M A R C O

Promoting social interactions on coworking spaces with artificial intelligence

M A D Y A N A  T O R R E S  D E  S O U Z A

2016
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ABSTRACT

With an increase in alternative forms of work, people are not longer limited to traditional office spaces. The aim for a healthier integration of private and work comes with the advantages of experimenting with new technologies. As a result, coworking spaces are spreading through the urban centres. But our way of dealing with work is still marked by our corporate-focused past.

This project aims to explore how can coworking spaces occupy a more meaningful role by connecting people with their interests. My interest is to unveil the social rules of the space and turn interactions between coworkers more pleasant and easy.

The result is a reflection about the future of collaborative workplaces. The success of the experiments reflect the openness of most coworkers and hosts. On a higher level the project gave me a better understanding of how AI could help to improve the social aspect of our workplaces.
BACKGROUND

The entrepreneurship culture is what used to be the defining characteristic of coworking spaces. Focusing on profit, most of them rent spaces with the promise of community building. At the beginning, their aim was to provide the infrastructure of an office to start-ups and freelancers. Today these workspaces host small and medium business, events and even makerspaces. This expansion of interests reflects the attempt to deal with a frequent issue: proximity, by itself, does not form a community. Common interests do. To be effective while building a community, coworking spaces today try to attend to specific demands. From industry segments to lifestyle choices, we can find the most diverse range of work spaces around cities today. And sharing workspaces affects a city in many levels.

Working with a sense of belonging increases productivity, creative outcomes and wellbeing. Besides that, work places are common scenarios for interaction design exploration. From the corporative perspective of workspace from the 1970's, we can observe that going to work has changed in shape and meaning.

By that time, cities were referred as messy, hard to navigate and expensive, a challenging scenario for creativity and innovation (Jacobs, 1970). With the spread of the startup culture and the use of Information and Communication Technologies (ICT) to mediate citizen interactions, new types of work started to give different meanings to live in a city. Considering that in thirty years the majority of global population will live within this context, this thesis project aims to investigate and reflect about:

**HOW MIGHT WE CREATE A WORKING SPACE THAT FOSTERS COLLABORATION BETWEEN PEOPLE AND OPENS ITSELF TO THE COMMUNITY AROUND THEM?**

**AND HOW CAN COWORKING SPACES OCCUPY A MORE MEANINGFUL ROLE IN THE FUTURE OF WORK?**

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1. Makerspaces or Hackerspaces are shared workshops used by a community to experiment with hardware and software. The spaces are built around the process of building and learning how to use production techniques in different levels of technology.

2. Xerox PARC’s projects, appointed as starting point to the interaction design field, focused on improving workspaces (Dourish & Bell, 2011).
PERSONAL MOTIVATION

The impact of technology on urban life has always intrigued me. My interest for ethnography and history guided me to study how the pursuit of efficiency shaped social landscapes. As a designer I wondered how could these elements help to produce knowledge for current and future citizens, to my home city in particular.

Recife, in Brazil, is a place that saw the rise and decay of the IT market but still holds its position as a tech hub. The attempts of turning Recife in a more productive space came with social segregation, focus on private interests and lack of care by its citizens. On the past years I’ve started projects related to civic empowerment, looking for a more democratic way of enabling access to public services. With this project I aim to balance the approach by considering the private interests that move resources in the city.

In Recife there is an increase of coworking spaces that end up focusing only on the profit of renting desks. To the coworkers, it increases the difficulty to socialize with potential work partners. To the neighbourhood, it increases the lack of knowledge about the potential of the space and alternative ways of working.

Designing for the future working life highlights the impact that a physical space has on its society. As an interaction designer this seemed to be an opportunity to explore tools that can help shaping the activities of our working life.

COLLABORATION

This project had as a collaboration partner the Finnish coworking space HUB13, the first to be founded in Helsinki. HUB13 provided the space to experiments and interviews and the feedback from staff and managers.

Jennifer Sarich-Harvey, from IDEO Boston, was invaluable as an external tutor to inspire the research phase, discuss outcomes and push the concept to a more complete and human-centred approach.

Matias Hjulmann Seidler, from Fucking Flink, was very important to push the early outcomes, research analysis and design directions into a more engaging experience. His background with design projects that encourage behaviour change helped me to understand the small triggers that soften the approach and turn the interactions more enjoyable on a long term.
HISTORICAL REVIEW: WHY DID WE START TO COWORK?

It is hard to perceive the changes in our workspaces. We deal with these environments with such level of immersion that further analysis is only possible after some decades. Most of changes used to happen on a slow pace, guided by big corporations and motivated by technological experimentation. Hierarchy, office layouts, tools and methods used to evolve according to the corporations’ agendas. All organised and oriented towards metrics of profit and productivity. It was not different when the social aspect of work caught the attention of researchers and companies.

During the 1920s, a group of researchers decided to investigate how environment lighting could improve workers’ productivity (Salovaara, 2014). The focus of this investigation, known as the Hawthorne studies, was to convince the industry to install electric lights. On the first round of experiments, there was an interesting increase on productivity. But the second round with the traditional dim lights pointed to another increase. Researchers realised that an agreement among workers that didn’t want to be perceived as unproductive altered the results independent of the lighting conditions. As a result, researchers, managers and owners started to consider the social environment of offices.

Although today many consider coworking spaces and open offices a trend, the origins of these explorations date from 1971. On a IBM report we can find the following description:

“Not only are all office walls removed, but most desks and other permanent stations are eliminated as well. All work is performed at laboratory benches and large round tables, and an individual may choose to work anywhere in the area that suits him or is convenient.”

IBM’s attempts were successful and increased communication among workers. But open offices did not appear until late 1990’s. The decades that followed IBM’s work had a strong corporate culture that did not remain confined in offices. As these corporations grew, cities changed to support their values. This affected social classes, debt, housing and even interest for the local culture. Both experiments focused on productivity, but another technological turn would change workspaces again.

Palo Alto Research Centre Incorporated (PARC), founded in 1970, created many technological developments used on today’s offices. Laser printing, Ethernet, the modern personal computer, graphical user interface (GUI), ubiquitous computing are just some examples of creations that started focused on an office scenario. Such a creative environment was a consequence of a diversified combination of knowledges. Visionaries from different areas could display their ideas and get the support they needed to move them further. The startup culture is the result of this environment, as well as the coworking movement: a place where the right partnership was more valuable than the office infrastructure.

This project considers every workspace with flexible structures that is designed for and by people that are not only from one certain company a coworking space (adapted from Nina Pohler, 2012). This definition broadens the initial approach from San Francisco’s Spiral Muse in 2005, the official first coworking space. The place created by the software developer Brad Neuberg was a reaction to “unsocial” business centres and the unproductive work life at a home office. During the first years, coworking members were most likely to be freelancers on the IT industry or founders of start-ups. Today the range of professionals that use coworking spaces includes artists, lawyers, accountants, teachers, life coaches and many more. The flexibility of the organisation, adapting itself to the community that is being formed reflects the early adoption and eagerness to learn and change ways of working to value a lifestyle.
**GOALS**

Coworking became a movement with particular variations. During this project I aim to investigate what it means to be a coworker from many perspectives (owners, members and employees). The design approach should start from the individual point-of-view to the perceived social value of sharing a space.

