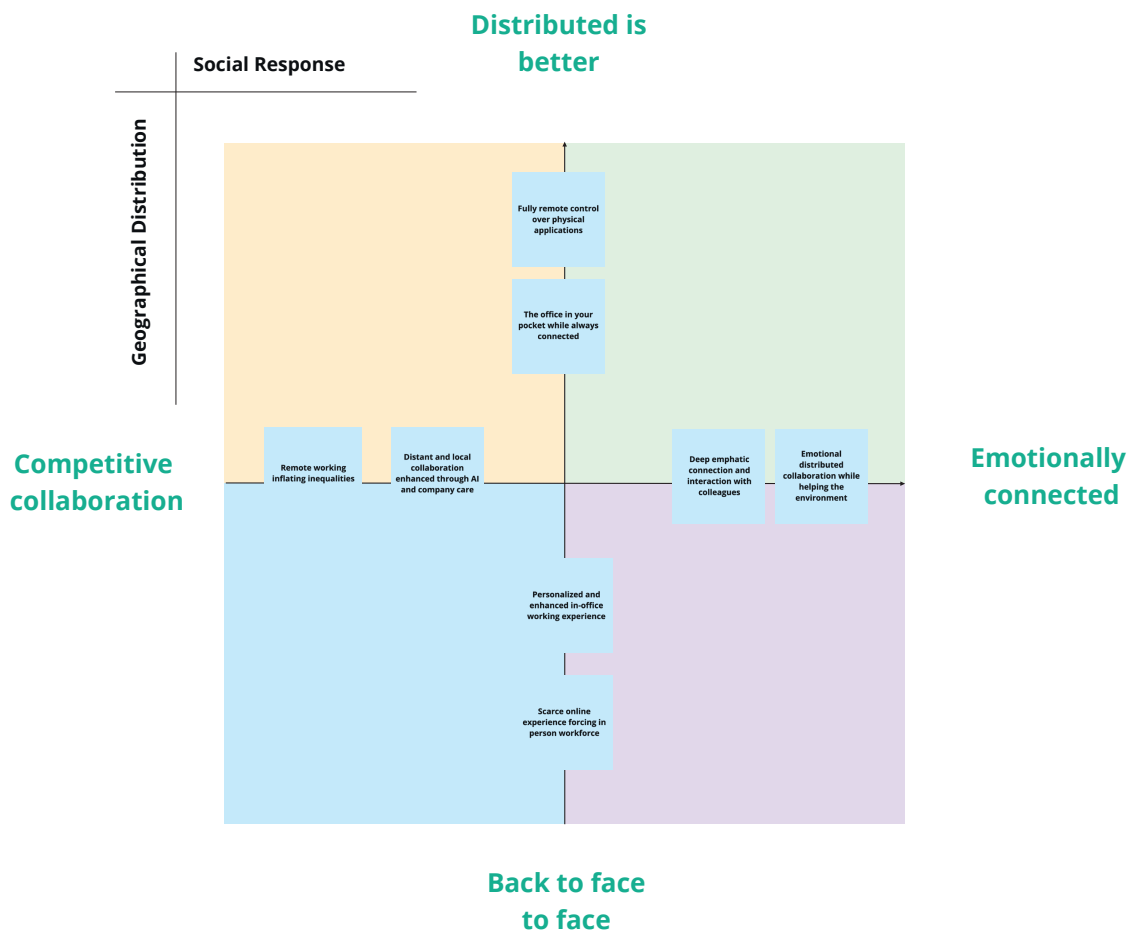
Figure 29: Matrix of future conditions distributed among 2 directions

The super-conditions, or clusters, are distributed in the main dimensions and across 4 directions:

- Dimension: **Geographical Distribution**

- Directions: **Back to Face-to-Face / Distribute is better**

- Fully remote control over physical applications

- The office in your pocket while always connected

- Scarce online experience forcing in person workforce

- Personalized and enhanced in-office working experience

- Dimension: **Social Response**

- Directions: **Competitive collaboration / Emotionally connected**

- Remote working inflating inequalities

- Distant and local collaboration enhanced through AI and company care

- Deep emphatic connection and interaction with colleagues

- Emotional distributed collaboration while helping the environment

2.3 Design Directions

Within the 4 quadrants of the axes, 4 possible scenarios in the selected domain have been imagined. The scenario selected to focus on is at the junction between the Emotionally Connected direction and the Distributed is Better. The other behaviours can be found in Appendix C.

Selected Behaviour

By 2030, the new connecting technologies and awareness of employees about what they can obtain thanks to a remote setting will generate a new working approach. This will focus on creating deeply empathetic and meaningful connections between colleagues who are both close and/or distant in hybrid working environments. The opportunity to be always reachable is balanced by reciprocal respect and trust.

Vision Statement

The aim is for employees to be able to connect empathetically and spontaneously with their colleagues while in an hybrid office environment.

This Vision Statement represents the direction to follow according to the specific behaviour selected and the path towards which direct the design goal.

The last part of the "Approaching the Future" phase regards the definition of the design elements that I decided to follow over the next phases. These elements are the design goal, the interaction vision and the design question.

Connecting the insights

By analysing and interpolating the different insights previously obtained, a specific aspect sparked my attention and found confirmation in one well-fitting participant's quote:

"You need to have more discipline in digital environments, to plan your breaks, like in the office, someone comes along "you want lunch? Let's go to lunch!'." Right here, no one is coming saying ' let's go for lunch!' " M.

This affirmation is strongly connected with the main insights gathered on the disappearance of small interactions and on the increased sense of responsibility, creating even more awareness of the need of small interactions to foster a beneficial effect on the overall experience of the workers in terms of both wellness and productivity.

One aspect that aligns the small and spontaneous interactions with productivity is the concept of Organizational Meta-knowledge. Organizational meta-knowledge refers to the knowledge of who knows what and who knows who. This knowledge is important to save employees' time and efforts

and it is usually created through spontaneous and collateral connections among the workers (Leonardi, 2014). These connections contribute as well to create an environment safe from loneliness and with a better feeling of satisfaction (Hickman, 2018).

Design Goal

After analysing and connecting the insights from the previous stages and shaping the vision statement of my project, my design goal reads as follows:

I want employees to be able to connect empathetically and spontaneously with their colleagues while in an hybrid office environment, to foster trust and camaraderie.

Interaction Vision

To help me understand which kind of interaction I aim to evoke in the workers, I used the analogy with an interaction vision. My interaction should feel like playing a rugby match: relying on your team, but also moving on your own, taking your decision independently and enjoying the moments in between the actions.

Figure 30: Visual representation of the intended interaction © Hamish McConnochie

This vision comes with some specific qualities that I wanted to evoke:

Design Qualities	IV Components
Aligning	Having the same goal, sharing the same ground
Awareness	Knowing the other will be in their positions when it is needed
Camaraderie/ Bonding	Belonging to the team as a whole
Engaging	Living the in between actions and the before and after excitement

Design Question

A design question has been formulated in order to guide the process of finding the interaction that should foster the interaction qualities and achieve the design goal. The question is:

How to facilitate multi-modal social interactions between remote colleagues for greater connectedness?

Develop

Ideation
&
Development
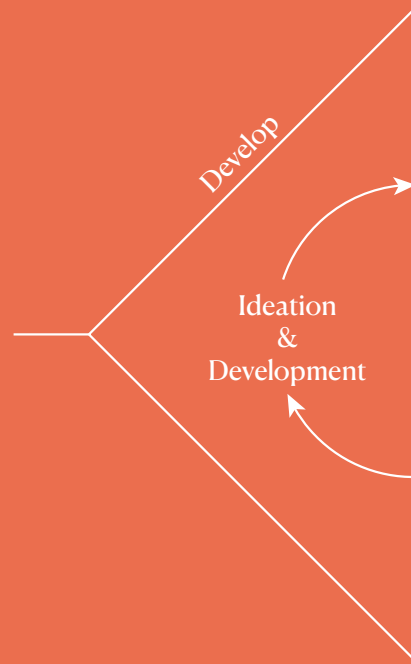
Get a glimpse

The aim of the third phase was to understand the differences between a hybrid and a full digital session and to develop ideas to enhance workers' bonding in a hybrid working environment. Three main understandings emerged: **(1)** all the ideas generated in the sessions concerning bonding between colleagues were focused on the awareness of each other's emotional status, **(2)** participants showed a different attitude when collaborating in the full-digital or in the hybrid session, as the former embeds widely internalized social rules which the latter is instead missing. **(3)** Lastly, the technical set-up of a hybrid session is crucial to improve the collaboration practice through the embedding of new interaction mechanisms which fit the hybrid environment.

3

Exploring the future

Introduction

In order to explore the envisioned future, in this phase I designed two further sessions that had the function to immerse the participants in a speculative future, in order to stimulate the creation of concepts aligned with the future vision I selected and also to explore the differences between an hybrid collaborative session and a fully digital collaborative session.

Figure 31: Sticker about the future
© Marija Zaric / Unsplash

Sessions

The plan included two different creative sessions, one with a group of designers and one with the Consortium. Despite the two sessions having a similar goal (i.e. to generate new ideas to enhance workers' bonding in an hybrid environment) and using the same digital board designed to facilitate creativity, the two set-ups were quite different. While the designers session was held with an hybrid set-up (i.e., some people were connected remotely and some were present in person), the consortium session was fully remote.

The Miro Board

The participants of both sessions were following the structure designed on a Miro Board in order to carry out different creative and brainstorming tasks. The Board firstly addressed the present time and participants were asked to think about solutions applicable in the current moment to the following problem statement:

How to facilitate multi-modal social interactions between remote colleagues for greater connectedness?

