

Access Mode: Inter-personalizing Communication at the workplace

by

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Abstract

The collaborative nature of open-plan workplace invites visual, acoustic distractions, digital and social interruptions that inhibits the ability to focus. These distractions can have a direct or indirect impact on individual emotional well-being, work performance, social interactions and in turn organization outcomes.

Two leading Tech organizations in Toronto, Canada were approached to study the interpersonal communication within open-plan workplace using mixed methods such as survey, observations, and semi-structured interviews with managers and employees.

The research explores the question: How can the workplace be better prepared and designed to support the worker of the future with Emotional Intelligence(EI) and Inclusive approaches for performance and effective interpersonal communication? A design prototype is offered as a tool to mitigate the challenges faced by harnessing better interpersonal communication in the open-plan workplace.

Keywords: Open-Plan Distractions, Social Interruptions, Social Cues, Emotional Well-Being, Interpersonal Communication, Emotional Intelligence, Inclusive Design, Diverse Workforce

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Dedication

To "Nani maa"

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2 Introduction

2.1 The Problem Space

One of the major issues faced by workers in any organization is the distractions and interruptions of the workplace. According to the latest ADP Canada Sentiment Survey, nearly one out of every two workers in Canada feel that they are less productive and 43% of these workers consider distractions as the leading cause of workplace productivity (Canada's Workforce Has a Productivity Deficit:ADP Study, 2016). The faced distractions are visual, acoustical, environmental, digital and social which can cause a loss of focus for more than 20 minutes every time (Borzykowski, 2017) and approximately 86 minutes a day to unnecessary distractions (Lindzon, Putting the 'work' back in the workplace: A desktop device that ..., 2014). ". Even momentary interruptions like text messages and taps on the shoulder are considered disruptive as they shift the focus and cut off the workflow (Altmann, 2014).

Researchers have found that individuals with high Emotional Intelligence (EI) have the greater empathic ability and better ability to understand self and others emotions and hence have a higher possibility of performing better (Jin Nam Choi, 2015).

There already exists an extensive resource on the impact of environmental and ambient distractions such as lighting, glare, temperature, and noise on work productivity. However, research does not measure work productivity per se but focuses on the existing distractions in an open plan workplace that may disrupt the workflow or have an adverse effect on a worker's emotional well-being and in turn on interpersonal communication in the workplace.

Poor Interpersonal communication at the workplace can result in low morale, less productivity, job dissatisfaction and hence the high turnover rate of the organization. Poor interpersonal communication implies to lack of self-awareness as well as awareness of other's preferences, needs, and availability for interpersonal communication. Since the workplace consists of

diverse workforce with different reactions to *stimuli*, *ability to focus*, *preferences* for social interactions, it is essential to manage interpersonal communications in workplace to ensure that the workflow is uninterrupted by external factors (such as environmental distractions, digital distractions, human interruptions) and internal factors (such as motivation, emotions, well-being).

2.2 Research Aims

-In order to enable a range of focused and collaborative work in open workspaces, the research aims to investigate the underlying causes of distractions, and the resultant loss of productivity. Through case study methodology, the research aims to explore the research question:

How can workers with different personalities, attitudes, work styles, communication styles and preferences effectively communicate with one another in the open-plan workplace?

A design prototype is offered as a tool to mitigate the challenges faced by harnessing better interpersonal

communication. The prototype is a personalized system to allow workers to signal their communication needs and preferences to others i.e. when, how, and how much one is prepared for social interaction through various physical and virtual communication modes. Aims to consider in understanding the context of the design prototype include:

How to assist workers in identifying and blocking negative triggers to interpersonal communication within their physical, digital and social environments?

How to improve behaviors and habits in relation to interpersonal communication at the workplace?

Finally, how to include emotional intelligence(EI) in the workplace to help foster effective interpersonal communication and social behaviors?

2.3 Research Questions

1. How can the workplace be better prepared and designed to support the worker of the future with

Emotional Intelligence (EI) and Inclusive approaches for performance and effective interpersonal communication?

2. How can emotional intelligence(EI) in workplace help in effective interpersonal communication and social behaviors and hence mitigate the range of potential distractions?

The research explores perceptions of the diverse workforce to understand the different factors such as physical/environmental, digital tools, and social behaviors and nonverbal cues present in the work environment that invites or inhibit communication among workers. The various roadblocks and accelerators for effective interpersonal communication in workplaces will be explored through a survey questionnaire, observations and semi-structured interviews with employees of two leading Information Technology organizations in Toronto.

2.4 Research Objectives

The research also explores perceptions of the diverse workforce, a workforce that is growing exponentially, to understand the different factors such as:

- Physical Factors- Spatial Hierarchy, Aesthetics, Environmental Conditions and,
- Digital Factors- including technological tools and devices, and new remote communication modes.

The design prototype ultimately aims to allow individuals agency to manage their own interpersonal communication at workplace based on:

- work modes such as focus, collaboration, learning and socializing,
- emotional states, and
- communication preferences.

The research will present global examples of design tools and strategies to manage interpersonal communication in the

open-plan workplace. The research entails literature review on the physical aspect of work environment (i.e. spatial hierarchy, aesthetics, environmental conditions), digital aspect of work environment (i.e. technological tools and devices, remote communications) and social aspect of work environment (i.e. individual's personal skills, perceptions and psychology) to understand their impact on interpersonal communication and hence on work efficiency, job satisfaction and employee retention.

3 Project Context

The workplace is rapidly changing with advancements in social and mobile technologies that have enabled us to virtually connect, create and communicate, and revolutionized how we work today. The role of the workplace has shifted from a mere place to perform work to a platform to collaborate, share, and socialize. The shifting perspectives and expectations have seen a cultural shift in organizations as they have now become more flexible, less hierarchical, more autonomous, and more collaborative. Many opportunities for remote participation such

as instant messaging tools, new cloud-based collaboration platforms, incubators etc. have blurred the boundaries of physical workplace. The flexible work culture puts a pressure on the work-life balance and therefore workplaces are increasingly adding more "life" into the "work" by offering more communal spaces, spaces to pray and meditate etc. This section will explore the physical, digital and social factors that influence knowledge sharing and worker performance in a workplace.

3.1 Open-Plan Distractions

The physical aspects of the workplace include spatial planning, the design of interior elements and specifications for environmental conditions like ambient temperature, air quality, lighting, noise etc. These type of physical elements have a considerable effect on an individual's emotions, perceptions, behaviors, and productivity (N. Kamarulzaman, 2011). Physical environment directly or indirectly impacts the worker's satisfaction, ability to concentrate and work productivity. For example, one may be distracted easily by surrounding noise

while someone else may prefer some acoustical stimulations to be motivated to work.

The open-plan office concept was introduced as an economical design solution to facilitate communication and increase work efficiency. Although the open-plan office concept has proved to be economical in terms of construction and equipment costs, yet the workers face immense challenges for work efficiency and job satisfaction. The spatial layout and design elements of a workplace play a role in guiding social interactions and interpersonal communication. The physical design of the workplace influences the extent and the type of social interaction, for example, the openness, visual co-presence (visibility of others) in the open-plan office directly or indirectly encourage face-to-face interactions (Mahbub Rashid, 2006) and the frequency of interpersonal communication is higher. Open plan office concept offers lack of privacy and excessive unwanted interactions (N. Kamarulzaman, 2011). The design of open-plan office makes it challenging to perform a range of focus and collaborative work tasks for the diverse

workforce comprising of different generations, personalities and for people with different abilities to focus and collaborate.

Workers negotiate with each other to be able to focus and be productive at work, by exhibiting verbal and nonverbal cues, however, these social cues are often misunderstood by others. For example, a person wearing headphones to block acoustical distractions is often misunderstood for being uninterested in valuable discussions surrounding him. Also, occupying a quiet room may be seen as a sign of weakness (Borzykowski, 2017).

Furniture manufacturing companies such as Herman Miller, Steelcase, Haworth have a range of innovative furniture solutions for blocking acoustical distractions in the open-plan workplace. Windowseat Lounge by designers Mike & Maaïke for Haworth is a good example of ensuring privacy in a collaborative open plan office. Although there is an extensive adoption of physical design solutions to minimize environmental challenges, yet there is limited attention to manage/ control environmental stimulations for achieving enhanced work productivity.

The individuals have a different level of tolerance to environmental stimuli like light, sound, temperature. However, most of the workplaces lack autonomy to choose and regulate the environmental conditions of the working environments and thus fail to include individuals with hypersensitivity to various environmental stimuli. As an example, excessive acoustical stimulation in the work environment may cause physiological stress (increased blood pressure) and in turn result in individual's negative emotional response such as anger, annoyance, frustration (Rylander, 2004).

Depending on personal needs and preferences, how can workers be aware and make informed decisions based on physical factors(such as spatial layout, design elements, environmental conditions) of the workplace?

3.2 The digital distractions

Technologies have become an inseparable part of our lives. The Generation Y and Generation Z thrive on technologies to meet not only the work needs but also for leisure and social

networking. According to a CNN article, an average American is spending nearly half a day staring at a screen (Howard, 2016). According to data collected by an Android app "Locket", a person checks 110 times a day on the phone on an average (Woollaston, 2013). Digital distractions affect the ability to focus, decreases the attention span and are commonly observed in the generations like Generation Y and Generation Z who have a more digital lifestyle (Turner, 2015). According to a study conducted by Microsoft which included a survey of 2000 Canadians and electroencephalograms(EEGs) to monitor 112 people, an individual's attention span has reduced from an average of twelve seconds in 2000 to just eight seconds in 2015, comparable to goldfish having nine seconds attention span (Inc., 2015). Digitally hooked generations face "fear of missing out" (FOMO) and have a tendency to check their devices compulsively for updates, therefore the presence of disruptive technologies such as smartphones in arm's reach can be very distracting (Altmann, 2014).

There are a number of apps like FocusMask, OneFocus, Concentrate, B-Social, and SelfControl designed with the hope to enhance concentration by blocking digital distractions (Hardy, 2015). Also the option of different modes like Do Not Disturb mode, Silent mode, General mode, Airplane mode in the mobile devices is a great way to manage digital communications. These settings allow one to block digital stimuli like lights, ringing tone, vibrations on the basis of preferences or task at hand. Also, the "Do not disturb" mode allows one to block all the incoming messages except urgent calls or from specific people. The similar blocking mechanism can be seen in the physical environments to block face-to-face interactions(refer section 4.2)

Ability to block digital distractions is not only helpful in enhancing work productivity but also for effective face-to-face interactions. The article "Stop Googling. Let's Talk" by Sherry Turkle mentions an interesting insight of the research " When two people are talking, the mere presence of a phone on a table between them or in the periphery of their vision changes both what they talk about and the degree of connection they feel.

Even a silent phone disconnects us."The article talks about how digital technologies are taking over face-to-face conversations at present, and hence limiting empathic conversations in our social lives. *"Technology is actually rewiring our brains to be addicted to interruption, as we anxiously wait for the next ping signaling a new email, text or social media post,"* says Dr. Sandra Bond (Rayasam, 2016)

The growing research and development on Artificial Intelligence (AI) is changing the way humans interact with machines to enhance different aspects of social life. The future work can be well imagined by humans working with robots. In fact, the human emotions which are considered to be distinguishing humans from machines are now being incorporated in machines. Sophia is a social humanoid robot developed by Hong Kong based company which received Saudi Arabian citizenship in October 2017 and can display more than 62 facial expressions.

Canadian workplace will be incorporated with technological tools to monitor and adjust performance levels of the workers in

next three years according to latest ADP study in 2016 (Canada's Workforce Has a Productivity Deficit:ADP Study, 2016). This insight supports the purpose of the research and leads to further exploration of the kind of data that should be monitored and evaluated, as well as the tangible and intangible factors that should be considered to enhance performance levels of workers.

3.3 Intergenerational Communication

The important aspects of effective interpersonal communication are attentive listening, interpersonal concern and emotional expressiveness (Sherblom, 2010). Individuals communicate using verbal and nonverbal messages (through facial expression, body language, gestures, proximity) to convey their meaning. At present, there are four generations in the workforce namely (1) the Baby Boomers (2) Generation X (3) Generation Y (4) Generation Z. There exist a communication gap between different generations as they value differently the face-to-face and computer-mediated communication for social exchanges and interactions. Baby Boomers or Digital Immigrants belong to the generation before the advent of digital

technologies and have mostly used face-to-face communication whereas Millennial or Digital Natives are the first digital generation born during or after the rise of digital technologies (Prensky, 2001). Due to the differences in the level of exposure and experience of communication technologies, the communication conflicts among different generations are expected.

The intergenerational differences in choice of the communication channel can restrict one's ability to convey meaning efficiently and hence create misunderstandings in communication (Venter, 2017).

This section looks into different generational preferences of communication modes and their potentials and challenges in interpersonal communication. Generation Y or Millennial born between 1976 and 2000 are the majority of the workforce today and prefer digital communication through video conferencing, mobile phones, interactive whiteboards, email, social networking, and digital files over face-to-face interaction. (Walmsley, 2011). Baby Boomers prefer autonomy and

individualized, concentrated working environment to perform tasks in contrast to Millennial preferences for multitasking and collaborative work environment (Venter, 2017). They mainly use digital technologies for interpersonal communication and have higher preferences for visual communication(graphics) over written communication graphics(text, emails) (Venter, 2017). For Millennial, flexibility to communicate from any place and anytime and instantaneous response via digital devices and social networks are of utmost importance (Venter, 2017). Millennial, also referred as "tech-savvy multi-taskers" communicate effectively through digital media but sometimes struggle with empathic conversations mainly because CMC lacks traditional nonverbal dimensions of human connection such as facial expression, gestures, body language, personal distance, vocal variety and eye contact (Choong Yong Heng, 2013) (Krohn, 2004).

There also exist research that links individual personality to preferences for the communication channel. According to (Sherblom, 2010), introverts prefer CMC over face-to-face

communication, especially written communication as they feel less inhibited, freer to disagree and to confront others (Venter, 2017). Also, the psychological state of an individual has a direct impact on the verbal and nonverbal behaviors. For example, an individual talking loud and fast, avoiding eye contact is likely to be experiencing negative emotions (Kristina L. Guo).

Generations have different ways of communicating interpersonally. Baby Boomers are "experienced, skilled and knowledgeable" and Millennial brings their knowledge of technology to the workplace, therefore it is essential to value multi-generational diversity and be self-aware as well as aware of other's communication style and preferences of communication channels for effective interpersonal communication.

For effective interpersonal communication, communicators must know when, with whom and how much to communicate. Nonverbal cues such as worker wearing headphones or a manager shutting the cabin's room are examples of social cues indicating unavailability to communicate with others. However,

sometimes social cues are misinterpreted or overlooked, thus impacting the communication process.

3.4 Emotional display in Communication Channels

Communication medium/channel is an important component of the communication process that needs to be thoughtfully chosen depending upon the information richness of the message (detailed or not) required response rate (urgent or not, synchronous vs. asynchronous) and emotional display (happy vs.sad news) of the message for effective interpersonal communication. Also using a wrong channel of communication can create misunderstandings and lead to waste of time in the communication process itself.

Sometimes choosing a communication mode which does not effectively communicate the emotional intent of the message can cause misunderstanding and misinterpretation of the message. The display of emotions plays an essential role in interpersonal communication. Nonverbal cues can determine

social impressions and affect the emotional climate of a conversation (Bente, 2011).

A major difference between face-to-face communication and Computer-mediated Communication (CMC) is the lack of physical presence, as well as the 'traditional nonverbal dimensions of human communication such as facial expressions, gestures, body positions, personal distance, vocal variety, and eye contact' to display emotions (Krohn, 2004). Face-to-face communication is the most information-rich medium as it has the highest information carrying capacity, allows immediate feedback and emotional exchange (Kristina L. Guo). In face-to-face communication, verbal as well as nonverbal cues such as body language, gestures, facial expression are used to synchronously display emotions to support the intended message.

Although computer-mediated communication (CMC) has enabled a faster and an easier way to connect, especially with distant people, CMC lacks personal emotional connection as it allows asynchronous display of emotions. Display as well as

interpretation of emotions in written communication like emails, messaging can be difficult as the usage of emojis, capital letters, exclamation points are not as descriptive emotional cues such as facial expressions, intonations, body language during face-to-face interactions (Managing Emotions in the Workplace: Do Positive and Negative Attitudes Drive Performance?, 2007). To ensure effectiveness in communication media, netiquettes are practiced such as keeping e-mails short and exclusion of sensitive content (Kristina L. Guo). To enhance social-emotional communication, the CMC is constantly evolving to enhance emotional exchange through digital inventions such as avatars, emoticons, skype, GIF, Animoji etc. However, these are "intentional" visual representation and abstractions of facial expressions (Krohn, 2004) as opposed to a more authentic and synchronous display of emoticons in the face-to-face communication. Although CMC allows communicators to construct, review and edit messages to present a desirable self-image in front of each other, it also delays response time and prolongs decision making (Venter, 2017). The following section

explores the existing theory on emotional aspect of interpersonal communication.

4 Literature Review

4.1 Managing emotions in Workplace

Emotions are an inherent part of any workplace and are aroused or suppressed, displayed or contained on an everyday basis. Human emotions are triggered by external factors such as the physical environment, surrounding technologies and the social situations which drives individual's performance, social interactions, and teamwork.

Management of emotions in organizations is seen as a professional conduct rather than for an individual's emotional well-being. The "emotional labor" is a common practice to regulate their public display of emotions to adhere to professional ethics or organizational culture. However, the suppression of prolonged arousal during emotional labor may lead to burnout and stress (A.Grandey, 2000). There are two types of emotional labour-Surface Acting and Deep Acting which

are used to hide the authentic feeling or emotion. For example, the manager may be stressed due to some internal news and try to appear neutral or cheerful in front of his team.

