

The Future of Connection: Serendipity and Control in Interpersonal Communication Tools

A collaborative project by

Susan LK Gorbet

Spencer Saunders

authors@futureofconnection.com

Submitted to OCAD University in partial fulfillment of the requirements for the degree of
Master of Design in Strategic Foresight and Innovation

Toronto, Ontario, Canada

December, 2011

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Abstract

This foresight project explored the contemporary trends and tensions inherent in people's experiences with and using interpersonal communication tools. A standard foresight process was overlaid with an experiential lens in order to provide technology designers with useful insights. The outcomes of this project include four tools intended for designers of interpersonal communication applications. These tools include a map of experiential tensions, a landscape of contemporary behaviour, a set of four future scenarios and implications of each, and finally a set of ten reflection questions intended to provoke critical thought about the choices designers make about the balance between serendipity and control in interpersonal communication tools.

Acknowledgements

Thank you to Anne Sutherland and Suzanne Stein for illuminating the path and exhorting us to greater effort on it. Thank you to Lenore Richards, Greg van Alstyne, Peter Jones, Jeremy Bowes, Helen Kerr, Nabil Farnoush and the rest of the SFI faculty for letting us know there was a path in the first place. Thank you to fellow SFI-ers Peter Rose for sharing methodological research, to Madeline Ashby for saving us from formatting hell, to Zan Chandler for moral support, and to the rest of the SFI explorers who braved the path ahead of us and with us. And special thanks to Stacey May and to Matt for being the support team the whole way along.

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1. Introduction

1.1 Tools for Connection

Interpersonal communication between humans is in flux. While the basic human need that drives us to connect hasn't changed in millennia (Kelly, 2010), there are currently new tools for communication springing up on a daily basis. (Frey, 2011)

The designer Bret Victor offers this definition: “A *tool* addresses human *needs* by extending human *capabilities*.” (Victor, 2011) With this in mind, we can view each new communication device or application (“app”) as a *tool* that extends the human *capability* to communicate in ways that are at times trivial and at times profound.

By opening new communication channels and creating new communication rituals, the rapid development of new *interpersonal communication tools* are providing the means to communicate and therefore build “propinquity”, or the psychological feeling of nearness (Korzenny, 1978) , sometimes also called “connection” or “rapport” (Baym, 2010). But despite the possibilities, there are practical limits on our ability to leverage the capabilities that these new tools provide. The way in which people use the tools enormously effects whether they bring us closer or push us apart (Baron, 2008)(Korzenny, 1978).

Many of the current tools fail to give us insight into each other’s emotional state of being in a way that reinforces our social awareness. Danah Boyd calls tools that lack this ability “autistic”, as in being unable to sense and understand emotion (Boyd, 2005).

According to Daniel Goleman in his book *Social Intelligence* (Goleman, 2007), the basis for “rapport” is awareness of and consideration for each others’ emotions—in other words, empathy. In this framing, the tools are reducing human capability, rather than extending it. However, Nancy Baym points out that we are resourceful beings, and we spend a great deal of time and energy putting emotional

cues back in to channels that are lacking them, exemplified by the invention of emoticons (Baym, 2010).

1.2 Serendipity and Control

There are fundamental tensions between the possibilities inherent in the technology and the social ways of being that humans have devised to deal with the delicate dance that is our connection and communication with each other (Baym, 2010). Our ability to engage in the social rituals of communication is not always enhanced by the simple and universal ability to connect (Nowak, Watt, & Walther, 2009). It is perhaps inevitable that our communication tools don't initially recognize or support our attempts at social correctness (Boyd, 2005). We put a great deal of time and energy into learning and using the tools that control and manage our communications (Baron, 2008). Despite being able to communicate easily and through a multitude of tools, we don't always *want* talk to everybody, or anybody. We've worked out a somewhat complicated code for how we approach, when it is acceptable to interrupt, and what are the signals that we send to open a communication (Baron, 2008).

At the heart of much human behaviour around connection is the struggle between the deep need to connect with others and yet the need to maintain privacy, distance, and ultimately control (Turkle, 2011) (Baron, 2008).

Many of the benefits of the "wired" society that we live in is one of discovery, of not knowing what we'll want until we've found it. This desire for discovery has manifest in a number of ways that include tools to let individuals discover new people, places and things. Several of the more paradigm-shattering platforms for interpersonal communication place the principle of discovery, or serendipity, at the centre of their platforms (Dumenco, 2011)

As the number of ways to connect, or "channels" proliferates (Court, French, & Riiber Knudsen, 2006), we must also negotiate between our own preferred channels and someone else's. In many situations, the more choices we as humans have, the

worse decisions we make (Oulasvirta, Hukkinen, & Schwartz, 2009). And yet, these tools are at the same time allowing us to create a sense of rapport, belonging and connection in even more ways than we have previously had available to us as humans (Baym, 2010). And we are adopting them at a breakneck pace (“U.S. Teen Mobile Report: Calling Yesterday, Texting Today, Using Apps Tomorrow,” 2010).

This essential tension between the human need to manage our connections, and the desire for discovery can be thought of as the *balance between serendipity and control*.

As these dichotomies exemplify, the choices we make about how we communicate with each other are becoming more interesting and complex by the month, by the week, and even by the day. Technology designers are adding to the list with vigour (Frey, 2011). With seemingly limitless possibilities for what to create, and yet quite limited resources to work with, what will focus the energies of the creators?

1.3 Design Choices for the Future

What will drive the choices that creators make about how we communicate? Just because the technology will let us connect in a certain way, should we? Are we creating technology to serve us as humans, or are we in service to it, learning and adapting to deal with the newest capability? *Are we designing it, or is it designing us?* This is a question that has been asked by technological philosophers since the earliest days of computing.

“We shape our tools and thereafter, our tools shape us”

- Marshall McLuhan, Understanding Media, 1963

“The technium wants what we design it to want and what we try to direct it to do. But in addition to those drives, the technium has its own wants.”

- Kevin Kelly, What Technology Wants, 2010

The authors' goal is to stretch the brains of the creators and designers of interpersonal communications tools in order to make visible the ramifications of the design choices that every creator must make constantly. Rather than just outlining what is possible, we hope to provoke designers to make conscious choices about the design of the modes of communication, the features, and even the simple controls that they create or leave out.

It is with this intent that we frame our research around the question:

In the next 5-10 years, what factors will designers need to take into account to create interpersonal communication tools that are reflective of human need and supportive of human connection?

2. Approach

2.1 Why Foresight?

This work aims to give creators a guide to the potential implications of design decisions for interpersonal communications tools through a set of compelling future visions, or scenarios.

Compelling visions of the future are key drivers of invention and design. World's Fairs have created visions of the future that sparked societal imagination and resulted in massive projects, such as the US Interstate Highway system ("The Original 1939 Futurama - GM & Highways," 2007), and science fiction of the 1950's gave rise to the space race of the 1960's in the United States, providing a shared vision of the future for the country (Stephenson, 2011). Science fiction writers like William Gibson, Bruce Sterling, and Neal Stephenson have had a profound effect on the products and technologies being created in Silicon Valley (Disch, 2000).

A foresight project has the goal, not of predicting the future, but of considering what possibilities the future may hold. The role of the futurist is to examine the data present in the current realities in order to provide well-grounded extrapolations (Denning, 2012). Rather than making predictions, foresight techniques such as scenarios are aimed at stretching minds and allowing stakeholders to see the potential futures in what is occurring today (P. Schwartz, 1996).

As designers in the technology industry with a collective 35 years of experience designing technological tools for people, the authors bring an intentional and focused experiential perspective to any analysis of future technology directions. By allowing this perspective to influence the inputs and outcomes of the standard foresight approach, we hope to ground the results in the experience of people and therefore make the outcome more useful to designers of communications experiences.

2.2 Foresight Influenced by Design

This project's methodology was most informed by that of a standard foresight process, however a number of procedural adjustments were made in order to bring in a design perspective.

Bishop, Hines & Collins' framework for a generic "comprehensive foresight project" includes six steps: Framing, Scanning, Forecasting, Visioning, Planning and Acting (Bishop, Hines, & Collins, 2007). For the first three steps (Figure 1), this

Table 1 A generic approach to a comprehensive foresight project		
<i>Step</i>	<i>Description</i>	<i>Product</i>
Framing	Scoping the project: attitude, audience, work environment, rationale, purpose, objectives, and teams	Project plan
Scanning	Collecting information: the system, history and context of the issue and how to scan for information regarding the future of the issue	Information
Forecasting	Describing baseline and alternative futures: drivers and uncertainties, implications, and outcomes	Baseline and alternative futures (scenarios)

Figure 1: First 3 steps of a standard foresight process (Bishop, Hines & Collins, 2007)

project followed the overall structure of the equivalent foresighting steps. However, we approached the process through the lens of experience design, with a focus on understanding the user experience at the intersection of interpersonal communication and technology.

The last three steps of the process, Visioning, Planning, and Acting (Figure 2), fall mostly outside the scope of this academic project, as they are the province of the implementers creating real-world tools.

Visioning	Choosing a preferred future: envisioning the best outcomes, goal-setting, performance measures	Preferred future (goals)
Planning	Organizing the resources: strategy, options, and plans	Strategic plan (strategies)
Acting	Implementing the plan: communicating the results, developing action agendas, and institutionalizing strategic thinking and intelligence systems	Action plan (initiatives)

Figure 2: Last 3 steps of a standard foresight process (Bishop, Hines & Collins 2007)

The design firm IDEO describes a standard design process as: Understand, Observe, Visualize, Refine, Implement (Kelley & Littman, 2001). Because the Future of Connection project is intended to provide guidance to designers of interpersonal

communications tools, the outcomes of this project – Scenarios and a set of Design Considerations – will lead into the Visualize step for designers who will choose their own preferred futures as a precursor to undertaking the rest of the design process.

Figure 3 gives an overview of the Future of Connection process and its relationship to both foresight and design. Following is further explanation of the steps of the process, as well as a discussion of the use of scenarios in foresight and design.

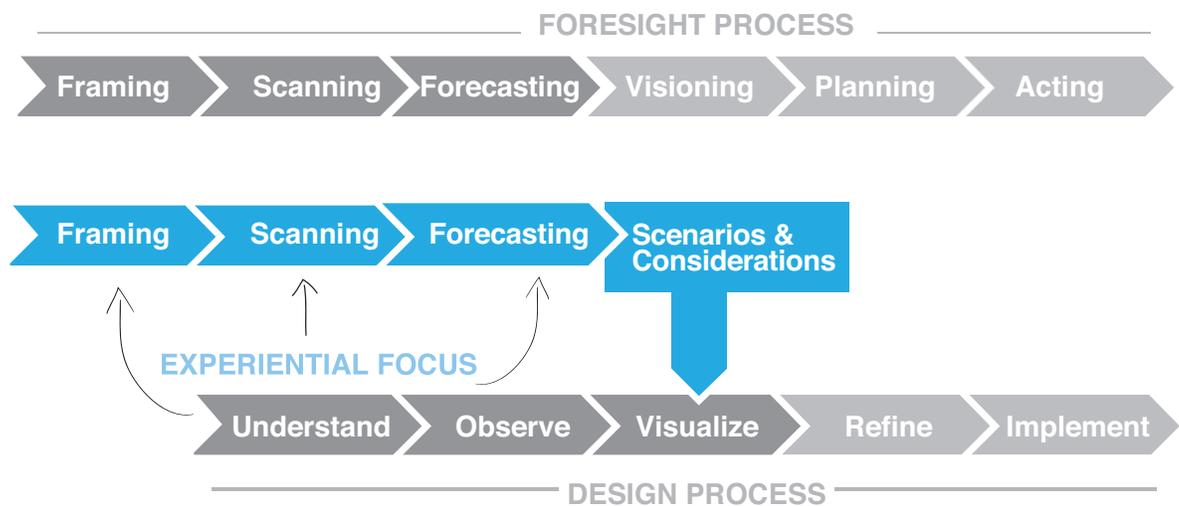


Figure 3: Overview of Future of Connection process – foresight influenced by design

2.3 Future of Connection Process Overview

Framing – Experiential Approach

As discussed above, the authors bring a history of experience design to the project, including many years in both software and web design, as well as physical computing. This lead us naturally to a focus on the creators and designers of technologies and a desire for an output that would be immediately useful to those designers.