Subsequently, we moved in a space of the board designed for participants to stimulate the understanding and the perception of future conditions. For this reason, a short video clip was created and played during this phase of the session, showing a News Channel from the future broadcasting some news that would create the desired mindset in the participants.
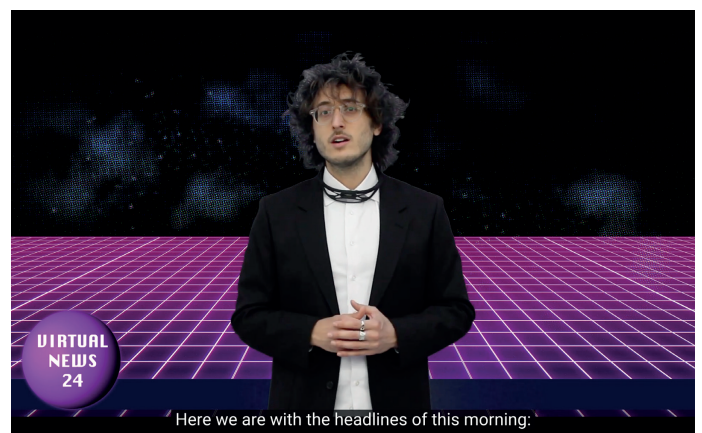

Here we are with the headlines of this morning:

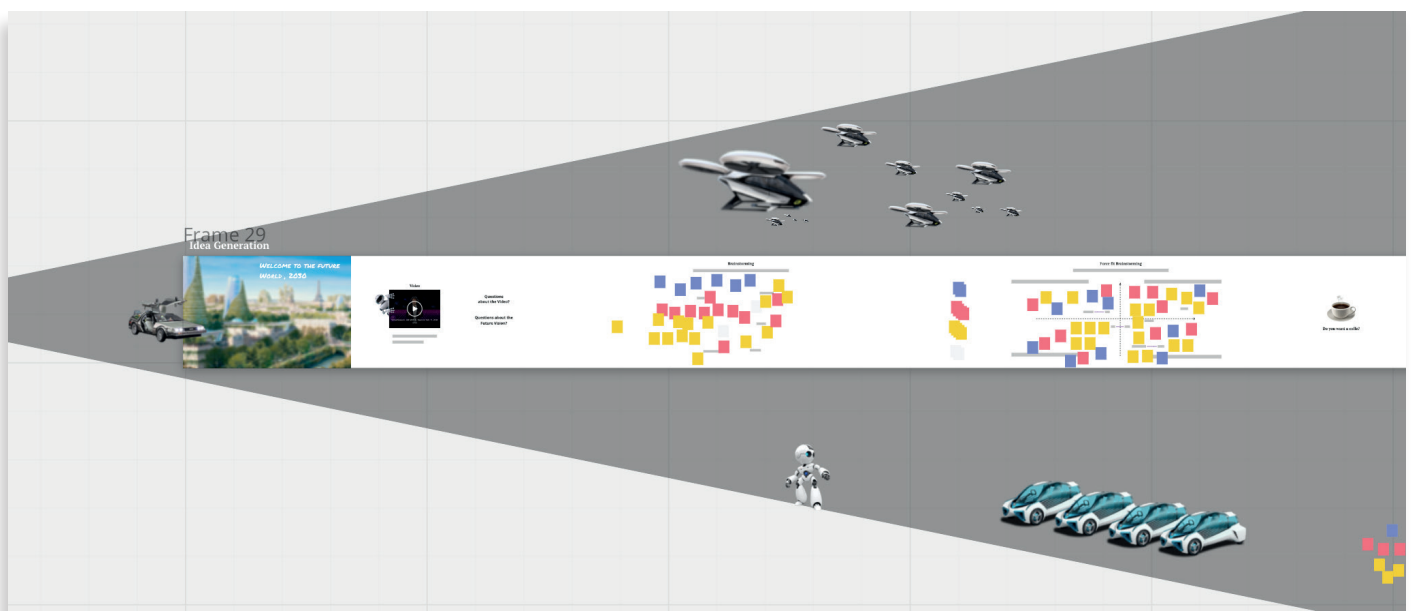**Figure 32:** Fictional News Channel Snap

Figure 33: Future Scenarios board used for the creative sessions

3.1 Designer Session

The session was held in a room of the Studio Lab, at the TUDelft faculty. The room was organized in order to activate a smooth collaboration among the present participants while respecting the COVID-19 distance rules, as well as to include the people connected remotely. Moreover, every participant from home was requested to get a basil plant to keep close during the session. Similarly, some basil plants were present in the StudioLab location. This detail was meant to activate a common sensorial perception between the participants in different environments.

The Designers Session had a dual purpose:

- To test an hybrid set-up, facilitating the in-house team to join the participants connected remotely and see what kind of relation this would entail.

- To ideate and explore the topic of the dispersed teams connection and find solutions to connect people from a distance.

Using both the physical and the digital environment not only allowed me to experiment a way to physically connect remote participants, but also to quickly fix unexpected problems thanks to the peculiarities of the digital environment.

1. The drop-out of an in-person participant half hour before the session was solved by replacing the spot with another participant available online.

2. One of the in-person participants did not have her laptop and even if she had the possibility of using her phone for the session, she preferred to participate by writing on paper post-its that were then digitised during the session with a specific app.

Technical set-up

The set-up of the session was aimed at creating a connection between the participants at home and the participants physically present in the StudioLab, by using a mix of techniques:
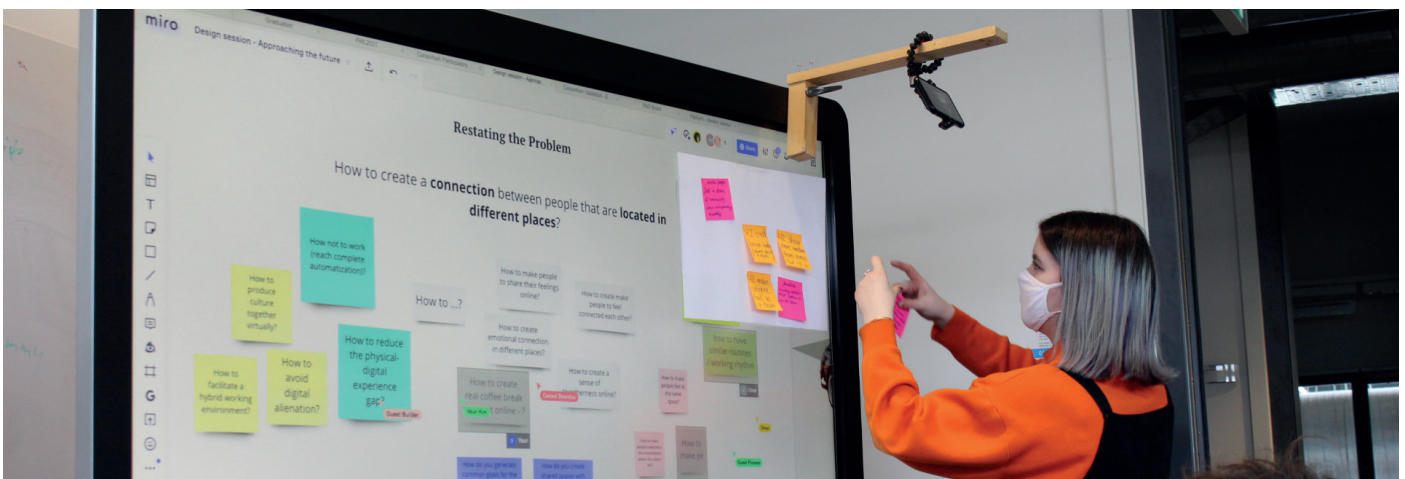
Figure 34: Use of the physical post-it area during the hybrid designer session

1. A big screen was showing the participants connected remotely to create the perception of their presence.

2. The remote participants were able to see the physical post-it thanks to a live-streaming camera which increased their awareness about the physical environment.
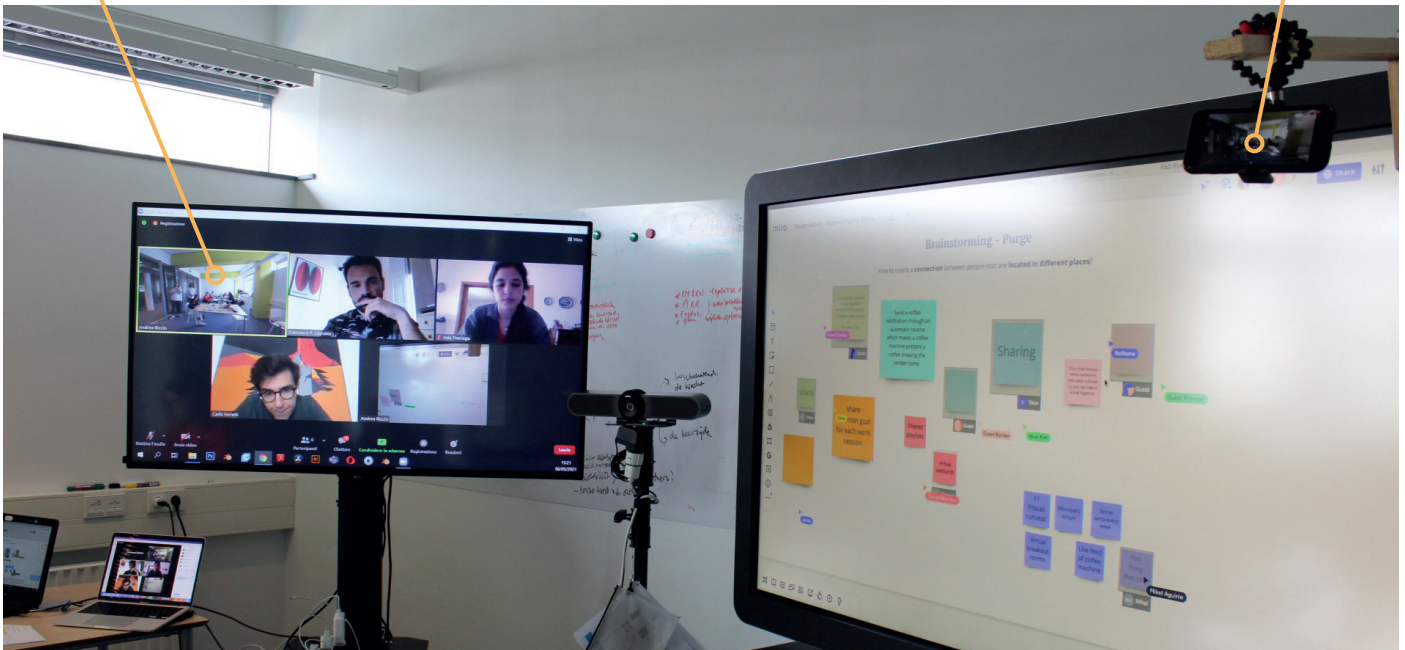
Figure 35: Hybrid designers session screens and cameras set-up

3. Each participant had their laptop available in order to be independent at any moment and decide what medium to use in each phase.