In contrast to Emotional Labour, the Emotional Intelligence(EI) in the workplace does not mean hiding real emotions or pretending a certain emotion but implies to being aware of self and others emotions to navigate a situation and manage behaviors. For example, when you are aware that your co-worker is in a bad mood and you curb your excitement to approach him/her until he/she seems better. In the late 1990s, psychologist Daniel Goleman identified four components of emotional intelligence-self-awareness, self-management, social awareness and relationship management. Therefore, choosing the right communication mode based on the emotional context i.e. the emotional status of the individual as well as the extent of emotional display needed for the message is an essential aspect of effective interpersonal communication. Since the emotional display during interpersonal communications takes place through

various online and offline modes, reflecting on the situations of emotional contagion can help in improving social relationships.

Organizations must focus on Emotional Intelligence in the workplace so as to create self-awareness, and an ability to regulate emotions to ensure workers emotional well-being, prevent negative emotional contagion and thus an overall positive emotional culture.

4.2 Emotional Intelligence Theory

Emotional Intelligence (EI) is defined as the ability to monitor one's own and others emotions to regulate one's thought process and behavior (Peter Salovey, 1990). According to Emotional Competence Inventory (Steven B. Wolff, pp. 3-4), the Emotional Intelligence comprises of four aspects: (1) Self-Awareness- refers to recognizing one's own emotions (2) Self-Management- refers to ability to manage one's internal states (3) Social Awareness- refers to awareness about others feelings, needs and concerns (4) Relationship Management- refers to ability to use self-awareness and social-awareness to manage

interactions effectively. Gardner (1993) identified two dimensions of EI i.e. Intrapersonal EI which relates to regulating self-emotions to be able to express emotions effectively and Interpersonal EI relates to regulating other individual's moods, motivations and intentions to be able to deal with others. Researchers have found that individuals with high EI have the greater empathic ability and better ability to understand self and others emotions and hence higher possibility of performing better (Jin Nam Choi, 2015). The research by Choi et al. hypothesize that during social negotiations such as interpersonal communication, Intrapersonal and Interpersonal dimensions of EI are required for three areas of emotional management (a) Emotion Expression (b) Emotion Recognition (c) Shaping Counterpart Emotion (Jin Nam Choi, 2015). Regulating self-emotions to be able to express pleasant and unpleasant emotions effectively can be beneficial for negotiator in communicating with counterparts to fulfill personal needs and accomplishing objectives (George 2000). During social negotiation process such as interpersonal communication, not only awareness and understanding counterpart's emotions but

also an accurate appraisal of emotions is essential for facilitating thought process, decision making and behavior of negotiator (George 2000).

Emotional generation and expression of negotiator and counterpart during interpersonal communication directly influence social relationship (Lopes et al.2004). Emotions are contagious and the disposition of positive emotions by the negotiator is likely to elicit positive emotions from the counterparts. In the context of the workplace, EI has been found to have influences on job satisfaction, task performance (Sy, Tram, and O'Hara2006), conflict resolution (Jordan and Troth 2004), and interpersonal relationships (Saklofske, Austin, and Minski 2003).

People with high EI are able to regulate and recognize their emotions and are likely to elicit counterpart's integrative behavior rather than destructive, competitive behavior (Allred et al.1997) (Jin Nam Choi, 2015). The research by Choi et al. concludes that negotiators need to engage in three aspects of effective emotion management (i.e. expressing positive

emotions, recognizing counterpart emotions and eliciting desirable emotions from the counterpart) during interpersonal interactions and exchanges for achieving a constructive climate with collaborative tasks, creative problem solving and constructive communication (p. 21). Negative emotions such as anger make the negotiation more competitive and tense (Kopelman et al. 2006) and elicit anger (Friedman et al, 2004) from the counterpart and unwillingness to interact again (Van Kleef and Côté 2007).

In the context of the workplace, the emotional intelligence can also be used to improve the social aspect of the workplace (i.e. social behavior and cues) and bring positive behavioral changes for effective interpersonal communication and teamwork. The whole experience created by different factors such as environmental conditions, design elements, technologies, social situations in a workplace defines the individual's emotional states and behaviors within that space.

As we continue to look into the adoption of technologies such as AI, VR in modeling the future workplace, the

technologies are being integrated with EI to enhance the human interactions with these technologies. However, in the present workplace scenario, it is foremost essential for humans to be emotionally intelligent to enhance interaction with each other. In the collaborative culture of the work today, the organizations must focus on Emotional Intelligence skills for effective collaborations and harmonious work relationships.

4.3 Existing Design Interventions

The impact of physical, digital and social distractions on psychological well-being, work productivity is slowly being noticed by major organizations. This section includes the existing design strategies and inventions for blocking distractions, enhancing work productivity, and effective interpersonal communication in the context of the workplace.

4.3.1 Blocking distractions in open plan workplace

The commonly adopted concepts to minimize acoustical distractions at workplace include "huddle rooms" or "focus

booths", which are small rooms for quiet reflection time, making a personal call or a small group discussion.

The CanFocus device, a circular device is used in Bnotions office, Toronto, Canada to block digital distractions on user's input. When the user pushes the button of the device, the software blocks digital distractions and the device glows red to act as a visual for others to indicate focus/concentration mode. Similar to that, the Lucid software company uses a block with green and red painted sides to allow or block face-to-face interactions respectively. More recent are the BusyLight by Plenom and Greynut's Luxafor Flag shaped LED light that connects to the calendar and automatically changes color to green or red light to display personal availability for social interaction.



Figure 1 Plenom manufactured Kuando BusyLight



Figure 2 Flag shaped LED manufactured by Luxafor

4.3.2 Ambient design solutions to manage stress levels

The little devil is a design prototype which uses negative reinforcement technique to encourage people to relieve stress by

taking short breaks during work. The prototype consists of hyperventilating motors which create unpleasant sounds on ignoring the desired behavior.

Ambiance Experience solutions are based on reactive environments that provide a more public or social type of feedback to people (Garde-Perik). The solutions can target different senses and hence trigger a mental state of individuals to behave appropriately in the shared space. Philips, one of the largest electronics company in the world designed "The Adaptive Relaxation Space", a prototype to create an ambient experience in the workplace for reducing the stress of workers. In order to alleviate stress and promote mindfulness, it adapts the environmental features like lighting, acoustics to the user's position.

Sensor technologies are slowly gaining importance by the organizations to collect different types of usage data. For example, Deloitte office in Amsterdam called "The Edge", uses a network of 28,000 sensors to maximize the use of space. An

architectural firm NBBJ came up with a Smartphone app solution to give users control by sending real-time information about the environmental conditions like temperature, lighting, and acoustics in their working environment and help orient themselves as per their preferences of the working environment. This design prototype is still in its experimentation phase to make it more valuable to the user experiences inside buildings. Adoption of sensor technologies in the interior spaces for enhanced user experiences has great potential to not only benefit the workers but also organizations to learn about the diverse needs of the workforce and the architects for future spatial planning to meet such needs.

4.3.3 Tools and devices for assessing mood

Wearable technologies are being extensively used by individuals to monitor their physiological and psychological well-

being. Despite, the great potential, it lacks its adoption at the organization level to enhance work productivity, effective interpersonal communication and thus in job satisfaction and employee retention. Rationalizer is an example of wearable technology in the form of bracelet adopted by the Dutch bank, ABN AMRO to ensure rational, emotionally unbiased decision made by the employees. The multinational technology companies like Apple, Microsoft, and Sony have come up with design interventions to track real-time emotions. Apple has a patent for mood-sensing technology for iWatch to deliver content based on individual inferred mood. Microsoft mood bra has embedded sensors to monitor women's heart rate to track their mood throughout the day to tackle emotional eating. The SmartWig by Sony measures brain waves and connects data to a smartphone via Bluetooth.

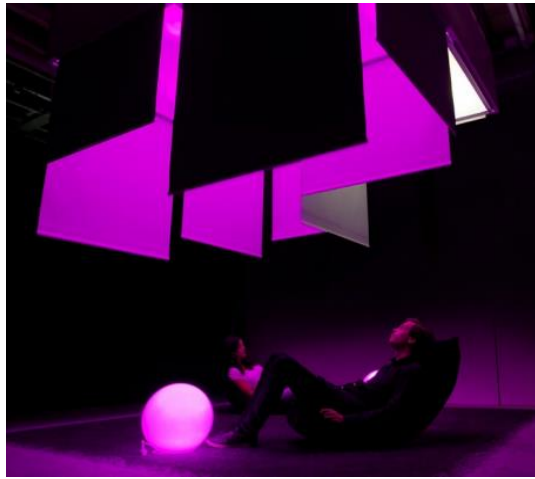


Figure 3 Adaptive Relaxation Space, an Ambient Experience Design Concept by Philips Communications



Figure 4 Rationalizer, a Wearable Technology by Philips Design and ABN AMRO

There are many mood tracking applications, such as Mood Tracker, Niko Kiko which allows the team members to log in

their emotional reactions to various activities throughout the day and analyzes their moods to productivity.

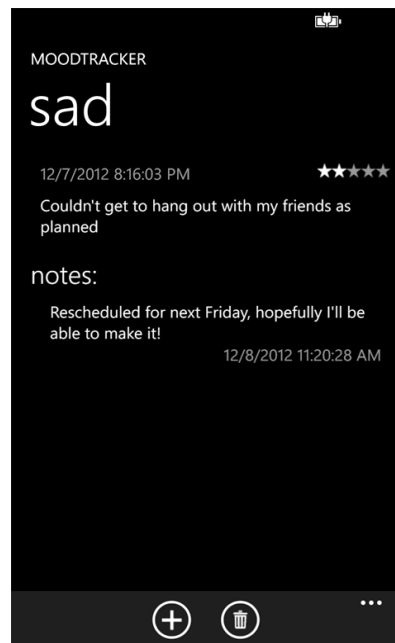


Figure 5 Interface of MoodTracker, a Mobile Application by Microsoft

There also exists EI assessment tools provided by the Institute of Social and Emotional Intelligence (ISEI), Six Seconds Emotional Intelligence Assessment for training employees to optimize organization results.

There exists a design prototype by Microsoft Research called BioCrystal which is an ambient tool for emotion and

communication. BioCrystal is a biofeedback device that evaluates users affective states in real time using physiological data and displays in the ambiance. It was tested for 2 weeks with ten users for over 115 hours and proved successful for self-awareness, stress management, and interpersonal communication. The device consists of a transparent shell for public display of mood and a black opaque one for privacy mode. The real-time feedback on individual feelings helps to identify possible triggers of emotions and aid in developing positive personal coping strategies. The findings indicated that on a typical workday when all goes well, the knowledge workers experience either relatively balanced or neutral emotional state or experience one of the common negative emotions such as stress, fatigue or boredom (low arousal negative valence emotions) and the positive emotions are rarely experienced. Although the color display of different emotions is intuitive and easy to read, however, it can be too eye-catching and can cause further distractions at work. Also, during emotional labor, people prefer to mask negative emotions in the workplace, and the color display of negative emotions may further lead to emotional

contagion. Therefore sharing of negative emotions in an unobtrusive way instead, can be useful to indicate the emotional availability of interpersonal communication with co-workers in the work environment.

5 Research Methods

5.1 Research Ethics

The research carried out case studies of two Information Technology (IT) organizations in Toronto, Canada. LinkedIn and TWG were studied with research methods including observations, survey questionnaire, and semi-structured interviews. The background and purpose of the research and letter of invitation was provided to all the teammates through the manager on behalf of the researcher prior to participation. The letter of invitation shared by the managers included the researcher's contact information (email address) so that interested individuals can contact for further information, clarifications, special needs to participate. Also, the workload and the availability of the participants was managed in between the participants and the

manager to ensure no added work stress for the time used in research participation.

5.1.1 Observations

The organizations were visited to observe physical factors (such as spatial hierarchy, aesthetics, environmental conditions) digital factors (such as technological tools and devices, digital communication modes) and social factors (such as interactions, collaborations, and social bonding) to understand the nature of interpersonal communication within the open-plan workplace. The observations were documented through photographs and notes. The photographs were shot from a distance to capture working environment in the organization. The observations took place for 15-20 minutes on 2 days at organization X after seeking permission from the manager. The research process allowed individuals to choose either to decline the consent or to feel free to reject taking of photographs/sketches. To ensure confidentiality, distinguishing features of individuals like faces were visually blurred. The blurred photographs were shared with the manager for approval and consent. An individual was free to

demand to block any specific identifiable feature that he/she may be uncomfortable with. If the photograph is shot close enough to be able to identify based on unique aesthetic style or skin color, an anonymization software could be used to convert visual images into cartoons or sketches to ensure further confidentiality.

5.1.2 Survey Questionnaire

For convenience and coherence purpose, the survey was designed and completed using an online platform i.e. Google forms. The survey comprised of 9 questions with 8 multiple choice questions and 1 open-ended question which was taken by one team per organization. The survey questionnaire was reviewed by professionals on content and feasibility and recommended improvements have been made. There are 9 questions in the survey questionnaire which required not more than 5 minutes to complete. The analysis did not include statistical representation of the sample demographic respective to gender, ethnicity, race etc. as the survey questionnaire is qualitatively analyzed. The background of the research, the

participation requirements and the online survey link was shared with the manager to be further shared with his team members on researcher's behalf. The consent form for the online survey was attached with the survey questionnaire itself with a mention that the participation in the research is completely voluntary and one should not consider participation obligatory since the manager is the connecting link.

5.1.3 Interviews and Co-creation activities

The idea was to understand participants perceptions regarding the interpersonal communication in the workplace by mapping their experiences, feelings, and responses to different environmental stimuli at the workplace. Similar to customer journey mapping where the journey of a user is documented to identify different touchpoints that characterize their interaction with the product or a service, a template for an employee journey mapping was prepared in order to identify opportunities to enhance workplace experiences for employees.

Only one participant took part in the semi-structured interview. In addition to a semi-structured questionnaire, a template was prepared to map participant's journey on a typical day at work using post-it, and sketches. The whole session took place for about 40 minutes. The interviews were planned to be done individually for each participant at a suitable time and location so as to maintain confidentiality and prevent any possible social risk or risk of power dynamics. The participants were briefed about the purpose of the research and semi-structured questionnaire at the beginning.

5.2 The Study

The research carried out case studies of two leading Information Technology (IT) organizations in Toronto, Canada. TWG is a software & app development firm that delivers its services to other organizations. LinkedIn is a business- and employment-oriented social networking service that operates via websites and mobile apps. Both these organizations were founded in the same year i.e. 2002, and are service providers to organizations to help them achieve their missions through digital

platforms. The case study method involves investigations using several different methods such as online survey, observations and a semi-structured interview with workers and managers. The data was collected through interviews and observations during three site visits to the organization X (a pseudonym used), and one site visit to organization Y (a pseudonym used), in Toronto, Canada. There was limited participation in interviews due to busy work schedule at both organizations. An interview took place with only one participant, which lasted for 40 minutes. In addition, an informal discussion took place with managers at both the organizations prior to observations and online surveys.

The key research objectives for this study are:

1. Understand the perceptions of knowledge workers in two leading Tech organizations in Toronto, Canada about their work environment.
2. Identify the factors that invite or inhibit interpersonal communication within the open-plan workplace.
3. Explore communication preferences of a diverse workforce.

4. Recommend inclusive Design principles and a design prototype that can be adopted in a workplace setting.

5.2.1 Survey Development

The survey questionnaire was prepared using Google Forms, comprising of 9 questions with 8 multiple choice questions and 1 open-ended question. The survey questionnaire was revised multiple times based on reviews and feedback from professionals on content and feasibility. The survey questionnaire was reviewed by Research Advisors as well as the Manager of the team at organization Y in terms of feasibility of the survey. After rounds of discussion with the Research Advisors in terms of the content of the questionnaire, the version 1 of the online survey was shared with the Manager at organization Y on September 26, 2017, via email to receive a feedback on feasibility. Also, feedback would have helped to know if any question was objectionable and needed to be removed from the survey. The survey comprised of a mix of multiple-choice and open-ended questions which could be completed in 15 minutes. After two weeks, the manager was

reached out to encourage participation by his team and the feedback he received from the team regarding limited participation was that the survey questionnaire was too time-consuming.

The Manager at organization Y suggested that the questionnaire should be revised to be completed in five minutes to maximize participation from the team. Revising the questionnaire posed quite a challenge as without reducing the questions, there was a possibility of gathering no data in the first place and on the other hand, reducing the questions would have meant not gathering enough data from participants. The version 1 of the survey was tested with faculty and students of the Inclusive Design program at OCAD University and the feedback was taken into consideration. The feedback received was to (1) convert the open-ended to multiple-choice questions with not more than 4-6 choices per question (2) take out anything that is uncertain about being used in the analysis process (3) reduce the number of questions almost by half. The recommendations would have helped to gather more information in the span of five

minutes as people tend to take longer in writing answers for open-ended questions and may choose to provide less descriptive answers for the lack of time. Also, people tend to tick boxes faster in the case of multiple-choice questions.

Changes were made to the survey layout and questions such as the wording of a few questions, which could possibly confuse the respondents otherwise. A few open-ended questions were clubbed together into multiple-choice questions and the number of questions was reduced from 15 to 9 to take not more than five minutes to complete. Version 2 of the survey questionnaire comprising 8 multiple-choice and 1 open-ended question was created by incorporating the feedback from Version 1 and was shared with the Manager at organizations X and Y office, Toronto on November 28, 2017. All five workers of a team at organization Y completed the survey questionnaire the next day. Please refer to Appendix for version 1 and version 2 of the survey.

Nine questions ended with an open-ended question asking respondents to write up to three design features/ improvements

in their work environment for effective interpersonal communication. The survey commenced by asking respondents their generation and job title. The multiple-choice questions sought information about (1) their personality traits, (2) the spaces and means of communication used by them on a typical working day, (3) the distractions faced in their working environment, (4) the perceived challenges in effective interpersonal communication at workplace, (5) the preferred communication modes for different purposes of interpersonal communication, (6) the overall impact of interpersonal communication in the workplace. The option of "other" was also provided in one question about the factors that can help in effective interpersonal communication in their workplace.