Scanning – Trends and Tensions in Interpersonal Communications Tools

The first step in research was to understand the current changes that are happening in interpersonal communications tools and their use. Over a 6-month period, we collected *Signals*, or indicators of change. We then grouped these *Signals* into *Trends* that are indicative of larger patterns and societal directions. These trends were not always consistent, so we brought in a technique from our design experience and explored the *Experiential Tensions* that exist between many of these trends. (See Section 3)

Foresight – The Landscape of Serendipity and Control

Through mapping out the trends and tensions, it became ever more clear that Serendipity and Control – one of the central dichotomies that we had noticed at the beginning of the project – was more prominent than we had realized, and that this tension lay at the core of nearly every other identified tension.

Building on the Global Business Network's (GBN) 2x2 matrix methodology (P. Schwartz, 1996), we expanded the single dimension of Serendipity and Control to a landscape.

We plotted a subset of current interpersonal communication behaviours and tools across the landscape to test it, and we could see the essential tensions play out in the resulting map.

Foresight – Scenarios

This experientially-defined matrix proved to be a rich landscape for building scenarios. Each of the resulting four scenarios contains a description, a number of mini-narratives that illustrate the key interactions, a set of Signposts, a set of current-day analogous behaviours, and a set of implications and recommendations for designers who want to create a tool that fits well into that quadrant. (See Section 4)

Outcome – Tools for Designers

These tools are aimed at helping designers and technologists to make choices about the factors to consider when designing for interpersonal interactions. Speaking directly to designers, the tools provide a guide to using the elements of this project in the design process. The design implications from each quadrant are gathered together and synthesized. A list of ten questions with many sub-questions provides a starting point for creators of interpersonal communications technology to critically examine their own designs.

2.4 Scenarios in Foresight and Design

Scenarios are used in the foresight process to challenge mental models about the world, and lift “blindness” that limit our ability to think differently and consider new options and alternatives (P. Schwartz, 1996). Within one foresight project, multiple scenarios might be created to show diverging futures, to explore possible current directions and to make clear the ramifications of policy or management choices (Denning, 2012).

However, our intended audience is not managers or policy makers. Rather, it is the people creating and shaping the interfaces for communication and connection – the designers. We aim to create an output that will fit within the design process and be helpful to designers of interpersonal communication tools.

Interestingly, designers also use a method of creating *scenarios* to understand possibilities, although design scenarios differ from those used in foresight. As a design tool, scenarios are most often written to paint a picture of a “use case”, or a user experiencing the design product (Rosson & Carroll, 2009)(Wirfs-Brock, 1993). The creation of this type of scenario helps the designer imagine the product from the user’s point of view and to work through the implications of design decisions (Erskine, Carter-Tod, & Burton, 1997), as well as to communicate design ideas (Rosson & Carroll, 2009).

Nigel Cross refers to design as the activity of creating a solution for an ill-defined problem (Cross, 2004). His studies of “expert design” show that even when a problem is well-defined, expert designers “exercise the freedom to change goals and constraints” (Cross, 2004). Cross also found that the way that experienced designers explore the problem space is to generate possible solutions, then to explore the resulting issues in order to iterate on the problem structure. This is referred to as a *solution-focused* design strategy and while useful, it has a number of potential drawbacks (Cross, 2004):

1. Quick selection and premature commitment to a solution
2. Re-use of familiar solutions, even when inappropriate
3. Inadequate exploration of design alternatives

It turns out that the more successful designers spend time (but not too much) in exploring and re-framing the problem, which helps them avoid the above traps (Cross, 2004). Rosson & Carroll propose that creating use-case scenarios can help overcome these problems because:

1. Scenarios are concrete yet flexible – they support a solution focus, yet relax the commitment found in many types of design specifications
2. Scenarios shift the design focus from the technology to the person using it, which helps evaluate use-appropriateness of design ideas
3. Scenarios raise empathy and are incomplete, so they generate questions about implications and design tradeoffs and alternatives

(Rosson & Carroll, 2009)

Both foresight scenarios and design scenarios are also used as vehicles for communication of ideas. By making concepts concrete and grounding them in a familiar frame, they become more memorable and understandable, and therefore actionable (Schroeder, 2011).

The scenarios in this project move away from traditional foresight or traditional design scenario methodologies in a few ways:

- Traditional foresight scenarios do not always take the form of narrative structures, whereas design scenarios often do. In the Future of Connection, we have chosen to use small story-based scenario snippets intermixed with more explanatory text. This allows for both the concreteness of storytelling and the clarity of explanation.
- Foresight scenarios, particularly those derived from the GBN method, are often arrived at through the combination of ‘critical uncertainties’ (P. Schwartz, 1996). Our work focuses on the more design-minded examination of tensions inherent in the experience of interpersonal communication technologies, allowing designers to empathize with the image of people using these tools.
- Design scenarios do not typically consider the question of how a particular world came to be, since it is brought about by the design. However foresight scenarios are commonly based on extrapolation of existing conditions. Our work includes aspects of “future history” through a technique called backcasting. This fictional recounting of events leading up to the imagined future can be seen in the *Signposts* sections of the scenarios, and aims to provide a roadmap through the use of signposts as indicators of change. These events and shifts are constructed through extrapolations of behaviours and technology developments for which contemporary signals exist.

By using a foresight process to create scenarios for use in designing tools, we aim to give designers a more “heads-up” view of the implications of the design choices they are making. By injecting a portion of the design definition of scenarios into a foresight process, we intend that the resulting scenarios are focused on the shifts in the everyday experience of people using the tools, and will therefore seem compelling and relevant to designers.

This approach is unusual in foresight work, and it has the potential to bring immediate and concrete value to the designers who are making the frontline choices about interpersonal communications tools and therefore humanity's ability to connect with each other.

3. Trends and Tensions in Interpersonal Communications

The first step in research was to understand how people's experience of using communications tools is changing. To accomplish this in a typical design process, we might observe behavior directly within a user population (IDEO et al., 2009). However, in a foresight process the goal is to get a broad sense of the changes and their directionality (Denning, 2012). This stage of gaining understanding in a foresight project is often called *Horizon Scanning*, indicating the view toward the distant horizon. By combining this distant view with a focus on the experience of people actually using the tools, we hope to provide designers with a means to stretch their own understanding of the future directions for the tools created today.

Over a 6-month period, we collected *Signals*, or indicators of change. The experiential focus led to research in the psychology of communications and connection as well as technology use and design, and the emergence of new technological tools. The capabilities of interpersonal connection tools were used as behavioural indicators in cases where new communication and connection uses were too recent to be included in the literature.

We then grouped these *Signals* into *Experiential Trends* that are indicative of larger patterns and directions in the use of interpersonal communication tools. Broader economic and political signals were considered outside the scope of the behavioural focus, although they informed the *Signposts* sections of the scenarios. Influencing many of these trends were several deeper forces, the examination of which was beyond the scope of this project, yet still relevant. These factors have been summarized as *Assumptions* that contribute to the understanding of forces that shape the trends.

3.1 Assumptions

The scope of this project is focused on the examination of ways in which technology helps humans connect, and the resulting outcomes of this interaction. We have made

several informed assumptions about both the human elements—consistent patterns of behaviour and ways of being—and technological elements—the directional currents in the technologies that support interpersonal communications tools.

The Human Element

Need to connect

Many theorists have established the underlying human need to connect. Connection is what makes us essentially human, and has afforded our evolution from that of *hominids* (early humans) to *homo sapiens* (Kelly, 2010). Studies on prisoners in solitary confinement have shown that it takes very little time – days to weeks – to start losing cognitive ability in isolation (Gawade, 2009). If we feel isolated, we will fight against it. Humans are “social snackers”, who re-visit evidence of connection with each other even when we’re not currently connected (Fiske, Gilbert, & Lindzey, 2010). We will always find a way to connect with each other.

Need for privacy

Despite the innate sociability in humans, we also have a need to maintain a degree of privacy. This urge can manifest in different ways in the context of interpersonal communication tools depending on the motive or uses of the tools. (Hosman, 1991)

Cognitive Limitations

People have limits on their ability to process information. This has long been thought of to be seven “bits” of information, give or take two additional bits (Miller, 1956). We deal with interruptions very poorly, and have a difficult time returning to our original thoughts when interrupted during complex tasks (Speier, Vessey, & Valacich, 2003).

Limits on social groups (Dunbar’s Number)

Anthropologist Robin Dunbar theorized that there was a natural limit to the number of stable social relationships that a person can maintain. This established what is now known as Dunbar’s Number, which is the number of close relationships that humans can maintain and still have an active relationship with each person in the

network. This number seems to be 120-150 connections, and has been shown to hold true even within current tools platforms and tools such as Twitter (Gonçalves, Perra, & Vespignani, 2011).

Technological Undercurrents

While on some time scales, these undercurrents might be considered trends because they describe changes over time, these technological forces are deeper and broader, and have been occurring for longer than most of the experiential trends in the next section. For the scope of this project, we can consider them the background assumptions against which the trends and behaviours play out.

Miniaturization

The technology needed for interpersonal communication is getting smaller, and is more easily embedded in devices, personal objects, and the environment. More abilities can be packed into smaller spaces, and can become less obtrusive, which makes the resulting devices and tools more mobile. Note that this does not refer to the miniaturization of the actual communication interface, the size of which is tied to the physical attributes of humans.

Popularization

Technologies that were once the realm of research labs and military experiments make their way into everyday use. GPS is a common example – once, only a very few people had devices that knew where they were, and now we take it for granted. Another example is e-ink technology. Once it was the realm of research labs and party tricks, and now millions of people own e-readers.

Connection Ubiquity

The ability to be connected to the network is becoming more and more ubiquitous. The penetration of both coverage (through third and fourth generation data networks and WiFi) and connected devices is increasing. Note that this is not the same as always *choosing* to be connected – this is simply the perpetual and pervasive *ability* to be connected if someone wishes.

3.2 Experiential Trends and Tensions

The wide-scale exploration of signals and trends lead to the identification of a number of tensions in the use of interpersonal communications tools. Rather than movement in one identifiable direction, in the tensions we see both behavioural and values-based signals in two opposing directions. In order to understand the implications, we developed a map of the trends and tensions by looking for polarities and grouping them logically. (Figure 4)

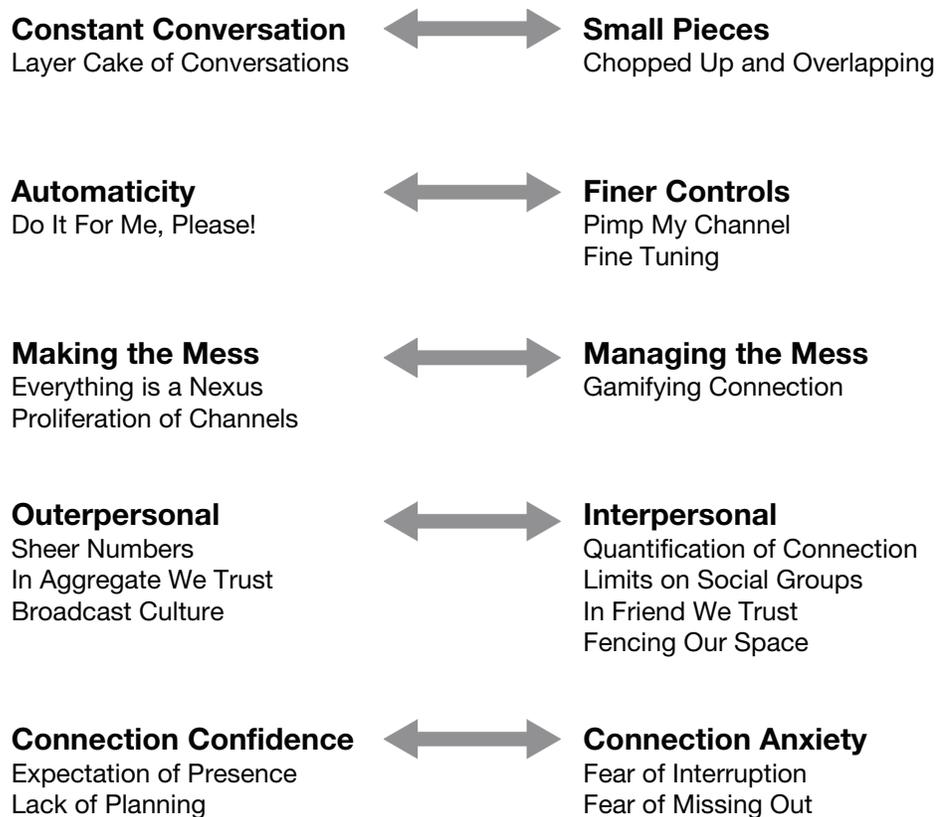


Figure 4: Trends and Tensions Map

TENSION: Constant Conversation vs. Small Pieces

We are drawn to the boundedness of small, encapsulated communication nuggets, partly for efficiency, but at the same time this is drawing out the conversations and encouraging more to happen simultaneously.