4. Paper post-its were available to use during the session and were digitised by the facilitator on the go.
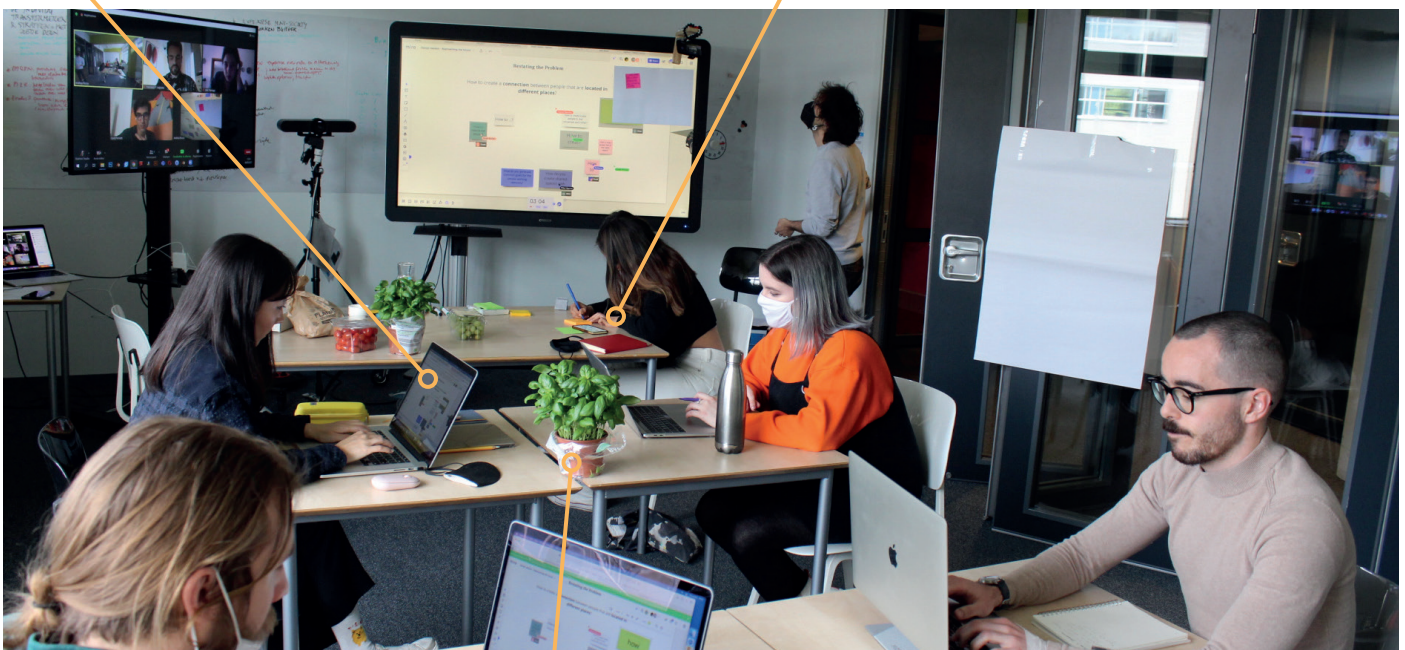
Figure 36: Hybrid session layout

5. A basil plant was chosen as a symbolically shared token. Participants connected remotely were asked to keep a plant close during the online session.

Findings

Hybrid interactions

The hybrid environment presents challenging aspects to deal with in order to achieve an efficient session, mainly based on the connection and communication barriers among participants.

The session unveiled different insights regarding the interaction in an hybrid environment, a full list can be found in Appendix D.

Connection

More inclusive interactions with the remote participants are needed

To interact with each other can be complicated in a digital environment, even more so in a hybrid one. The interaction that happens during a physical environment involves more conscious connections and awareness of others' actions, while the hybrid interaction creates differences between the online and the in-person level of interaction, with feelings of being excluded from the activities.

"There was a level of interaction, but mainly it was everyone talking to you, and you facilitating the connection with the others online - a kind of audio and video for everyone - a digital representation of all of us would make it more inclusive." - I.

Communication

Remote participants have more difficulties in contributing to the discussion

One of the most difficult parts of a hybrid session is to intervene, talk and discuss. The rules that regulate a conversation in person become a filter that does not align with the people in an hybrid environment and, instead, interfere with the smoothness of the communication. Talking to each other, being heard, and the performance of basic body movements are exactly the elements that need to be facilitated by the right technologies.

"It's ok, it's not like the worst, it's difficult to listen to what the other says, build on each other's ideas, I can hear but I'm not sure." - I.
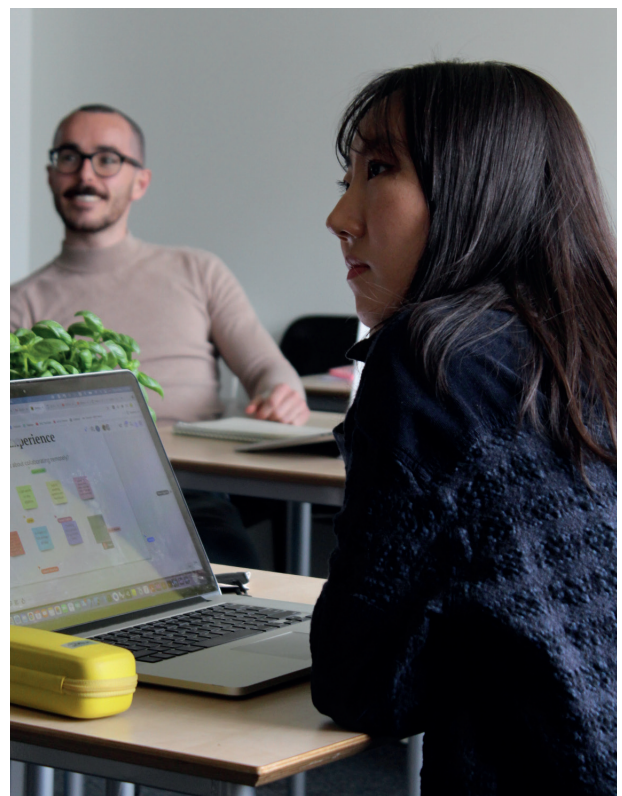

Figure 37: Hybrid session moment

Concept development

The second aim of the session was the discussion and the development of ideas in rough concepts to achieve the goal of connecting dispersed teams.

The proposed concepts were 3, all of which strongly influenced by the presence of the basil plant:

Garden Table
Taking care together of our shared garden

Every member of a team is represented by a plant, which is displayed on a digital table as part of the team's shared garden. The sensors in the pots share the information about the plant and display it for everyone in order to let them take care of it together.
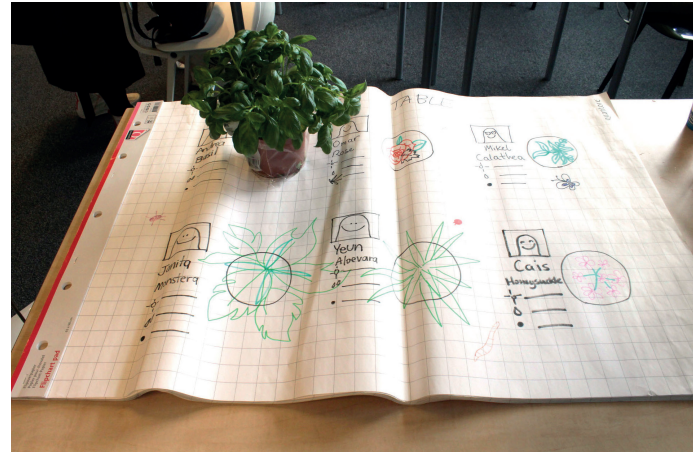
Figure 38: Garden Table showcase

InterGarden
Take care of your teams garden and let it flourish with your relationships

The InterGarden is a virtual garden shared with one of your colleagues, in order to take care of it together. The aim is to activate multiple interactions to create a powerful connection between the 2 users.
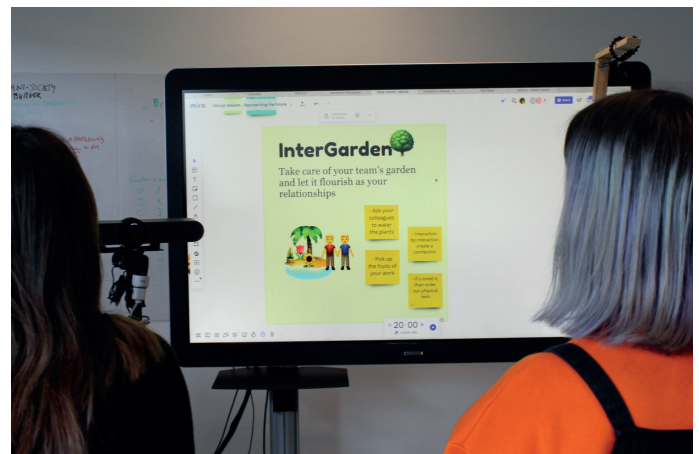
Figure 39: InterGarden poster

Little buddy
Showing your status using a representative avatar

Using biometric data, an AI can interpret how you feel and show it to your colleagues. The idea is to use a little animal as an analogy of your status, like an energetic lion, a lazy snail, etc.