On a small scale, the research aims to understand the **individual behaviour inside a workspace**. Observations, interviews and diaries made by coworkers are the planned activities.

On a larger scale, a review global trends and experiments aim to understand **which values are promoted by coworking spaces and how can workers find their community**.

**CONSTRAINTS**

It is hard to create a generic point-of-view on coworking spaces, even if they are part of a globalised culture. For this reason, this project evolves as a future vision of workplaces, with the influence of HUB13 and Helsinki’s culture. The future vision aimed on this project should be also restricted by adoption of new technologies. This excludes any kind of technology not yet researched or invented. The goal of this restriction is to reduce the complexity of the design choices when dealing with so many stakeholders.

Adapted double diamond method (Stickdorn & Schneider, 2012), created for this process with deliverables from every phase.
RESEARCH PLAN

The main assumption of this project is that highlighting the social aspect of a workplace can create a stronger local community. To support this goal, we need to understand: How can we foster community building on the current scenario? What is on the way of this goal today? And what is the place for technology there?

About coworkers

This is framework created to answer these questions from the coworker's perspective. The assumption is that the motivation to join these spaces was better infrastructure, new opportunities and human contact. It was expected that most of them would use the space for working and meetings with external clients.

**MOTIVATION**
Why do people look for coworking spaces instead of home-offices?

**ROUTINE**
What do they use the space for?

**LIKES**
What are the top 3 things they like about their coworking space?

**DISLIKES**
What do they miss when working there?

**FIGHTS**
What do they do to overcome that?

**DREAMS**
How they hope the place will evolve?

About owners of coworking spaces

This framework was used to collect the owner’s perspective about the same subject. The assumption was that the possibility of reducing costs pushed people away. Also, it was expected that the owners would find community building challenging. A breakdown of the questions can be found below.

**MOTIVATION**
Why they decided to invest in a private/public coworking space?

**ROUTINE**
What is their process of establishing this community of workers?

**LIKES**
Which part they enjoy the most until now?

**DISLIKES**
What is the most challenging part of the process?

**FIGHTS**
What do they do to overcome that?

**DREAMS**
How they envision the place to evolve? If they had all the money they needed, how would they rebuild the coworking space?
EXPLORATION PHASE

This phase includes literature review and reflection on how the current trends will shape the way we work and how can we relate these trends to coworking spaces.

Collecting trends: The future of work

Today the spaces created by this movement started to incorporate other functions, and design researchers tried to envision the future of workspaces and work relations. Gathering data from The Future of Work reports (PSFK, 2013) we can group the trends related to coworking on the following categories:

Empowered culture
Under this category there are trends related to micro-communication tools and channels that help to reveal workplace sentiment.

Quantified Workers
PSFK’s report already recognize that many corporative social media already started to integrate metrics on their working life. This project will use the Quantified Worker section to explore the benefits, impacts and methods of collecting and comparing data from workers.

Social Communication Tools
Digital tools intended to foster collaboration with colleagues cover the working life today. These tools will become even more sophisticated and complex with time. As an example, the car marketplace ‘Shift’ became a cross-organizational social tool, letting workers collaborate with multiple companies.

Agile workplaces
Under this category there are trends related to tools to create a more efficient, flexible and non-hierarchical workplace.

The Pop-Up, Healthy Workplace
Considering the amount of time, we spend at work today and the nature of coworking spaces, the PSFK report points the rising in concerns about flexibility and health. This project will consider at this point how to balance privacy and focus with socialization and health (both mental and physical aspects).

Office Feedback Culture
Evolving the work evaluation from a top-down perspective (bosses evaluating employees), the office feedback culture is a resource for workers to communicate suggestions and feelings across their working life.

Intuitive collaboration
Under this category there are trends aiming to foster collaboration and communication between workers occupying the same space.

Training and Skills Marketplaces
To some workplaces, collaborative learning, visual libraries and partnerships with young entrepreneurs will be the main feature (PSFK, 2013). These initiatives not only benefit the employees but also turn easier the integration with the concept of skills marketplace. Similar to what is experience on some social networks such as LinkedIn, these marketplaces are social tools that allow employers to quickly get a handle on applicants’ skills.

Telepresence
Also part of the communication tools but with a bigger role during working life, telepresence is shaping the way that meetings and conferences happen. Taking advantage of the rise of conversational interfaces and A.I., this project aims to explore how our relations to meetings change when multi-sensory interfaces mediate our work collaboration.
Collecting trends: The world around us

Since this project approaches the social aspect of sharing a workspace, trends related to macroeconomic predictions were also studied to understand what might impact or be impacted by a different working life. Based on the trends mentioned by UK Commission for Employment and Skills’ reports (2014) changes could influence the adoption of coworking spaces were mapped in relation to the individual on the following aspects:

Economy
The report predicts that as emerging countries develop the infrastructure, regulations and new business ecosystems will start supporting different centres of excellence abroad. This scenario combined with the ongoing economic crisis would lead to an uncertainty of incomes for those who don’t adapt to the new paradigm.

Resources
It is noted that the global economic growth will lead to a higher demand of natural resources. But concerning cities these basic resources start to include basic infrastructure and space. Overcrowded neighbourhoods, bad public transportations, gentrification and other problems could disrupt the required environment to foster innovation, economic growth and stronger communities.

Politics
On the referred report, investment in employment and education are increasingly challenged by the public debt. Reflecting on this scenario within the context of this project, that could mean that initiatives to deal with these aspects are no longer exclusive to governments. In order to cope with the situation, private institutions would have to start dealing with social matters to support development.

“THE GENERATION Y (PEOPLE BORN BETWEEN 1980 AND 2000((..)) WILL FURTHER DRIVE THIS TREND, WITH 92 PER CENT IDENTIFYING FLEXIBILITY AS A TOP PRIORITY WHEN SELECTING A WORKPLACE.”

UK Commission for Employment and Skills, 2014

Society
The social landscape changed to not only give more attention to the workplace but to demand changes on it. Separation between working and personal life has increased, letting personal life values bleed into the work routine.

Contributing to this trend, the diversification of gender, roles and use of workspace guides the future of work to a less fixed structure. With the constant move of workers, skills trading start to increase in importance.

Technology
Building on the last point observed in the societal area, the focus on skill learning increases as a reflect. The evolution of Information and Communications Technologies (ICT), Internet of Things (IoT) culminates on great amounts of data being collect and used to improve the other five areas on the graph. However, while the digitalisation of production and reliance on skill learning contribute to a more flexible scenario, the insecurities related to income and more stable aspects of a job start affecting the workers, tying back to our first point on this analysis.
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Methods

MFA Interaction Design - Umeå University - 2016
A HEALTHY WORKPLACE IS A SOCIAL WORKSPACE

Distancing from the industrial era, the social aspect of working life is receiving progressively more attention. The emergence of alternative professions that rely on collaboration combined with the desire of a healthier and more flexible activity pushes workers outside the conventional offices.

SKILLS AWARENESS

The flexibility demanded and incorporated by the workers ends up to create a very heterogeneous environment where different working styles and knowledges coexist. With a focus on collaboration these differences are stimulated, even on workers from the same field. For that to happen, they need to be aware of each other.