Layer Cake of Conversations

Because bits of conversation are encapsulated, we can and do have multiple conversations simultaneously, often drawn out over a longer time frame. Many strata of connection happen simultaneously, both within and across physical spaces. While we have one discussion in the physical realm, another set of discussions take place in various electronic communication channels.

Examples: Twitter being used in classrooms for simultaneous discussion, live-blogging of conferences.

vs. Chopped Up and Overlapping

Conversations happen in small pieces that are intermingled with other interactions. Rather than being one long continuous stream, like a visit or a phone conversation, our interactions in many new channels are chopped up into ever-smaller bits.

Examples: Short audio-burst communication tools like HeyTell and Yiip. Micro-status and text tools with size limits, like Twitter (140 chars) or Shortmail (500 chars)

TENSION: Automaticity vs. Finer Controls

People are looking for tools that will remove the burden and let them communicate automatically at the same time as they are gravitating toward ways to add more layers of meaning to their communications through more degrees of control.

Do It For Me, Please!

As there are more degrees of control plus more people are contributing to the social web, tools that remove the need for explicit action are becoming more prevalent and popular. Contextual updates are being added and broadcast automatically to save time and cognitive effort.

Example: Auto-Checkin apps broadcast people's location automatically to 10 location-based services. Status Shuffle app suggests and auto-inputs witty status updates for Facebook.

vs. Pimp My Channel

As the main modes of online sharing – text, audio, photo, video - have become commonplace, people are gravitating toward tools that allow the addition of more layers of meaning, often through decoration.

Example: Instagram, which adds simple filters to photos and shares them, has become the top-ranked free photo app for iPhone. Twitter allows users to design their own backgrounds for their personal pages on the website. Multiple apps for sending emoticons and coloring text messages are in the top 50 in "Social" on Apple's app store.

and Fine Tuning

As more and more devices and services allow us to live constantly connected lives, we see people looking for tools to control and broker their availability. As we have become used to tools for online expression of opinion, we are demanding more degrees of control in our ability to contribute. Tools are springing up to fill in the gaps between "all" and "nothing" that add more control over how, what, and with whom we share.

Example: Facebook's new "Like" button gives developers the ability to create their own actions. Multiple new apps give people the ability to share info such as location with small, pre-defined groups of people. E.g. Glympse

TENSION: Making the Mess vs. Managing the Mess

Dealing with the proliferation of channels for communication is hard to do because of cognitive limitations. So we need tools to help manage, which are also proliferating rapidly and add to the mess themselves in an arms race of mess-creation and mess-control.

Everything is a Nexus

Every person, place or thing is a point of connection to others. The ability to share, comment on, and otherwise connect through the things and places we encounter is becoming ubiquitous. Kernels of information are shared socially, then re-shared and commented on.

Example: A newspaper article, a bike ride, or a sandwich can all be “shared” and become the center of an online conversation.

and Proliferation of Channels

The number of channels available to us to communicate and connect with each other is proliferating rapidly. As we have more choices for connecting, the cognitive effort required to keep up increases, thus complicating the process of initiating and maintaining communication.

Example: See the report Profiting from Proliferation by McKinsey & Company, 2011

vs. Gamifying Connection

Game-like structures such as challenges and rewards are increasingly being used for non-game applications in an effort to influence behaviour. Game-play mechanics are being successfully injected into connection-related activities in order to increase engagement and incentivize preferred patterns of use.

Examples: The Email Game uses a point system to help players get through their piled-up email. Foursquare badges, points, and “Mayor” status incent users to continue checking in.

TENSION: Outpersonal vs Interpersonal

A tension between the interpersonal, meaning a 1:1 interaction between two people bounded by the control of who those individuals are, and the outpersonal, meaning a communication broadcast into the world at large, with less control or consideration for who consumes it.

Sheer Numbers

We are connected to and have the ability to interact with more people than ever before. Social networks have allowed us to bolster so-called “weak ties”, and we are able to access and get information from many more people.

Example: It is common for people to have hundreds of connections on Facebook or Twitter – the bottom 82% of Twitter users have an average 346 followers and follow 350 people (<http://web.resourceshelf.com/go/resourceblog/60940>)

vs. Quantification of Connection

The strength of a person’s public influence is being measured and broadcast. This codification of the impact of a person’s public interactions is being used as a “currency” where highly rated influencers trade their clout for special privileges and access.

Example: Services such as Klout, PeerIndex and tweet.grader all assign influence scores to people’s social media profiles.

and Limits on Social Groups (Dunbar’s Number)

An upper limit has been observed on the number of close social connections that one person can maintain. Dunbar’s Number is the number of close relationships that humans can maintain and still have an active relationship with each person in the network. This number seems to be about 120-150 people. (see above under Assumptions)

In Aggregate We Trust

We increasingly live in a recommendation society where value is discovered and created through a social filter. As we become more versed in the influence of the aggregate, we trust the voice of the crowd more than that of any individual. The more people who express an opinion, the more weighty that opinion becomes.

Example: “Most emailed” or “most shared” features indicate to users what content other readers also found interesting.

vs. In Friend We Trust (The Curator is King)

As the amount of content produced and archived online increases exponentially, the role of the content consumer as content curator is an increasingly important part of the socially-connected information ecosystem. Both individual curation and socially aggregated curation are on the rise, and social connections are starting to supplant straightforward searching.

Examples: The “Others also looked at...” feature on Amazon.com. Pinterest – a platform where users can “scrapbook” things they find on the web for others to see.

Broadcast Culture (Outerpersonal¹)

As tools for sharing become more and more ubiquitous, we are sharing more and more details of our lives with more and more people. Society’s values around what should be private from whom are undergoing a slow drift. Each new tool for revelation of personal details seems shocking at first, and then becomes commonplace.

Examples: The telephone, callerID, and pagers were all initially considered an invasion of privacy, but then became a normal part of contemporary life. The sharing of everyday acts, such as making a sandwich, was considered unusual just a few years ago, but has become commonplace (“Facebook Statistics, Stats & Facts For 2011,” 2011)

vs. Fencing Our Space (Interpersonal)

Now each and every aspect of people’s lives can be made public, and this is a shift that many are struggling to negotiate. In order to have a more private conversation,

¹ We have coined the term *Outerpersonal* to refer to this overarching trend of sharing with wide audiences and distinguish it from the media theory term *Narrowcasting*, as the latter implies a conscious selection of the target audience when dispatching a message or communication. *Outerpersonal* has less to do with the targeting of an audience for a message and is more about the broadcasting of personal dispatches at a global scale, with the audience being created as a result.

and to keep control of with whom they share, people are using tools and channels that create borders between a small group and the rest of the world.

Examples: Mini social networks create a place to share information between just two people: Between, Tokii, BeCouply.

TENSION: Connection Confidence vs. Connection Anxiety

Expectation of Presence

We increasingly expect others and ourselves to be constantly available electronically. We often feel anxious when we cannot connect with others through the expected channels, or when we ourselves are disconnected.

Example: See The Age of Disconnect Anxiety, research report summary, 2011

vs. Fear of Interruption

People are afraid of interrupting each other, so we hesitate to connect. Although we have more and more options for connecting, we are at the same time increasingly concerned about the interruption of real-time communications such as phone calls. As both senders and receivers, younger people prefer channels such as texting where communications are bounded and they feel more in control.

Example: Nielsen shows that phone calls are drastically declining in younger audiences. Sherry Turkle examined the shifting behaviours of youth around technology and found that teens don't like the phone because it is not 'bounded' and leaves them feeling out of control. (Turkle, 2011)

Lack of Planning

A reduction in the planning of social coordination has resulted in a tendency to "flow" with emergent events and serendipitous rendezvous. This is facilitated by cheap mobile technology and services such as MMS and SMS, which allow people to stay connected with others and coordinate interactions on the fly.

Example: Younger generations do very little advance social planning because their communication tools let them figure it out on the fly. (Itō, 2010)

vs. Fear of Missing Out

Tools for heightened in-the-moment awareness of the activities of friends mean that more possibilities are available at any social moment. This leads to the Fear Of Missing Out, or FOMO – the feeling that life is passing by, and that stopping even for a minute would result in missing out.

Example: Facebook and Twitter users report that they don't like being away from their accounts for too long because they will miss social happenings.

3.3 Landscape of Serendipity and Control

An examination and mapping of the trends and their polarities led to the realization that underlying every tension identified above lurks the pull between Control and Serendipity.

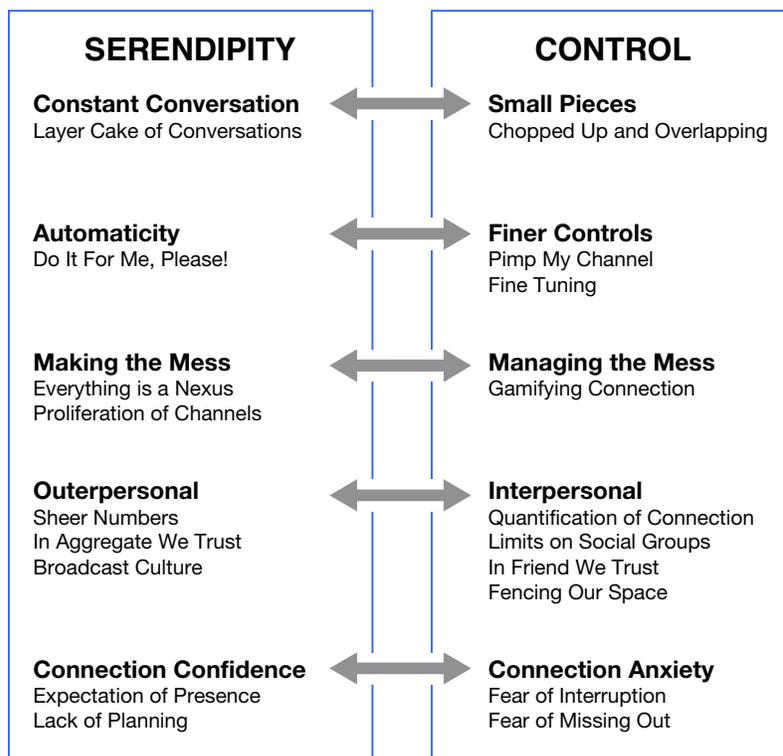


Figure 5: Trends and Tensions overlaid with Serendipity and Control

Control

In the right column of Figure 5, the trends all have at their core an increase in control. The word *control* has a number of meanings that are relevant to the observed trends above – to regulate, to manage, to repress, to command. Though some treat the need for control in communications mainly as a privacy issue (Ellison, Vitak, Steinfield, Gray, & Lampe, 2011), this project shows that something broader is at play, and that privacy is just one dimension of control.

As shown through the trends and tensions above, control over interpersonal communications tools comes in many forms, from finer granularity of sharing to controlling the number of channels available, as well as selecting the people to share with and the information that's shared.