Figure 40: Little Buddy acting scenario

Re-Conceptualization

Taking in account the knowledge gathered so far, I used the 3 concepts developed during the session and the different ideas generated by the participants as a starting point to design 3 new vision concepts, which were then presented to the experts to get feedback and to be validated.

The new concepts are:

NAB - Network Activity Bracelet

- Communication Wearable
- Shares Availability Status
- Connects network members based on their status

Features

Randomized connection
Connect with a casual network member when both are available

Headphone Connections
Talk with your colleagues from everywhere

Digital Touch
Touch your colleagues as if you were in the same place

On screen notifications
Be aware of who is around with your peripheral view

Digital Garden Board

- Shows your and your colleagues' status
- Use of a Metaphorical Avatar or Token (Plants)
- Uses working habits & biometric data to create a visualisation
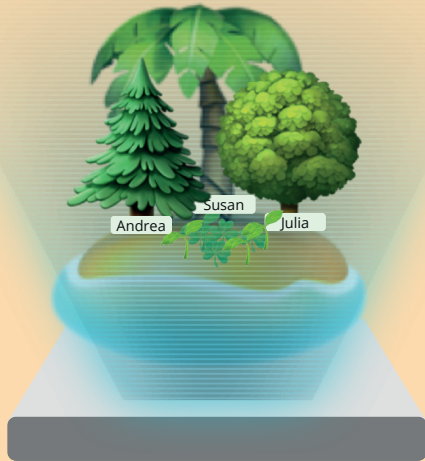
Features

Shared Responsibility
Everyone is aware of each others' condition and can interact to improve it

Holographic representation
Visualise the well-being of the garden and so your colleagues in a glance

Team Nudges
Interact with the plants to communicate with your colleagues

Biometric Representation
Unhealthy work/life balance is transferred to plant status

DOK - Dematerialised Office Key

- Access device to your office experience
- Vehicle to move in the digital office
- Encrypting mediator to work from everywhere and keep connection with your team

Features

Moving around
Lets you navigate around the digital office space or in the room during a collaborative session

Encrypt
Lets you work from everywhere encrypting your data

Work-log
Keeps track of your working tasks and notifies your colleagues when you log-in

Hand gestures
You can interact and navigate through the device by using free hand gestures

3.2. Consortium Co-creation & Validation Session

The session was held completely remotely using Zoom and Miro.

The Session aim was:

- To observe the interaction among the participants in the digital environment and compare it with the hybrid set-up.

- To explore and ideate on the topic of the dispersed team connection, to find solutions to connect workers in a hybrid environment.

- To validate and build up on the 3 concepts previously developed.

Findings

Hybrid vs. fully remote

Spontaneous connection brings value

A relevant moment happened right after the break, before starting again with the planned activities of the session. Two out of three participants joined the video call earlier and started talking about a physical token received as award (see picture below). That conversation appeared to be more spontaneous and relaxed compared with the previous ones and was really similar to the coffee corner conversations.

Physical tokens create a feeling of something special in both digital and physical environments

The physical tokens mentioned during the sessions appeared to be a valuable means of connections, and recurred during different phases of the research as a valuable element to enhance positive feelings.

Online interactions are sharp but work, hybrid ones are messy and not regulated

The dominant feeling during the remote session was a cumbersome interaction, dictated by the clear turns in the

Figure 41: Spontaneous conversation before to start again the session

communication between participants. However, despite its complexity, this interaction was still smoother than the interaction among the participants of the hybrid session.

Rules for hybrid collaboration are still not clear and accepted by everyone

Within the fully digital environment, a set of rules appears to be strongly established and already accepted by all the individuals. Differently, during the hybrid sessions, participants experience an unregulated, messed up type of interaction, which often requires an external facilitator to successfully work.

Example: during the hybrid session I carried out, one of the online participants (F.) tried many times to speak by raising his hand (a normal rule of physical communication) and was not noticed by the in-person group.

Hybrid set-ups support the in-person interactions, while ignoring remote colleagues

Taking a break during a hybrid session for

remote participants means to shut down the camera and the microphone, creating a sharp transition in their availability status. On the other hand, when participants are co-located, the moments of breaks create a smooth transition, with the interactions being more fluent and continuous.

To take advantage of the hybrid, new collaboration rules need to be arranged

Taking advantage of what the physical interactions are, the hybrid session has the potential to gather the best of both worlds - the remote and the physical one - keeping the benefit of smooth, physical interactions and conveying the feelings and the information through the right medium to other people in another environment.

However, since the remote is already a well-accepted practice and has its own set of rules, it conflicts with the in-person rules, creating a hybrid collaboration with some degrees of interference. In order to efficiently combine these two parties

Figure 42: Ideas clustered during the Session with the Consortium

together, new collaboration rules need to be arranged.

3.2.2. Vision Concept Ideation and Validation

The final step of the session consisted in the ideation of a vision concept by the Consortium and in the validation of the vision concepts produced so far.

The ideation section produced 2 main concepts:

Random physical surprise

A core aspect of the concept focused around the physicality of a gift for a colleague. The idea was based on a meal delivered by a future robot delivery service as an act of care for the co-worker.

Office speed dating

A second concept was focused around the use of speed dating and quick meetings to create connections, including features like mailbox for colleagues working late or Vlogs (Video Blog) to share messages with co-workers.

Finally, the Validation section saw the Consortium members give feedbacks on the concepts developed in the previous phase:

NAB - Network Activity Bracelet

The consortium agreed that a wearable might feel like a forced connection with the team and the work in general, with possible overwhelming feelings, suggesting as an alternative something that could instead show the employee availability.

– The main concerns were:

- Being always connected and available

- The possible privacy issues

+ The main positive aspects were:

- Randomness of meetings

- Possibility to leave a message for the colleagues

Digital Garden Board

The display of the colleagues' status with a plant metaphor was widely appreciated by the experts of the Consortium, however, some concerns about privacy were raised.
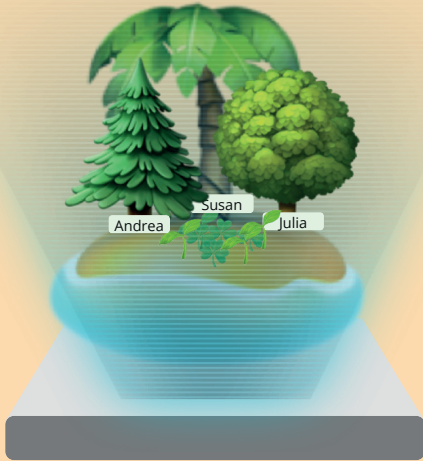
– The main concerns were:

- Privacy issues because of sharing each other's emotional status

- Holographic should be replaced with something more physical

+ The main positive aspects were:

- Makes it easier to understand colleagues' status in a remote environment

- Valuable metaphor used to visualize other people's emotions

- Displays the team well-being on each others' desks

DOK - Dematerialised Office Key

Despite seeing people around is a good stimulator of interactions, notifications about all the colleagues joining in might create an overwhelming number of feeds that could end up being annoying and turned off quickly.

– The main concerns were:

- Potentially overwhelming number of notifications and feeds

- Navigation obsolete and unnecessary

+ The main positive aspects were:

- Good stimulator of unplanned interactions

- Lets people explore moments outside of arriving and leaving the office

Deliver

Implement
&
Delivery
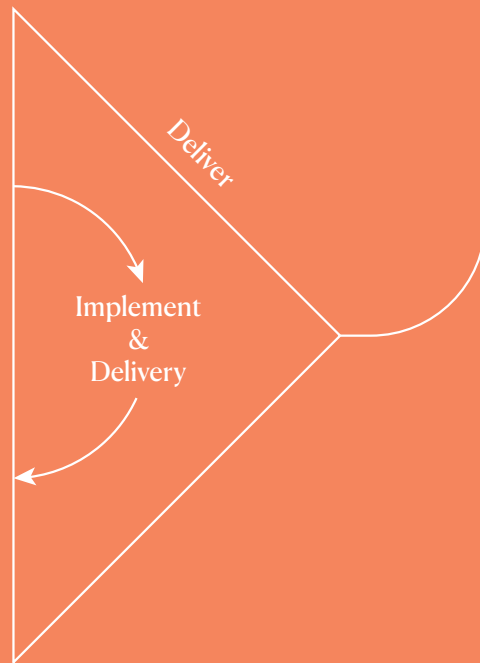
Get a glimpse

Three main directions for companies and designers to follow arose in the research so far: **(1)** embrace the hybrid, **(2)** invest in facilitation and **(3)** support remote employees bonding with real actions.

To communicate these directions, the HYPED Magazine - a fictional future magazine from 2030 - was created and a vision concept to support hybrid teams bonding by facilitating chance encounters was designed.

The prototype tested in two different facilities demonstrated that it is possible to activate serendipitous encounters among hybrid workers by connecting them easily to a virtual room. It also underlined that, in order to work in different contexts, the vision concept needs to be adapted to the user groups to which it is directed. Despite the serendipitous encounters appearing to be linked with an increased sense of familiarity among the participants, issues such as privacy invasion and the awkwardness of meeting strangers in the virtual environment had a deterrent effect on the use of the prototype.

4

Communicating the future

Introduction

After condensing and reflecting on all the knowledge gathered so far, as a next step I have created 3 main directions that companies and designers might pursue to improve remote and in-office workers' experience.

Embrace the hybrid: that consists in being receptive to the challenge of a hybrid set-up, as it will be relevant and present in the future to come.

Invest in facilitation: to facilitate the collaboration process with a human facilitator or with tools that will serve this purpose.

Support remote employees bonding with real actions: that consists of small gifts, joint activities twice a year, tools or physical facilities that enhance chance encounters and improve co-workers activities.