ADAPTIVE WORKSPACES

Creating a flexible environment also opens up the possibility of blurring the lines that so clearly defined work and personal life in the past. To balance individual goals, tasks and group collaboration and awareness, a more flexible space or means to expression needs to be considered.
Exploring Evidences: How do we cowork today?

The aim of this phase was to identify how coworking is perceived today using the framework mentioned on the previous chapter. Three activities were realised to address these questions:

**Surveys and interviews**
Eighteen people from 11 countries, working in 12 different coworking spaces, answered a digital survey. This survey aimed to identify basic demographics, process and motivations of subscribing to a coworking space and to have their agreement for the second activity. From this group, 4 participants were coworking owners or directors.

**Remote experiments**
The second activity was a set of two missions where the participants had to register a diary of their working life, then point what they liked and disliked about their workspace. These activities were remotely coordinated through an app and platform and the participants submitted photos with a short description and reflection of everything they captured.

**Workshop at UID**
To compare the likes and dislikes on the coworking space to regular workspaces, another workshop was hosted with 12 students at UID.

From the top: (1) workshop at UID with students, (2) result mapping the responses and (3) photo diary of a day inside a coworking space from the remote experiment.

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Exploring Evidences: Findings

Who coworks?
During both secondary and primary research, it became clear that coworking spaces are used by people connected with a different way of working, more self-driven and independent of location within cities or even countries. In general, most of them once tried to work from home or coffee shops aiming to reduce costs, but eventually they felt the need to have more people around to discuss ideas, create partnerships or just gain social learning experiences (Redman, 2014). With an age varying from 22 to 65 years old, the common element amongst all research participants was the desire to find a better balance between work and personal life, everyone with their own strategy. For some, it meant to be their own boss, investing time and money in some business idea. For others, the opportunity to be move around and set their own schedule. The effect is described by Bilandzic (2013) as Nomadicity:

Nomadicity evolved as a trend of office workers occupying, negotiating, and appropriating the city as their office to avoid the monotony in office spaces, as well as the lack of social contact when working from home.


On his study, the author also points that coworking spaces are often perceived as social environments as much as cafés by members and owners. The comparison highlight problems, since cafés are environments designed for consumption, together with the social aspect, and not for collaborative activities. With that in mind, Bilandzic concludes pointing that to just create “optimal work conditions” sabotages productivity in these new contexts of work that value the lifestyle balance.

Less “co”, very “working”
Even if coworking spaces are meant to embrace the social aspect of working, people rarely engage with strangers without a middle element that highlights the mutual interests (i.e. an event). Most of the interviewed members agreed that there is no much space to interact outside these occasions. The fear of interrupting someone else’s work or not understanding how to share a space with other professionals gets in the way of social bonding.

Owners x Members
While owners perceive their coworking space as a place where communities are formed, contributing to social innovation, members often pointed infrastructure as the most delightful asset there. The social aspect is pointed by the members as a great opportunity but not a routine. It seemed that the “essential” assets for getting the work done were considerably more important ("great internet connection, comfy chairs and desks, coffee machine available, etc.").
PROBLEM ANALYSIS

Social constraints

Inside a coworking space there are different members from different backgrounds and very particular goals. Although most of the infrastructure is created to support and form small startup companies, the consistent individual workers are main supporters of the basic expenses (Foertsch & Larosa, 2016). They are also the most impacted by the hidden social rules, since they often don’t come to the space as part of a previously formed group. The gap on forming groups affects also the sustainability of the business.

Analysing the entrepreneur culture fostered by owners, the graph above points four phases: communicating ideas, creating partnerships, founding a startup and growing/establishing a company. The first two are the ones strongly connected to the social aspect of a working space since they rely on the skills of whom is communicating their insights, proposals and vision. This focus on the physical social networking drives certain people away, the ones that are working by themselves or are introverted. It also creates very specific niches, restricting the valuable input of external peers later on the business development. That can be observed when comparing the owners’ view with the the members’ one, demonstrated on the diagrams.
Neighbours vs. Partners

The persistent mention of coworking as movement not restricted to physical space pointed to a different way of analysing behaviours inside the movement. Using the activity theory framework from Spinuzzi (2012), two behaviours emerged from the coworkers named neighbours and partners.

Good neighbours

Good neighbours work in parallel with others. The shared space is perceived as converging point for different activities that might be relevant or not for their own. The attention is mostly attributed to the infrastructure (building, interior design, facilities in general) since they use the space as part of their professional image.

Good partners

Good partners aim for work in cooperation with others. The shared space is perceived as one and all members are potential partners for a next project. The attention is mostly attributed to community activities and platforms (events, social media, how popular is the space and flow of people) since they use the space as networking tool to find/develop work and ideas.

These two groups coexist in most coworking spaces. The difference in focus create the tensions mentioned before: lack of understanding of acceptable social rules that turns socialising and integration difficult for individual workers.

Community involvement

As mentioned before⁴, Social Learning is the ultimate goal of sharing a workspace with people from different backgrounds and specially different interests. Bilandzic (2013) describes the coworking activity as "unstructured and self-direct in format; active in participation and serendipitous in learning experience". Together in this group we also find Meetup Groups and Hackerspaces. However, coworking spaces lack the common subject that tie all members together, compared with the two others. That often happens because, as Parrino (2015) mentions, most people think that physical proximity guarantees knowledge exchange, a vision that contradicts with his and many other research results. Adapting from Bilandzic, to achieve good Social Learning, coworkers need opportunities for self-directed exploration to achieve inspiration, motivation and support from peers. And these peers are not always the ones around them.

Considering a scenario where social learning was solved inside the space and the growing trend of digital nomads, there is potential to reach out to people that might enrich and create a flow of resources, transforming coworking from a movement to an acknowledged format of working, as solidified as the regular office of today. Most predictions from the 70’s appointed to technology eliminating the need to share a space. Today, when the experiments from that decade had become reality, there still a need to interact with people. Discussions, frictions and socialisation are today perceived as more vital aspects of work. That’s what Ratti & Claudel (2016) call "The birth of a new proximity".
Selecting a Framework

From the secondary research and first phase of contact with coworkers, three main areas emerged to be further explored: Connected Learning, Social Networking and Ambient Displays.

Reactive spaces

One of the most interesting outcomes of following a day in the life of coworkers was to notice how their priorities, mood and needs change during the day. From a passive researcher perspective, the change in these factors was much harder to perceive, and this contributes to the hidden social rules that get in the way of social bonding. So as a guiding principle, this project should consider how to use the space to best communicate the social rules and welcome newcomers?

Social networking

This combination of individual workers and technology benefits social networking structures that already exist today. Even though previous research points the problems with enforced skills matchmaking services (Bilandzic, 2013), the social networking need and practice should be taken in consideration. Social Networking is especially hard for individual workers and introverts due to the hidden social rules previously mentioned. So as a guiding principle, this project should consider how to turn social networking/bonding easier to different personalities and working styles of individuals?

Connected learning

On the intersection of people and place, Connected Learning refers to the knowledge exchange between peers on a space, both social and skill-based types. Turning the coworking space into a learning hub attract not only new members but people with similar interests that might be around in the neighbourhood, companies and other entrepreneurs. So as a guiding principle, this project should consider how to create a platform to share knowledge between coworking members and turn this knowledge available outside the coworking space?