Serendipity

The trends in the left column of Figure 5 all have at their core a loosening of control - casting a wider net, putting out lots of information about every possible moment, not planning ahead. But “less control” is an unsatisfying way to describe this phenomenon because it lacks any explanation for why this lack of control might be so desirable in the face of the opposite pull toward a great deal of control.

Bringing in the experiential lens led us to go beyond this simple description to look at the motivations for letting go. Why would people want to loosen the tight control over their personal and even intimate information? What benefit does this opening up to strangers or even just broadcasting our every move to our friends provide?

The answer is serendipity – a lovely word meaning “accidental discovery”. The publicizing of our actions leads to happy accidents and a resulting enrichment of our lived experience, so we continue to seek it out at the same time that we are trying to maintain control.

The Landscape Axes

Building on this identification of the core tension between Serendipity and Control, we moved to create “scenario logics” or the underlying framework that would be a rich basis for the creation of scenarios that might truly affect designers’ conceptions of what is possible or desirable.

Collapsing all the tensions into this one dimension, while having a certain elegance, was not very useful in creating scenario logics that stretch in more than one direction. Inspired by the Global Business Network’s (GBN) foresight methodology (P. Schwartz, 1996), we sought to expand the single dimension of Serendipity and Control into a 2x2 matrix that would create a landscape.

The purpose of the 2x2 technique is to combine 2 dimensions of *critical uncertainty*, or in our case *tensions*, orthogonally in order to establish 4 potential combinations on which possible future scenarios can be built. The ends of each axis represent the extreme states of a spectrum. Since the matrix axes have been identified as uncertainties or tensions, the resulting potential futures deliver more compelling and challenging scenarios than simply exploring a linear extrapolation of currently dominant trends. This practice is used to help organizations envision what the future might hold under conditions that are difficult to consider otherwise. (P. Schwartz, 1996)

Who to share with? – The tension between Interpersonal and Outerpersonal

One of the most currently volatile of the tensions is the decision around the scale of the audience for an act of communication or connection. The struggle around how public is appropriate has created a culture clash between generations, has inspired countless “netiquette” diatribes, and has spawned countless tools aimed at giving either control or freedom over how far a message travels.

What to share? – The tension between selective and constant communication

A similar kerfuffle has erupted over the question of what’s too much sharing and what’s enough in terms of content. Even if someone is sharing with only close friends, how much information is appropriate? What and who determines whether

the posting of an action is relevant? Do we need to know about the sandwich, the trip to the grocery store, the trip to the bathroom? (Look at the social app iPoo. Or perhaps don't.) According to Robert Scoble, the "freaky factor" is that feeling of discomfort around the extending of the boundaries of social norms (Scoble, 2011). The telephone, call waiting, callerID, and even, long ago, the openness of the messages on postcards, all created the same feeling of social unease until society got used to them.

The resulting matrix

We mapped the two dimensions of Serendipity and Control on a 2x2 matrix with these axes:

Scale of Audience, from Interpersonal to Outpersonal

Frequency of Communication, from Selective to Constant

This resulted in a two-dimensional landscape of Serendipity and Control, where the lower left quadrant is the most controlled and the upper right quadrant is the most serendipitous. (Figure 6)

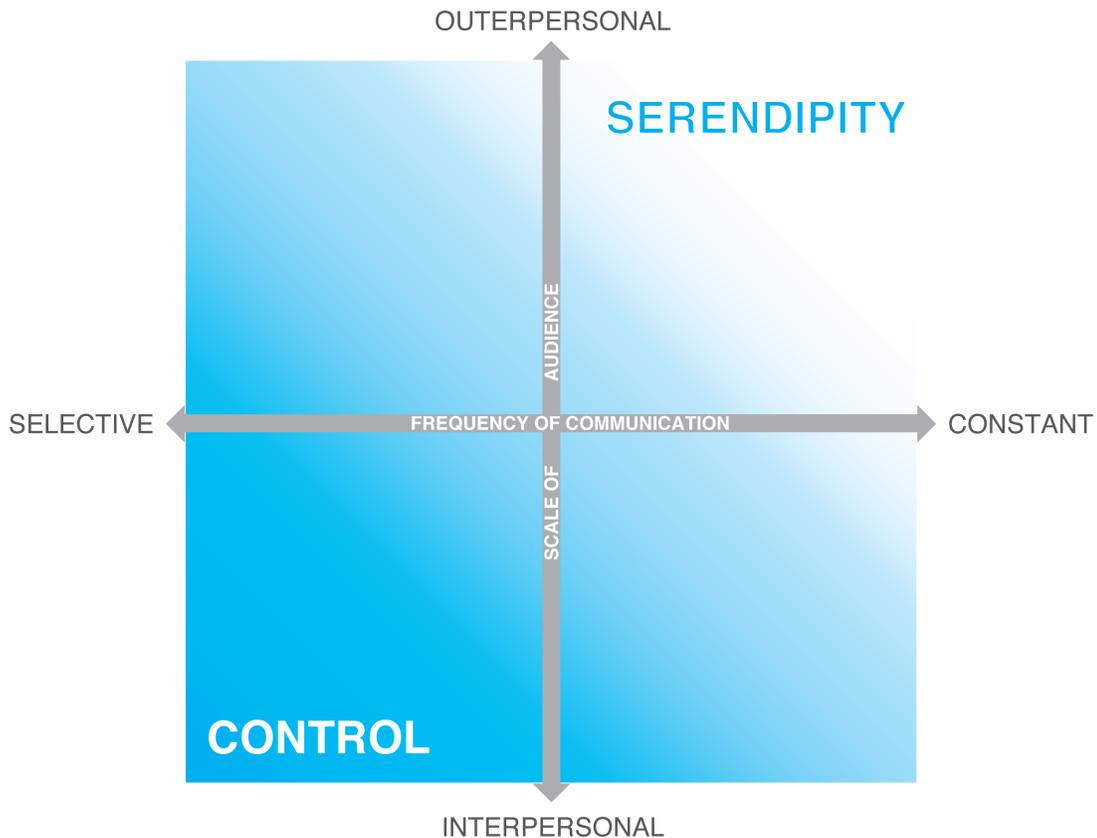


Figure 6: The Landscape of Serendipity and Control

Map of Contemporary Interpersonal Communication Behaviours

A large part of the *Scanning* research was the investigation of currently available interpersonal communications tools. A spectrum of new possibility can be seen any day by looking at “What’s New” in the Social category of apps, and the popularity of apps is an interesting proxy for understanding the functionality that people find desirable.

We plotted a set of contemporary behaviours in interpersonal communication against the axes in order to test the usefulness of the landscape (Figure 7, following page). Note that the distance from the origin for these current-day apps is much shorter than the distance used to create future-looking scenarios, where the goal is to push thinking as far out along the axes as possible. (See Appendix A for list and explanations of the referenced tools.)

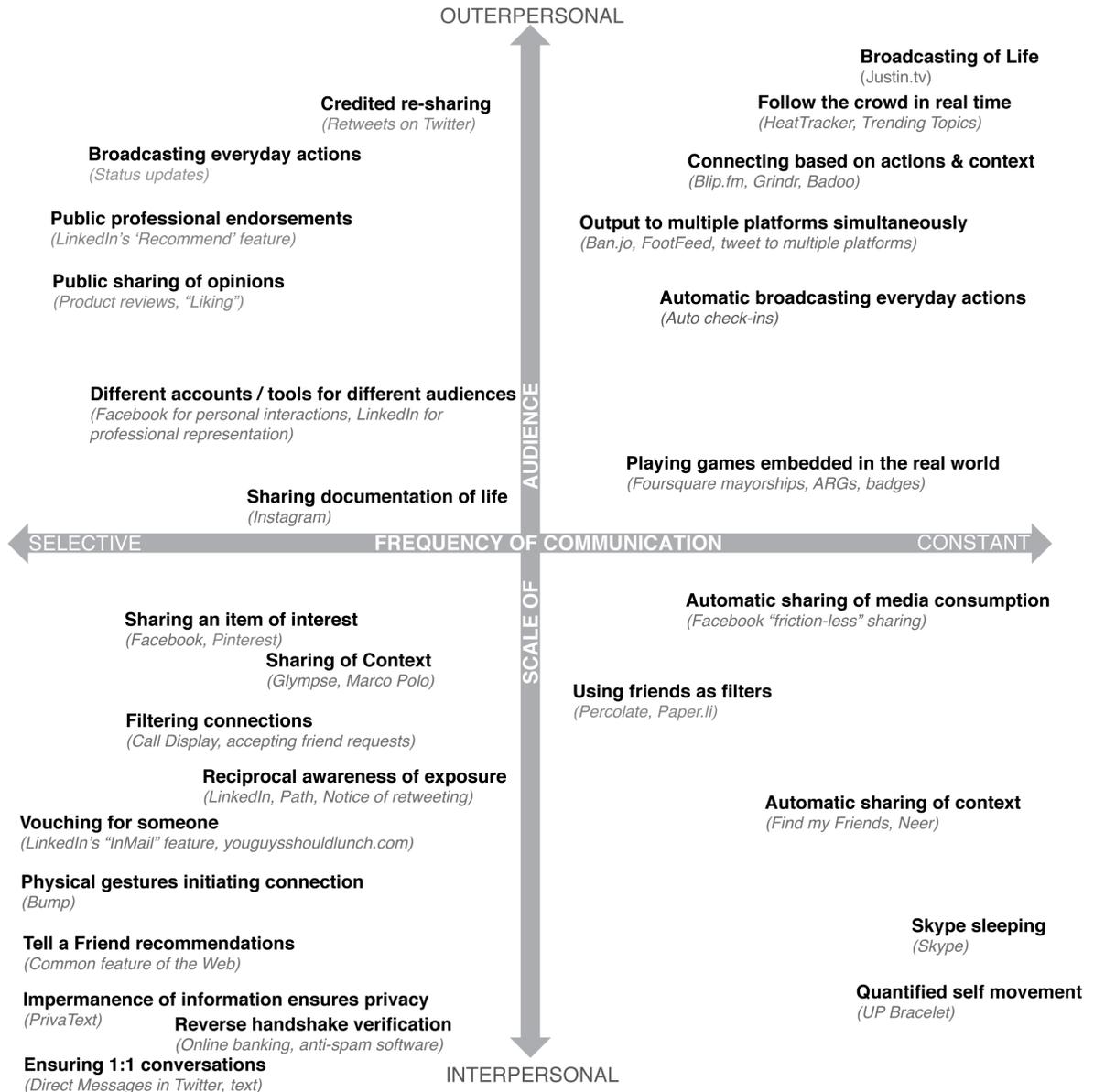


Figure 7: Map of Contemporary Interpersonal Communication Behaviours

4. Future Scenarios and Implications

The following four scenarios explore the four quadrants that result when crossing the axes of Frequency of Communication (Selective or Constant) and Scale of Audience (Interpersonal or Outergroup). Each resulting future scenario includes an exploration of how this future might come to be, contemporary examples of analogous behaviours and tools, and the implications of this world for designers of interpersonal communications tools. For ease of recognition, each scenario has a descriptive title and a graphic icon loosely representing the connection paradigm most relevant to that scenario.

While this 2x2 matrix approach builds on the Global Business Network's (GBN) foresight methodology (P. Schwartz, 1996), it should be noted that this landscape is not derived from a set of critical uncertainties, as is common in the GBN method, but is borne out of the examination of core tensions at the intersection of people and interpersonal communication technologies. Its intent is very close to that of a foresight approach; to compel and provoke the audience to consider the ramifications of their designs in multiple possible futures.

When imagining multiple futures, it is all too easy to fall into the trap of creating a "good" future and a "bad" future, plus a couple in the middle (P. Schwartz, 1996). In this project, we have consciously chosen to look for the positive aspects of each world.

During the development of these future scenarios, we found that including the negative aspects quickly pulled the choices of the inhabitants of that future back towards a more moderate state or even all the way to the opposing scenario. In order to achieve the goal of provocation – stretching towards the limits of the plausible – the focus on the positive attributes was important.