Figure 43: Future scenario
© Werner Du plessis / Unsplash

4.1 Embrace the hybrid

Imagine using an extremely comfortable pair of jeans. These are a bit more expensive than the ones you are used to, but the benefits of using them are really worthwhile for you. When the time comes to replace them, will you go back to buying the old pair of jeans?

A similar situation is what the pandemic has triggered in the remote working context. People tried first hand the benefit of a flexible remote office, as well as its downsides. Most of the workers interviewed during this research have largely expressed their interest in a hybrid work solution, keeping some days of working from home and, at the same time, having the opportunity to join their colleagues in the office.

"People were coming to the office just to have coffee with colleagues" - B.

Indeed, the value of the offices is not only in the facility and the furniture, but lies mainly in the relationships between the people living in that environment everyday.

The hybrid, as like the remote, challenges the bonding practice. For instance, working over 2.5 days at home accentuated beneficial effects on work-family conflicts, but harmed the relationship with co-workers, as previous literature showed (Gajendran, R. S. et al, 2007). For this reason, in order to enhance the advantages of this practice, we need to find a new way to connect co-workers. The best approach then is to embrace the hybrid set-up, to explore it, in different contexts, companies and among different workers, and see what fits best in every unique condition.

Two main considerations become relevant at this point:

• Since more and more workers will try to get the advantages of a hybrid working environment, companies will have to adapt in order to retain talents and be competitive.

• When the hybrid environment will slowly become the norm, replacing the previous trend of remote working, people will have to focus on improving that experience, both in technical and social aspects.

Figure 44: Collection of jeans © Ian Deng / Unsplash

4.2. Invest in facilitation

Picture yourself collaborating in a large international project. After the first conference call, a South African team member tells you: "Great, I'm calling you just now". You are looking forward to getting the call, but after waiting half an hour no call arrives. The reason lies in a simple misunderstanding. In fact, South African time expressions transposed in the English language deviate quite a lot from what we are used to.

South African Time Expression

Present Time   Future

Right now   Now   NowNow   Just Now
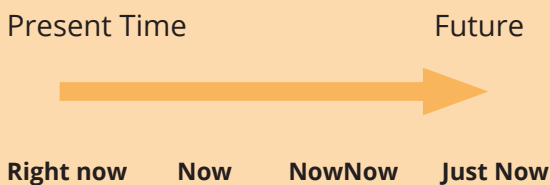
Collaborating has always been a matter of understanding each other. Let's consider when the teams become increasingly multicultural, performing asynchronous activities on the same project and exhibiting a different range of expertise. Those teams will need some help to smooth the collaboration practice and make it work efficiently.

The near future will present a growing trend of diversified collaboration during projects, where 'diversified' refers to the presence of different distributed teams that collaborate using several mediums and across a large spectrum of collaboration practices.

Since the concept of the **minimal design team** (Papanek, 1973) is getting closer to being the daily reality, it is vital to facilitate groups formed by diversified backgrounds, different cultures, different time zones and different availability.

Investing in facilitation is the only way to ensure a successful collaboration. The facilitation can be put in practice by the subjects themselves (designers, for example, suit this role very well), by tools (platforms such as Google Docs or Trello are already enhancing this procedure), or by practices, for example introducing ways of systematically sharing information and daily updates.

Minimal Design Team

According to Victor Papanek, the minimal design team had to be composed by a wide range of expertises, including the customers.
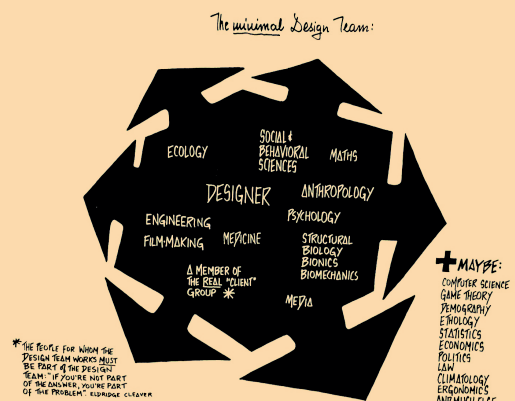

Figure 45: Minimal design team
© Victor Papanek

4.3. Support remote employees bonding with real actions

Everyday, by working in the office, we are used to commuting to our workplace, to move from our desk to the meeting room, to stop at the coffee machine or at the canteen or simply to chat with a colleague at his desk. All these activities happening in between working related tasks can be defined as transitional moments.

During transitional moments, colleagues get to know each other and connect, stimulating team building, bonding with co-workers and easing the in and out from the working mindset (Klemp L. and Klemp K. 2020).

The transitional moments create three main effects:

1. As often occurs in working contexts, the flow between one activity and the next varies from peaks of focus on some specific task to slow-pace moments of walking around and changing environments (i.e., going to the meeting room, chatting with a colleague or having a coffee break).

2. The transitional moments allow people to get to know what is going on with their colleagues, their activities and their status, empowering awareness and helping workers improve their work/life balance by comparing it with their colleagues.

3. Moments of disconnection between activities create a more flexible mindset that allows workers to get less stressed and less detached, easing the switch from work to their personal life.

One of the main differences between workers in the office and workers using remote platforms are exactly the missed connections opportunities during the transitional moments in between activities. To address this issue, many solutions already exist aimed at inciting chance encounters and triggering a different flow of activities while working remotely. At a first glance, most of them may appear effective, but according to some remote workers interviewed such solutions often feel forced and do not fit in a smooth way of interacting.

Most of the current existing solutions can be divided in two categories:

Share your presence via webcam

Sneek

uShare.to

PukkaTeam

NowBridge

Virtual Water Cooler

Donut.com

UnRemote

Share your presence via webcam

The aspect of these platforms is really similar and consists in a window on your desktop displaying your team throughout all the working activities (by taking a snapshot or by having the camera on for the full working day) with the possibility to connect with them for a quick chat with a simple click. These concepts remind the Porthole experiment designed by Xerox PARC and mentioned already in Chapter 1.

SHARE YOUR PRESENCE VIA WEBCAM

Pros

- Create awareness of who is in front of the laptop

- Quick and easy interface to connect with colleagues

Cons

- Feeling of being under control

- Efforts to set up the availability or the snapshot time

VIRTUAL WATER COOLER

Pros

- Randomness of meeting

- Providing hook for new conversations

Cons

- Forced connection among people

- Not connecting people outside the digital environment

Virtual Water Cooler

The virtual water cooler uses a chance encounter facilitator approach. The platform consists of specific chat rooms with a bot that provides random topics to talk about or directly connects two random employees of the same company to get a digital coffee break.

The direction aimed at supporting people bonding is the one I decided to investigate further in this project as not only it appeared to be closely aligned with my design goal, but also to be the element with the greatest chain effect on employees' life and experience.

4.4. Vision Concept

The vision concept aims at communicating to the stakeholders and the designers what the imagined future could be by using an object that conveys the interaction I envisioned.

According to the experts' comments on the first iteration of concepts, the elements that resulted more interesting were:

- Use of a token or metaphoric element

- Spontaneous and random meetings

- Creation of a real physical and tangible place where to find colleagues

- Exploration of the moments around arriving and leaving the office

Looking back at my design goal and connecting some of the more relevant insights of the previous phases, the desired effect of the concept was the creation of better connections among colleagues and the stimulation of a healthier work-life balance.

To create spontaneous connections without forcing the users while inducing them to pro-actively engage with my concept I selected two different mechanisms:

The physical token

During the test performed in the designer creative session (see chapter 3.1) the presence of the plant as a physical stimuli among the different participants locations was working as a strong connection element. Moreover, the Consortium creative session (see chapter 3.2) highlighted the positive feeling given by a physical token as a sign of reward and the use of physical tools as a stimuli for a more engaging working experience.

The set-up of a ritual

The use of rituals is considered in literature as a powerful medium to reinforce good habits, motivate personal and professional achievements, create a common bond between co-workers and build shared values (Ozenc and Hagan, 2019) Since the hybrid environment will diminish the number of fixed interactions due to flexible schedules and intermittent presence in office, the future will have space to establish new rituals.

Figure 46: Car vision concept example, 2016 © Renault TreZor

Acty

A token to connect you with your working environment

Acty is a small floating sphere which connects the user with a virtual office space, capable of light feedback to communicate information and tactile interactions.

Description

By switching on Acty on his platform, workers will activate their daily log-in to the virtual office, whether they actually arrived physically or they are connected from home.

This small sphere is the means to drive employees to communicate their availability status, connect with each other when free and navigate around their colleagues' desks.

Using a physical interaction to activate the functions of the object creates a physical perception around those moments of transition from one activity to the other. Every time Acty is removed from his stand, it transfers the user to a digital space where the common areas of the office are streamed and connects with other colleagues available. In addition, the little sphere can create subtle nudges by changing colour when one of your colleagues wants to communicate with you.

Characteristics

Interaction Qualities

● Physical Token

A suspended sphere with touch feedback and the possibility to be squeezed

Engaging ●

Guiding Insights

Chapter 1 - An object can become a link with the company identity, fulfilling the need for rooting.
Chapter 3.1 - Physical plants sparked a common reaction among in-person and remote participants.
Chapter 3.2 - Physical tokens can became something to be proud of and can help workers to be physically proactive while working.
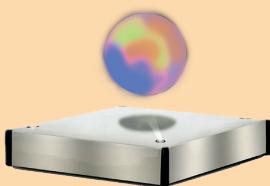
● Light Presence Feedback

Acty can light up when colleagues are in the virtual space or when someone is in the common room of the physical office

Awareness ●

Guiding Insights

Chapter 1 - As *Xerox Parc Media Space* research highlighted, the awareness of other workers around the office is a powerful element of connection and interest among colleagues.
Chapter 3.1 - To know each others' status helps to facilitate interactions with remote colleagues.