5.3 Observations

The physical, digital and social aspects of the workplace were observed and validated during the one-to-one informal conversation with the Manager as follows:

Physical	Open plan, Lounges, Huddle space, Phone booths, Meeting rooms with varying occupancy, boardrooms	Dispensing machines, Thursdays team lunches are organized, Place for bike racks	No cabins. All work in open-plan	Multi-functional space-lounge turns into a town hall in case of events, Rented out space to 2 other companies
Digital	Slack for internal and remote communications, Zoom for video conferencing	Slack is mostly preferred in the open-plan workplace	80-90% of the is spent on collaborative working	A screen outside boardrooms , sync with Google calendar to indicate whose occupying till when.
Social	Flat organization, some kind of hierarchy for better management as the company is growing,	Weekly demos to spark conversation and socialize	The team sits together for the whole course of the project.	Scent free working zone, Pets friendly, also adding nursing rooms, prayer rooms

Table 1 Physical, Digital and Social observations

The central lounge served as a multifunctional space for collaboration as well as personal work.



Figure 6 Collaboration Space for Social Bonding



Figure 7 Open Pantry and Dining Area



Figure 8 Recreation zone with Ping-Pong table & Coffee Machine



Figure 9 Access to Natural Elements like Daylight and Plants

Breakout rooms and meeting rooms of varying occupancy are used for small and large group meetings. Natural elements

such as views from outside and plants are an essential consideration in design. The whole floor is dedicated to common shared amenities like the dining hall, lounges, breakout/huddle rooms, stand-up rooms to facilitate social bonding across teams.



Figure 10 Formal and Informal Conversations

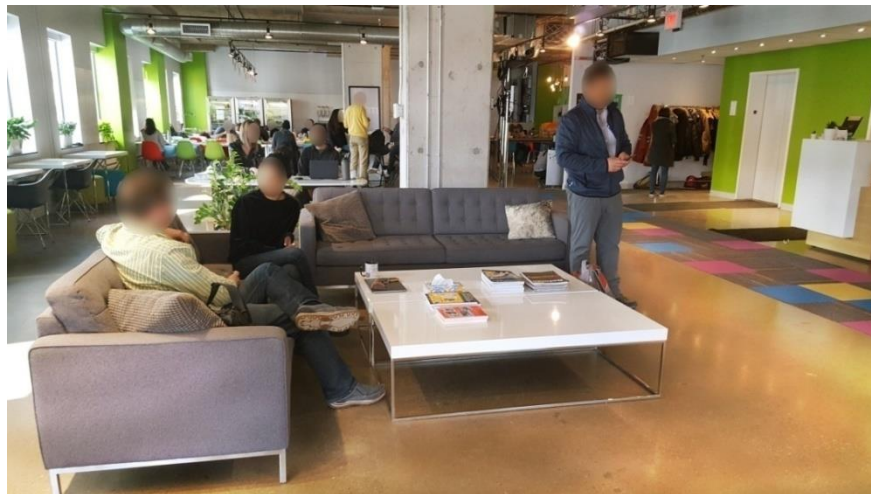


Figure 11 Waiting lounge next to Reception

There is a digital screen in the waiting lounge that displays content on the organization culture and team profile.

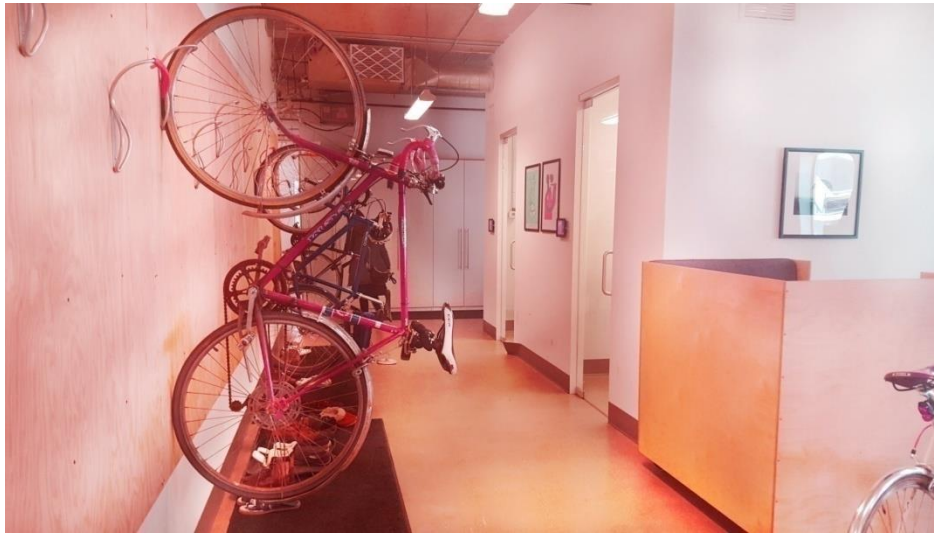


Figure 12 Space for Bike Parking inside Office

The open plan workplace was on a different floor where all the technical work happened. Every worker has an assigned seating and the team works together in the assigned area for the entire span of the project. Open plan workplace provides a great opportunity for social interactions and open discussions. The noise in the open-plan workplace was predominantly through face-to-face discussions among the team members and some

people wearing headphones were observed in the open -plan workplace.

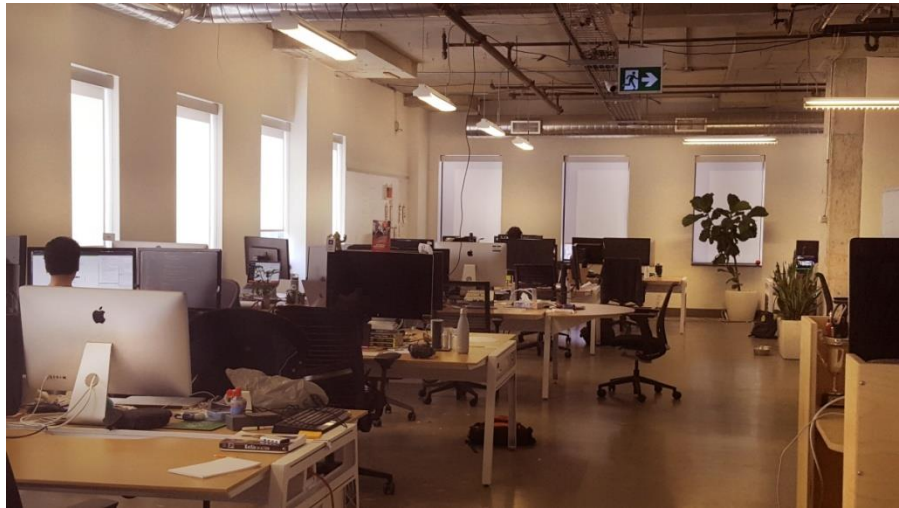


Figure 13 Open-Plan Workplace next to the Windows

All the enclosed rooms such as meeting rooms, stand-up rooms, phone booths have to be booked prior to the usage. There is a digital screen outside every shared enclosed space indicating the occupants as well as the booked time of the space.



Figure 14 Inside of a Meeting Room



Figure 15 Digital Screen outside Meeting Rooms

5.4 Survey Results

5.4.1 Organization X

The online survey was completed by seven employees at organization X, with the following job titles. Due to a small sampling, the survey results are analyzed qualitatively rather than quantitatively. The analysis points the majority perceptions as well as of the outlier.

- General Manager
- Business Development Manager
- Senior Strategist
- Project Manager
- Director, Business Development

The core roles of the above employees are as follows:

- General Manager-Managing the Sales team. Job responsibilities include developing a long-term relationship with customers and overseeing sales.

- Business Development Manager-Helps in expanding clientele. Work responsibilities include creating and apply effective sales strategy.
- Senior Strategist- Work responsibilities include developing strategic solutions and thinking for existing and potential clients on an ongoing and project basis.
- Project Manager- Work responsibilities include delivering the project on time within budget and scope with close coordination with team.
- Director, Business Development-Builds market position by locating, developing, defining, negotiating and closing business relationships.

The survey results of organization X are as follows:

On a typical day at work, most of the time spent by all the participants are at their workstation. 4 out of 7 spend most of the time of the working day in an enclosed meeting room besides their workstation.

The participants spend different amounts of time of the working day using various means of communication. The amount of time spent on IPC is the highest for written communication such as slack, emails followed by face-to-face interaction and social media. Least amount of time is spent on IPC modes such as telephonic conversations, visual communication like videos, graphics and video conferencing. All the participants spend less than 10% of the time of the working day on telephonic conversations, visual communication like videos, graphics and video conferencing. 6 out of 7 participants spend less than 20% of the time of the working day on social media or online mediums. More than 50% of the time of a working day is spent on written communication such as email, slack by 4 out 7 participants. 20-40% of the time of a working day is spent on face-to-face interaction by 4 out 7 participants whereas 1 participant spends 60-70% of the time of a working day on face-to-face interactions.

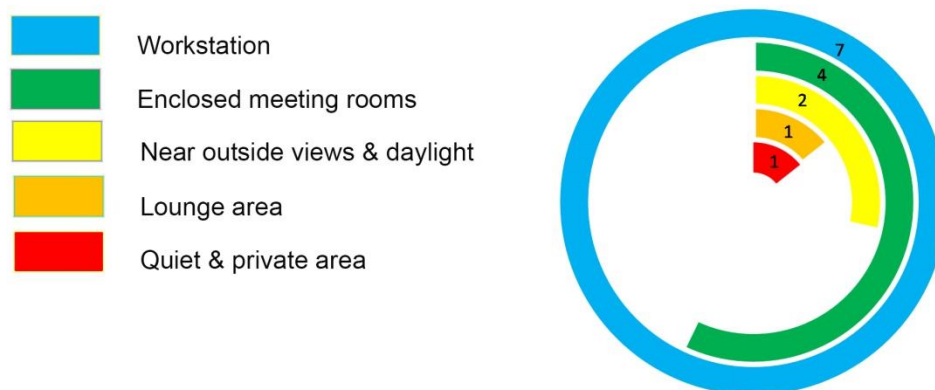


Figure 16 Most Amount of the Time Spent (On Average) by Participants At Various Locations on a Typical Day at the Workplace.

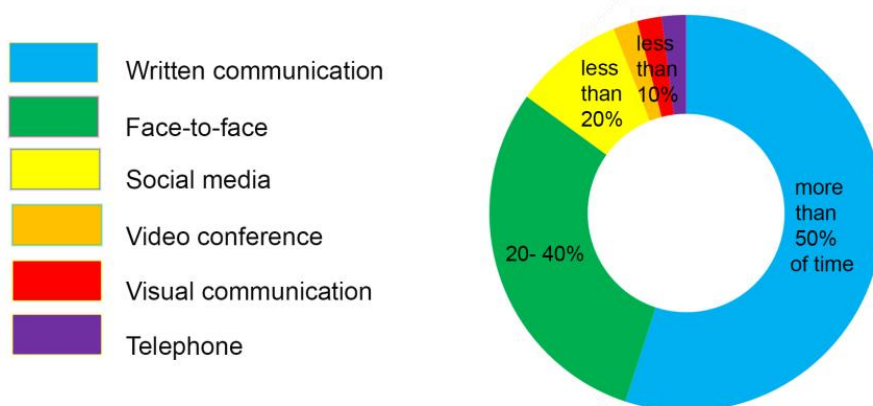


Figure 17 Time (in percentage) of Working Day Spend on Different Modes of Interpersonal Communication by Participants.

The participants were asked about the perceptions of their current working environment. 5 out of 7 participants felt that it allows them to focus and/or collaborate. 2 out of 7 participants felt that the present working condition neither allows them

neither to collaborate nor to focus at work and make them face all the types of distractions such as acoustical, visual, human and digital distractions in their work environment. Only one participant felt that it allows them to be creative but faces human distractions. One participant felt that it allows them to focus as well as collaborate but faces digital distraction. All the participants experience some kind of distraction in their working environment. 4 out of 7 participants experience all types of distractions such as acoustical, visual, human and digital distractions in their work environment.

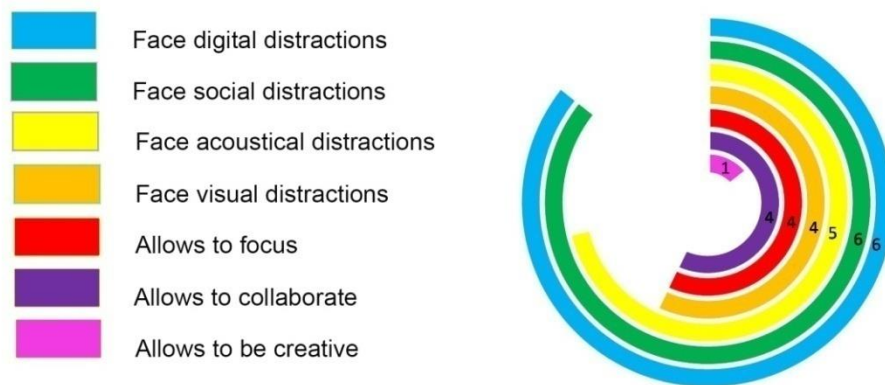


Figure 18 Worker's Perceptions about their Working Environment.

The participants were asked about the perceived challenges in effective interpersonal communication (IPC) at the

workplace. The environmental distractions such as lighting, temperature, noise levels etc. are perceived as the "often faced" challenge by three participants whereas the other three participants consider it as "rarely faced" challenge in effective IPC. One participant "always faced" environmental distractions in the workplace as a challenge in effective IPC. 6 out of 7 participants rated the digital distractions as the most "often faced" challenge in interpersonal communication.

Although 6 out of 7 participants rated the digital distractions as the most "often faced" challenge in interpersonal communication. One outlier faced human and digital distractions in the work environment, but "rarely faced" digital distraction as a perceived challenge in effective IPC. People overlooking social cues, and reading and decoding nonverbal cues like body language, facial expression etc. were "often faced" perceived challenge in effective IPC by the participant.

Although 6 out of 7 participants rated the lack of awareness about preferred means of communication of others as the most "rarely faced" challenge in interpersonal

communication, one outlier "often faced" perceived challenges in effective IPC included distractions, lack of awareness about preferred means of communication of others, lack of awareness about others availability to communicate, and mismatch with others belief system and cultural perspective.

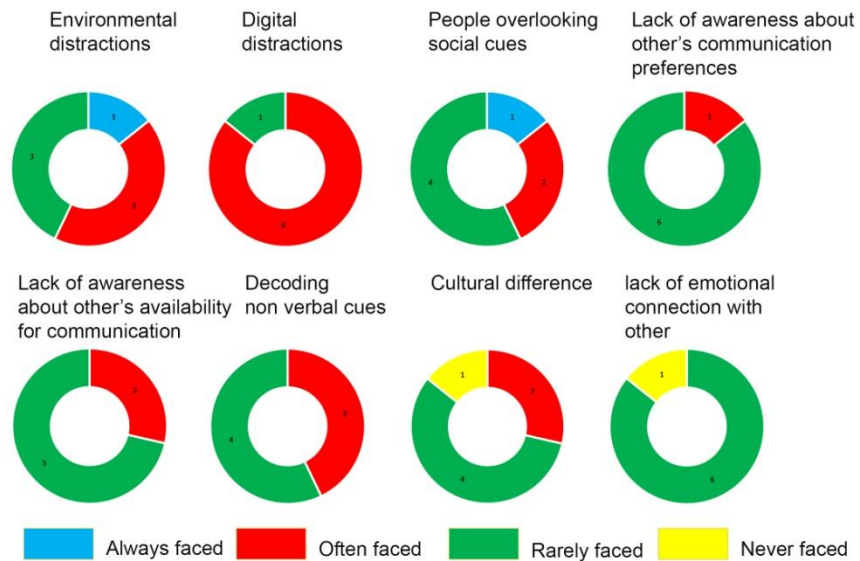


Figure 19 Perceived Challenges in Effective Interpersonal Communication (IPC) at the Workplace.

The survey explored the participant's preferences of using different means of interpersonal communication for various purposes such as knowledge sharing, advice, feedback, motivation, sharing work responsibilities, emotional support,

remote participation. For a given purpose, the participants were asked to choose their preferred means of interpersonal communication such as face-to-face communication, telephonic conversations, written communication such as email, slack etc., video conferencing, visual communication such as videos, graphics etc., social media, online tools or applications. The results were as follows:

- For the purpose of knowledge sharing, all seven participants preferred face-to-face communication followed by written communication such as email, slack etc. (5 out of 7 participants) and social media, online tools or applications (3 out of 7 participants). Some participants also use visual communications such as videos, graphics etc., video conferencing, and telephone for knowledge sharing.
- For the purpose of advice, all seven participants preferred face-to-face communication followed by written communication such as email, slack etc.

(4 out of 7 participants). One participant prefers video conferencing as well.

- For the purpose of feedback, all the participants preferred face-to-face communication followed by written communication such as email, slack etc. (3 out of 7 participants). One participant also preferred video conferencing and telephone along with face-to-face and written communication.
- For the purpose of motivation, all the participants preferred face-to-face communication. Other preferred mediums were written communication, video conferencing, social media and telephone. No participant preferred visual communication such as videos, graphics for motivation purposes.
- For the purpose of sharing work responsibilities, the participants preferred written communication such as email, slack etc. (6 out of 7 participants), face-to-face communication (5 out of 7 participants) followed by video conferencing (3 out of 7 participants), telephone

(1), visual communication (1). No one preferred social media for sharing work responsibilities.

- For the purpose of emotional support, the participants preferred face-to-face communication (6 out of 7 participants), written communication such as email, slack etc. (4 out of 7 participants). Besides these mediums, two participants preferred social media as well. No one preferred visual communication such as videos, graphics or telephone for emotional support.
- For the purpose of remote participation, the participants preferred video conferencing (6 out of 7 participants), written communication such as email, slack etc. (4 out of 7 participants) followed with telephonic conversations (2).