Since the envisioned futures themselves are intrinsically neither "good" nor "bad", we instead ask: Why might one want to live there? What are the elements of that future that support and enhance us as humans?

Because the goal of this foresight project is to stretch thinking in an external audience of designers, we have used concrete examples of humans in real situations to illustrate what these four futures might be like. This behavioural narrative allows an audience who hasn't been through all the stages of the project to grasp the feel and possible implications of these futures.

In using this type of storytelling, we must make choices about which aspects of these possible futures to highlight, and we will inevitably leave out some possible and plausible aspects of what might be. We invite readers to use these scenarios as a springboard to imagining your own possible futures. Let us know what you imagine at authors@futureofconnection.com.



Figure 8: 2x2 Matrix with Scenario Names and Descriptions

4.1 Scenario: Faceted Personas

Frequency: *SELECTIVE*



Audience: *OUTERPERSONAL*

Multiple facets are representations to multiple audiences. We are highly aware of reputation capital and exchange, and the goal of each interaction is to demonstrate our value. Mutual endorsement increases our reputation capital, and the community collaboratively contributes to each others' facets. Surrounding surfaces reflect and are controlled by those in close proximity.

Faceted Personas: Description and Narrative

This is a world of performance and convention in our public interactions with others. We are highly aware of reputation capital and exchange, and the goal of each interaction is to demonstrate our value. We are public about our day-to-day experiences, recognizing the value of sharing the best parts of ourselves and our world in exchange for the best parts of others. It is commonplace to broadcast our communications, yet it is considered socially inappropriate to do so indiscriminately. As a result, we channel content to a series of *facets*, or public personas that are based on the faces we show in various social situations like work, family, or sports groups.

We post our opinions for all to read, but are very conscious about what we say. Our responses are never recorded automatically – we make decisions about how we build the view that others see. Our public communications are mostly polite and encouraging, as we each strive to be seen in the best light. We recognize that negative commentary on others in fact reflects negatively on us, and anonymity is frowned upon. We attempt to stay away from emotional or irrational responses – because we understand that our communications become a part of the record, and that they might hurt our reputation in the long run.

Reading the news, Afshin harrumphs at an article on the current state of politics. As a legislative analyst, he knows better. He responds with a few cogent arguments, and tags his comments to appear in both his company *Lens* and, after a moment of thought, his *Skeptic's Lens*. He takes a minute to read other comments and give a few a positive *Nudge* – after all, if he wants his *RepScore* to go up, he'd better show himself to be a discerning judge of what's good. Then he spots a story about the trade of the goalie for his favorite hockey team. The comment he tags to his "Grump About Sports" *Lens* is succinct, "Noooooooooooo!" A few of his friends will bother to look at both, but for the most part, he uses the "Grump About Sports" *Lens* to let off steam in a way that wouldn't be acceptable professionally. Seems there are lots of people who feel similarly, because by now he has quite the *RepScore* in the sports world. He only wishes his work *RepScore* were half as high.

Virtual interaction with others involves a degree of social ritual. Each party involved understands the code of conduct the situation demands. Trust is a form of currency, and it is earned through positive and reciprocal social interactions. Violations of trust include failing to communicate through the appropriate channels, "bleeding" content between facets, and self-centred behaviour. These result in polite but firm reprimands by the network at large.

The tools of connection support this community regulation of social norms. Our reputations are measured in part by how we recognize others. We must publicly acknowledge those we meet and we must thank those who help us, or we are considered rude. It is through these public endorsements – recognition of wit and accomplishment, displays of gratitude, and expressions of interest – that our personal reputations grow reciprocally with those of others.

Our facets are in this way not only reflective of ourselves, but of the others we interact with. In fact, the contributions of others are key components of what keeps our facets interesting. Our tools of connection allow us to set up conditions that help us manage how we are presented with the help of those we interact with.

Afshin comes up the stairs from the subway and activates his *SenseAround* to see who and what have *pinned* themselves in the neighborhood. Among a few screaming endorsements for a new coffee shop is his friend Jenny. In fact, looks like she endorsed the Java Jump too. "Oh great, I haven't seen her in a while! Wonder if she'd be up for a coffee." But of course he can't just ask her without checking first... wait, Jenny's *Social Lens* is looking dark and even a bit...scary? There are large Keep Out signs plastered across it like a bad horror film. The *tags* on them say they were the handiwork of a few mutual friends. He looks a bit closer and sees Jenny's original message, "Working on a deadline, so no socializing - try me next week!" Afshin laughs, adds a No Trespassing banner and a few spider webs, and then leaves a positive *Nudge* for her work habits, and puts in a reminder to himself to *Ping* Jenny next week.

We have collaborative control over many types of reflective surfaces, both virtual and embedded in the physical environment. These surfaces act as screens that reflect content and attributes of those who are nearby. That includes our clothing, surfacing the various facets of our lives on our persons. This has also allowed us to alter our appearance for a given circumstance, ensuring that we present ourselves in a manner consistent with the expectations of our situation.

Faceted Personas: Signposts – how might we get here?

Signposts are hypothetical steps along the path to arriving at a scenario. These signposts were developed by backcasting, or working backwards from the scenarios, asking, "What would need to happen for this to be true?" One of the uses for signposts is to view them as indicators that this scenario is becoming more prominent, or more likely.

- The use of influence and reputation metrics gain new traction as people collectively begin to track and modify behaviour to increase their "scores". The triggers for increasing this metric are based on corpus analysis, valuing *what* we say and who responds, rather than how often we say something.
- We get used to communicating in short bursts when bandwidth becomes a pricey commodity, therefore we place value on highly conscious connection behaviour.

- We no longer tolerate the various aspects of our lives mashing together in our online presence, and we move to separate our different personas. This happens initially through separation of tools (e.g. Facebook vs. LinkedIn) and creation of multiple identities, but eventually the overhead of maintaining these facades separately gets overwhelming, and we look to aggregation tools that allow us to manage them together. Once these tools are in place, we continue to fracture the aspects of our personalities, in order to show who we are with greater and greater granularity.
- We are frustrated by the control being entirely on the publishing side of the equation. We want to be able to be equally selective on the input side - choosing which facets of someone we are interested in seeing.

Faceted Personas: Present Day Analogous Behaviours & Tools

Google Circles

The competitive advantage that the Google+ (pronounced 'Google Plus') social networking platform professed was the ability to manage your contacts into "Circles", an interface feature that would allow a user to control who sees what message or status update.

Influence Metrics

There are a number of "influence" measurement tools that have emerged recently, such as Klout (www.klout.com). These tools are attempting to measure how influential a user or status update is by watching how many other people respond or react to these broadcasts. Often using the micro-blogging platform Twitter as its core data source, tools such as these have begun to shape how people behave in these platforms in an effort to effect their scores, despite the fact that these metrics have in no way been qualified as accurate indicators of any kind of influence.

Twitter Conversation Filters

A user's personal Twitter feed only exposes "conversations" (also known as "at messages" or "at replies") when that user is following both parties in the conversation. This is a design decision that helps manage the feed for users and assumes that if you don't follow all people in the conversation then this conversation likely has little relevance to you.

Twitter Follow Friday

Follow Friday is an emergent phenomenon where people explicitly recommend other people to "follow". This is a form of respect and endorsement of another user's feed. Because many of the relationships on Twitter are not made in person, these endorsements are made solely on the basis of the way that users present themselves in their feeds.

Twitter Profile Proliferation

In order to be able to express opinions or views that may challenge the dominant persona represented by a single account, some Twitter users are creating secondary accounts which serve as a space to explore these other facets of their personalities. People have even been publicly fired for tweeting to the wrong account.

Foursquare and other location-based apps

Foursquare and other similar apps such as Gowalla, Loopt, and SCVNGR allow users to broadcast where they are to their various social networks. Some of these apps aggregate into a list the other people who have also "checked-in."

Faceted Personas: Implications and Recommendations

*These are recommendations for designers who make the choice to respond to or encourage behaviours such as those seen **in this scenario**. Note that some of these recommendations may directly contradict recommendations from another scenario – this makes sense because the scenarios are purposely constructed at opposite ends of experiential tension around communication. For a view of these issues separated from a specific scenario, see Section 5.4, Ten Questions for Designers.*

- Multiple facets are the foundation of online presence, and must be supported robustly. It is often the external aggregation tools that provide the ability to manage multiple accounts. This needs to become commonplace within the communication tools themselves.
- Endorsements will be common place in this world, and users will demand a more refined and nuanced way to indicate their approval or objections. These endorsements will provide informed context to online and mediated social interactions, and need to be explicitly surfaced.
- Reciprocity is incredibly important – responding back meaningfully to those who responded to you is a social ritual that must be followed, and the tools need to support it.
- Designers will need to be highly sensitive to the way in which their tool behaves - ensuring that notifications, feedback and the general interface experience is consistent with the rituals and manners embedded within society.
- Creators must build in the ability for people to express social nuance – extra layers of meaning – within communication nuggets. These nuances might include context, emotion, or intent, and the augmentations might enhance the presentation of the message or its content.

4.2 Scenario: Everyone Everywhere

Frequency: *CONSTANT*

Audience: *OUTERPERSONAL*



We are constantly connected to people in every aspect of our lives. Even the smallest actions are broadcast in a never-ending stream. Since we can't manage the deluge ourselves, sophisticated collaborative filters make sense of it, presenting information based on relationships between people, places, and things.

Connections with others fluctuate based on current context, like location, activity, near neighbours, recent history and future plans. Individual and collective biofeedback lets us bubble up items that are emotionally important to others and ourselves.

Everyone Everywhere: Description

Context is king -- by broadcasting where we are and what we're doing, we get back highly relevant and useful content. The cardinal rule of context-based information: You get out what you put in. The technology we use thrives on more and more data. The more connected we are -- the more we put in -- the better the content we get back. This has created a culture of constant transmission of the smallest specifics of our lives.

We can be everywhere at once, and we can know anything. We discover events just before they occur, and are present at the emergence of culture. Did we follow a movement or help create it? Trends emerge and die at the speed of information and interest.

We live in a world of redundancy and overlap, of multiplicity and simultaneity, of transparency and discovery.

The coordination of social interactions are loose and subject to change. We do not feel socially bound to commit to any event or group meeting. We expose many

aspects of our lives automatically. "Where are you?" is a question rarely asked because it can be ascertained by simply looking at our digital profiles.

Miri ducked into Java Jump and shook out her umbrella. Looked like her kind of place – she was glad some friends had been here before. It popped up when she and Jem looked for a place to meet based on where they were an hour ago. She looked at her *Watch*, noticing that Jem was stuck on the subway. That's fine, he'd be here soon. She saw on the *Watch* that two friends were walking by the corner, but she didn't feel like going back out in the rain, so she just *Tapped* them and got a quick *Tap* back.

We are not selective about what we put out, because it would be too much effort to make choices about the minutiae. We each have a stream that contains every tiny bit of transmitted data about ourselves, but direct access to anyone's stream is mostly just boring, so no one looks at it except the love-obsessed, the FBI, and parents. Instead, we have *StreamLines* that highlight important moments based on a combination of the viewer's perspective, our own mostly automated input, and a socio-collaborative overlay.

We use our devices to view, augment, and create connections around every person, place, and thing we encounter. A kind of Social GPS shows us instantly what our current and potential social connections are in any situation. We have become used to knowing how we're connected with someone, including contacts, purchases, interests, focus, mood and anything else we send out.

People have "auras" that let us know their current mood and context - just as we now know about each others' status based on our reading of their interaction with the environment (e.g. headphones mean don't interrupt) we've developed symbols of our interaction with the virtual that combine into a meaningful "aura".

Since she had a few minutes, Miri did a quick focus on Jem's *StreamLine* to see where they should start their conversation, and noticed that their *Friendweave* had gotten stronger since their last meeting. Oh, looked like he was talking to her friend Sara on the subway. She could see the flash of his laughter, so it was going well. Good thing he was on the way to this meeting, or they never would have *Noticed* each other, because the connection wouldn't have been so relevant. When he walked in, he greeted Miri with, "She's funny!" "Sure is," Miri answered, and they got right to work.