“TOO MUCH REMOTE WORK CREATES ITS OWN SET OF PROBLEMS, SUCH AS DIMINISHED KNOWLEDGE TRANSFER, DECREASED ENGAGEMENT, CULTURAL DISCONNECT, AND A SLEW OF NEW DISTRACTIONS”

Redman, 2014.
Possible Scenario: The Farmer’s Market

To deal with a coworking space, these areas (people, place and technology) need to overlap. The combination of the three principles previously mentioned is a framework named “Farmer’s Market” approach, where you combine members with different purposes, casual unstructured interactions and tacit learning.

On this model, the three mentioned guiding principles interact. From inside to outside: Reactive Spaces guarantee that the workspace is dynamic enough to allow serendipity to happen, letting a social code emerge and not be enforced. The Social Networking aspect makes sure that different kinds of members and visitors get involved in the space by their peers, but also digitally. Connected Learning is the element/platform that might attract and create this flow of people, either looking for business partners, new work opportunities, learning new skills or even public services. The defining goal will be adapted further in this study with a more contextual analysis of a specific coworking space, the scenario of the final concepts.
**INSPRIATION**

Co-designing the future coworking space with members, hosts and owners at CUASIA16.

CUASIA16 (Coworking Unconference Asia 2016) is an event dedicated to discuss and share innovative ideas about growing, running and being a member of a coworking community. Reuniting around 200 people from spaces around the world (North-America, Asia, Oceania and Europe), the event was a great scenario for ideation.

Three ideation sessions of 45 min were held on during the conference with an average of 30 participants per session. They were asked to ideate on the question “How would your workspace be (look/behaviour) if you have all the money and time available?” This activity aimed to answer the following questions:

**Pain points**

What is the part of the working life they feel that needs to be changed the most today? What concerns them?

**Tech adoption**

How open is the coworking community to the introduction of technology on their workspace?

**Dreams**

How they envision the place to evolve? If they had all the money they needed, how would they rebuild the coworking space?

**Barriers**

What is in the way of achieving their dreams today?

Eight ideas had to be generated, spending 2 minutes in each one. The participants used markers and paper to draw or write about each idea and after the ideation was completed their worksheets were shuffled and redistributed. With the new group of ideas, they were asked to select the one they liked the most and add or edit information on it. Every participant got to present their new formed concepts. The activity generated around 760 ideas. 96 were selected by the participants.
Experiments: The Social Clock

To explore how technology could clarify the social rules, a small experiment took place on a Finnish coworking space, HUB13. The location was selected in spite of the other coworking spaces in Bali since there was no related event happening at the moment and the routine could be better observed.

The experiment consisted on a series of sliders connected to lamps. Positioned by the desk, the coworking members could select their working status by interacting with the slider: from social to focused. After cycles of 25 minutes, the sliders would move back to the “social” position. Six prototypes were left on the coworking area for two working days\(^5\). From the six, only two had the function of returning to a social status. Instructions to operate and leave comments were left together with the prototypes.

The purpose of the experiments was to understand “How technology might help clarifying social rules in a non-intrusive way?”. This activity aimed to answer the following questions:

Mediated engagement
How members of a coworking space react to the mediated experience of externalising their working mode?

Community reaction
How would the other members react to the ones with the prototype? How would their interactions with them be perceived by the bigger group?

Social awkwardness
Would sharing a neutral and abstract information about yourself be enough to “break the ice”? What else is needed?

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\(^5\) The experiment was monitored by the security camera of the space and the footage was shared under restrictions.
Results

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Analysis: Politics of Space.

The experience of attending the conference and discussing the coworking activity under different perspectives tackled the initial questions and unveiled new ones. Related to the problem analysis we can find:

Reactive spaces

How to use the space to best communicate the social rules and welcome newcomers?

Tackling this question, the experiments previously mentioned failed to engage people in conversation. Although members and owners initially expressed interest on the prototype, the sliders didn’t work as expected. Coworkers often refer to themselves as “early-adopters” and the technology aspect was not a barrier. However, with the prototype people felt the need to interact only when they wanted to be in a focused mode. Some others decided to hide the lights with notebooks to not have their status visible to others, claiming that they didn’t want to be pressured to talk with someone just because of the light’s colour. The ones that used the stations with motorised sliders (returning to a social position after 25 minutes) used tape, books and other resources to avoid the movement. The concerns with privacy were also raised since the prototypes were positioned right by the desks. The results were similar to problems mentioned by the use of chat rooms in office spaces:

“Despite sharing a physical space, the modern office needs to embrace (a way) of encouraging people to be more at ease in needing to respond to messages. Especially when you see people across the room.”

(Hulick, 2016).

Social networking

How to turn social networking/bonding easier to different personalities and working styles of individuals?

There was a great emergence of ideas and discussions around how introverts behave in such a social environment. Conversation starters, isolation booths and robotic personal assistants are examples of how people envisioned how to deal with the topic. Most of the casually interviewed participants referred to coworking spaces as a way of curing loneliness, but the business model (charging by the hour) drove them away from social interactions to efficiency at work. For that reason, many coworkers move, looking for a better fitting community or set of values. When the coworking host doesn’t act as a facilitator, many coworkers look for neutral agents and places, such as the Barista (on Hubud’s case) and the kitchen.

Connected learning

How to create a platform to share knowledge between coworking members and turn this knowledge available outside the coworking space?

Sharing knowledge was still a challenge outside very clearly oriented events. All participants were excited about sharing their skills and learning new ones but it was hard to ideate around this area. The conference format was a demonstration of the principle of sharing knowledge: the unconference format means that during one day someone would pitch topics to be discussed and guide this discussion. During ideation, many interesting areas, including education, were mentioned. However, during the topic’s selection, many people felt uncomfortable guiding a discussion despite the casual format.

From the observations around this area is clear that even if the coworkers seem to be early-adopters of new work-life paradigms, the word professional still evokes a pressure to be neutral and letting go of your perks as a person. To tackle this feeling is essential to promote a more tacit education on a work environment.
New Findings

The coworking host
One of the new findings during the experiments mentioned was the role of the host. During my previous mapping there was no mention from the members to this figure that is present in most of spaces. The Host is someone hired to take care of the energy of the space, make sure everyone is having a good time and if everything works. The later ends up consuming most of the time, leaving the host with more practical tasks such as equipment maintenance, make sure there is enough coffee and space for everyone, regulate bookings and promote events.

Design for outgoing introverts
Another point frequently mentioned was the existence of ambiverts or outgoing introverts: people who like being around others but have a hard time engaging in social interactions during a whole day and need some time alone or focused. As pointed by Jung (1976), besides the common division of Introverts and Extroverts:

“There is, finally, a third group... the most numerous and includes the less differentiated normal man... He constitutes the extensive middle group... I call the first group extraverted and the second group introverted.”