One participant chose face-to-face interaction as the only preferred form of interpersonal communication for all of the above-mentioned purposes

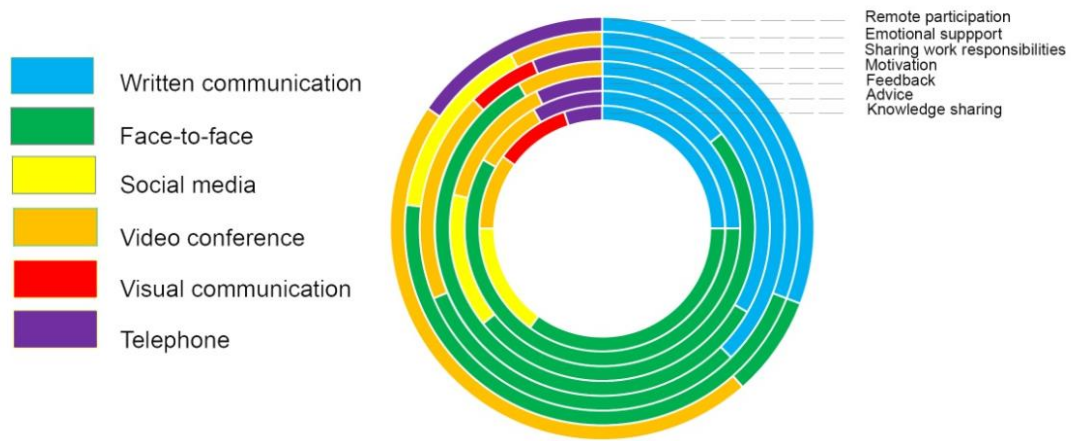


Figure 20 Participant's Preferred Means of Interpersonal Communication for Various Purposes.

The participants were asked to rate the "extent of impact" the interpersonal communication in the workplace has. According to the participants, the effective interpersonal communication has a "great impact" on the ability to collaborate (6), morale (6), job satisfaction (6), emotional well-being (5), and loyalty to the organization (5). Work efficiency was impacted by a "great" (4) and "somewhat"(3) extent by the interpersonal communication (IPC) at the workplace. Individual's ability to focus was impacted by "somewhat" (4) and "great" (2) extent by IPC at workplace according to survey results. Only one participant felt that IPC impacts the ability to focus to a " little extent".

The participants were asked to select the factors that can help in effective interpersonal communication in their workplace. The factors such as the knowledge about co-workers communication style, preference (6 out of 7 participants), self-awareness about communication style and pattern (5) followed by self-awareness about positive and negative emotional triggers (4), knowledge about co-workers interests and skill sets (4), the ability to block physical, digital and social distractions at workplace (4), and the ability to communicate personal availability for social interactions (3) are considered helpful factors in effective interpersonal communication in the workplace. To this question, one of the participants shared an additional comment that *"weekly demos of projects people have been working on sparks conversations and helps identify others within the organization that shares mutual interests/skills"*.



Figure 21 Factors that can Help in Effective Interpersonal Communication at the Workplace.

The last question of the survey was an open-ended type to state up to three design features/ improvements in their work environment for effective interpersonal communication. The responses were focused on all the three aspects i.e. environmental/ physical design, technological tools, and social cues and behaviors for effective IPC in the workplace. The environmental features included high ceilings, the presence of natural light, more control over lighting, better light levels, acoustics, better soundproofing, more quiet HVAC etc. The importance of collaboration and networking with co-workers was also brought up for effective interpersonal communication. The participants expressed their preferences for physical spaces such

as small stand-ups room for short, informal meetings and break out rooms, lounge areas, comfortable armchairs for more comfortable collaboration. The preference of communication tools like Slack for fast, efficient communication over emails in many cases was mentioned. One participant responded, *"Closed off workspaces, remote working, decoding visual cues (ie, headphones are on = Slack me, don't talk to me in person"*.

5.4.2 Organization Y

A team of 5 employees was sent out an online survey to understand the interpersonal communication at their workplace. The survey was filled out by the following employees in organization Y, Toronto:

- One Account Manager
- Four Relationship Manager

The core roles of the above employees are as follows:

- Account Manager- Responsible for development and achievement of sales through the direct sales channel.

- Relationship Manager- Responsible for client management and growing business with existing clients.

On a typical day at work, most of the time spent by all the participants are at their workstation. 2 out of 5 people also use the enclosed meeting room and sit near outside view and daylight beside their workstation. One participant also spends most of the time of the day at play and wellness zone, besides the workstation and enclosed meeting room, and near outside view and daylight. One participant also spends most of the time of the day at lounge or collaboration space, besides the workstation and enclosed meeting room.

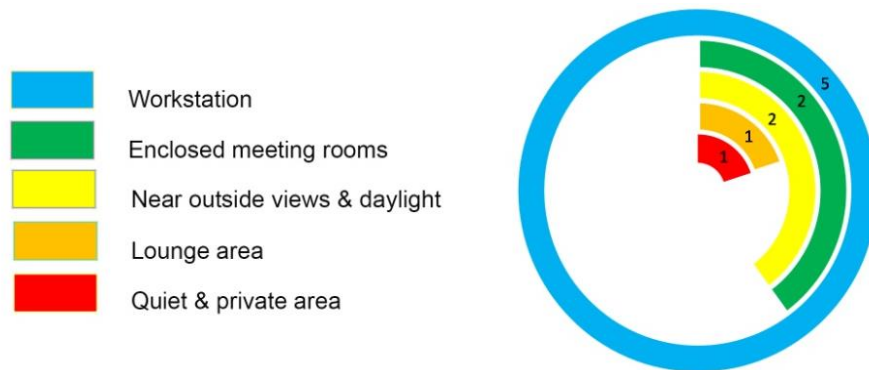


Figure 22 Most Amount of the Time Spent (On Average) by Participants at Various Locations on a Typical Day at the Workplace.

The participants spend different amounts of time of the working day using various means of communication. 30-50% of the time of the working day is spent on written communication such as slack, emails by 4 participants. 20-30% of the time of the working day is spent on telephonic conversations with 4 participants. Up to 30% of the working day is spent on social media and online tools by 4 participants. Up to 30% of the working day is spent on face-to-face communication by 3 participants. Up to 20% of the working day is spent on video conferencing by 4 participants. Up to 10% of the time of the working day is spent on visual communication like videos, graphics by 4 participants.

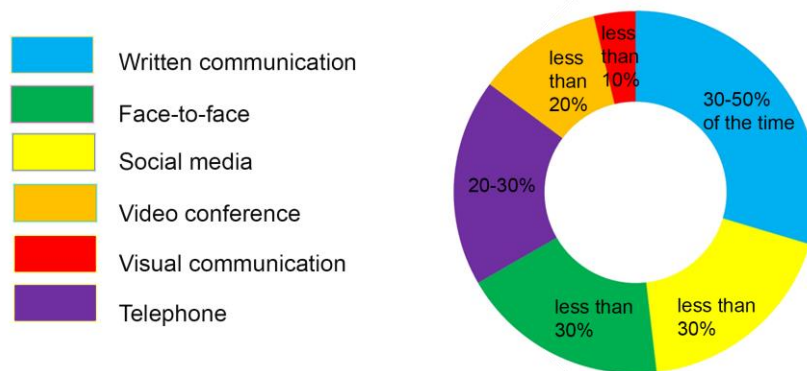


Figure 23 Time (in percentage) of Working Day Spend on Different Modes of Interpersonal Communication by the Participants in Organization Y.

The participants were asked about the perceptions of their current working environment. All 5 participants felt that it allows them to collaborate, and 4 out of 5 participants felt that it allows them to focus. 2 out of 5 participants felt that it allows them to focus, collaborate and be creative, however, face distractions such as visual, human and digital distractions in the working environment. All 5 participants face human distractions in their work environment. 2 out of 5 participants face all types of distractions such as visual, acoustical, human and digital distractions.



Figure 24 Worker's Perceptions about their Working Environment.

The participants were asked about the perceived challenges in effective interpersonal communication (IPC) at the

workplace. The environmental distractions such as lighting, temperature, noise levels etc. are perceived as the "often faced" challenge by 2 out of 5 participants, "rarely faced" challenge by 2 out of 5 and "never faced" challenge by one participant in effective IPC. The digital distractions such as notifications, social media etc. are perceived as the "often faced" challenge by 2 out of 5 participants and "rarely faced" challenge by 3 out of 5 participants. In addition to environmental and digital distractions, one participant also considers people overlooking social cues as a perceived challenge in IPC. The mismatch with others belief system and cultural perspective is "rarely faced" challenge by 3 out of 5 participants, "often faced" by one participant, "never faced" by one participant in IPC. The lack of awareness about others availability to communicate and reading and decoding nonverbal cues like body language, facial expression are considered as "rarely faced" challenges by all participants in IPC. People overlooking social cues, lack of emotional communication with others and lack of awareness about preferred means of communication of others are "rarely faced" challenges in IPC by 4 out of 5 participants.

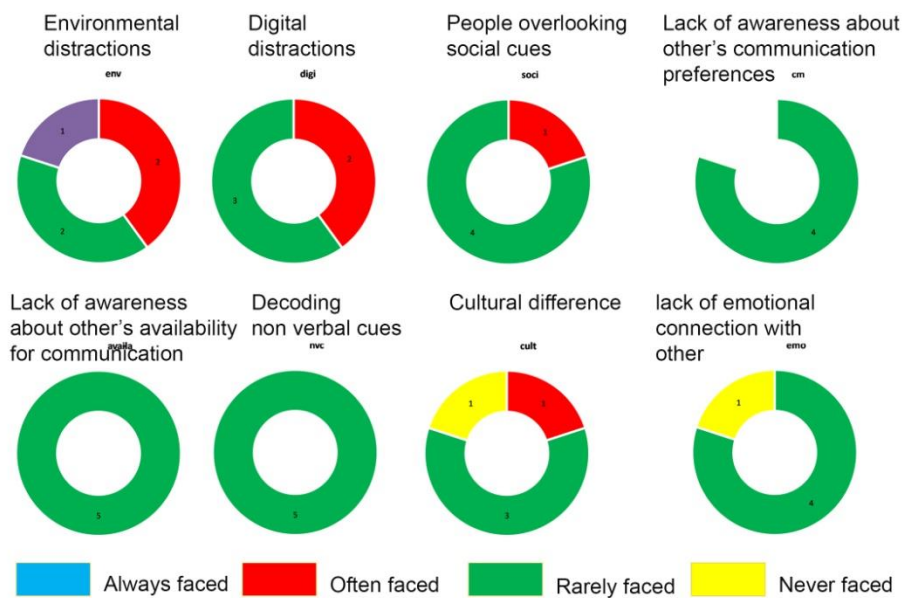


Figure 25 Perceived Challenges in Interpersonal Communication (IPC) at the Workplace.

The survey explored the participant's preferences of using different modes of interpersonal communication for various purposes such as knowledge sharing, advice, feedback, motivation, sharing work responsibilities, emotional support, remote participation. For a given purpose, the participants were asked to choose their preferred means of interpersonal communication such as face-to-face communication, telephonic conversations, written communication such as email, slack etc., video conferencing, visual communication such as videos,

graphics etc., social media, online tools or applications. The results were as follows:

- For the purpose of knowledge sharing, 4 out of 5 participants preferred face-to-face communication followed by video conferencing (2 out of 5 participants) and social media, online tools or applications by one participant.
- For the purpose of advice, all five participants preferred face-to-face communication followed by telephonic conversations (2 out of 5 participants) and video conferencing(2 out of 5 participants).
- For the purpose of feedback, all five participants preferred face-to-face communication followed by written communication such as email, slack etc.(2 out of 5 participants). One participant also preferred video conferencing and one participant preferred telephone along with face-to-face and written communication.
- For the purpose of motivation, all five participants preferred face-to-face communication. Other preferred mediums were visuals such as videos, graphics (2 out of 5), video conferencing, and social media.

- For the purpose of sharing work responsibilities, all five participants preferred face-to-face communication followed by telephonic conversations (3 out of 5 participants), and video conferencing (2 out of 5 participants).
- For the purpose of emotional support, all 5 participants preferred face-to-face communication. One participant also preferred telephonic conversation and video conferencing.
- For the purpose of remote participation, the participants preferred telephonic conversations (4 out of 5 participants), video conferencing (3 out of 5 participants), written communication such as Email, Slack (2 out of 5 participants), and social media, online tools and applications (2 out of 5 participants).

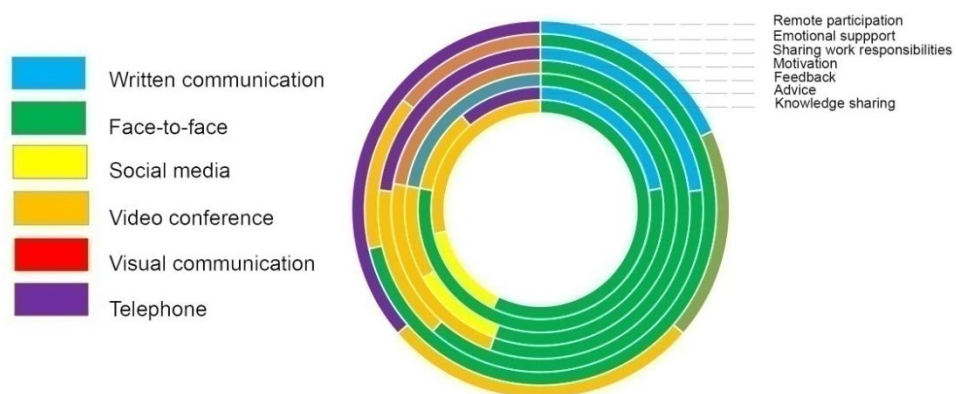


Figure 26 Participant's Preferred Means of Interpersonal Communication for Various Purposes.

The participants were asked to rate the extent of impact the interpersonal communication in the workplace has. According to the participants, the effective interpersonal communication has a "great impact" on the ability to collaborate (3), morale (2), job satisfaction (2), emotional well-being (1), and loyalty to the organization (1). Work efficiency was impacted by "somewhat" (3) and "a little" (2) extent by the interpersonal communication (IPC) at the workplace. According to the participants, the effective interpersonal communication has a "somewhat impact" on ability to focus (3), work efficiency (3), loyalty to organization (3), morale (2), job satisfaction (2), emotional well-being (2), and ability to collaborate (1).

The participants were asked to select the factors that can help in effective interpersonal communication in their workplace. The factors such as the knowledge about co-workers communication style, preference (3 out of 5), self-awareness about positive and negative emotional triggers (3 out of 5), knowledge about co-workers interests and skill sets (2), self-awareness about communication style and pattern (2), the

ability to block physical, digital and social distractions at workplace (2), and the ability to communicate personal availability for social interactions (1) are considered helpful factors in effective interpersonal communication in the workplace.



Figure 27 Factors that can Help in Effective Interpersonal Communication at the Workplace.

The last question of the survey was an open-ended type to state three design features/ improvements in their work environment for effective interpersonal communication which was not answered by any participant.

5.5 Interviews

Post the survey results, one-to-one semi-structured interview with a worker was carried out to gather in-depth information about interpersonal communication within the open-plan workplace. The participant work requirements involve one-third of collaboration and two-thirds of focus or individualized work. He expressed the organization as a great working environment that does not create any sort of barrier to the focus related tasks. However, he sometimes moves away from his desk in open-plan to a small room with a door or prefers working from home to avoid any disturbance during work tasks that require continuity or longer focus. Also, verbal cues such as *"I got to be in a meeting in two minutes"* or *"let's catch up later"* are commonly used during unplanned interactions to avoid long conversations at a busy time. Some people pick up on the verbal cues right away whereas some people don't. The participant was asked about how the readiness or availability for social interaction is indicated to others? He expressed that headphones have become a socially accepted norm in the workplace, which

means although it is not a rule set by the organization, but workers have learned or become accustomed to it. The headphone and device screens are used as nonverbal cues to decide if a person should be interrupted or not. Although what's happening on a screen is the deciding factor, for example, one may be approached without hesitation if shopping online or doing any leisure activity. However, if a person is suspected to be busy on his/her screens, for example, is seen working on Google spreadsheet, Slack is preferred to send a message as it is considered as a less intrusive channel and provides receiver the flexibility to respond later. Although Slack allows a faster exchange of messages, it can be overwhelming to keep track of every message. Participant also expressed the importance of context in written communication channels like Email and Slack as the ambiguity in the message can sometimes create worry in others. The participant expressed that after an emotionally exhausting day, moving out from the situation or a bike ride helps in clearing off the mind. Also in case of unplanned interactions, scheduling a meeting to another time when there is more energy to participate in the conversation is preferred. The

stress may not always be work related, therefore a good work-life balance as well as ability to manage time well can be helpful for emotional well-being.

The organization also allows pets like dogs which are sort of tension breaker and create a happy place to work. The organization gives a lot of attention in the hiring process to have diverse, gender balanced and culturally fit employees in the workplace. When asked about integrating emotional intelligence in the workplace, the participant suggested that every organization has a way of codifying behaviors and differs in ways to handle conflict, to handle people's interest in an equitable workplace, and to handle opportunities for people to express themselves. Therefore *learning about techniques that companies with "good culture" adopt in their hiring policies, in diversity and inclusion policies can inform the decisions about a product design. It would be useful for start-up companies or companies that have a sudden growth to learn from other companies about the different prototypes or ideas that guided an ultimate solution.*

As per observations and in-person interview with the manager and employees, the flow of interpersonal communication in the open-plan workplace can be interpreted as the following:

- Sender (of the message) reads nonverbal cues of the receiver (of the message) which informs whether the receiver is busy or not. If the receiver is wearing headphones, it suggests that the receiver is engaged in something. Then the sender confirms by looking at the screen of the receiver to predict if anything important is taking place. However, the steps lack a cue to determine receiver's choice/availability for interpersonal communication.
- Sender decides a suitable communication mode based on the length of conversation and the response required from the receiver. If a short and quick conversation is needed, then Slack is preferred. If a long conversation is needed and response can be delayed, then the meeting is often

scheduled on Calendar, However, if a long conversation is needed and the response is urgent, then the receiver is interrupted for a face-to-face interaction or Slack is used depending upon the preferences of the sender. The step lacks information about receiver's preferred communication channel.