Attention is a highly valued commodity, and it is almost always divided. We do not expect others to give us their complete attention because they may be taking part in several other connections at the same time, as are we. We have developed lightweight ways of "touching" our friends, so that we can maintain connections without spending precious cycles on communication. We indicate interest automatically, with biofeedback sensing what and who we find compelling.

We use each other as content filters, and don't need to search for content of interest. Focus defines interest, and interest defines what we are offered to focus on. We have developed methods to make sure we're exposed to new content – we know we need to break out of the potential for a closed interest loop.

Miri waited for Jem to come back from the bathroom before they parted. While she waited she opened up her *WorldStream* and scanned the headlines. A new bill on immigration quotas caught her eye. It was flagged as *discovery*, so it was not a story anyone in her close network had promoted. "Hey have you heard about this new legislation?" Miri asked as Jem returned. "Might affect your family." Jem nodded, "Nope, I've got my scan filters set really tight right now because I'm working on a deadline. *Flick* it my way?" Miri does, secure in the knowledge that her action plus the tags on the story will promote it to the other friends it might affect as well.

Because there is so much data about each of us, any one bit of it feels ephemeral. Even if we feel like we've over-shared we also understand that this moment will pass quickly and get lost in the stream.

Everyone Everywhere: Signposts – how might we get here?

Signposts are hypothetical steps along the path to arriving at a scenario. These signposts were developed by backcasting, or working backwards from the scenarios, asking, “What would need to happen for this to be true?” One of the uses for signposts is to view them as indicators that this scenario is becoming more prominent, or more likely.

- The trend towards exposing more and more of one's day-to-day life becomes so common place that society adjusts and it no longer seems exceptional. Wired culture becomes synonymous with transparency.
- In response to the data glut, people begin to demand greater filters in order to manage the information streaming at them. The design of these filters, and the intelligence built into them shapes how people connect with each other.
- Companies begin leveraging data being broadcast into the “social graph”, such as loyalty programs and incentive programs. Advertising becomes more and more contextual, and only promotes products to those whose interests match what the product offers.
- The “social web” and “the cloud” become the dominant place to store our personal data, accessible any time, any where. This new norm offsets previous concerns about “being exposed” as we come to realize that there is little to fear if everyone is as exposed as we are. The serendipitous benefits of this exposure outweigh the fears of negative repercussions.

Everyone Everywhere: Present Day Analogous Behaviours & Tools

Social Recommendation Engines

Many web-based services have implemented recommendation engines that rely on other user's purchasing habits to suggest other items that are of interest to a consumer. These systems are passively crowd-sourcing recommendations and are not dependent on consumers reporting their preferences—it is inferred by their purchasing history.

Instagram

This popular photography app for mobile phones posts the pictures users take into a public feed, which users cannot turn off. While this app provides for closed networks, allowing users to select which people they allow into their feed, it is assumed that the user will be comfortable sharing any photo taken with this application.

Twitter

Twitter has become a popular micro-blogging platform, boasting over 200 million members, and the service sees over one billion status updates from users a week. The majority of users post these status updates in the clear, allowing anyone to view them. Twitter aggregates information through the Trending Topics feature as well as recommending and surfacing other people to follow. Most recently, Twitter introduced the Activity tab, exposing the smaller actions of users more publicly, as well as publishing locations of updates.

Everyone Everywhere: Implications and Recommendations

*These are recommendations for designers who make the choice to respond to or encourage behaviours such as those seen **in this scenario**. Note that some of these recommendations may directly contradict recommendations from another scenario – this makes sense because the scenarios are purposely constructed at opposite ends of experiential tension around communication. For a view of these issues separated from a specific scenario, see Section 5.4, Ten Questions for Designers.*

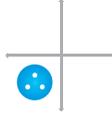
- Because this is a world where users can connect with many people, and so their choices must be filtered, it is likely that a consequence of this is the “closed loop” problem—where users are only connected to others that are like themselves and information they already agree with, leading to biased thinking and experience of the world. In order to combat this potentiality, designers should consider how to ensure a level of serendipity into their tools, allowing users the benefit of unexpected points of view and knowledge.

- Connection tools in this world should surface contextually relevant information to users at all times, and in turn be designed to allow automatic sharing of various aspects of people's lives. These controls should provide overrides however, as it is in what users will choose to activate or deactivate that will inform the emerging social conventions of tomorrow.
- The connection technology in this world requires a high degree of integration into other systems and platforms, which may include objects and places as well as people. For this reason, creators should consider the architectural distinction between an "app" and a platform, which allows other designers to build on the core services that their tools enable. This architecture should be relatively open to and discoverable, allowing it to connect to other systems "in the wild" as well as allow other systems and devices to connect to it.
- The tools that will succeed in this world are the ones that help people "manage the mess" of information, filtering, aggregating, and surfacing information relevant to each user, based on their personal profiles, behaviours, and connections and relationships. These tools should be designed to be adaptive, as new trends will emerge quickly, many of which will disappear just as fast but several key shifts will likely remain and continue to change the way in which we connect.

4.3 Scenario: Trusted Handshake

Frequency: *SELECTIVE*

Audience: *INTERPERSONAL*



We share highly selectively with a small number of people, and we don't waste each others' time. Trust is key, and personal recommendations carry weight. Social rituals around validation of identity and ensuring reciprocity are the precursor to initiating connections. Biometrics and physical presence ensure identity, which is brokered by personal devices.

Trusted Handshake: Description and Narrative

We are careful curators of our social tribes, selecting those whom we allow access to our digital lives. We are very particular about who we connect with and we deeply value personal recommendations. Because there is so much unwanted noise from advertisers and spammers, we want to be sure that our interpersonal connections aren't wasting our time. Our digital views of others are highly reciprocal, and when we look at someone, they know that we have looked.

Gone are the days of uninhibited status updates on the banalities of everyday life. These actions are seen as having little value to people's connected community. We have opted to be highly selective in our life updates, and we view "oversharing" as distasteful. In the absence of public sharing, we no longer have much information about the lives of strangers.

Sarala grinned excitedly and thought about who to tell about her new *iConnect*. Her elementary school comms teacher's voice rang in her head, "Just because you **can** share doesn't mean you **should** share! Remember the three R's of sharing: is it real? is it relevant? and is it reciprocal?" Sarala considered, then sent a quick *Stat* update just to her games circle, "Can play the latest now!" She put in a *Face* request

to Jin, carefully opening her own vid first to be polite. Oh great, Jin would be free in 15 minutes for a quick *Face* conv.

Trust is highly valued and coveted, and breaches of trust carry with it a heavy social consequence. Vouching for others is an intrinsic part of this social dance, and we place a premium on close ties, measured by degrees of separation. New connections must be personally vouched for and are often facilitated by face to face meetings. We place a social premium on physical presence. When we connect at a distance, the connection is always considered secondary to what's happening in the physical world. Connection rituals confirm the desirability of connection before opening up a channel.

Personal recommendations of people, places, organizations, and products carry significant weight. As a result, these recommendations are usually targeted to specific individuals or small groups, rather than being broadcast. Public forums for sharing opinions exist, but they are so overrun with special interests that they are considered untrustworthy.

Because trust is so important, confirmations of both trust and presence are needed to initiate connection. Mutual physical gestures like the handshake, the fist bump, and the hug have been augmented with digital meaning. Since these mutual gestures need the participation of both parties, they have been overloaded as activation protocols for information exchange.

Sarala smiled as Jin introduced her, "Hi Osman, where are you visiting from?" In response, he stuck out his hand. Friendly, but cautious. She could see that he had an *AugGrip*, so he didn't have to hold his device. Well, she had bought the *exten-sleeves* for the same reason, She shook his hand and felt the slight buzz signaling the exchange. Glancing at her display, she first looked for his *Trust* levels. Wow, super-high! Oh, wait, that's why -- there was a *Vouch* from Jin recommending him to Sarala specifically. Then she noticed the answer to her question and looked up in surprise, "Tanzania! I spent 5 years there." Osman smiled and Jin looked smug, "I thought you should talk."

Biometrics play an important role in verification of identity. Our personal devices verify that we are really us every time we pick them up, wear them, or speak to them. These personal devices are the highly secured gatekeepers of our connections to the rest of the world. Because personal identity is verifiable through mobile devices, these devices have become the secure centrepiece of every kind of transaction, from purchases to medical exams.

“Here Jin, take a look at this!” Sarala handed her *iConnect* to her friend. Jin laughed at the silly expression then tried to look at the next photo. “Hey! Your guest restrictions are really strong – what’s up with that?” Sarala took the device, waited for it to recognize her BioSig, then said, “Permission for photos, “ and handed it back, looking to make sure it registered Jin properly. “Oh, I didn’t want my mom looking through them.”

Connections with external systems are never automatic. Unverified connections are easily spoofed, and the many scams that take advantage of this have made us wary. Interaction with public interfaces must be consciously initiated and then verified on both sides.

In many interfaces, a requirement for tangibility ensures that interaction is with a known entity who is actually present. Connections with mobile devices are often verified with physical connectivity, even when transactions are conducted wirelessly.

Trusted Handshake: Signposts – how might we get here?

Signposts are hypothetical steps along the path to arriving at a scenario. These signposts were developed by backcasting, or working backwards from the scenarios, asking, “What would need to happen for this to be true?” One of the uses for signposts is to view them as indicators that this scenario is becoming more prominent, or more likely.

- The data networks become so overloaded that the carriers raise pay-per-use bandwidth pricing to draconian levels. This results in people making more explicit choices about the content that they send out and consume.

- Spammers become more and more clever at reaching people, eventually spoofing the identities of friends across many networks. This results in a great deal of skepticism around identity, and a need for proof of identity in even the smallest interpersonal transaction.
- The development of an "unbeatable" encryption technology provides the governments, businesses, and private citizens comfort in the belief that their personal data profiles can not be hacked or stolen as long as they are physically controlled.
- Recognizing that consumers have concerns about the security of their data on mobile devices, manufacturers begin building biometric scanners into their devices. This leads to the reliance on devices as secure brokers of identity.
- Devices become "digital wallets" that carry payment ability, and this leads to the digitization of many government services including identity, voter registration, and licensing. Access to other services like health care follow quickly.

Trusted Handshake: Present Day Analogous Behaviours & Tools

Texting

Text messaging is usually a private conversation between two or a few people. Both the content and the audience for the messages are tightly controlled.

Call Display

As call display achieves ubiquity, we **expect** to know who is calling. In the event of an unknown or blocked number, people now hesitate to answer the call.

Reverse Handshakes

Bank account logins from a new computer require the input of a code sent to a previously known address. Email spam prevention tools sometimes require a

return email from a first-time correspondent where the original sender must explicitly confirm that they are a real person.

LinkedIn's InMail and "How do you know this person" features

In order to connect with a person on the business social networking platform LinkedIn, the user making the request must indicate how they know the person they are trying to connect with. If they do not know the user, they can request to be connected through someone they mutually know.

Tell A Friend

The tell-a-friend feature allows people to send a recommendation for an article, product, or other content directly to someone they think might be interested. This is a very personal recommendation, and so carries more weight than a general broadcast.

Bump

The Bump mobile application trades contact information with another person based on a simultaneous bumping of fists clutching phones.

Trusted Handshake: Implications and Recommendations

*These are recommendations for designers who make the choice to respond to or encourage behaviours such as those seen **in this scenario**. Note that some of these recommendations may directly contradict recommendations from another scenario – this makes sense because the scenarios are purposely constructed at opposite ends of experiential tension around communication. For a view of these issues separated from a specific scenario, see Section 5.4, Ten Questions for Designers.*

- Build in intentionality. Connection tools should not assume that automatic or involuntary sharing of information is appropriate. Give a fine granularity of control – allow users to control both who they share with and what they share. Make the results of those controls visible.
- Make connections reciprocal – e.g. if I can see your location, you should be able to see that I am looking/looked.