Functions

Interaction Qualities

● Spontaneous Meeting

By touching Acty, the user can be projected in the virtual office, without knowing exactly who is there and therefore activating serendipitous encounters

Camaraderie ●
Aligning ●
Awareness ●
Engaging ●

Guiding Insights

Chapter 1 - Creating small interactions and enhancing the feeling of working together can be a major aspect to fulfil different fundamental human needs, even in a remote environment.
Chapter 2.1 - Casual conversations spark communication that aligns and improve colleagues' knowledge about each other and emphasises the activities outside the strict working topics.
Chapter 3.2 - Spontaneous conversations bring value even if it is not directly perceived by the singular subjects.

● Communicate Availability

Using simple gestures, for example by turning on the sphere or pressing it, allows the user to communicate his availability to talk or his engagement in other tasks.

Aligning ●
Awareness ●

Guiding Insights

Chapter 1 - The management over time schedules and surrounding environments is enhanced by the possibility to control when to enter in the virtual office. Availability can impact new connections with the team.
Chapter 3.2 - The privacy concerns are avoided by giving the complete control to the user to participate.

● Ritual set-up

When starting and finishing the working day it is suggested to interact with Acty, by turning it on or off. This allows the creation of new rituals which can be personalized by the user.

Aligning ●
Awareness ●

Guiding Insights

Chapter 1 - Control over the time schedule can be regulated and balanced by the token. Workers with more problems to self-regulate the amount of time they should work can use this feature to better perceive their own habits.
Chapter 3.1 & 3.2 - The use of the ritual can raise awareness among the colleagues and improve empathetic connections.

● Walk About

Using the sphere allows to pop by the desk of the available colleagues, interact with them and check what they are working on.

Camaraderie ●
Aligning ●

Guiding Insights

Chapter 2.1 - It is useful to have workers encouraged to drop by an home-office desk, in order to create small pushes that help regulate and align each others' activities.
Chapter 3.1 & 3.2 - The possibility to pop by other colleagues and ask questions, understand their status and create inclusive interactions can be beneficial to the connections and useful to explore the virtual office context outside the normal meeting times.

Prototype

Proof of concept

To realize a proof of concept I developed a basic prototype of the vision concept to answer the following design questions:

- Does the physical token stimulate the process of communicating the availability of the users?

- Does the physical token create awareness of the user's daily working routine?

- Does the use of physical/digital spaces create spontaneous connections between colleagues?

- Does the connection to a physical/digital space create trust between colleagues?

- Does the connection to a physical/digital space create a feeling of camaraderie between colleagues?

- Does the connection to a physical/digital space support engagement in between working daily activities?

- Does a daily routine of connecting to the physical/digital space activate the feeling of a new ritual?

The device prototyped consisted of a coloured box with an arcade button that, when pressed, activated a connection with a zoom call. The zoom call had a 24/7 active camera and microphone in the pantry area of the selected testing facility. In total, 9 buttons were produced and distributed to 9 workers that were working in an hybrid modality.

Figure 47: Interaction Storyboard

Characteristics

● Physical Token

The button aimed to attract attention with its bright colours and to be a luring element to touch thanks to the arcade button sound and the tactile feedbacks

● Plug & Play

An easy plug & play solution was meant to easethe user experience and avoid any technical problem that could interfere with the test.

● Coffe Corner Camera

The use of a 24/7 camera in the pantry area was directed to facilitate interaction among people in the office and at home and create spontaneous and casual encounters.

Technical Detail

The board used for the project is an attiny85, which is able to emulate a keyboard. This allows the prototype to require no set-up from the users, since it is automatically recognized by any device. In a nutshell, when pressing the button, it will activate a series of shortcuts that will automatically run Zoom and connect to the meeting room.

Characteristics · Interaction Qualities

Engaging ●

Engaging ●

Camaraderie ●
Aligning ●

Functions · Interaction Qualities

● Spontaneous Meeting

The set up and the main goal of the proof of concept was to test the spontaneous meetings and their effect on the users.

Camaraderie ●
Aligning ●
Awareness ●
Engaging ●

● Ritual set-up

Participants were asked to interact with the button according to the start/end working day routine, in order to be sure that the button was pressed a couple of times a day.

Aligning ●
Awareness ●

Concept evaluation

Context

The test was run in two locations that, due to the pandemic, had members working some days remotely and some days from the office, being a good fit for the testing purposes.

IDE's Studio Lab is an office from the TUDelft Industrial Design Engineering department.

The IDE's StudioLab is home for the academic work-life, people have high autonomy and usually work on projects that have some touching points, but that are not uniquely focused on team work mechanisms.
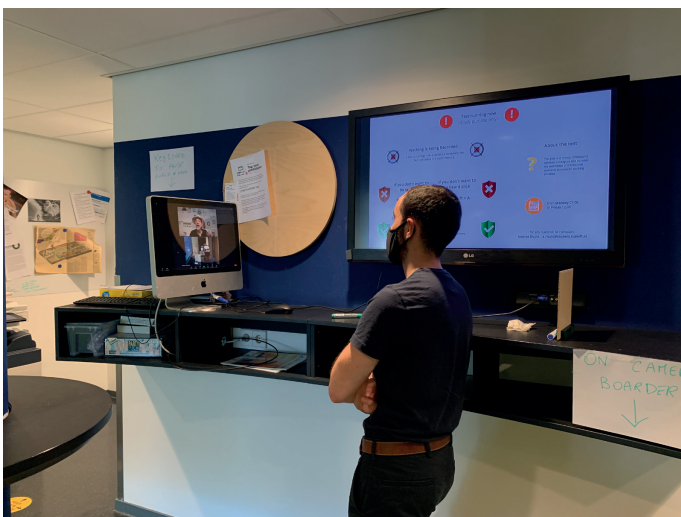

Figure 48: StudioLab pantry area

Muzus is a Service Design Agency situated in Delft.

The Muzus office is a business environment, people have strict schedules and meetings from early morning up until the end of the day, with deliverables and dense work-based contacts. Moreover, the Muzus office is shared with an architecture firm.

These differences in the two facilities influenced the use people made of the button prototype.

Results

Despite the working context and modalities of the test groups were different, some of the feedbacks received aligned - for example, the easiness to connect to the Zoom call just by pressing the button or the intriguing physicality of the token - confirming the effectiveness of some of the features derived from the insights.

Nevertheless, the distinct contexts produced two contrasting outcomes on the use of the button:

(1) The Muzus office test was mainly unsuccessful, with most of the team not participating. This was due to the prototype not being a good fit in such context, considering the busy schedule that interfered with the ritual and the feeling of awkwardness when alone in the virtual room.

(2) The Studio Lab members, instead, had a more flexible schedule that allowed them to follow the ritual and were more predisposed to meet someone unexpected in the pantry area. This was due to the academic oriented organization, freer from meetings with clients and with activities that did not involve the constant presence of the same StudioLab members.

Overall, responses on the form filled by all the participants after the test showed interesting facts:

Characteristics

Interaction Qualities

● **Physical Token**

Engaging ●

● **Plug & Play**

Altough the button was considered an attractive object with a distinctive colour and appealing to click, this was not enough to engage workers in between their activities, and, even if they were tempted to click it, being afraid to meet someone unexpected was stopping some of them from doing it.

### I feel that using the button **supported my engagement** between working activities

Respondents

5
4
3
2
1

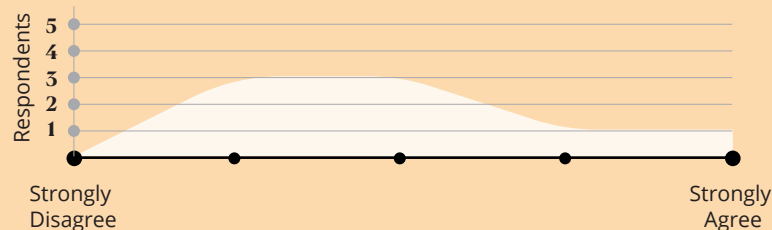Strongly Disagree — Strongly Agree
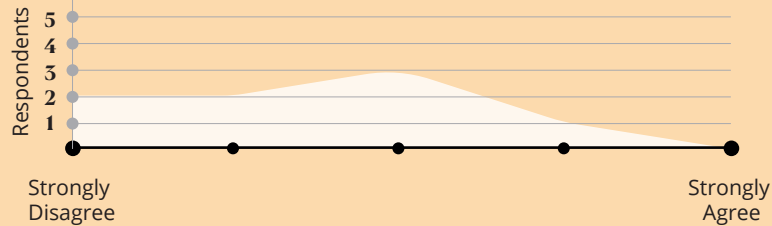
● **Coffee Corner Camera**

Camaraderie/Aligning ●

The 24/7 camera in the pantry area of the facilities was supposed to facilitate a sense of camaraderie and randoom encounters when users communicated their availability by clicking the button. Even if this was succesfully used in some occasions, the worry of meeting unknown people was a deterrent for some participants and concerns arose about privacy.
These concerns may interfere with the team building practice, and since they were mainly coming from the participants in the Muzus office, it highlighted that a shared office may create more resistance to open publically a private space such as the participant's own apartment.