- The receiver's mood impacts the availability for communication as well as choice of communication channel. For example, if the receiver is stressed, may not be ready for a long, and technical discussion or may want to talk to a close friend to have a light conversation. Therefore it is essential to determine if the receiver is stressed or whether emotionally available for IPC or not.

6 Discussion

The participants in both the organizations are mainly in managerial positions and their job responsibilities involve a range of focus and collaborative tasks. Most of the time of the day is spent on their workstation followed by meeting rooms.

Both the organizations are designed to foster collaboration and social bonding within the teams. Although open-plan workplace provides a great opportunity to work closely with the team and build stronger social relationships, it also encourages social interruptions, acoustical and visual distractions and digital disturbances. In both organizations, human distractions, as well as digital distractions, were perceived as a common challenge in the working environment. The survey found the digital distractions are as the most "often faced" challenge in interpersonal communication.

The survey results and interviews of both case study organizations revealed that most commonly perceived challenges in interpersonal communication were (1) environmental distractions (2) digital distractions (3) people overlooking social cues, and (4) decoding non verbal cues. Also, the most essential factors to improve interpersonal communication were (1) knowledge about coworkers communication style & preferences (2) self- awareness about positive and negative emotional triggers (3) self-awareness about communication style

& preferences, and (4) knowledge about coworkers interests & skill sets.

The survey results of both the organizations revealed face-to-face communication as the most preferred one for purposes such as knowledge sharing, advice, feedback, motivation, and emotional support. The computer-mediated communication is widely used across the organization not only for remote participation or bonding with virtual team members but also for interpersonal communication within the visual range. In the open-plan workplace, the participants prefer modes which enables them to communicate in an unobtrusive way and to receive a quick response. The research found that the work today demands a quick response, and impromptu feedback, however too much collaborative demand of work leaves with little time to "catch up" with a busy schedule which may lead to stress and emotional exhaustion in the workplace.

The case study revealed that nonverbal cues such as a headphone or looking at receiver's screens act as a vital cue for the sender in deciding a suitable mode of interpersonal communication for a specific purpose. However, these cues lack the receiver's preferences and availability for interpersonal communication based on on-going emotions.

Emotions are conveyed mainly through nonverbal cues such as body language, facial expression, voice intonations that shapes people's behavior at the workplace. Emotions are an integral part of humans that need the right channel or outlet during interpersonal communication for effective exchange of messages. Both the forms of interpersonal communication, face-to-face communications and computer-mediated communications are essential for different situations. "The idea is not to turn away from digital technologies but to develop a more self-aware relationship with them and with humans," says Sherry Turkle (Turkle, 2015). However, it requires a conscious decision to choose the right mode of IPC based on the purpose

of communication, personality, communication style and preferences of others.

Constant exposure to noise can hamper attention levels as well as intellectual, psychomotor, and memory functions specifically while attempting to multitask (Plaxton, 2017). Noise distractions and misunderstanding of social cues can disrupt interpersonal communication and the negative impact is greater when individuals are stressed. Also, negative emotions can be contagious and cause a negative work environment, therefore the need to manage emotions becomes crucial to ensure healthy social relations and a positive work environment. Managing emotions at workplace take efforts but the payoff is big. It helps not only in employee well-being, social relationships, and work performance but also in enhanced job satisfaction, organization emotional culture and organization outcomes. The importance of physical and mental well-being is widely acknowledged in organizations but still exists a gap in awareness about how the employees feel in the workplace.

As the literature review suggests a significant relationship between the different generations, personalities and their preference of communication channel, the research could not analyze on these factors due to a small sample size of the participants. However, the future studies can further explore how the sender chooses communication channels for a specific purpose based on receiver's characteristics such as personality, communication style, and generation and if these preferences of communication channels changes with emotional changes of the receiver.

7 Design Prototype

7.1 Concept Generation

Through analysis of literature review, observations, survey result, and individual interviews, some key insights were:

- Open-plan workspace is great for collaboration but poses issues to perform a range of focus and collaborative tasks simultaneously.

- The workers extensively use nonverbal cues to read others, especially to predict coworkers' availability for social interaction.
- Emotional Intelligence (i.e. awareness about your own feelings and feelings of other coworkers) can positively impact interpersonal communication and teamwork in the workplace.

The following themes were identified during the research that leads to a potential design prototype:

- Distractions within in a collaborative team
Noise is a major barrier to effective interpersonal communication as well as for work performance, particularly in open-plan workplaces. How can diverse workforce work efficiently with one another without any distractions such as noise?
- Culture of transformation
In the information technology industry where hard skills change rapidly, social skills can also be seen to be

an essential part of the industry distinct from technical skills. How can organizations facilitate emotional intelligence i.e. self-awareness and self-improvement in their workers?

- Awareness about diverse needs of the workers

In a dynamic workplace with constantly changing needs, how can an inclusive model be adopted to ensure equitable participation from diverse stakeholders?

7.2 The potential of *Affect Sensing Technology*

There is growing research on what is called "affect-sensing technologies", however, the implementation of mood-monitoring technology is relatively scarce in the context of the workplace. Since a diverse workforce has different spans of attention and responds quite differently to external stimuli, self-awareness about positive as well as negative emotional triggers due to external stimuli can be a useful tool for work performance in the workplace. A multi-sensor system by Kapoor and Picard (2005)

for affect recognition and hence the prediction of student's interest in their learning environment was amongst the first successful attempts in the field of emotional recognition (Asta Roseway, 2015). More recent examples such as SmartHelicity, AffectAura, and BioCrystal include affect-sensing, employing one or more multi-modal technologies including facial recognition, audio, visual, physiological and contextual data (Asta Roseway, 2015). The existing mood-sensing mobile applications rely on regular user inputs or self-reporting for assessing emotions which limit its usage especially in a busy context like the workplace.

Although a combination of multi-modal sensors increases the accuracy of *affect* classification, the design prototype presented in this research works only on facial recognition and physiological measurements in order to expand its usability in the workplace setting. The design prototype presented in the research will be based mobile application independent of regular user inputs and will allow users to anonymously report about the emotional responses to the workplace, particularly to their

management if desired. In addition, the technologies such as speech and text analysis are not included to assess affect recognition, in order to make this prototype a less intrusive model for use by the worker.

7.3 Workflow of Design Prototype

The collected objective non identifying data, including physiological and expression measurements is then visually represented to the user and prompts them to choose a suitable interpersonal communication (IPC) mode such as *Available, Do Not Disturb, Meeting or Away* based on their real-time emotions, work mode and communication preferences, to indicate their availability for communication and collaboration with others. The design prototype is inspired by the concept of *emotional intelligence* and works in correlation with the following components:

- Sensors to track emotional and physiological well-being using facial recognition API and fitness tracking devices such as Fitbit,

- Mobile Application to provide analyses of emotional well-being and for setting interpersonal communication mode and preferences.
- Digital screen on workstations to display work mode for a team based on individual IPC modes.
- Digital screen at the entrance to search for the worker's work modes, availability for interpersonal communication and preferred communication channels.

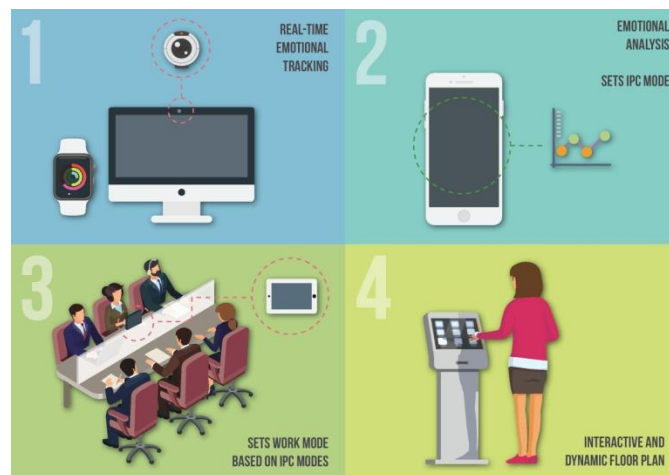


Figure 28 Workflow of Design Prototype

7.3.1 Real-time Emotional Tracking

Emotions and stress can be associated with physiological changes such as releases of hormones, increased heart rate,

breathing, blood pressure, skin conductance (A.Grandey, 2000). Since the facial recognition is a relatively new concept to measure affect, and can possibly create errors at times of surface acting(which implies to hiding honest emotions) by the individual, the emotions of worker are predicted using both physiological data from fitness trackers (like Fitbit)and facial recognition software such as AFFDEX by Affectiva(as shown in figure 28). For tracking real-time emotions of the workers, the arousal is measured using physiological data such as heart rate and the valence is measured using facial expressions. The following four affective states (as shown in figure 29) are predicted and displayed by different colors on the mobile application.

- High Negative Affect
- Low Negative Affect
- High Positive Affect
- Low positive Affect



Figure 29 Real-Time Facial Tracking by AFFDEX SDK Application

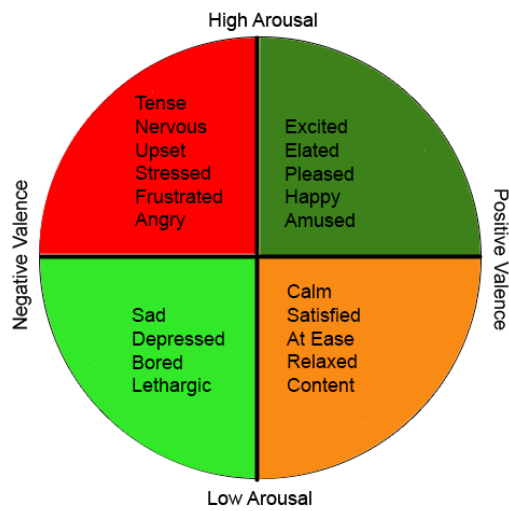


Figure 30 Arousal vs. Valence Classification of Emotions adapted from Russell Model of Affect (Russell, 1980)

7.3.2 Setting Interpersonal Communication (IPC) Modes

The workers can set the following interpersonal communication (IPC) modes depending upon the work activities, ongoing emotions and communication preferences, explained as below:

- Available Mode- When a worker is available for computer-mediated communication (CMC) and/ or face-to-face interaction.
- Do Not Disturb mode- When a worker is not available for communication through any channel.
- Meeting mode- When a worker is engaged in a physical or virtual meeting and is available only for Asynchronous CMC.
- Away mode- When a worker is not in front of the computer/ laptop and is available for CMC and/or face-to-face interaction.

Based on worker's emotional well-being through physiological data and facial recognition, the mobile application

suggests a suitable IPC mode, which can be overridden by the user. The flow diagram (in figure 30) shows how the mobile application suggests different IPC modes using emotional data and device usage.

1. Away mode- When worker is not in front of the computer/ laptop and is available for CMC and/or face-to-face interaction.
2. Do Not Disturb mode- When worker is not available for communication through any channel.
3. Meeting mode- When worker is engaged in a physical or virtual meeting and is available only for Asynchronous CMC.
4. Available Mode- When worker is available for computer-mediated communication (CMC) and/ or face-to-face interaction.

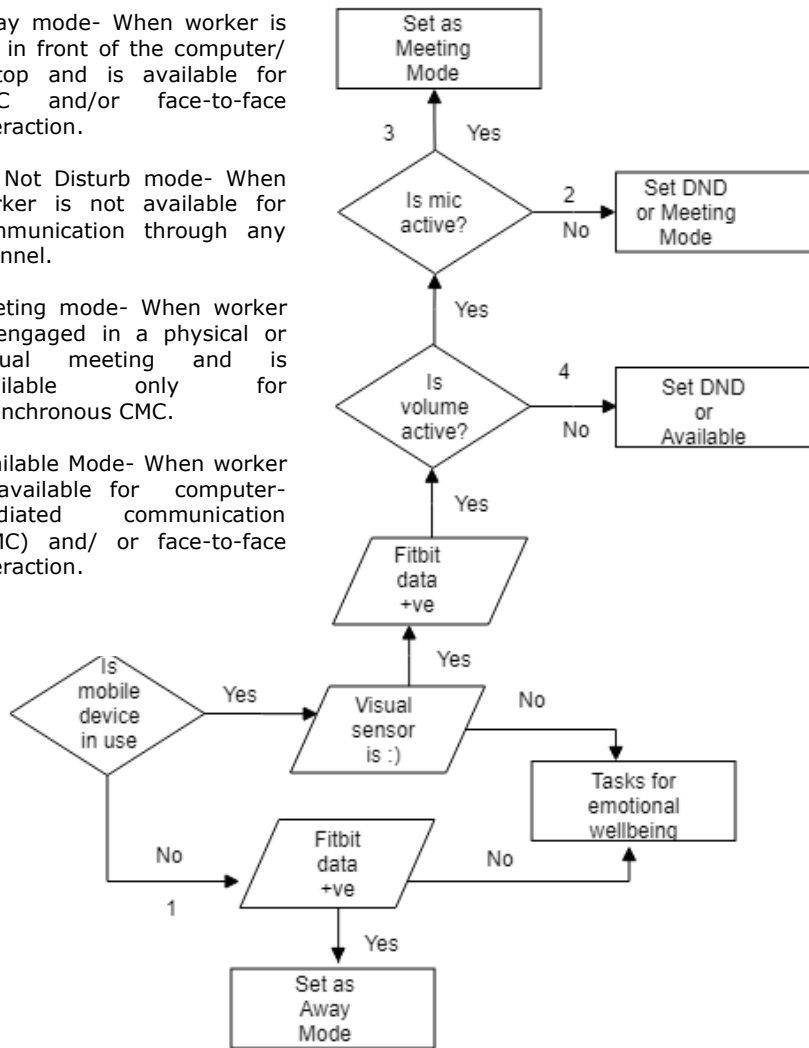


Figure 31 IPC Work Modes

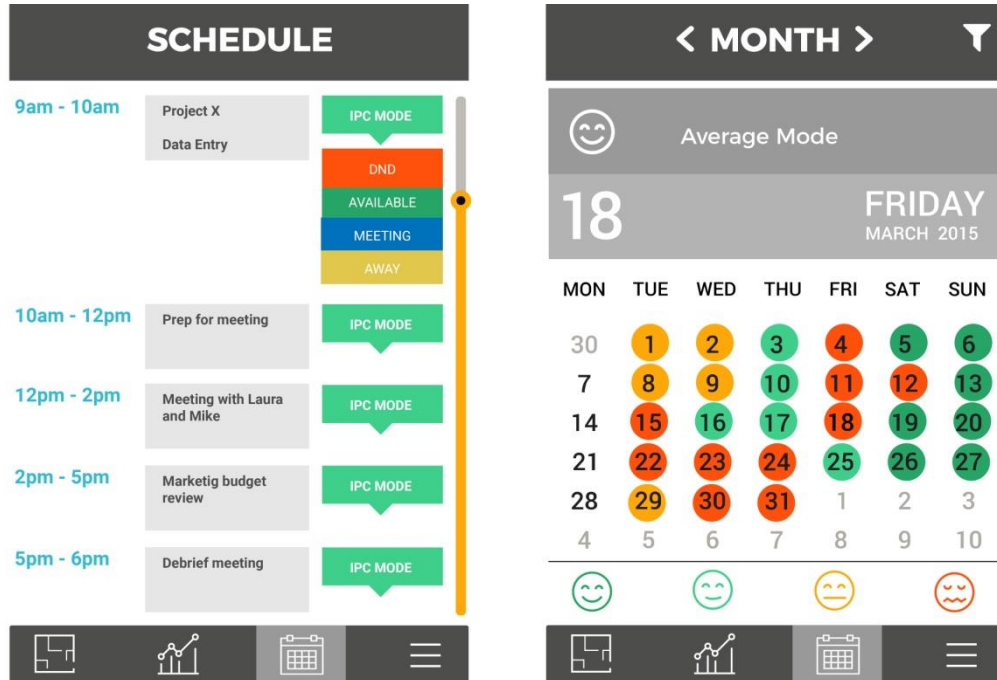
The mobile application enables workers to effectively communicate and collaborate at most optimal times by creating self-awareness about emotional well-being as well as awareness about coworkers communication preferences. The mobile application consists of the following features:

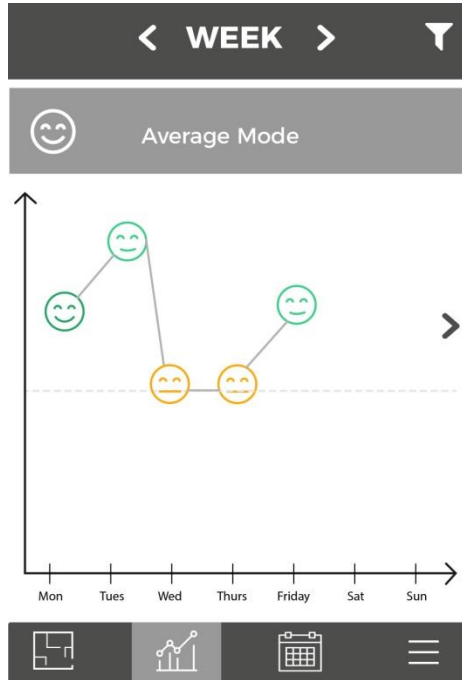
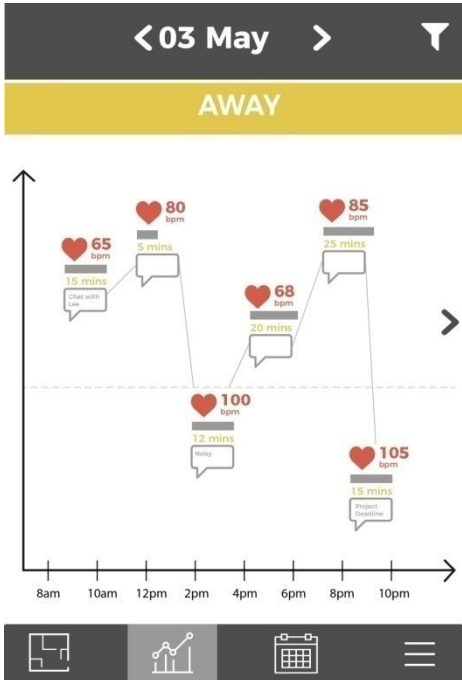
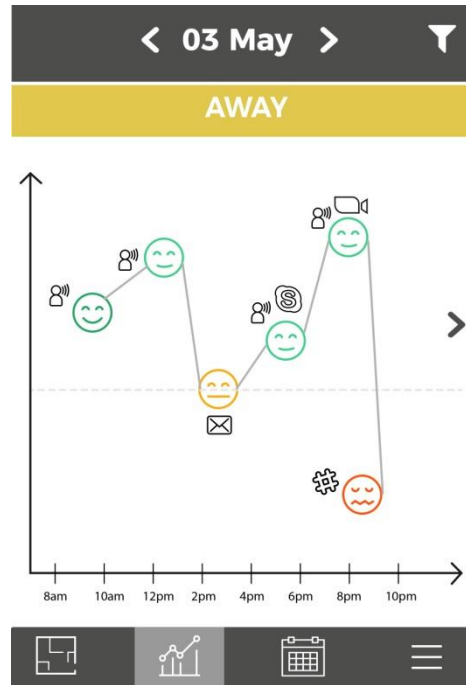
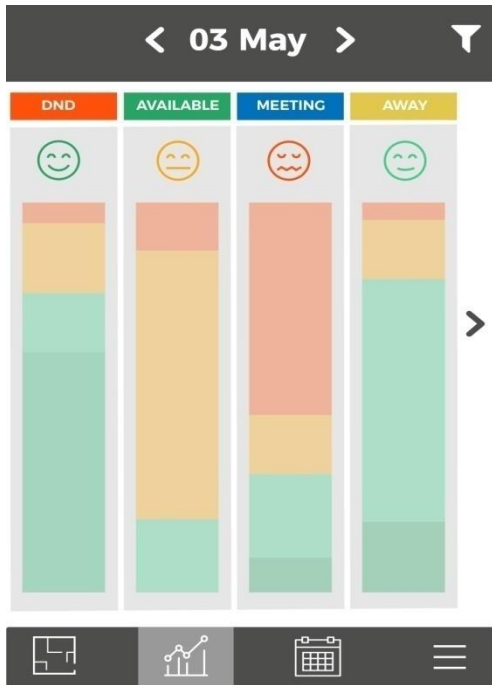
- Analyzes workers emotional well-being using real-time physiological data (from Fitbit) and facial recognition (from computer/laptop camera) to create self-awareness about emotional triggers during the day.
- Allows workers to set IPC modes such as *Available, Do Not Disturb, Meeting and Away* for indicating their personal availability for interpersonal communication as well as their preferred means of communication(face-to-face and/or computer-mediated communication) to the coworkers in the workplace.
- The mobile application can be synced with a digital calendar to automatically set a Meeting mode for all the planned meetings throughout the day.

- During high negative affect over a prolonged period, the mobile application suggests workers to set Do Not Disturb (DND) mode and tasks for emotion regulation, especially negative emotions such as anxiety, anger, frustration etc. for emotional well-being and to prevent negative emotional contagion.
- Allows workers to self-evaluate their emotional well-being during interpersonal communication i.e the possible causes of positive and negative emotional triggers throughout the day. It provides key findings of the emotional analyses on a weekly basis based on emotional patterns and user evaluations.
- The real-time emotional tracking is co-related with time, duration, location and IPC modes. It suggests the most appropriate communication channel based on past records of emotional well-being during interpersonal communication. For example, if the emotional patterns show that worker Josh is generally stressed on Mondays during his face-to-face meeting with colleague Nate, then the mobile application will suggest Josh to

book a virtual meeting through a communication channels such as Skype, Zoom or another platform instead.

The mobile application can be effective in ensuring a positive and healthy work environment by helping workers to recognize the sources of emotions (such as stress, anxiety, sadness etc.), implement personal positive coping strategies, as well as anonymously share the factors of negative emotions with the management of the organization if desired.





< WEEK >

Did you know?

4 pm meetings were emotionally exhausting.

You had the most positive interaction with Mr Nash this week.

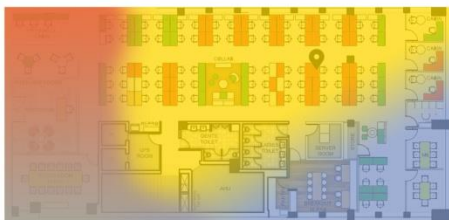
Coworkers checked your IPC modes about 35 times this week.



< SEATING PLAN >

Emotional Map

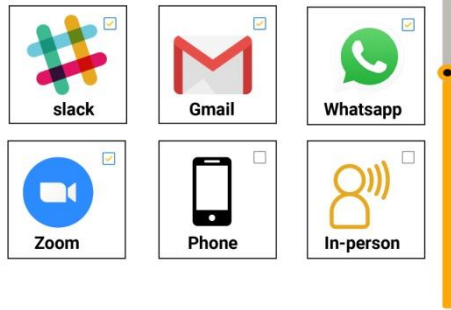
Search



< IPC MODE >

AVAILABLE

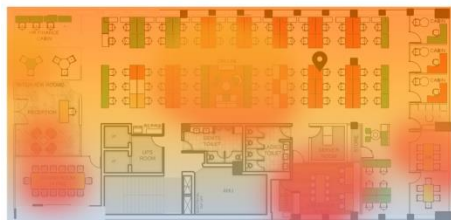
Set this mode to allow incoming messages, alerts and media through selected communication channels.



< SEATING PLAN >

Sound Map

Search



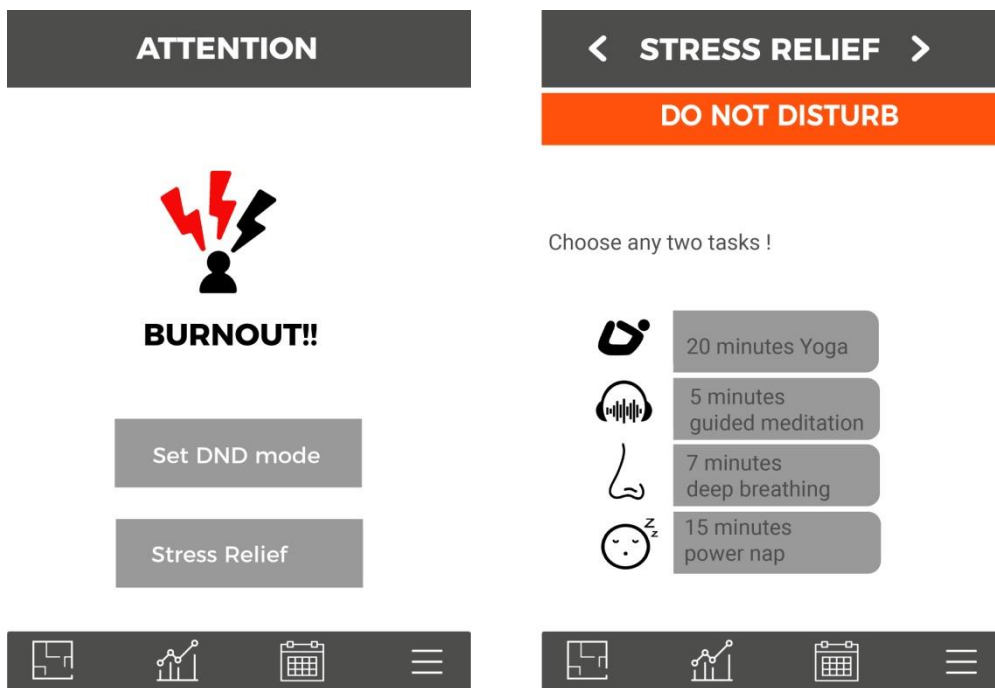


Figure 32 User Interface of Mobile Application

7.3.3 Communicating Work Mode of the Team

The IPC modes (such as *DND*, *Meeting*, *Away*, *Available*) are also analyzed to predict a shared work mode of a group of workers sitting together. A digital screen, located at the workstation is synced to the mobile applications of workers and displays shared work mode, namely focus or collaboration work mode. As an example:

- If the majority of workers have set DND mode in their respective mobile applications, then the screen displays focus mode.
- If the majority of workers have set Available mode in their respective mobile applications, then the screen displays Collaborative mode.
- If someone has set Away mode, meaning they are away from their workstation, then the set mode is not counted as part of the collective communication or interaction setting.
- Finally, if someone has booked a room for a meeting, then Meeting mode is not counted, unless there is a change in the mode setting.
- However, if someone has preferences for work environment other than the prior set work mode, the mobile application can also be used to find a suitable spot within the workplace for an ad hoc group or meeting collaboration.

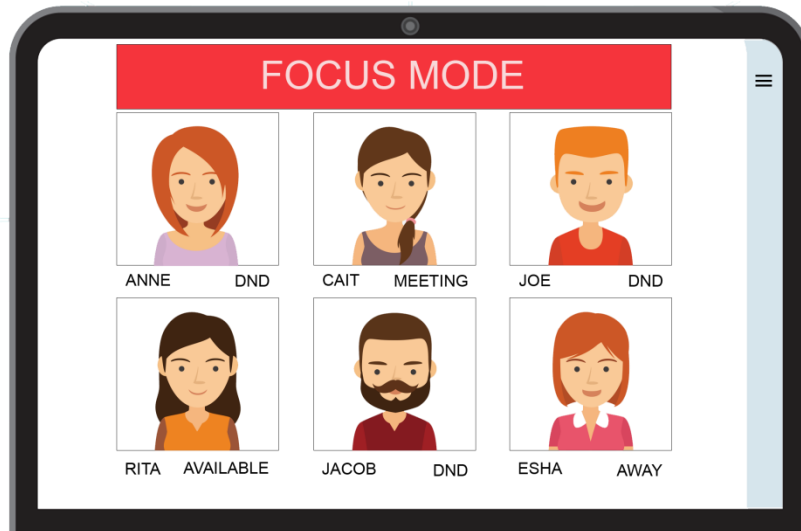


Figure 33 Collective Work Mode of Group on a Screen

7.3.4 Dynamic and Interactive Floor Plan

Since the nature of work in the open-plan workplace is dynamic, where individuals switch locations throughout the day based on focus and collaborative demands of their work, the typical floor plan seems outdated to capture this movement and should be replaced by a corresponding dynamic floor plan at a location visually and physically accessible to all. Real-time emotions of workers are collectively integrated and represented

as a visual emotional climate of the organization. The dynamic floor plan shows real-time information such as collective work mode (focussed vs. collaborative working zones, for example), emotional climate (calm vs. stress working zones), and noise level (quiet vs. noisy working zones) of the organization.



Figure 34 Dynamic & Interactive Floor Plan

The presented design prototype is a personalized tool to manage interpersonal communication based on individual needs and preferences, which can be adopted in the contemporary workplace to benefit the employees, the

employer and the designer of the environment, be it physical space or virtual platforms for collaboration and communication. The emotional association with spaces needs further consideration by designers. The design prototype can be a great tool to map end-users perspectives of the spaces and benefit architects and designers to find answers to questions such as "*Is the design functioning as intended?*" "*How people feel in the space?*" "*How can the design improve user experience?*". However, to ensure an effective interpersonal communication in the workplace, the worker diversity in terms of generation, abilities, personality, communication needs and preferences should be valued and included in the ideation, creation and implementation process for the optimal strategies and solutions of workplace communication.

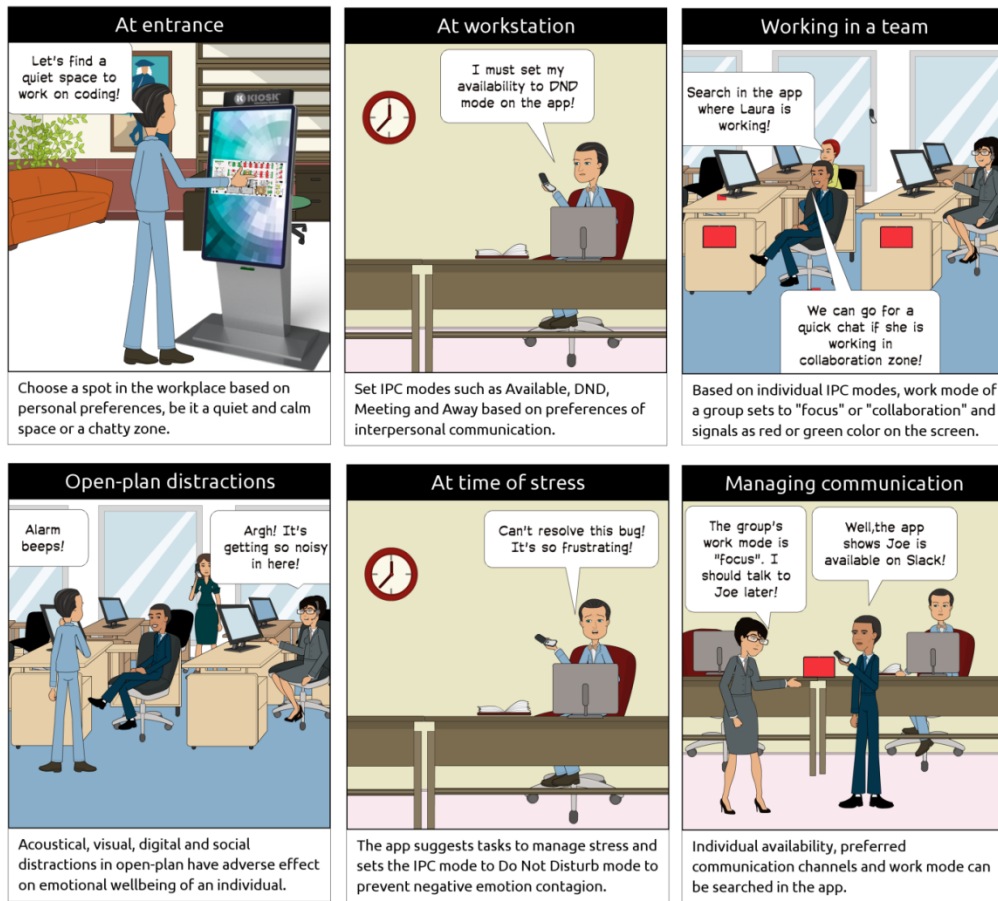


Figure 35 Storyboard of Design Prototype

7.4 Inclusive Working Environment

In today's work environment, the teams are interdisciplinary, self-directed and involve engagement beyond the team and the hierarchies have reduced. In order to ensure

high-performance work systems, removing barriers, open communication and holistic inclusive approach are key factors.

Inclusive Design refers to designing products, tools, services, and processes "*inclusive of the full range of human diversity with respect to ability, language, culture, gender, age and other forms of human difference*" (Inclusive Design Research Centre)

The book Strategy and Place by Martha.O'Mara highlights the following features of high-performance teams (pp. 261-263)that align with the principle of Inclusive Design and should be considered while designing workplace polities, strategies, and solutions:

- Difference-Respect diversity in terms of the varied backgrounds, points of view, style of work as well as their conflicting perspectives and responses.
- Interdisciplinary- Should embrace heterogeneity as it broadens team's ability to function in different scenarios and modes.

- Egalitarian- Should facilitate collective effort and participation in all stages.
- Self Managing-Allow sufficient autonomy for workers to manage their work environment based on their working needs.
- Information-Rich- Provide transparency in information exchange. Enable teams to see the whole picture themselves.
- Flexibility-Adaptability to changing nature of work and workforce.

"Segregated solutions are not sustainable economically or technically. Inclusively designed personalization and flexible configurations must be integrated to maintain interoperability and currency" (Inclusive Design Research Centre)

Inclusive Methodology must be adopted in the workplace, involving different stakeholders such as employees, employers, designers, and management to co-create strategies and tools. Conducting engaging workshops and co-creation sessions is an inclusive method to capture individual's point of view, brainstorm

solutions and decide an implementation plan. For example, WorkfloMAP model by Greg Dekker, Teknion can be used by organizations to understand working preferences of a diverse workforce.

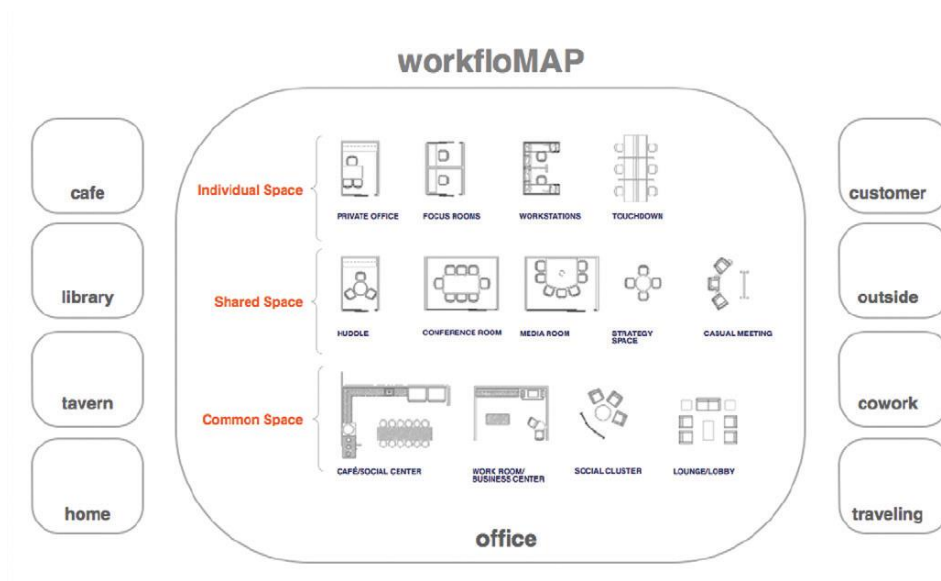


Figure 36 WorkfloMAP by Greg Dekker

Biomapping technique by Christian Nold can be also used to map worker's emotional responses to their working environment and collectively ideate design solutions involving workers, management, and the designers.