This points the fact the most of us are introverts in relation to certain moments or subjects. To work on a space that forces an endless social engagement without considering these fluctuations might be the reason that few relationships inside coworking spaces seem to be very superficial. During the CUASIA16 and my visit to HUB13 it became clear the desire of making social interactions something more relaxed without the pressure of engagement.
IDEATION

Coworking bots

Considering the Host’s problems in addressing more than practicalities of the space, this concept proposes a form of AI to be the neutral element. A robot dedicated to address most practical requests from the space would help the host to perform on a different level, promoting collaboration without being disturbed by random tasks. The bots also create a sense of care from the whole group. When embodied, AI seems to awake similar feelings of care that we have to our pets.

A demonstration of this phenomena was registered during the CUASIA16 conference, when among us a Buddhist monk seemed to treat his recently bought drone as a pet, naming it and even becoming happy or angry when it performed some tricks.
**My[today]self**

The second concept approaches the sharing of skills in a subtler way, taking advantage of the downtime to create connections. Individually, the concepts are based on tokens that change in colour, light and texture depending of someone’s profile and can react to each other when in the same environment. The tokens could be also used as “keys” to the space, replacing the key cards that were pointed as a negative aspect on previous research. Following up on this concept, there is potential of creating some sort of game or interactive surface to connect the tokens (i.e. on the kitchen area of HUB13).

**Extension: the knowledge well**
The second part of this direction is to create a common space on the coworking area where people can see requests from external peers and they can see which kind of work is being developed inside coworkings across the city.
If places could emote

The third and final concept has a more experimental approach. Here, instead of introducing new elements to a workspace, the facilities itself are sentient. This way, the coworkers need to build a trustful relationship to acquire resources. As an example, depending of the social interactions you have inside that space you could be allowed to have more devices connected online, a special power adaptor or even artificial lights that “appreciate” your presence around them.
CONCEPTS EVALUATION

Coworking bots: helping the host

This approach focused on understanding how can we help the host’s work of promoting collaboration between people on the workplace. To put the host on the centre of the concept it was created a stakeholder map, another round of ideation, a simple script with the envisioned workflow and a prototype to explore the interactions that could be added to this workflow.

Prototype
The prototype investigated how elements such as voice and movement can be persuasive to convey a certain tone of voice. The prototype used Emic2 text-to-speech module, Servo motors and an Infrared reader connected to Arduino to control both directions and response from the robot when interacting with someone. The project was tested with other students from UID, but the main goal was to experiment the process of building a conversational interface with a physical behaviour.

Script
You are a host, arrive at work and the Personal Assistant is there by your desk.

The PA can identify that someone passes by the door, without using facial recognition, to control the amount of people inside.

The PA can sense small connected elements such as lighting, temperature and what you have on your schedule.

The host can control the space settings manually or talking to the PA.

Members of the coworking can also talk to the PA if they want.
My[today]self

This approach focused on understanding **how can we help coworkers to share and access information about the community**. Similar to the first exploration, a stakeholder map explored the relations that surround a coworker.

**Prototype**

The prototype created for this exploration was a machine that printed tweets from people around UID or trend topics. Most people felt connected to the humour present on the messages and the surprise to understand how the day or week was being to other people.

**Script**

You are a coworker. You arrived at your favourite coworking space.

In order to access the Wi-Fi, you need to tell them what are you doing today (in a casual way). The information it’s mapped on a website, anonymous for viewers.

You place your phone on a deck to be charged. By doing that you are connected to the web service. A screensaver-like app starts.

If someone is interested or wants to discuss something related to what you wrote, they just tap the message to contact you. The image on the app changes to inform you.

To get a random conversation started, you go to the kitchen (or other social area) and PRESS THE RED BUTTON.

To get summary of what people are doing around you, you go to the kitchen (or other social area) and PRESS THE BLUE BUTTON on a machine.
If places could emote

The same process of ideation failed to grasp the potential of this approach. The character fictional and critical of it conflicted with the interests of both hosts and coworkers. Since a fictional approach is not the aim of this project, the relation between resources and human connections and use of physical space are design principles to be integrated to the other two.
Design principles

HELP THE HOST TO DO THEIR WORK OF PROMOTING COLLABORATION AND KEEPING A NICE ENVIRONMENT (SOCIALLY AND PHYSICALLY).

The hosts are constantly seeking for tools to make the environment as flexible as possible. The hosts interviewed during this project demonstrated to be qualified and desire a position where they can better plan events and provide support for growing businesses. However, the daily tasks (cleaning, making coffee, running errands) occupy them most of their working hours. To provide assistance to manage the space becomes a way of minimizing the time spent on practical tasks.

USE THE COMMON SPACE AS A THIRD PLACE FOR OPEN ENDED CONVERSATIONS.

As pointed by the research, there is a need to clarifying the rules of the environment to help them to socialize and reach out to the host or each other for help. However, to evolve the relationship from helpers to partners there is a trust building cycle that needs to be taken in consideration. A neutral touchpoint on the common area of a coworking space seems to be the optimal choice to host this cycle, where not only practical subjects would be discussed and coworkers could get to know each other without the fear of disrupting a work in progress.

USE THE VIRTUAL SPACE AS A THIRD PLACE FOR OBJECTIVE CONNECTIONS.

While the presence on the same space collaborates to create open-ended conversations, the virtual space makes it easier to be efficient and objective. The effort of inputting your doubts, requests and needs can be rewarded by a very clear response and privacy of information. It was observed that the digital space could be also very effective as an entry point when used for short interactions. Since the first routine activity when entering a coworking space is connecting to the Wi-Fi and most of the work is done using your own computer, digital interactions need to either motivated by the coworker or very short, not getting in the way of their work and main purpose on the space.
EARLY CONCEPT AND BEHAVIOUR CHANGE

An early concept was formed by the previous design principles. The concept was built around an artificial intelligence programmed by the host to facilitate conversations and ask for help with practical tasks on behalf of the host.

Storyboarding

Storyboards helped to understand the emotional journey of both stakeholders (the host and the coworkers) and which interactions needed to be designed.
Wizard-of-Oz of an AI Interface

The potential and risks of introducing an AI to a workplace seemed to be high and hard to constraint at first. To understand how the host should configure the AI and how the voice interface should interact with coworkers, a 2-day long experiment was held on HUB13. The main goal of the test was to investigate how the artificial intelligence could influence the behaviour of a group of people. According to Fogg (2009) behaviour can be influenced in 15 different ways, varying in time, frequency and intensity. The script for this test aimed at dot and span behaviours. The desired behaviours, according to the diagram, are:

To achieve that, the goal of the script was to:

- Engage in conversation with a person and include somebody else.
- Investigate whether people would start a conversation without any cue from the AI.
- Determine if the coworkers would follow an order or suggestion from the AI.
- Investigate how comfortable the coworkers would feel with an intelligent system on the social space.

The AI consisted of a Bluetooth speaker and a case with a LED matrix, responsible to communicate the states of speaking, listening and being idle. A voting box with two buttons to evaluate the AI was placed on the side, asking whether people liked or not the presence of the device. The conversations were controlled by distant: a text-to-speech interface on a computer connected to the Bluetooth speaker.

Results

Four scenario combinations were tested during the 2 days: conversations initiated by the AI, conversations initiated by coworkers, less intelligent system with slower response time, smarter system with more sensors. There were all simulated by me during the Wizard-of-Oz experiment. 22 people entered the room on the first day and 17 people were present on the second day. From this total, 12 participants were the same in both days.