I feel the button was useful to **communicate my availability**

Respondents

5
4
3
2
1

Strongly Disagree — Strongly Agree
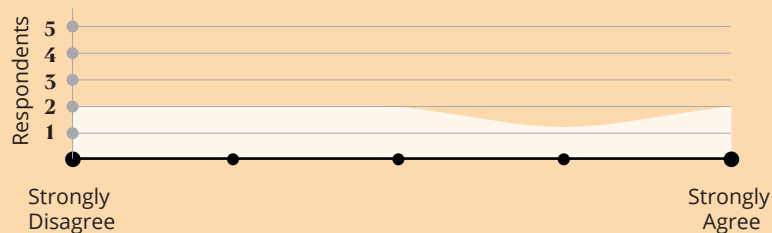
I feel that using the button **facilitated team building** with the other participants

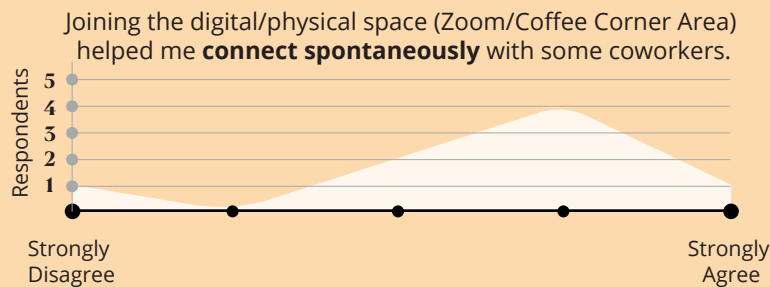Respondents

5
4
3
2
1

Strongly Disagree — Strongly Agree

" I was temped to press it, but the idea of 'running into' people I didn't know at the coffee corner @ the muzus kitchen was a bit scary "
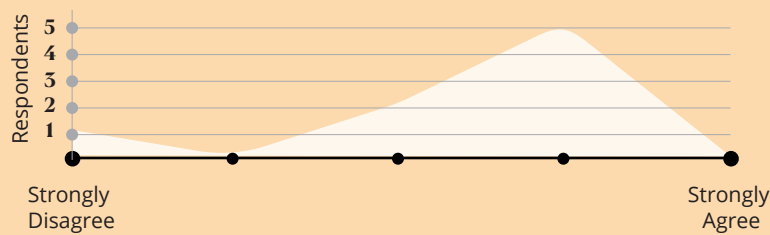
Participant from Muzus

● **Spontaneous Meeting**

Spontaneous meetings were the most succesfull effects triggered by the button.
Among the StudioLab participants serendipitous encounters happened multiple times, with some participants meeting others for the first time, having a conversation for a few minutes at the start of their working day, just as it could have occurred in front of a morning coffee.
At Muzus, due to the limited use of the button, almost no spontaneous encounters happened, but a group participation was triggered by a message shared by a participant in the common team messanging app.

Joining the digital/physical space (Zoom/Coffee Corner Area)
helped me **connect spontaneously** with some coworkers.

Respondents: 5 4 3 2 1

Strongly Disagree — Strongly Agree

I feel that using the button **increased familiarity** with the other **participants**

Respondents: 5 4 3 2 1

Strongly Disagree — Strongly Agree

● **Ritual set-up**

According to the respondents, the button triggered on a certain extent the awareness of their working routine, bringing up reflections on how and when they work. Many users are convinced that the button can be an useful mean to create a new ritual, however, some concerns about the intensive social aspects involved may prevent the activity to become a ritual.

The button helped me to **be more conscious** about my working routine

Respondents: 5 4 3 2 1

Strongly Disagree — Strongly Agree
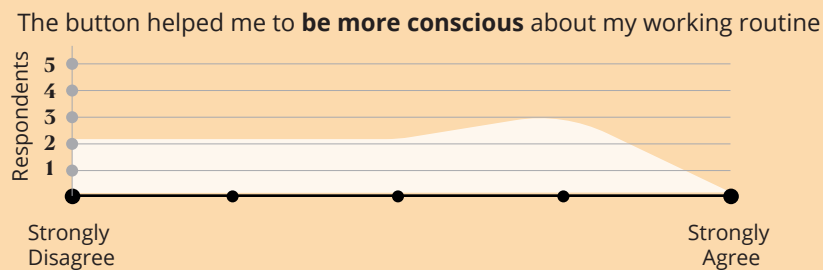
I feel that using the button everyday may lead to the **creation of a new ritual**

Respondents: 5 4 3 2 1

Strongly Disagree — Strongly Agree
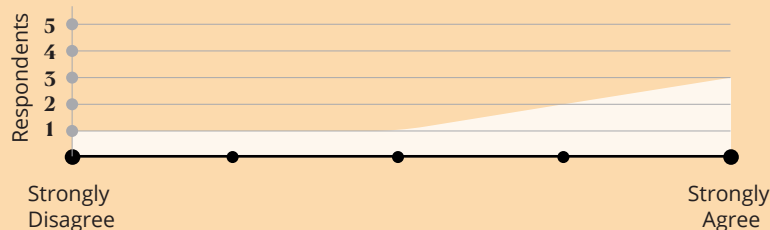
Limitations

During the development and test of the prototype some aspects limited the concept evaluation:

(1) The technology involved is still rough and misses elements, such as the light nudges, that could have increased the interest and the effects on the participants.

(2) The time spent for the evaluation was limited to one week and even if some conclusions can be still drawn in such a limited amount of time, an extensive test (e.g., one month) would give a clearer overview on how the prototype can be implemented in the daily activities of the teams.

(3) The contexts in which the prototype has been tested are design-oriented, therefore the button may need to be tested in different contexts (e.g., governments, finance, etc.)

Other relevant limitations during the test were:

- The button may be easily forgotten at home

- The button stands out but may quickly blend in a busy desk and go unnoticed

- Knowing if someone is in the virtual space is a good trigger for many participants

- Feeling of privacy invasion may arise while being connected with the office corner

- It may feel just like another Zoom call or Zoom may be needed for other activities.

- Someone may want to walk around or have to move to grab a coffee while transitioning to another activity, without being forced to stay in front of the computer.

Recommendations

Solutions that may seem trivial, like a simple button, appeared to be an effective way to inspire users to actively interact with fellow co-workers. However, it is not the button itself which is able to spark and activate the complex interactions that happen in an office facility. A recommended direction to follow might be to design a whole apparatus with added features, but which may still be as simple as a button.

Some recommended features to keep in consideration are:

- Include subtle lights to communicate both the presence of other participants and get noticed (increase awareness).

- Use a stand-alone platform, specifically made for the requested functions - e.g., avatar presence - and the audio/video channel (increase freedom).

- Set-up the office environment connection to create a comprehensive view of who is around - e.g., 360 camera and directional microphones (increase awareness and control).

- Include the ritual within the habits of the team (increase control).

- Provide a multiplicity of buttons available both at home and at the office (increase engagement).

The key is to device elements which are able to subtly interfere in a positive way with our daily activities, without disrupting our flow. This should continue to be taken into account while implementing new features, as we are constantly overwhelmed by digital stimuli, especially in a remote environment.

4.5 Magazine & Video

HYPED MAGAZINE

Boundless collaboration

Summer 2030 edition

The HYPED Magazine is the output designed to communicate efficiently the vision and the findings generated during this research.

It is openly inspired to the Wired Magazine and it includes advertisements, articles and interviews contextualized in the summer 2030.

The stories told in the magazine include evolutions of real projects that are running nowadays as well as numerous fictional elements. Moreover, embedded in the stories, there are real facts collected during the research and quotes from real users interviewed during the project.

Finally, a video interview from a fictional future character has been recorded to complete the storytelling process and make a more exhaustive use of different media, with the aim of better communicating the final findings of the research.

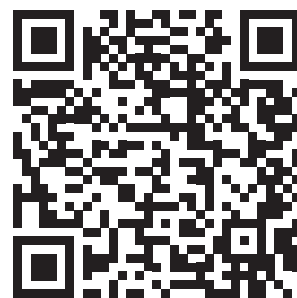You can find the full magazine and the video interview at this link: andrearicc.io

Figure 49: Hyped Magazine cover

Magazine

Video Interview

Content

Future Scenarios

The three articles presented in the magazine embed elements derived from the context factors collected in Chapter 2 and include results of the test and the investigation conducted during this thesis project.

WonderCities

Wonder cities is the evolution of a project actually running in South Italy called WonderGrottole. The project represents a new way of interacting with tourists and remote workers.

Adya Chupta

Since some of the concerns from the interviews were referred to the workers' rights in a remote context, this article envisioned a possible future where remote works must be preserved, taking inspiration from the current condition of delivery riders.

Interview with Roberto Corici, CEO of Facilitare

The last article is an interview with a fictional character who works in the field of facilitation for hybrid-oriented companies.

This character explains the main relevant aspects regarding the hybrid future and how to tackle some of the difficulties and enhance some of the benefits.

Future Context

The future context has been introduced thanks to different advertisement placed in between the articles.

Those advertisements ranged from Ikea delivering mobile offices to skincare enhanced with DNA data, with the aim of contextualizing the stories and allowing the reader to get lost in the fictional future.

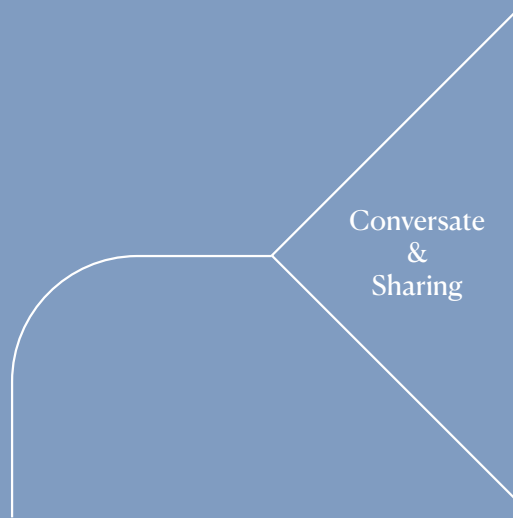**LET SERENDIPITOUS ENCOUNTERS HAPPEN, JUST LIKE IN THE OFFICE**

Our technology provides a complete plug and play setup to link your physical office and your disributed team.

Connection with your colleagues is just a button away

FACILITARE ©

Figure 50: Facilitare/Acty button advertisement

Conversate
&
Sharing

Get a glimpse

In order to make sure that colleagues in a hybrid environment will keep connecting with each other in a serendipitous way, we must rethink the way connections are created through digital and physical mediums. Collaborating properly in a hybrid context means being ready to find new rules that fit the hybrid working environment and providing support with facilitation mechanisms, involving both people and tools. Facilitation is also needed to enhance collaboration among different cultures and to simplify the aligning of workers located everywhere in the world. The future of remote collaboration should go beyond the working environment and be the mechanism that allows people to collaborate worldwide with the ultimate goal to improve society and contribute to a better world.