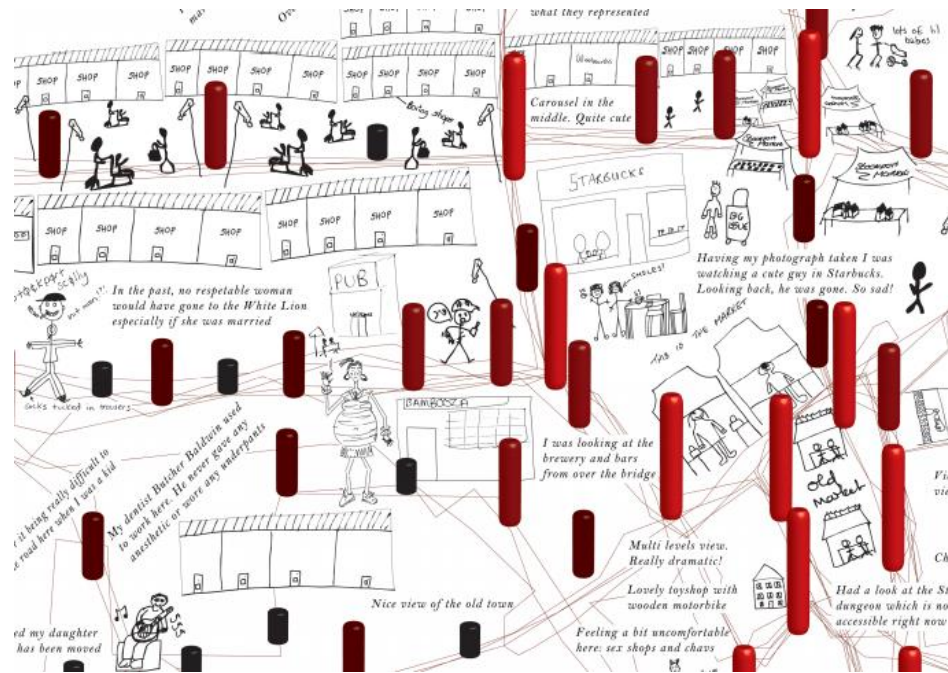


Figure 37 Stockport Emotion Map by Christian Nold

8 Conclusion

The research found that effective interpersonal communication not only implies to the effective transfer of a message between the sender(encoder) and the receiver(decoder) but also self-awareness as well as awareness of receiver's availability for communication, and choosing the right means of interpersonal communication based on that knowledge. The availability refers not only to the receiver's

physical presence but also the emotional well-being and desire of engaging in social interactions.

Empowerment of employees is linked to *positive feelings about territory, belonging, ownership, place, and attachment, and participation in the design of the workplace* can give greater satisfaction in the results (Vischer, 2008).

Inspired by the concepts of Emotional Intelligence and Inclusive Design, the presented design prototype allows workers to manage interpersonal communication based on emotional wellbeing, and communication preferences of self and other coworkers. The design prototype aims to benefit at three levels:

- Individual level: Self-awareness and regulation of emotions to ensure the emotional well-being and prevent emotional contagion during interpersonal communication.
- Group level: Awareness about emotional availability, communication preferences of other coworkers to prepare for interpersonal communication.

- Organization level: To ensure the positive emotional culture and healthy social relationships within the organization, Inclusive Design approaches like co-design sessions should be adopted to reflect, design and implement with the diverse workforce rather than for diverse workforce. The intrinsic data of the individuals can be converted into a collective emotional map of the organization in real time and can serve as a great resource for designing workplace on the basis of how workers feel in spaces.

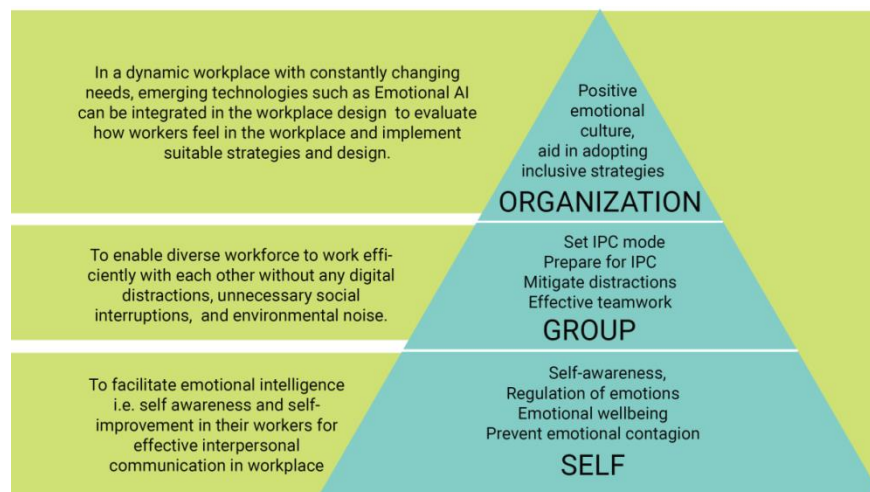


Figure 38 Three Tiers of design prototype

Inclusive design, as conceptualized by the Inclusive Design Research Centre, OCAD University extends in three dimensions. (1) Recognizing diversity and uniqueness of end users and fostering self-awareness in end users (2) Adopts inclusive processes and tools, and (3) Aim to create a broader beneficial impact that extends beyond the intended user group.

Different stakeholders such employees, employer, designers, technicians must be involved in different stages of the design process such as evaluation, ideation, and implementation. Understanding individual differences, as well as their emotional responses, are essential while designing for positive experiences in the workplace. The future workplace should leverage technologies such as Emotional Artificial Intelligence to detect complex and nuanced human emotions and cognitive states for assessing collective emotional well-being at the workplace.

The design prototype can be implied to any kind of organization for mitigating distractions in the open-plan workspace, caused due to unmanaged interpersonal communication. However, the research findings are only limited

to small sampling of two case study IT organizations in Toronto and further needs participation from stakeholders involving employees, management, and designers etc for evaluations such as feedback and user testing of the design prototype.

The scope of Emotional Intelligence (EI) technologies have a great potential in the context of workplace and hence, future studies should further explore emerging technologies such as Emotional Artificial Intelligence to improve social behaviors and habits in relation to interpersonal communication at the workplace

9 References

(n.d.).

A. Grandey, A. (2000). Emotion Regulation in the Workplace: A New Way to Conceptualize Emotional Labor. *Journal of Occupational Health Psychology* , 95-110.

Altmann, E. (2014). Momentary interruptions can derail the train of thought. *Journal of Experimental Psychology* , 215-226.

Asta Roseway, Y. L. (2015). BioCrystal: An Ambient Tool for Emotion and Communication. *International Journal of Mobile Human Computer Interaction* , 20-41.

Ben Waber, J. M. (2014). Workspaces that move people. *Harvard Business Review* .

Bente, G. &. (2011). Virtual gestures: Embodiment and nonverbal behaviour in computer-mediated communication. *Face-to-face communication over the internet* . New York: Cambridge University Press.

Borzykowski, B. (2017, January 11). *The solution for open office frustration*. Retrieved January 2, 2018, from BBC Capital: <http://www.bbc.com/capital/story/20170105-open-offices-are-damaging-our-memories>

Canada's Workforce Has a Productivity Deficit:ADP Study. (2016, November 22). Ottawa, Ottawa, Canada: Canada NewsWire.

Choong Yong Heng, R. Y. (2013, October). Generation Gap; Is There any Solid Solution?From Human Relation Point of View. *International Journal of Economy, Management and Social Sciences* , 837-840.

Clements-Croome, D. (2006). *Creating The Productive Workplace*. New York: Taylor & Francis.

Daniel McDuff, M. A. (2016). AFFDEX SDK :A Cross-Platform Real-Time Multi-Face Expression Recognition Toolkit. *CHI EA Proceedings of the 2016* , 3723-3726 .

Garde-Perik, E. v. (n.d.). *Getting a GRIP on work-related stress - CRISP Repository*. Retrieved January 10, 2018, from CRISP: http://www.crisprepository.nl/_uploaded/1631-1b.pdf.

Gowan, N. J. (2016). Cognition and Return to Work. *OOHNA* , 12-17.

Grandey, A. A. (2000). Emotion Regulation in the Workplace: A New Way to Conceptualize Emotional Labor. *Journal of Occupational Health Psychology* , 95-110.

Hardy, I. (2015, May 8). Losing focus: Why tech is getting in the way of work. *BBC News,New York* .

Howard, J. (2016, July 29). *Americans devote more than 10 hours a day to screen time, and growing*. Retrieved April 14, 2018, from CNN Health:

<https://www.cnn.com/2016/06/30/health/americans-screen-time-nielsen/index.html>

Inc., P. (2015, May 12). *Canadians now have shorter attention span than goldfish thanks to portable devices: Microsoft study*. Retrieved 01 22, 2018, from National Post: <http://nationalpost.com/news/canada/canadians-now-have-shorter-attention-span-than-goldfish-thanks-to-portable-devices-microsoft-study>

Inclusive Design Research Centre. (n.d.). Retrieved 04 08, 2018, from Inclusive Design Research Centre: <https://idrc.ocadu.ca/index.php/resources/idrc-online/library-of-papers/443-%20whatisinclusivedesign>

Jin Nam Choi, G. H. (2015). Does Emotional Intelligence Matter in Interpersonal Processes? The Mediating Role of Emotion Management. *Seoul Journal of Business* , 45-70.

Kristina L. Guo, Y. S. Chapter 4 :Workplace Communication. In N. Borkowski, *Organizational Behaviour in Healthcare* (pp. 75-108). sudbury, massachusetts: Jones and Barlett Publishers.

Krohn, F. B. (2004). A Generational Approach to Using Emoticons as Nonverbal Communication. *Journal of Technical Writing and Communication* , 321-328.

Lindzon, J. (2017, 3 25). *A device that puts the work back in the workplace*. Retrieved 4 6, 2018, from The Globe and Mail: <https://www.theglobeandmail.com/report-on-business/careers/management/putting-the-work-back-in-the-workplace/article16551675/>

Lindzon, J. (2014, January 29). Putting the 'work' back in the workplace: A desktop device that ... *The Globe and Mail* , p. B17.

Lutchyn, Y., Johns, P., Roseway, A., & Czerwinski, M. (2015). MoodTracker: Monitoring Collective Emotions in the Workplace. *International Conference on Affective Computing and Intelligent Interaction (ACII)* , 295-301.

Mahbub Rashid, K. K. (2006). Spatial layout and face-to-face interaction in offices—a study. *Environment and Planning B: Planning and Design* , 825-844.

Managing Emotions in the Workplace: Do Positive and Negative Attitudes Drive Performance? (2007, 04 18). Retrieved 02 24, 2018, from Knowledge@Wharton. The Wharton School, University of Pennsylvania: <http://knowledge.wharton.upenn.edu/article/managing-emotions-in-the-workplace-do-positive-and-negative-attitudes-drive-performance/>

N. Kamarulzaman, A. A.-G. (2011). An Overview of the Influence of Physical Office Environments towards Employees. *Procedia Engineering* , 262-268.

Nold, C. (2009, December 5th). Emotional Cartography: Technologies of the self.

O'Mara, M. A. (1999). *Strategy and Place*. New York: The Fress Press.

Peter Salovey, J. D. (1990). Emotional Intelligence. *SAGE journal* , 185-211.

Plaxton, H. (2017). Communication, Noise, and Distractions in the Operating Room: The Impact on Patients and Strategies to Improve Outcomes. *ORNAC Journal* , 13-22.

Prensky, M. (2001). Digital Natives, Digital Immigrants. *MCB University Press, Vol. 9 No. 5* .

Rayasam, R. (2016, 12 12). *Capital*. Retrieved March 15, 2018, from BBC: <http://www.bbc.com/capital/story/20161208-you-probably-suffer-from-scattered-brain-syndrome>

Russell, J. A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology* , 1161-1178.

Rylander, R. (2004). Physiological aspects of noise-induced stress and annoyance. *Journal of Sound and Vibration* , 471-478.

Sherblom, J. C. (2010). The computer-mediated communication (CMC) classroom: A challenge of medium, presence,. *Communication Education* , 497-523.

Steven B. Wolff, D. (2005). *Emotional Competence Inventory (ECI) Technical Manual*. HayGroup.

Turkle, S. (2015, September 26). Stop Googling. Let's Talk. *The New York Times* .

Turner, A. (2015). Generation Z: Technology and social interest. *The journal of Individual Psychology* , 103-113.

Venter, E. (2017). Bridging the communication gap between. *International Journal of Adolescence and Youth* , 497-507.

Walmsley, A. L. (2011, October/November). Closing the Communication Gap. pp. 25-26.

Woollaston, V. (2013, October 8). *How often do you check your phone?* Retrieved January 1, 2018, from Daily Mail UK: <http://www.dailymail.co.uk/sciencetech/article-2449632/How-check-phone-The-average-person-does-110-times-DAY-6-seconds-evening.html>

Appendix A: Semi-Structured Interview

Greetings

R: Can you describe your job role.

I: (part removed for anonymity)

1/3 of the work is in collaboration with others and 2/3 is on my own.

R: According to you what is effective interpersonal communication?

I: Honesty, Clarity, Articulating what your objectives are if I am having a discussion with somebody, communicating the purpose of

discussion, if I am hoping to participation from that person, I want to be very clear and upfront.

R: Where does unplanned interaction take place?

I: I am generally very open to those unplanned interactions, I today had a good conversation with somebody today over lunch, something which was very productive. But if am busy, I expect this from anyone that I might bump into for chatting, to provide some verbal cue that you know I got to be in meeting in two minutes but let's catch up later or if you are getting a sense that conversations could go longer, then letting that person know that you have a limited amount of time to speak and just being upfront about that.

R: Do you feel the verbal cues deliver the intended message?

I: Generally yes, some people are more sensitive to those verbal cues than others, so some people pick up on them right away, some people start by saying like do you have a couple of minutes to chat before they start talking. I am somewhere in the middle, I think. If I need to repeat a verbal cue, then I will.

R: Do you face any distraction while doing an individualized task?

I: I would typically say no. There are times when I do realize in advance that I am going to be writing a piece of content or writing a proposal that I know I would need several hours focus, I will move myself from my desk and either find a stand-up room, which is a very small room with a door, so I won't be disturbed or I work from home, that the other alternative.

R: But you don't prefer working in an open space while working on an individualized or focused task?

I: 90% of the time its fine. If I am writing a very long piece of work, I need several hours of uninterrupted focus, usually, I work from home or I'll find a separate quiet room like a meeting room that is not occupied.

R: How do you indicate to others your readiness or availability for social interaction? Do you use nonverbal cues?

I: It's not a hard and fast rule but sometimes if somebody has their headphones on, you don't bother them, that is something I have learned or become accustomed to over the last several years or I look at what they have on their screens sometimes too and if I could see if they are _____, I generally don't bother them because I understand that _____ is one of the things that takes a lot of time to get back to where you were if you interrupt somebody. So if I look that they are looking at their vacation pictures or they are on Amazon like shopping or something, I won't hesitate to speak with them. If they are clearly in the middle of spreadsheet or writing some code then I won't bother them. Headphones depend again on sometimes you see what on screen plus the headphones, to say that they are pretty focused. And you can also use Slack, we use Slack a lot and Slack is a good way to send somebody a message even if they are not visually around, even you are not sure whether they might be working from home, they might be in the office and say like let me know if you have five minutes to catch up, I just want to have a quick chat with you about whatever it is. Also, another thing is that I try to give some context that if I do send somebody a message or an email to say hey, I want to chat with you about something, instead of

making it vague, which sometimes creates worry in people like how come you don't want to tell me. And 99% of the time, if it's not anything bad, I will often tell people ahead of time like I just want to catch up with you to discuss that project or to discuss this client or something that they know what it is that we are talking about. Just only because the ambiguity sometimes is worse than..you think you are just saying I want to catch up with you and its like you know..

R: If it's with remote people, as you said Slack is perfect but if you have people around you, sitting two desks away, do you still prefer using Slack for impromptu feedback or advice or you?

I: Yeah unless if I suspect they might be busy, might be occupied with something else, I'll use Slack because that is an unobtrusive way to give your attention and they can respond when they need to or sometimes if I need somebody's email address or phone number, piece of information, it's easier for them to reply via Slack than it through a conversation.

R: And you, yourself prefer using headphones while doing focused work or something else?

I: Yeah just kind of the soft.

R: so it's the standard

I: Yeah

R: I am looking at emotional intelligence in the workplace too, so when you are in a bad mood or you feel emotionally exhausted, do you prefer hinting to others in some way that maybe you are not available for communication or?

I: I am generally not like that very often, although towards the end of the busy day if I am emotionally exhausted, if somebody wants to engage me in a long conversation or something, i will say lets talk about it tomorrow or lets book a meeting, like I am not shutting down a conversation but just differing a conversation to a time when I have more energy or just go home, I will just remove myself out of the situation and say I had a super busy day, I don't want to deal with anything else, I just need to like you know to go home and watch Netflix or something to clear my head or usually I will ride my bike, even after the busiest day, when my brain is full, a 30 minute bike ride home is enough to clear my head.

R: And you said you don't face too many challenges in the open workplace and 90% of the time when you're doing individualized tasks, you are working either in the closed space or working from home. Yeah right?

I: Yeah and I don't think our open spaces are too loud and people are generally very respectful of people around them so that's also a part of the culture, like a social Norm that has been created here is respectful about the open workplace.

R: Do you feel any challenge or barrier in communicating with others in your workplace and how do you deal with such situations, if you face?

I: The only communication challenge that I would say is related to the workspace itself but often you do need 10 minutes of somebody's time or half an hour, it is difficult to get that when you need it in timely fashion, like it might need you to say I want to talk through this project with you and they'll say like look I'm completely

booked for the rest of the day, I'm not here tomorrow so it's trying to find out the time sometimes to get people's schedules but that's not an environmental issue it's just really a scheduling issue. slack is one that we use a lot it's good for short communication, it's a bit faster because you don't necessarily have to go through the same social conventions like you know hello, how are you.

R: Throughout the day, which things would you call emotional triggers for you, like what makes you happy, what makes you sad?