My Cute Friend vs. Killer Robot

The coworkers seemed to be very sensitive to the intelligence of the system. Understanding how the AI thinks creates a feeling of safety. Small cues such as presenting the source of information (“According with Google” for example, instead of jumping to the answer) can help the person to recreate the logic path and do not fear when sharing information. During the test, one of the coworkers even shared information about their children when using this approach.
Social Motivation
The experiment failed when directly asking coworkers to complete tasks to help the host. When the interaction started with a conversation or offered a small reward for helping to create the environment, more attention was paid to both the task and the machine (coworkers were concerned about the machine being close to water).

Familiarity and Form
The form of the machine didn’t bother the coworkers but it was hard for them to notice the artefact. When more people engaged in conversation, it was difficult to understand to whom the machine was talking or listening. The lights didn’t work as a good channel to communicate the machine states. However, when testing how to create a conversation between two people, the AI seemed to be a fun distraction at first that it was later ignored, as the coworkers started to discuss different topics between themselves.

A better communication of the system’s purpose is extremely necessary to increase familiarity with the machine. During the test, the machine explained who it was and its purpose but a third of the participants didn’t engage with it at all. Revealing the potential of an AI on the first interaction (visual) seems to be as relevant as the other elements mentioned.
SYSTEM OVERVIEW

The introduction of a shared AI Assistant on a workspace can be approached from many points of view, depending on the need of every user. This promising interface, however, needs to be gradually introduced to the coworkers in order to be used on its full potential.

To deal with multiple interests and workflows, the chosen approach should have features on different stages as described below:
Shortcut

Shortcut features are simple and useful. They create a base for the system to work and address ephemeral needs. Example: ordering food, calling a cab, creating calendar events or playing a song. Most of the AI assistants are used for these tasks today.

Hands-free

Once the AI starts to learn, shortcut tasks can be automated according to other events. Google Now is one example, informing the best route to work when you are on your way.

Extra-hand

By learning from your behaviour, the AI can not only help you do something faster and anticipate your requests, but suggest alternatives that you might not have considered. Clara is a good example, managing your schedule appointments with you, not requiring too specific instructions.

Companion

When the language interface becomes natural, the AI can turn into a companion, specially on a social context. Jibo is one example that suggests features that are not limited to errands.
What if our future workplaces offered more than just a physical structure to work? What if we could pick the best place to meet people relevant to what we want to learn or work with? How can a group of people shape the atmosphere of a coworking space?

MARCO⁶ is a service composed by an artificial intelligence, sensors and a digital platform for potential coworkers, hosts and current coworkers. For the host, Marco helps to keep a nice environment by monitoring the stress levels and minimising the amount of practical tasks required to maintain a nice space. The service can be considered the physical manifestation of an égregore⁷ or a group mind which is created when people consciously come together for a common purpose: it can not only facilitate conversations but learn when, how and what people around it like to talk about. A video was created to demonstrate how MARCO can be helpful in these circumstances⁸.

For current and potential coworkers, MARCO also helps to discover the most interesting space to work. When arriving at the space, the assistant can help with small errands, clarifying rules of the space, bonding with other coworkers and keeping a nice environment in exchange for points that lead to discounts.

Learning from the behaviours and struggles from both hosts and coworkers, the service highlights the goals and personalities of people working at that space and uses them as an attractive quality for people seeking for the coworking space that suits them the most.

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⁶ "Maybe A Robot Could Organise".
⁷ From French égregore, the "spirit of a group" (https://en.wiktionary.org/wiki/egregore)
⁸ The video can be accessed on http://vimeo.com/madytorres/marco
**HOW DOES MARCO LEARN?**

The AI learns from two specific data sets: the first set of training data is provided by the host and the second is produced by the use of the space and interactions with the Physical Interface. While sensors monitor the activities on the physical space, the hosts can connect schedules for events, their personal schedules or even membership systems already in use on the coworking space. The management of how the AI should start to behave is done through the Host’s Channel.

**The host’s channel**

On the Host’s channel is possible to feed the initial data set about the space, members and how the system should behave. The Channel is a combination of dashboard with conversational interface. When training an AI, our behaviour influences future decisions, language and other machine behaviours. But not all choices made by the AI are culture sensitive and can be relatable to a human judgement of the situation. The Channel is a good way of visualizing why the AI is behaving the way it is and change it to what the host considers appropriate.

The interface design aims to balance the fluidity and casual form of communication provided by conversational interfaces with the control and fine

The system has a dynamic background, inspired by suminagashi, the floating paint technique. Every change in setting is reflected on a colour and movement.

A feedback system makes sure that the host’s goals are in sync with the mood of the coworking space.

The interface is simplified on direct questions to avoid misunderstandings, turning the process less complex for the AI assistant and faster to the host.
HELPING THE HOST

The host has more time for other activities due to the contribution of coworkers. But how did they contribute?

Through this dashboard, Marco can be set to ask for help with practical tasks in exchange for points that can be converted to discounts while using the space. This way, the activities are distributed and the host have more time to observe, help or even use Marco as a tool to keep a nice environment.

See Appendix to the complete Service Blueprint and setting up process.
tuning necessary to make the AI as useful and friendly as possible. The envisioned platform should be accessed from both computer and smartphones.

**Sensors**

The service comes with sensor modules that monitor the stress levels of the environment. According with Evans and Cohen (1987), from the environmental stressors that affect work, the ones that can be addressed on the space are **overcrowding, poor air quality, lack of privacy, distractions, noise and lighting levels**.

For the host, priorities and concerns change depending on the type of activity or event that is being hosted. Reflecting this behaviour, the system focuses on a specific set of sensor readings according to the space’s need for the day. The set can be suggested by the system or selected by the host.

Twisting the bigger part to the marked area on the base will activate the sensor. A display will inform which elements are being sensed at the moment. The form was decided based on the public character of the coworking space: monitoring is not perceived as friendly unless the coworkers understand what is being monitored and the purpose of it. For that reason, the form makes it evident that there is a system trying to improve the environment quality. The block shape informs the limitations of the sensor: the lack of cameras or other invasive types of inputs is intended to preserve the coworker privacy. Highlighting what is being sense at the moment informs the source of all data.

Using HUB13 as scenario, the system contains 3 sensors, one for each room that is not used as a common area: the reception, the area for temporary members and the area for fixed members. Some other arrangements might include a division of “loud” and “calm” areas or “social” and “focused”, depending of the activities being held on that day.

The sensor size should be close to 14cm. The object should reinforce that is feeding the system with information: by being on display, there are more chances of raising questions and discussing the benefits of creating a less stressful environment.

When receiving a specific reading, the sensor should display the icon of the element that is being monitored.
HOW DOES MARCO BEHAVE?

Talking to a space

The first interaction that coworkers or visitors have with Marco is when they are connecting to the internet. Introducing yourself to the space is the way of getting the basic resource to start your working day. Instead of using passwords, Marco casually asks what are you aiming to work on during the day. To avoid a repetitive or exhausting description, the system auto generates sentences based on your first input. As a visitor, you can either input your own sentence or select one of the options. The information gathered by this touchpoint enables the AI to have a glimpse of what is being done on the place.