- Create mechanisms for validation of identity. These might range from reverse-handshake verification to biometrics. Use ritual back-and-forth to assure users that the person they are connecting to is in fact who they say they are.
- Consider using physical acts to indicate intention and facilitate interaction. Physical connection is an indicator of actual presence, and is therefore a basis for trust, as well as holding strong affordances for human behaviours.
- Build on top of existing rituals and social customs. Gestures of trust and partnership such as handshakes, and physical embraces can be used as metaphors or as actual acts to initiate connection. Rituals carry a great deal of social smoothing that can make connection tools feel more socially aware – we don't barge in to a door without knocking on it first.
- Enable personal vouching. The concept of 'vouching' for others carries great significance, and the tools that enable this should reflect the weight that these recommendations carry. Designers of such interactions should consider what users expect when receiving a recommendation for connection from another person, and include or surface appropriate information.

4.4 Scenario: Pocket Friends

Frequency: CONSTANT

Audience: INTERPERSONAL



We bring our close friends with us everywhere we go. Enabled by miniature wearable devices, we create and join small, highly selective social networks that are maintained through constant connection. We feel a great deal of empathy and connection with our close friends because we mutually share our current geographic, situational, and emotional states in a constant stream. Because it is too much work to control which information we share, we instead focus on controlling who it is shared with.

Pocket Friends: Description and Narrative

We take our friends with us and in turn, we travel with them. Miniature wearable devices capture multiple dimensions of our day-to-day experiences. We live in many sensory spaces concurrently – that of our own personal experience, as well as the spaces of our friends and families. We reach into these spaces through visual, textual, auditory, physical and emotional streams fed both ways through peripherals that we wear constantly such as glasses, shirts, hats, and armbands.

Although we are practiced at simultaneity, we are still bounded by the limits of human cognition. We must make choices about where to focus our attention, and the key to that is our emotional awareness. Sophisticated interfaces externalize our internal physiological and emotional states to help to focus our choices. Because we know how our friends are feeling, the “important” moments are highlighted for us - the surge of joy, or the burst of fear.

Josh yawns his way into the kitchen, shrugging his *Rig* on with his shirt. Halfway through a fresh cup of coffee, he starts as he realizes that he never made it. “Heyyyy...” he casts his *awareness* out to find Marni grinning at him from her hotel room. “About time you figured it out, bro.” “Thanks Marns, appreciate the pot-starting service, but aren’t you up a little early? It’s 5:30am in Vancouver!” “I’m still on Toronto time. Was hoping you’d get up before noon – luckily, I won my bet.” “Uh oh, your bet with who?” Josh asks out loud as he reaches into the fridge to grab the milk. Marni *ghosts* for a minute as she focuses on something else. Then he gets a *glimmer* on the edge of his *awareness*, signaling another member of their personal *Sphere* joining in. “Mom, no fair, are you guys ganging up on me again?” Josh whines as he puts on his jacket and adjusts his *Rig’s* collar over it. They all have a laugh, then head off to appointments in three separate cities.

We love the feeling of being constantly and instantly in-touch with our closest community. We are so highly aware of each other’s context that our direct communications no longer require perfunctory exchanges. We know whether we are interrupting, and when it might be okay to talk.

Each user theoretically has complete control over what aspects of their lives the various members of their networks can access. However, in practice, it is just too difficult to manage, so we rely on *Spheres* that adapt privacy settings contextually. Our *Pocket Spheres* contain our closest, always-connected friends. Social norms dictate that if we are in close proximity, we are automatically added to each others’ outermost *Spheres*, but do not have access to very much information.

Because we must grant access to a great deal of information in order to create and maintain the rapport that we crave, allowing someone into our Pocket is a serious decision, only granted to those we trust completely. As a consequence, these networks often mimic circles created in institutions such as schools, workplaces, and the family unit.

Spheres are also collaborative creation spaces - they don’t just control access, they also are a place to have a group conversation, store socially relevant artifacts such as photos and videos, and know that your product is personal to that group.

The crossover between the *Spheres* that people have active at any given moment are surfaced to others through mechanisms built into the peripherals we use. In order to avoid embarrassing over-sharing or cross-pollution of our *Spheres*, contextual deactivation of non-relevant spheres is a social norm, and most people set their permissions to allow the environment to control at least that much.

Josh walks into the lobby of InnoTech where he is greeted by the receptionist. His *Rig* immediately closes off his open connections to his friends and family. He would know if they were in a serious accident or won the lottery, but barring that, he won't hear from them while he's here. He is now presented with an InnoTech logo and company news feed. "Have a seat, Josh" says the receptionist. His *Rig* indicates that the person he is meeting with is running 10 minutes late. He opens the news feed and pulls up a story.

Pocket Friends: Signposts – how might we get here?

Signposts are hypothetical steps along the path to arriving at a scenario. These signposts were developed by backcasting, or working backwards from the scenarios, asking, "What would need to happen for this to be true?" One of the uses for signposts is to view them as indicators that this scenario is becoming more prominent, or more likely.

- Consumer-level wearable technologies are integrated into clothing and can extend people's natural sensing apparatuses. This technology captures many dimensions of awareness that can not be accessed without its aid.
- The adoption of wearable technology is facilitated by inexpensive and high bandwidth wireless connectivity. Virtually all hardware and software companies begin to develop embedded and mobile computing devices and peripherals which include network connectivity.
- As a result of adoption of this embedded technology, the structure of our conversations start to shift, with the expectation that people have awareness and context of each others' current situation and recent history prior to a conversation.

- The sizable friend networks of earlier social media platforms such as Twitter have become much more insulated and closed, and many platforms encourage, by design, a limit to the size of any one *Sphere* to 150. This limit has been informed by research that shows network developers that the value of their products diminishes in the absence of rapport created by larger networks.
- A push and pull evolution happens, with technology platforms oscillating between exposing too much data and not exposing enough, and users both desiring transparency but also an ability to "turn it off." This leads us to limit access to our lives only to those we know well. We are comfortable "putting out" this information to trusted friends, but not to the world at large.
- Embarrassing moments of oversharing lead to automated limiting of transmissions. While biological functions are shared amongst the entire human race, cultural values around these daily acts vary, and it takes several "over-share" instances for technology companies to build in pattern recognizing tools and external triggers, such a "dampening zones" in bathrooms that block automatic audio and visual transmissions.
- Damaging incidents occur during the early days of adoption where one user is not aware of the others that are "present" in a conversation, leading to inadvertent insults and broken friendships. As a response to such incidents, consumers begin to demand technology-facilitated cues that indicate a virtually connected presence. These evolve to allow people to detect the shared and unknown connections present in a given situation.

Pocket Friends: Present Day Analogous Behaviours & Tools

Skype Sleeping

Skype sleeping is a form of networked presence where two people who are emotionally close, such as in a romantic relationship, sleep with a video/audio feed open to the other. This is a high-bandwidth sharing experience which is controlled and exposed only to the other person(Young, 2011).

Closed Twitter feeds

Twitter, the current popular social networking and micro-blogging platform, allows users to create “closed” accounts—accounts that require the owner to grant access to each and every person who wishes to “follow” their feed. This feature is often used by those who may be subjects of harassment (such as flaming) or who simply want to be able to share more about their lives, but not do so in a completely public way.

Find My Friends

Apple’s recently launched Find my Friends app can be set to always broadcast your location, allowing (only invited) friends to see where you are at any time.

Quantified Self Movement

Groups of people are collecting significant amounts of data about their biometric processes through sensors and various products like the UP wristband from Jawbone, meant to be worn 24 hours a day, 7 days a week. These individuals are interested in what stories their data can tell and how it can inform their own behaviours.

Pocket Friends: Implications and Recommendations

*These are recommendations for designers who make the choice to respond to or encourage behaviours such as those seen **in this scenario**. Note that some of these recommendations may directly contradict recommendations from another scenario – this makes sense because the scenarios are purposely constructed at opposite ends of experiential tension around communication. For a view of these issues separated from a specific scenario, see Section 5.4, Ten Questions for Designers.*

- Find the "Goldilocks" spot between too much and too little for many parameters of connection, including: the volume of information; the means in which it is surfaced, filtered and aggregated; the intelligence built into the platforms; and the integration into consumer's daily lives.
- Respect the desire to explicitly grant permissions. Be explicit about how and with whom users are sharing their information, and allow fine-grained control over which level of streaming each group sees.
- Make virtual connections explicit in physical environments. Remote presence feels creepy when it is secret. Every tool that facilitates remote awareness needs to consider how it represents who is "listening."
- Create tools that mimic current social norms around sharing. Use contextual data to inform semi-automatic filters for circumstantial privacy. Automatic decision-making around what users will want to share is important because it is too burdensome to make every decision explicitly.
- Verification of a friend's identity is key to developing positive connections and open sharing. Users will need to trust that they know exactly who they are allowing into their Spheres.

5. Four Tools for Designers: A User's Guide to this Paper

Many aspects of the previous scenarios are already evident today. We are currently witness to a period of astonishing innovation in the interpersonal communications space, with new extensions of our capabilities for connection appearing constantly. Each one of these innovations had a designer who looked into the future and imagined something that did not yet exist.

These designers probably used many tools² in the process, from pen and paper to Photoshop to sophisticated app prototyping environments. The tools helped them explore design possibilities, and therefore to make choices about what to include and what to leave out.

It is the goal of this project and its authors to give designers another set of design tools. These are design tools that are meant to be used before pen is ever set to paper; to expand thinking, rather than give strict guidelines; to be questions rather than answers. The intent is to lift the view of designers who are so heads-down and short of time that they feel they cannot afford to do broad-horizon research.

The following four design tools are offered in order to:

- enable designers to understand biases and values around everyday interpersonal connections.
- provoke new insights about people, and therefore more human designs.
- allow the luxury of looking toward the future in a way that fits within the tight constraints of the always-on technology industry.

² Throughout this paper, the word *tools* has referred to the *tools* that are being created to help answer the human *need* to connect by extending the human *capabilities* for communication. This section will discuss a different type of tool – design tools that designers use in the process of creating interpersonal communication tools.

Following is a guide to using the outcomes of this project in a design process. Because these are tools specifically for designers, the remainder of Section 5 will be addressed directly to designers in the second person.

A Note to Designers

To aid in the development of tools that are reflective of human need and supportive of connection, the following design tools can be used to think critically about the functionality and experience of the interpersonal communication tools that you are creating. Since the goal is for you as a designer to consider the future you are creating and make your own decisions, these tools are intended to be provocative rather than prescriptive. If you are a designer of interpersonal communications tools and this paper has made you think a little differently about what you design, then we have achieved our goal and hope that we have helped you achieve yours.

5.1 Experiential Tensions: A Tool for Understanding

The list of trends and tensions is a glimpse into the already-existing dichotomies that users struggle with when they make choices about how to communicate and connect. While the trends will grow, become commonplace, and perhaps fade, the essential human qualities that they point to will continue to hold. The *Experiential Trends and Tensions* (See Section 3.2) are the current instantiation of the essential pull between Serendipity and Control, and they are useful in exploring the basic needs of a set of users. By understanding which of these tensions figures most prominently for your particular audience, you will create some guiderails for your design directions.

5.2 Map of Contemporary Behaviours: A Tool for Analysis

As is evident by the number of current analogous behaviors identified within the scenarios, there are small indicators of each of the future scenarios that are apparent today. The *Map of Contemporary Interpersonal Communication Behaviours* (See Section 3.3) will be useful to designers looking to understand why certain apps succeed or fail. The process of exploring where an existing technology or tool is located in the landscape of serendipity and control will help situate new ideas for tools in both the marketplace and the design space.

5.3 Future Scenarios: A Tool for Exploration

These four *Future Scenarios* (See Section 4) will help you cast your designs into the future to understand what the ramifications of design decisions might be. By travelling farther out on the axes of Audience and Frequency than is possible with today's technologies and infrastructures, the scenarios explore the possibilities for design and the reasons that each direction might be desirable. The characteristics, expectations, and even interaction paradigms are very different based on which direction is extrapolated. We have been careful to focus on the positive aspects of each experiential future because we hope to pass on the idea that the value judgments are of your own making, and to encourage you as a designer to explore your own ideas about which direction might be preferable.