5

Looking back into the future

5.1 Conclusions

This project explored the potential of remote collaboration and the impact it had on workers during the COVID-19 pandemic. While exploring the effects of forced remote working and uncovering workers' needs, I developed a vision that could guide stakeholders to conceive solutions for workers' well-being and successful remote collaboration.

The hybrid working environment happens to be the way work will be conceived by workers and consequently by companies in the following years. A hybrid working environment means a working place that ensures collaboration among co-workers that are either working some days from home and some in the office, or are located in remote locations and different time zones. This different working setup should be in the spotlight for the development of good practice such as new rituals for hybrid team-bonding and support for dispersed teamwork alignment, in order to achieve a successful collaboration.

Since the rules that regulate interactions in a hybrid environment are not embedded in our common culture, the collaboration among the workers in this context is still difficult and not fully efficient. For this reason, facilitation mechanisms are required, from the creation of the right environment and support to achieve good communication during a session, to the provision of tools that are meant to improve serendipitous encounters

or bonding among workers. Moreover, the optimal collaboration among workers is founded on the relationships that they build and a working-oriented knowledge of each other is not enough to create meaningful bonds and shared ground. That is why particular attention should be devoted to easing the process of creating relationships among workers, without forcing them in scheduled meetings, but, instead, enhancing the more natural ways in which connection happens: casual encounters.

The present research focused on four main aspects concerning the way users perceive working from home, its consequences, workers' collaboration dynamics and the creation of relationships among them.

Figure 51: Acty prototype

Consequences

What are the effects of forced working from home on workers?

The global COVID-19 pandemic caused a large number of consequences on the workers worldwide. Among those effects, there is the experience of remote work and remote collaboration for workers that never thought of it as an option.

Workers tried a new way to experience their jobs, a way that was not bound with the 9-to-5 office life, but instead more similar to the freedom that a university student may experience. Let's think about university student life. Students have deadlines and lectures to follow, but on the other hand, they have all the freedom to organize their studying tasks and to work from wherever they want. Similarly, the workers experienced first hand benefits such as the flexibility obtained by self-managing their schedule or the possibility to choose their working location as well as the trust relationship that arises when working distant from the supervisors' direct control.

However, disadvantages such as the missed interactions among colleagues and work/life balance management are widely perceived and need to be addressed in order to keep remote working as a healthy and effective practice.

Implications

What are the implications of this new working experience and how will this characterise the next future ?

There will never be a coming back to how it was before the pandemic. People like to have the freedom to choose how to manage their schedule and their favourite option is to work half from home and half from the office. Once workers experience a new and convenient way to do their jobs, with advantages that can improve their lifestyle, they will try to keep those benefits and companies have to adapt in order to retain talents. However, issues regarding the collaboration dynamics and the disappearance of the office interactions must be addressed.

Working in the office is a crucial part of bonding and connection, it helps workers to understand if their activities are aligned with the team, it creates knowledge outside the work related topics and sparks unplanned actions and ideas that are the real motor of innovation.

It is not possible nor effective to recreate the same dynamics of the office in a digital way based on high tech solutions. However, by focusing on the fundamental human needs, it is possible to find the triggers to recreate the spontaneity and its consequent advantages.

Dynamics

What are the collaboration dynamics in the hybrid environment?

Humans developed face-to-face unwritten rules that have regulated communication and collaboration for thousands of years. In the realm of fully remote interactions, some of those rules evolved spontaneously, like muting the microphone or waiting for the others to stop talking before you start. However, the virtual environment is missing important human communication elements, such as the general body movements, face expressions, which are reduced to a small area on a screen and the clear perception of the other, which is regulated by the specific set-up of the participants.

On the other hand, despite having the potential to grasp the best of the two worlds, the hybrid context actually results to be the most complicated practice due to the lack of social rules that regulate communication and collaboration. The hybrid context suffers the marginalization of remote participants, the unclear and rough interactions between physical and remote teammates, and the moments of break or spontaneous interactions are missed due to the peculiarity of the virtual set-up. As these interaction problems have remained the same since the first experiments of hybrid collaboration with rudimental set-ups in the 1980s, it is important to not sideline the issues to technological advancement as the only solution to improve.

Interactions

How can we facilitate the interactions among remote workers?

The most effective and practical solutions to facilitate interaction among workers are the participation of facilitators within the working environments. Such figures can integrate, design and support all the needed elements to achieve effective collaboration among workers. On the other hand, physical and technical solutions can help to trigger specific behaviours that facilitate relations and connections. Acty, the prototype tested in this project, is a physical button that creates a bridge from an employee's working place to a virtual office room. It resulted to be an efficient attempt in creating spontaneous interactions, although it appeared clear that it still needs to be adjusted and tuned in its mechanisms in order to better suit the specific working context of use.

5.2 Limitations

Although the aim of the project was not the delivery of a finalized product, an additional iteration of the prototype concept would have been useful to understand the potentiality of the vision concept and the relevance of the findings that arose during the different phases of the research. In fact, to achieve a better implemented product, the design of the prototype would have benefited from a more extensive testing phase.

Despite the active and engaged participation of the IDE's StudioLab members and the Muzus team, an additional limitation was that the testing phases occurred only in design-oriented environments, with participants keen to teamwork and open to collaboration and communication. Moreover, the number of participants was limited to 9 and a valuable output might arise from testing the prototype in bigger teams, with a specific platform that embeds the required functions.

Another limitation entails the limited number of participants interviewed, and consequently the limited working environments explored in relation to the wider context of the knowledge workers.

Lastly, the topic of remote working and the consequences of the pandemic are not fully understood yet, and this makes many of the assumptions about the way people will operate in the future difficult to predict.

5.3 Contribution and future directions

The future of remote collaboration

The COVID-19 pandemic forced a huge amount of workers worldwide to actively engage in remote collaboration practices. In the coming years, businesses will widely direct their attention on how to create the best conditions for their workers in the after pandemic context, but also focus on which product or service is needed for the remote workers market.

However, the future of remote collaboration should include more than a mere additional feature for business growth, it should instead be a way to radically change the way people collaborate worldwide in order to tackle the global problems we are facing. Let's take the (not so old) phenomenon of the first online chats and forums at the beginning of the Internet era. When they started to become common, chats were a medium that allowed people worldwide to connect, to communicate, to exchange information and solve problems. By magnifying this approach with today's developments, if used in the right way, remote collaboration might be the approach to face political and societal issues and consequently global concerns such as workers' rights, but also climate change or green revolutions.

Recommendation for future research

By understanding the social and human implications of remote collaboration, the project focused on the fundamental human needs behind the merely technical needs of working remotely, paving the way for the role of stakeholders and designers. The focus on people's experience and the insights gathered during the process can be used as suggestions or driving directions to further explore future possibilities and as a recommendation while developing a new tool, a platform or a business.

The COVID-19 forced remote collaboration opened the doors to a future of collaboration without boundaries, with the possibility of achieving global connections to overcome global problems.

- Since a hybrid workplace will quickly establish itself as something common among companies, it is suggested to keep this scenario in mind for further research on employees' collaboration.

- Tools and technological developments will have to consider that the collaboration practice differs by people and by culture, so in order to achieve a successful development of a global oriented solution it is suggested to test it with participants with different cultural backgrounds.

- Collaboration practice is founded on trust and shared ground among the co-workers. The remote setting challenges the bonding practice and it is good practice to assure that co-workers are able to connect on multiple levels outside the merely working issues.

- Different working contexts must be considered as carriers of structural differences in the way co-workers collaborate and bond, for this reason it is important to focus on specific target groups in order to achieve the more suited solutions.

5.4 Final remarks

As we are finally recovering from a turbulent year and a half of change and challenges, it appears even clearer how this unprecedented pandemic disrupted almost every aspect of our lives, including simplest tasks such as going to work. Work as we know it has been transformed forever and remote work has proven to carry both successes and failures. Despite the large flexibility and the option to work in multiple locations, we saw that building relationships remotely can feel unnatural, potentially isolating and demotivating. That is why developing new strategies for improving connection and communication is a must. The growing distance bound to the rise of remote work showed that creating and maintaining strong work relationships represents an increasing challenge to face, but also stands as the key factor for workers' well-being and effective collaboration.

Collaboration is the mechanism that allowed Homo-sapiens to create the marvellous world in which we live in today. These difficult times, among other things, taught us that the future is a choice and, for this reason, we must focus on which kind of future we want to create. We need to be proactive and work towards the goal of a more fair and sustainable society and the only way to achieve that is by collaborating. To this end, people should be conscious of the communication dynamics and the facilitation needs. In this context, designers are the perfect fit: they are trained to tackle complex matters by finding common threads, to mediate the communication process and to provide solutions that can be realized, produced and implemented. In fact, collaborating would be impossible without communication and the more we need to communicate with people that are far, that have different time zones, that have different cultures or approaches, the more difficult it is to be understood.

While researching on the topic of this thesis, I had the chance to connect with many people, from different locations and different backgrounds, from school professors and students, to business-oriented workers. During this project, I have been strongly influenced by their ways to look at the pandemic consequences on work and I have realized how important it is for inspiration to absorb new visions and perspectives.

I have no doubt that a hybrid approach will be the way forward for work and collaboration and, although we cannot predict the future, I strongly believe that the power to determine it lies in our hands.

Personal Reflections

This graduation project has been the accomplishment of 2 years of challenges and discoveries. Among other things, my experience at TUDelft taught me to create scientific knowledge with rigorous methodologies and planning and to be a valuable human-oriented designer.

Using this graduation project as the apex of my learning process, I achieved my academic goals focusing on the methodology to apply, creating the planning and the execution of the different phases, connecting multiple stakeholders and delivering knowledge and inspiration to the scientific community.

I am proud of the overall results I have obtained and, although my final design still needs to be improved and implemented, I have been able to manage the difficulties, the stressful situations, the pandemic limits and opportunities, and take the most out of the convergence of different points of view, inspirations and expectations.

I have always been devoted to creating connections among people and one of my greatest personal achievements during this project was to use this graduation as a means to inspire others toward a more positive vision of the future to come.

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