I: The only thing that I would say is that often if you have 4-5 meetings in a day, every meeting often comes with some actions that you need to complete and often when you go from one meeting to another meeting you have 30 minutes for lunch that you try to squeeze in lunch and then you have to go into another meeting and you feel like you never catch up so after a day of 4-5 longer meetings that all have actions to come up, that's meant to be somewhat exhausting because you're shifting gears quite a bit. That's about all I would say. So I try to manage dad and I try to book time in my calendar often if the day looks like it's already got three meetings booked, I might book 30 minutes after a meeting that I know is important so that I book myself some time to catch up on my notes and somebody else doesn't book me into a meeting right after.

R: And is that everything? According to you what makes it very pleasant for you to work?

I: Yeah I think natural light it's a big thing and our office is designed in such way that workspaces are close to windows, arranged so that the desks are all around the perimeter as opposed to all in the middle. In some offices, the executives would get the corner offices

and then there was a kind of turn around. Personally, I don't feel I have a lot of emotional triggers, I'm not somebody who get easily stressed out. I have been doing this for 20 years or more. I'm comfortable making decisions and managing my time. and I'm in a position where I have a lot of control of my schedule so if I need to leave work early because my wife's working late I need to go pick up the kids or if I have a doctor's appointment or whatever we have a system to let people know when the team if you are going to work from home or if you are getting late. it takes me 10 seconds to send a message I don't need to ask for somebody's approval so those things that feel like I have control over my life. the feeling that I have control over my life and in the workplace respect my responsibilities to get my work done I often work maybe until 6 or 6:30 in the evening when I'm busy or I might work from home on the weekend and do things on my own but I know it's important I know what needs to get done and the company has faith in me to manage my own time and doesn't create a lot of rules and regulations around this is what you have to do if you have to leave work early one day or whatever so that removes a lot of stress so it's often from the things from outside the work-life that complicates things and that's what stresses you out when you have a conflict between what my work wants me to accomplish on what my life needs me to accomplish. the other thing we have children a couple of people who regularly bring their dogs to the workplace and having a dog around is actually a really nice thing for a lot of people I think too. I like them and dog just exude a certain attitude of like everything's fine like life is great you know food water one place like you should be happy, what you're complaining about so I think that's kind of nice thing, sort of tension breaker when you see a happy dog in the office

you can't help but be happy. I also think it takes a long time to hire people, there are many interview stages but one of the most important thing is cultural fit so understanding even when 120 people that every person we hire , we want to feel like they're somebody that we would want to spend time with socially and culturally it's a good fit and we want a diverse Workforce we want a gender balanced Workforce we want to ensure that that isn't too much of any one thing in terms of who we hire and also the personality of those people sort of just feels right that we feel like they have a good fitting and they are great and there is a lot of attention paid to that which may be some other companies don't but because of that you genuinely end up working with people who enjoy whom they work with.

R: During the hiring process, are there any assessments of social skills or to identify the cultural fit?

I: I don't know what the HR team does it's part of the process how they assess cultural fit do they have some kind of Matrix I don't know but I could find out.

R: Do you think emotional intelligence could help in better social relationships in the workplace?

I: yeah I think it's extremely important

R: Do you think digital integration into the physical environment in form of visual cues or inform of some app to track and self-regulate your emotions would help?

I: I think that there are things that develop over the time. So I am trying to think about what the product would look like that I would use you know if I was because I think we have ways of doing that we kind of codify behaviours as a company and every company is

somewhat different in terms of how they handle conflict, how they handle people's interest in an equitable workplace, how they handle opportunities for people to express themselves like on every Friday we do demos, so we have 3 demos that anybody can come up and do like a 5 to 10 minutes demo on whatever they want, might be talking about a project they worked on might be talking about hobby they have, might be about the book they read. So for me, I think what would be more useful would be a way to capture how companies that have really good culture what are the techniques that these companies use in hiring policies, in diversity policies in policies around dogs how to do a deal when you have employees who are allergic to dogs are afraid of dogs. how do you support that how do you come up with a work-from-home policy that's not going to mean that people are just goofing off not actually doing work when they work from home how do you establish that kind of things those to me are the bigger problems to tackle. how does a company improve by learning the lessons of other companies that have already gone through and tested five to six different ways of doing something and ultimately they came up with. For us like this was the best solution. So maybe can you take those lessons and maybe put that into a product. Because the goal of this ultimately to help a company that started with like two to three Founders and then got to 25 people and now they're like 50 people and I know they're going to be like 200 people and they are people who started off as a software company or a product company or service company or whatever, but they started out very small. They never came to this with decades of management and how to run a company, so now they have to figure this out. Something that actually helps companies implement the best practices that other companies

have developed and shared and maybe around that there is some kind of a framework like a net promoter score or something like that which allows employees on a monthly basis to provide feedback. So what like overall general happiness with, maybe each month you pick up a different thing or ask the classic net promoter question like *how likely would you be in the space to recommend a friend or a colleague to come and work at this company assuming that they will qualify*. The net promoter score can help identify which place is doing well, which place is doing very poorly. If the whole bunch of people has said the similar thing, then that needs to be fixed at this location or ask what makes a location get a high score. It is a very easy way to have a standard practice.

R: I am looking at Emotional Intelligence as a methodology in the workplace, like self-awareness about emotional triggers, can help in regulating and managing them for positive behavioral changes. And how all this data can help the management in an anonymous way and even architects and designers to redesign workplaces.

I: What is interesting about Emotional Intelligence is that some people are naturally quite good at it and some are not. I am curious how effective EI naturally is or people just always regress back to like maybe, they are aware of these things and two or three weeks after they have taken a course in EI, do they just regress back to where they were, is it something you can effectively teach people. And the other thing is that in terms of personal interaction, how I might, my default personality is something that works extremely well with these six people and maybe doesn't work really well with other 6 people, and maybe it's just terrible with one of those people. The reality is that when you do something or don't do something and the other person is

upset or offended as a negative reaction or has a positive reaction to it, their reaction is real, doesn't matter what my intent was, what justification I have for saying that thing. I think that's the part of EI, you need to recognize, you need to be aware, not just like your motivation for why you think saying something is justified or the way you did something was justified made sense to you, you can't assume that everybody else will be equally fine because it made sense in your head. Everybody else may have a different reaction to that and their reaction is entirely valid. It comes back to saying that company developing a culture and company developing its kind of own social norms, I think that's kind of the most effective way. If you develop a strong enough culture, it self-polices. I think a good company creates a variety for everybody, you want to make it open so that if you have a changing lifestyle like if you have a baby or if you are not feeling satisfied with the kind of work you are doing, you are frustrated by it and you think you can provide more to the company, we want to make sure that there is a dialogue which you can have with us, maybe we can improve it because if we want to keep you as an employee, we want you to be happy. If there are training opportunities that you think would greatly help you to be able to do your job, then we want to be open to that. A company should aspire to have an open culture where communication, ideas are heard. And the workplace itself is the sort of thing that you want to create a feedback that you are talking about. What is about the environment that you can make better? what are the simple things we can do? Can we create a broad communication round saying like if someone has got their headphones on, don't bother them unless like you have a meeting at 1:30 and its 1:30, then sure tap on the shoulder but let's collectively agree that if

somebody has their headphones on means that go back to your desk and send them a slack message so that they can respond to when they want.

R: And even the organizations can learn about how workers are feeling in the workplace so as to collectively decide on the social norms of the organization.

I: Yeah. Cool

R: Thank you very much. It was great. I appreciate you for taking out time.

Mapping a day at work

Job title
I am

For me , effective interpersonal communication is....

	Morning	Early Afternoon	Late Afternoon	Evening	Remote
Activities					
Comm. Channel					
Location					
Thinking /feeling					
Challenges					
Facilitators					
Opportunities/Innovations					
<ul style="list-style-type: none"> ● Touchpoints/key moments ● Challenges encountered ● Opportunity areas/ Scope for improvement 	I would further want to say...				



Figure 39 Template and Thinking Cards

Appendix B: Survey Questionnaire

Version 1 of survey questionnaire

Inter-Personal Communication at Workplace

* Required

1. Which generation you belong to? *

Mark only one oval.

- Traditionalist(born before 1946)
- Baby Boomers(born between 1946-1964)
- Generation X(born between 1965-1980)
- Millennials(born between 1980-1994)
- Millennials(born between 1980-1994)
- Generation Z(1995-2009)

2. Job Title and description *

Q-1 On a typical working day, how much time(on average) do you spend for inter-personal communication at the following locations? *

Mark only one oval per row.

	least amount of time	less amount of time	more amount of time	most amount of time	don't have access
Workstation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hot desking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Enclosed private room	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enclosed meeting room	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lounge or a collaboration space	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cafeteria or coffee station	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Play and wellness zone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Private and quiet corner	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Near outside view and daylight	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Natural Outdoors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Work from home	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other locations outside	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q-2 What are the three aspects that positively influence inter-personal communication? *

Q-3 What are three perceived challenges in effective inter-personal communication at various locations in the workplace and how do you respond to these challenges? *

Q-4 Select the different forms of inter-personal communication preferred for the following purposes? *

Check all that apply.

	Face to face interaction	Telephonic conversation	Written communication like Email, Slack	Video Conferencing	Visual Communication like videos, graphics	Social Media, online tools, apps
Knowledge sharing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feedback	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Motivation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sharing work Responsibilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emotional support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Remote participation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q-4b Please specify other forms of inter personal communication and purposes, if any. You could provide additional information for the above question.

Q-5 Which of the following forms of communications do you prefer for peer-peer, peer-manager, remote communications? *

Check all that apply.

	Peer- peer communication	Peer- manager communication	Remote communication
Face to face interaction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Telephonic conversation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Written communication like Email, Slack	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Video Conferencing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Visual Communication like videos, graphics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Social Media, online tools,	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q-6 When and for what purpose do you prefer peer-peer, peer-manager, remote communication?

Q-7 What impact does inter personal communication in the work environment have on your ability to focus?

Q-8 What impact does inter personal communication in the work environment have on stress Levels ?

Q-9 What impact does inter personal communication in the work environment have on work life balance ?

Q-10 What impact does inter personal communication in the work environment have on job satisfaction?

Q-11 What improvements in design of physical and digital work environment would you suggest for effective inter-personal communication? *

Q-12 In the context of following modes, which forms of interpersonal communication would you prefer?

Check all that apply.

	Face to face interaction	Telephonic conversation	Written communication like Email, Slack	Video Conferencing	Visual communication like Videos, graphics	Gestures body language, facial expressions	Social Media, online tools, apps
General Mode	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Silent Mode	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vibrate Mode	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Airplane Mode	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do Not Disturb(DND) Mode	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q-13 Which of the following forms of non verbal communication do you consider important while interacting with your colleagues?

Mark only one oval.

	Least Useful	Little Useful	Somewhat Useful	A lot Useful	Most Useful
Facial expressions(smile/frown/eye gaze)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gestures(waving/pointing)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Para linguistics(tone/pitch)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Body language and posture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Proxemics(personal distance)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Haptics(touch)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical appearance(dressing style)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q-14 In the context of following modes, which forms of inter-personal communication would you prefer?

Check all that apply.

	Acoustic	Visual	Verbal	Haptic (touch,vibration)	Virtual	Olfactory
General Mode	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Silent Mode	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vibrate Mode	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Airplane Mode	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do Not Disturb(DND) Mode	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q-15 Imagine you can set modes to manage your inter-personal communication, which of the these modes will be useful for following activities?

Mark only one oval per row.

	General Mode	Silent Mode	Vibrate Mode	Airplane Mode	Do Not Disturb(DND)Mode
Focus/ Concentration work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Collaborative/ Team Work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informal work discussions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Formal meetings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Creative Thinking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Respite/ Absorbing information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Socializing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unplanned interactions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Version 2 of survey questionnaire

Inter-Personal Communication at Workplace

Which generation you belong to?

Mark only one oval.

- Baby Boomers(born between 1946-1964)
- Generation X(born between 1965-1980)
- Millennials(born between 1980-1994)
- Generation Z(1995-2009)

Job Title and description

Q-1 Rate yourself on the basis of following personality traits.

Mark only one oval per row.

	Most Related	Closely Related	Slightly Related	Least Related
Expressive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Observant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Introspective	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reserved	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Tough-minded	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Friendly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scheduling	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Probing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q-2 Where do you spend most amount of time (on average) on a typical working day?[can choose multiple options]

Check all that apply

- Workstation
- Hot desking
- Enclosed private room
- Enclosed meeting room
- Lounge or a collaboration space
- Cafeteria or coffee station
- Play and wellness zone
- Private and quiet corner
- Near outside view and daylight
- Natural Outdoors
- Remote working

Q-3 How much time(in%) of the working day you spend on the following means of communication?

Mark only one oval per row.

	0-10%	10-20%	20-30%	30-40%	40-50%	50-60%	60-70%	70-80%	80-90%	90-100%
Face- face interactions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Telephonic conversations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Written communication like Email, slack	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Video conferencing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Visual communication like videos, graphics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social media, online tools	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q-4 Which of the following reasoning is the closest to your working environment?[can choose multiple options]

Check all that apply

- It allows me to focus on work
- It has acoustic distractions
- It has visual distractions
- It has human distractions
- It allows me to collaborate
- It has digital distractions i.e. notification, email
- It allows to me be creative
- Other: _____

Q-5 Rate the following perceived challenges in effective interpersonal communication at workplace.

Mark only one oval per row.

	Always faced	Often faced	Rarely faced	Never faced
Physical distractions -Background noise like phone ringing, people talking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Digital distractions- notifications, social media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Misunderstanding due to language, body language	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mismatch with others belief system and perspective	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Disinterest due to state of mind/mood/emotion of the person	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q-6 Select the different forms of inter-personal communication preferred for the following purposes?[can choose multiple options]

Check all that apply.

	Face to face interaction	Telephonic conversation	Email, Slack	Video Conferencing	Videos, graphics	Social Media, online tools, apps
Knowledge sharing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feedback	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Motivation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sharing work Responsibilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emotional support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Remote participation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q-7 To what extent does your inter personal communication in the work environment have an impact on the following?

Mark only one oval per row.

	To a great extent	To somewhat extent	To little extent	Not at all
Ability to focus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to collaborate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Morale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Job satisfaction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Work efficiency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emotional wellbeing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Loyalty to organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q-8 Which of these following can help in effective interpersonal communication at your workplace?[can choose multiple options]

Check all that apply

- Self awareness about your personality, communication style, state of mind
- Knowledge about your co workers-their interests, cultural background
- Ability to block physical, digital and social distractions
- Better understanding of non verbal cues like body language, facial expressions, gestures, tone of others
- Ability to express preferred time, method and means to communicate
- Presence of cues to understand willingness of others for communication at a given time
- Other: _____

Q-9 State up to three design features/ improvements in your physical and digital work environment would you suggest for effective inter-personal communication?

Appendix C: Sources of Images

Image Number	Image Source
1	https://www.plenom.com/products/kuando-busylight-omega/
2	http://luxafor.com/luxafor-flag/
3	<p>"Adaptive Relaxation Space" by "Philips Communications" Licensed under a Creative Commons Attribution 2.0 (CC BY-NC-ND 2.0). Accessed 9th May 2018.</p> <p>https://www.flickr.com/photos/philips_newscenter/10574639513/in/album-72157637121437715/</p>
4	<p>"EmoBracelet" by "Christophe Ducamp " Licensed under a Creative Commons Attribution 2.0 Generic (CC BY-NC-SA 2.0). Accessed 9th May 2018.</p> <p>https://www.flickr.com/photos/christopheducamp/5010551043/in/photolist-8CLog6</p>
5	https://www.microsoft.com/en-ca/store/p/moodtracker/9nblggh095dz#
6	Picture was taken by Author
7	Picture was taken by Author
8	Picture was taken by Author
9	Picture was taken by Author
10	Picture was taken by Author
11	Picture was taken by Author
12	Picture was taken by Author

13	Picture was taken by Author
14	Picture was taken by Author
15	Picture was taken by Author
16	Author's own work
17	Author's own work
18	Author's own work
19	Author's own work
20	Author's own work
21	Author's own work
22	Author's own work
23	Author's own work
24	Author's own work
25	Author's own work
26	Author's own work
27	Author's own work
28	Authors own work
29	<p>" ai_9_2016_nyc-6629" by "O'Reilly Internal" Licensed under a Creative Commons Attribution 2.0 (CC BY-NC 2.0). Accessed 9th May 2018.</p> <p>https://www.flickr.com/photos/145819839@N03/30996533276/in/photolist-AGPHdk-ADqw6w-AEzYUR-G6BYXT-ADoyjd-zLJs9K-9utEir-9utEtr-9utEBX-AFmZY5-JBKEQn-AnYBUA-23vNacJ-zHENUP-JBKesi-23vN9sY-9uwEYY-AGpBBq-M4YB7z-M9e9UA-Eydpb9-P7bGWP-PhgmpR-Pe3Mo3-Pe3MgE-PhfVsr-ovHUmL-P4EAPG-PhfVCr-Mc1Dui-PhfRZz-PheX2v-N8mKVu-</p>

	LeDjoo-LKjk33-LKjjRS-P79D9x-Pe4krw-Pe4hp9-P4EAGC-PhfSRz-Pe4ixw-Pe4jUj-HFpBcz-M4ymaC-MvuLTH-MvuJrZ-Phf8fB-GzUMrT-MvuLfP
30	Author's own work adapted from James A. Russell.1980 " A circumplex model of affect ". Journal of Personality and Social Psychology.
31	Author's own work
32	Author's own work
33	Author's own work
34	Author's own work
35	Authors own work
36	From: Vanessa Vilic Evangelista. 2016. "Creating an Inclusive Learning Environment for Post Secondary Design Education - Synergized design learning in a co designed space"(p 119).
37	"Stockport Emotion Map" by "Christian Nold and Daniela Boraschi" Licensed under a Creative Commons Attribution 2.5 (CC BY-NC-SA 2.5).Accessed 9th May 2018. http://www.softhook.com/stock.htm
38	Authors own work
39	Authors own work