5.4 Ten Questions: A Tool for Reflection

The following ten sets of people-focused questions will help you focus on the user-experience inherent in the present that you may be designing for, or the future you are trying to create. These questions will help you think through the possibilities for what *could* be created, and make highly conscious choices about what *should* be created by taking into account the ways in which your technology will affect the people who use it.

BALANCE: What is the balance between serendipity and control?

Are you living in a world that values serendipitous discovery or one in which people desire control over their interactions? Each interpersonal communication tool we've examined sits on the landscape of Serendipity and Control, and our research identifies this to be the essential tension in all tools. If you give people the control that they need and want, how might they continue to have serendipitous experiences? How are you going to balance this tension in the tools you create for people?

WHO and WHAT: Control the WHO or control the WHAT?

Every social interaction technology makes a decision about control. The scenarios in this project are the result of mixing up the decisions of control across the WHO and the WHAT. Where are your tools going to live in this model? How can you support the essential control functions in your interface? How will you provide a clear view on what is controlled or open? Controlling the WHO is external and requires features to manage groups of other people (in relation to oneself), whereas controlling the WHAT is more about managing your own information and its public presentation.

TWO-WAY: Are you designing for both sending and receiving?

Much of the vocabulary around communications is biased towards either the sending or the receiving of communications. In working with interpersonal communications tools, this makes it easy to get stuck in one point of view. Who does your tool work best for – the sender or the receiver? (Be honest.) Are your sending and receiving audience the same? Do they have the same goals for the communication? If the receivers are very separate from the senders, as in a very broadcast model, then they might need entirely separate interfaces.

TRUST: How much verification is needed?

How do you help people be sure of who they are interacting with? Can your tools be easily manipulated to “spoof” or fake someone’s identity? Is that important to the interaction in question? When people need to control the WHO (see above), then being sure of identity is important, and connection rituals can help, but when that is less important, then verification becomes cumbersome.

RECIPROCITY: How reciprocal are communications?

Push and pull, give and take, call and response, mirroring, handshakes, waves; these paradigms for mutual awareness and feedback offer differing levels of reciprocity. Understand not just what people currently expect from experience with past communications tools, but what will make them feel good, based in fundamental human sociological expectations. Does your tool allow, encourage or even perhaps enforce a model of reciprocity that will be consistent and harmonious with the social experiences of its users?

AUTOMATICITY: How automatic are communications and connections?

To what degree does your tool perform communications functions automatically? Are people expecting automaticity, or are they more comfortable with keeping a high degree of control and initiating actions on their own? Be intentional about what is automated, for whom, and for what purpose.

SOCIAL RITUALS: Do you follow social conventions and rituals or disrupt them?

Are your tools building on existing social conventions or creating new ones? What are the social rituals that your tools are enhancing or replacing? How might the forms of those rituals inform the structure of communication within your tools? Is your interface dictating new modes of interaction and social customs? Is it open to new conventions created by unexpected use? Are you planning to support those newly user-created customs? Rituals are powerful social forces – consider how both the interactions and the interface within your tool align with or disrupt the existing social conventions for communication.

FILTERS: What will help people make sense of the overload?

Given the explosion of available data about others, how is your tool helping people “manage the mess” of information overload? What types of filters can you design into your tools to ensure that the communications deliver value instead of noise? How are those filters created and managed? How can people see beyond the filter boundaries when needed? Does it make sense to use social filtering? What are the parameters of awareness that will allow people to focus on what’s important? Beware of the “closed interest loop” where a stream of information that is too highly filtered can stifle the ability to discover new things.

CONTEXT: What kind of contextual awareness do you facilitate?

Does your tool provide an automatic level of awareness or an easy way for users to indicate context in a given situation or communication? As more sensing technology and data sets become available, they can be leveraged to provide some basic intelligence to a user's situation. What levels and kind of awareness will users find useful in the context of your tools?

MEANING: How are you enabling the enhancement of the meaning of communications?

What kind of "extras" are you offering within your tools to allow the addition of layers of meaning? How much contextual information does your tool enable? How do communicators in your tool add emotional depth to channels (like text) that don't naturally deliver it? Do these enhancements also communicate identity (personalization), or are they more about the content of the message (markup)? What small augmentations can give users an easy way to broaden, deepen, and provide context to their various communications.

6. Conclusion

The current proliferation of interpersonal communications tools and channels greatly extends the human capability to connect. But all too often, the very technologies created to bring people together can simultaneously push us apart. This project sought to understand the experiential tensions inherent in interpersonal communications tools. These tools extend human capabilities, and they are being molded and shaped by designers, which means that the designers of these tools are in fact shaping our collective futures. This project's intent is to provide ways to explore the ramifications of the design choices for these tools to ensure that we are consciously designing our technology, rather than letting the capabilities of that technology design us.

As interactive technology designers, consultants and educators, the authors are grounded in the world of experience design – how a piece of technology or software feels, its affordances and the emotional aspects of experience that it evokes. A driving motivation for us as designers ourselves is that of a great user experience. To us, it is not simply an “added bonus” or “nice to have” aspect of design, it is a competitive necessity that is shaping the landscape and differentiating winners and losers in the fast-paced world of technology development.

This project primarily followed a foresight process in conducting an horizon scan of the current trends and extrapolating the results of this scan into the development of future scenarios. This foresight framework was strongly augmented and influenced by the design process, specifically experience design. Designers and foresighters both use “scenarios”, but with a different focus. Foresight scenarios are used to provoke and stretch the thinking of the reader, while design scenarios are used to validate and test a solution. By infusing the foresight methods for stretching the brain alongside a designer's focus on the human experience, this project has created a set of design tools that are both far-reaching in their vision and useful in their practical application to the design process.

Most revealing is just how useful the scenarios have been in the service of provocation. Throughout the course of the scenario phase of the project, new product ideas continually emerged out of discussions of these possible futures. This constant stream of potential opportunities compelled us to push the scenarios further, trusting that this tool for provocation was in fact achieving its intended goal.

As was acknowledged in the introduction to the Future Scenarios (Section 4), this project has focused on the positive attributes of each potential future. As the 2x2 matrix was developed, we discovered that if we considered negative, or mitigating factors, then the resulting behaviours changed the dynamics of the scenario, causing a shift closer to the center or even into a different quadrant of the 2x2 matrix. However, an exploration of the risks or dystopian potentials in each future would be a valuable addition, and would help in understanding the challenges inherent in each future direction.

Throughout this research, the strongest theme that emerged was the tension between the human delight in serendipitous connection and a strong need for control over channels of communication. This tension is evident in the behavioural strategies employed by communicators, as well as the directions of emerging interpersonal communications tools. By articulating serendipity and control as a dominant tension at the intersection of technology and communication, and by providing tools to designers to understand and frame their decisions around this central tension, we hope to enable them to look beyond the current product cycle to see the impact of their design choices on the future of human connection.

It is our sincere hope that the results will guide the development of future interpersonal communication technologies, and that the methods that we used can be extended to other areas where design choices could have far-reaching and systemic impacts.

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Appendix A: Glossary of Referenced Communication Tools

In the Landscape of Contemporary Behaviours (See Section 3), contemporary tools are given as examples in order to illustrate current manifestations of each behaviour. The alphabetical list below describes the example tools and clarifies common usage of each.

Badoo: A social network and app designed for dating and socializing with people geographically near you. <http://badoo.com/>

Ban.jo: Combines info from multiple social networks into a "socialverse" of activity. With Ban.jo you can be in two places at once and see what's happening where you are, where you will be, or where you want to be. Alerts you when your friends are nearby, even if they aren't on Ban.jo. <http://ban.jo/>

Bump: Allows people to exchange digital data (contacts, photos etc) by "fist-bumping" two devices together to initiate the transfer. <http://bu.mp/>

Facebook: Facebook allows users to post status messages, product reviews and content (including rich media and links from the Web) into their stream, which is then aggregated by the platform and displayed to *friends* – connections that must be requested and approved by each user on the platform. Facebook has encapsulated the personal aspect of people's lives, connecting them primarily to family and friends, and is used less for business connections.

Facebook introduced a 'Like' button and enabled users to install this button on external websites and platforms. 'Likes' are broadcast into a user's feed, letting their friends know what they find interesting.

Facebook has also enabled 'friction-less sharing' which broadcasts what people are reading and listening to on the Internet without the need to click a button. This form of sharing is considered 'friction-less' because users do not have to take any action to enable the broadcasting of their media consumption. <https://www.facebook.com/>

Find My Friends: An application developed by Apple that lets friends look at your location any time, once you've given them permission to do so.

Footfeed: Provides a dashboard for status updates on all geo-location check-in services and aggregates nearby Deals/Rewards. Currently it works with Britekite, Foursquare, Facebook, Gowalla, Latitude, Loopt, Whrrl, Buzzd, etc. <http://footfeed.com/>

Foursquare: A social networking application that revolves around checking-in to physical locations, which exposes other users who have also checked-in recently and historically. The platform awards users points based on how often that have check-in and grants titles of “Mayor” to users who check-in to locations the most. The platform also rewards lower-level accomplishments in the form of virtual badges associated with your profile.

Grindr: An application for gay and bisexual men that surfaces other men nearby and whether they available for meeting. <http://grindr.com/>

Glympse: An app that allows you to share your current location for a set period of time, with one or more people. Useful in coordinating meetings and managing expectations of when someone will arrive. <http://glympse.com/>

Heat Tracker - looks at where people are checking in and assigns a "Heat Rating" based on the number of check-ins. The greater the number of people checking-in, the hotter (brighter) the heat rating. This app uses data from the Foursquare platform. <http://www.heattrackerapp.com/>

Instagram: A social photo sharing application that always posts a person’s photos into their feed the moment the image is captured. Instagram prioritizes the “app” experience in that it does not provide an equivalent desktop experience. <http://instagr.am/>

Justin.tv: A website and application that allows users to broadcast any video feed across the internet. <http://justin.tv>

LinkedIn: A social networking site designed specifically for business professionals to facilitate introductions and networking. LinkedIn allows users to recommend colleague’s performances from previous or existing engagements and assignments. LinkedIn encourages users to keep their profile updated, as it is used by many as a resume of educational and professional experience. <http://www.linkedin.com/>

Marco Polo – “Share your location with your friends and not the whole world. Marco! uses a reverse check-in -- your friend sends you a Marco! asking for your location and you respond (or not) directly to that friend." Uses Facebook connect.

Neer: Allows personal and private automatic sharing. No check-ins, just allows you to see "whether your kid made it to school." <http://www.neerlife.com/>

Paper.li: A “newspaper” style interface for content automatically aggregated from your social network feed. The platform includes the ability to then publish these artefacts (daily “papers”) as updates to your social network feed. <http://paper.li/>

Path: A mobile social networking app that limits your connections to 150 friends, in order to allow a more fluid and less edited version of your digital self. The app allows

notifies you when someone is looking at your feed in addition to the typical chronological feed of status updates.

Percolate: A tool for content aggregation based on what is being said in your personal social network. Users can sign-up for daily notifications on what the most popular topics and articles were discussed within the last 24 hours. <http://percolate.com/>

Pinterest: An online pinboard of assets found across the web, curated by individual users and organized by interest or topic. You can “follow” users or pinboards of interest to develop your own feed of interesting content.

Privatext: Deletes messages sent through the app after a short, set period of time. <http://www.privatext.co/>

Twitter: Currently the world’s most popular micro-blogging network. You can post status updates up to 140 characters long, referred to as a *Tweet*. Several platform-specific behaviours have evolved from the platform including Re-Tweeting, the act of republishing another person’s status update. This behaviour encourages sharing, transparency, and giving credit to those that originated the tweet.

Twitter later introduced *Direct Messages*, a means in which to send a private message to a user. This feature only works if the recipient is following the sender.

The Twitter platform also aggregates all conversation taking place at one time to provide a “Trending Topics” list of the most active themes taking place at any moment. <http://www.twitter.com>