Physical Interface

Marco’s physical interface follows the same principles as the sensors. To make it honest and transparent its limitations on a physical world, the shape is minimalistic and geometric, making use of movement and sound as the primary modalities of interaction and light on a secondary level.

As exemplified on the inspiration phase, movement is a captivating modality, as we humans abstract its meaning to depict emotions and characteristics of being alive (Hoffman & Ju, 2012). On the coworking context, movement is also relevant to deal with multi-person conversation, identifying who is the person receiving or sending a message.

The physical interface has two parts: a body that holds sensors and motors - and a head that indicates directions and moves in a way to convey certain emotions. The size reduces the impact of the movements and the AI reactions are perceived as harmless. The variety of movements was selected based on the Social Robot experiment created on the AAAI ’05 Open Interaction Event (Hollinger et al., 2006).

Voice, Light and Soul

The AI personality should reflect the space. Marco should be perceived and understood as a tool. However, the combination of voice and movement requires a more concrete analogy to other live beings. That’s why, even with its limitations, the coworkers should interact with Marco as they would do to a person when using voice.

Marco’s sound interface uses a human synthesized voice. To support the interpretation of what is being communicated, a light pattern will follow the words said by Marco and change colour as an attempt of conveying changes in emotion. The main purpose of this sound interface is to become a common ground between coworkers, an effect observed during the tests (page). The choice of letting Marco start conversations or wait for a coworker to start depends on the host at first. In case Marco reacts on a way that coworkers don’t appreciate, their reactions (for example, asking it to be quiet) will be taken in consideration and communicated to the host.

The main tasks predicted are to facilitate conversations among coworkers and gather volunteers to help the host with simple maintenance tasks such as making coffee, keeping the kitchen clean, dealing with an unexpected request, amongst others that usually drain all the working hours and availability of the host for other tasks related to the well-being of coworkers.

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8 The Coworking Bots – page 15
9 The human-like behaviour to be demonstrated is more connected to the ability of changing emotions than to clarify the specific emotion being conveyed.
Form exploration and moodboards are available on the Appendix.

EXPRESSION

Based on the PAD Scales for emotion expression on robots, light colors should follow the parameters above when Marco is interacting with someone. The range of emotions is generated by the host's interface and should be also reflected there.

TURNING ON

The seamless appearance while turned off should inform also if the voice interface is not working.

SOUND DIRECTION

The upper part of the model should determine the direction where the sound is being transmitted or received to simulate attention.
Digital Interface

Not all interactions with Marco need to be public and voice oriented. While inside the space, coworkers can chat and talk about goals and errands, preserving the principle of using the digital space for objective tasks and the physical space for open-ended conversations.

Opening up the coworking space

Marco can be used to guide potential coworkers to the space. A website should allow people to ask about the type of work and environment that is being done.

If we consider multiple coworking spaces using the service, searching for a place can become more human, oriented to the type of interests and atmosphere of a place, elements that are better experienced by the discussing with someone - or something - that knows the place routine.
Marco: Promoting social interactions on coworking spaces with artificial intelligence
Since the start of the project I was expecting that dealing with a subject as broad as work would be challenging and time consuming. To work around the schedule of partners also made it tricky to narrow it down as soon as possible. However, I believe that using experimentation and diverse methods of research allowed me to gain confidence when pointing out and eliminating directions.

The process of understanding the subject took much more time than I expected, especially after comparing the findings and literature review with the field trips and visits to coworking spaces. A great number of assumptions were proved wrong and failure with them and the experiments was the most entertaining part of the process. Acknowledging the failures I could understand the impact of my actions and to control how much my project should be designed.

I started the project trying to tackle social issues on a workplace, motivated by my own desire of working in a non-conventional way. At the end of the project, my focus was shifted to Artificial Intelligence as a way of interact with social friction. The result caught me as a happy surprise. I’m not totally convinced that AI, as presented on this work, can deal with the complexity of a group interaction but I’m eager to further develop and test the hypotesis that this project raise.

There is a great amount of resources that I didn’t have the chance to interact with during this project, but I consider it the scratch on the surface of this literature. I believe that is time for interaction designers to also understand how machines learn to not only deal with them but to find good uses to this powerful and promising technology.
REFERENCES


Stickdorn, M., & Schneider, J. (2012). This is Service Design Thinking: Basics, Tools, Cases. Wiley.


## Marco: Promoting social interactions on coworking spaces with artificial intelligence

### APPENDIX SCHEDULE

<table>
<thead>
<tr>
<th>January</th>
<th>February</th>
<th>March</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 02</td>
<td>Week 03</td>
<td>Week 04</td>
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<tr>
<td>T</td>
<td>F</td>
<td>M</td>
</tr>
<tr>
<td>14</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>February</td>
<td>Week 05</td>
<td>Week 06</td>
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<tr>
<td>T</td>
<td>F</td>
<td>M</td>
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<tr>
<td>14</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>March</td>
<td>Week 13</td>
<td>Week 14</td>
</tr>
<tr>
<td>T</td>
<td>F</td>
<td>M</td>
</tr>
</tbody>
</table>

- Tutoring: Jen (IDEO), Tara (UID), Søren (UID), Mattias (F*cking Flink)
- Critical Friend
- Documentation (report)

### Timeline

1/ Brief
2/ Research
3/ Ideation
4/ Concept Development
5/ Design Refinement
6/ Presentation
7/ UID16
Marco: Promoting social interactions on coworking spaces with artificial intelligence

Appendix
FORM IDEATION
Tools created to build the final shape on a laser cutter, respectively a 60, 45 and 32.5 degrees.

Internal case to enclose the arduino shields.
# SERVICE BLUEPRINT PT1

## STEPS

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>BEFOREHAND</th>
<th>USING THE SERVICE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COWORKERS</strong></td>
<td>Finding what people are working on in the city.</td>
<td>Login in the local internet connection.</td>
</tr>
<tr>
<td></td>
<td>Searching for a space to work.</td>
<td>Working at own spot.</td>
</tr>
</tbody>
</table>

## TOUCHPOINT

<table>
<thead>
<tr>
<th>ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Website</td>
</tr>
<tr>
<td>Host</td>
</tr>
<tr>
<td>AI Assistant (digital interface)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enables search for places based on activity.</td>
</tr>
<tr>
<td>Enables chat with the Assistant of every coworking space.</td>
</tr>
</tbody>
</table>

## SERVICE

<table>
<thead>
<tr>
<th>ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coworker is introduced to the space and AI Assistant.</td>
</tr>
<tr>
<td>Introduces engages in conversation about the space.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asks what the coworker is doing today as a password.</td>
</tr>
<tr>
<td>Introduces itself to the coworker and offers its services: practical tasks, guidance through the space, social networking.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>After identifying the coworker, the assistant will try to offer guidance or accomplish the tasks.</td>
</tr>
<tr>
<td>After identifying coworker, try to offer accomplish</td>
</tr>
</tbody>
</table>

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*Marco: Promoting social interactions on coworking spaces with artificial intelligence*
<table>
<thead>
<tr>
<th>Time of Use</th>
<th>Activity</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Hand Processes</td>
<td>Help the host: Taking part on practical tasks such as making coffee or organisation of space.</td>
<td>The host's role is to guide the coworker through tasks.</td>
</tr>
<tr>
<td></td>
<td>Social Networking: Help with information and connections, introduction to people eager to connect.</td>
<td>The coworker will be introduced to the social area.</td>
</tr>
<tr>
<td></td>
<td>Engage in conversation</td>
<td>The AI will introduce topics based on members' request or just start talking about some subject.</td>
</tr>
<tr>
<td></td>
<td>Evaluation of the space.</td>
<td>If the coworker doesn't want to speak to the AI, a simple command to &quot;shoooh&quot; would turn it off. He/She will also be asked to evaluate the space on the website.</td>
</tr>
<tr>
<td></td>
<td>Recommendation to a friend.</td>
<td>The coworker can recommend the space to a friend to gain credits by introducing it to the Assistant or with a website sharing link.</td>
</tr>
</tbody>
</table>

**Before Use**

- **Social Networking:** Helps with information and connections, introduction to people eager to connect.
- **Engagement:** Engage in conversation.
- **Evaluation:** Evaluation of the space.
- **Recommendation:** Recommendation to a friend.

**After Use**

- **Social Networking:** Helps with information and connections, introduction to people eager to connect.
- **Engagement:** Engage in conversation.
- **Evaluation:** Evaluation of the space.
- **Recommendation:** Recommendation to a friend.

**Interactive Assistant**

- **Digital Interface:** AI Assistant (digital or voice interface).
- **Website:** AI Assistant (digital or voice interface).
- **Messaging (email):** Website
- **Al Assistant:** Al Assistant
**SERVICE BLUEPRINT PT2**

<table>
<thead>
<tr>
<th>BEHIND THE SCENES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTIVITY</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HOST</th>
<th>Touchpoint</th>
<th>Hosting App</th>
<th>Hosting App</th>
<th>Hosting App</th>
<th>Hosting App</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensors</td>
<td>Hosting App</td>
<td>AI Assistant</td>
<td>Hosting App</td>
<td>Hosting App</td>
<td>Hosting App</td>
</tr>
<tr>
<td>AI Assistant</td>
<td>Hosting App</td>
<td>Hosting App</td>
<td>Hosting App</td>
<td>Hosting App</td>
<td>Hosting App</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INTERNAL PROCESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tone of voice is determined by the host at first but it changes according with the social activity at the space.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXTERNAL PROCESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answers and keywords feed the search channel (website).</td>
</tr>
<tr>
<td><strong>BEFORE HAND PROCESSES</strong></td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td><strong>App</strong></td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
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</tbody>
</table>

- **Add request for the volunteer work and determines the amount of credits to be earned.**
- **Define if the AI should start conversations, how fun should it be, etc.**
- **Receive feedback and recommendations to change things that the AI has no permission to self adjust.**
- **Task schedule, if to accomplish and create appointments for**
- **Credits can be exchanged by service discounts. The amount should encourage member’s fidelity to the space, the longer the member stays, the more he/she can profit from it.**
- **The AI personality and settings will be shaped based on the public reaction to these actions. Example: speed of speech, subjects.**
- **The credits are related to a person only.**
Marco: Promoting social interactions on coworking spaces with artificial intelligence

**FINAL UI - INTRODUCTION (HOST’S DASHBOARD)**

Let me introduce myself

HELLO, MY NAME IS MARCO.
NICE TO MEET YOU :)

You can talk to me using your voice or typing in the text field below.

During the set up, all icons are added to the top bar as a way of indicating progress but also a quick way of checking past choices.

NOW YOU CAN TURN ON THE SENSORS.
I WILL TELL YOU WHEN I FIND THEM.

I'VE FOUND ONE! HOW SHOULD I CALL THIS SENSOR?
I'm not sure what it is but it's active so let me keep looking.

You can help me by choosing your voice or typing in the text field below.

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MFA Interaction Design - Umeå University - 2016
THAT’S GREAT ANA, ALL SENSORS ARE WORKING. I HAVE ANOTHER QUESTION:

HOW WOULD YOU DESCRIBE THIS SPACE?

I’m going to use this description when people ask me about it. If you don’t feel like writing right now we can do it later. You can also let me know if something changes.

You can tell me using your voice or typing in the text field below.

The AI will start to understand what the host wants the place to become base on the words used to describe it.

The background changes according to the changes made on the system.
The host is encouraged to share what they need help with. Sharing a workspace is a innovative, cost-saving and democratic approach that has been still used under the the paradigm of an old office - where you are not directly responsible for the space.
The AI wants is the interface between environmental sensors, technologies to manage the space and the host. The host is the interface between the AI and social rules. For this reason, it's important to show the relation between human ways of expression (i.e. saying that you need to be on a focused environment) and sensor response and control (dimming lights and monitoring sound levels are ways of creating a focused environment).

Highlighting how the AI learns, knows and controls generates trust on the relationship with the host and coworkers.
Giving always the option to change a setting also reinforces that even if the AI learns enough to decide, the control of how the workspace should feel is on the hands of the coworkers.
Marco: Promoting social interactions on coworking spaces with artificial intelligence

**FINAL UI - DAILY INTERACTION (COWORKER VIEW)**

**WELCOME TO HUB13**

I'M MARCO, THE VIRTUAL ASSISTANT OF THIS SPACE.

TO CONNECT TO THE WIFI, JUST TYPE BELOW WHAT KIND OF ACTIVITY YOU ARE DOING HERE TODAY:

I can give you some suggestions.

By creating a casual way to connect to the space, the system can be perceived as friendly and use share the information with other workers in an anonymous way.
**WIREFRAMES - INTRODUCTION (HOST’S DASHBOARD)**

Hello, name is **Marco**.
Nice to meet you. Let's see how can I help you.

Make sure to turn on the sensors and position one in each room you want to monitor. I will tell you when I detect them.

I've found one! How should I call this sensor?

Can you tell me what people do in this space?

They use the space to work on their personal projects.
Great. All three sensors are working.

What is the name of this coworking space?

HUB13

How would you describe this space?

Well, I think it

HUB13

Have other businesses?

Do you want help with any task? If you have a busy day ahead, I can monitor the space and ask for volunteers.

Maybe if you
Good morning, Ana. How do you expect the workplace around Reception to be today?

- **Focused**
  - A more quiet atmosphere makes people concentrate.
  - A focus on the energy of people with less social interaction.

- **Energetic**
  - A busy and lively atmosphere.
  - Enthusiastic conversations about their day and work.

- **Social**
  - A friendly and social atmosphere.
  - Conversations about their day and work.

On, do you have other goals? Could you give me an example?

You picked **Energetic**.

These are my suggestions for today, but you can change them as you want:

- **Outwards**
  - Open
  - Serious
  - Intimate

- **Inwards**
  - Friendly
  - Social

Design your own workspace!
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Appendix
EXHIBITION PROTOTYPE

Continuing the experiment with voice interfaces, a prototype was created to be presented during the degree exhibition. People would ask how the day was going to MARCO and it would introduce projects around the area.

Promoting social interactions in the office space

Marco is a social artificial intelligence that lives on your shared workspace.

You can use Marco as a personal assistant that develops its personality according to the surrounding community.

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Appendix