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Sensemaking in virtual settings: A practice-based approach

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Abstract

Since the mainstream uptake of computers and the internet, our world has become increasingly virtualised. Modern organisations are deeply reliant on virtual technologies to carry out their business across time and distance. Indeed, virtual technologies are now implicated in almost *all* organisational activities, from (virtual) meetings to (online) collaboration. Many scholars have been drawn to investigate the new organisational phenomena that have resulted from the virtualisation of our world, such a virtual learning, virtual leadership and virtual decision making. My research, however, tackles a more fundamental question about how organising more generally is accomplished in the virtual age. Namely, the research question is, "How does sensemaking, as the basis of organising, take place in virtual settings?" To explain, sensemaking – a foundational concept in Organisation Studies – underpins all organisational activities. Therefore understanding how sensemaking takes place in virtual settings will necessarily illuminate how organising more generally is accomplished virtually.

To date, how sensemaking takes place in virtual settings has hardly been studied. Further, the studies that do exist impose Weick's (1969, 1979, 1995) theory of sensemaking (which was developed at a time pre-dating virtual technologies) on to the new context. As a result, existing studies do not illuminate what is new, unique and interesting about how we make sense in virtual settings. In this thesis I develop an alternative, practice-based conception of sensemaking (which serves as the theoretical framework for the study) that sensitises me to previously overlooked but critical concepts, namely materiality, embodiment and ongoing accomplishment. First, materiality describes how things, which in virtual settings are often digital, are implicated in sensemaking. Second, embodiment describes how physical bodies, and their digital representations in virtual settings, are involved in accomplishment of activities. Finally, ongoing accomplishment describes how sensemaking takes place in the flow of activities as they are carried out in the physical world, the virtual world, or combination of both. This framework also enables me to position activities as the unit of analysis for sensemaking. Taken together, this is a novel approach that reveals new facets of the phenomenon of sensemaking in virtual settings.

This theoretical framework is applied in three different fieldsites (of varying levels of virtuality) which are selected using a virtuality continuum developed within the thesis. These fieldsites are Yammer (a social media platform), telepresence (a video-based collaboration platform), and Second Life (a three-dimensional virtual world). The methodology is a hybrid traditional-virtual ethnography in which data is collected through participant observation,

complemented by interviews. Empirical data are presented in the form of accounts that exemplify the key activities of practitioners in each fieldsite. The analysis reveals how sensemaking is enabled, constrained and altered owing to activities being carried out virtually (rather than in traditional settings). Further, various unique features of sensemaking as it takes place in each fieldsite are articulated, which become the subject of a cross-fieldsite comparison.

By overlaying the results from each fieldsite on to the virtuality continuum, the question of how sensemaking takes place in virtual settings is answered in two ways. First, features of sensemaking that are common across all fieldsites, and therefore levels of virtuality, are identified. Second, I identify features of sensemaking that are specific to particular fieldsites and make inferences about how sensemaking features change depending on the level of virtuality of the setting. Some anomalies arising from this analysis are resolved by suggesting an alternative matrix model of virtuality which has potential to be included in future research.

The findings culminate in articulation of a practice-based theoretical account of "virtual sensemaking". This virtual sensemaking is then compared to traditional sensemaking, further illuminating the uniqueness of how sensemaking takes place in virtual settings. I then articulate contributions to the fields of sensemaking and organising as follows. This is the first study to articulate an account of sensemaking as it takes place specifically in virtual settings. Moreover, the account of virtual sensemaking broadens our understanding of sensemaking generally by opening up previously under-theorised aspects of how we accomplish (virtual) organisational activities. Contributions to broader organising include reconsideration of how we define quintessential organising activities, such as meetings. Practical implications pertain to creators, administrators and users of virtual technologies who may use this knowledge of virtual sensemaking to inform more effective and efficient design, implementation, management and application of virtual technologies in organisations.

Finally, exciting avenues for future research are suggested, including opportunities to reconceptualise the theoretical, empirical and analytical landscape for investigating organising in the modern virtual age. Namely, we may let go of notions of organising that are rooted in traditional settings and embrace new conceptions of virtual organising. Organising is no longer place-specific or linear, nor does it require our physical presence or real-time participation. Instead, modern virtual organising is a complex, multi-dimensional blending of the physical and virtual. As technologies evolve and our activities become ever more integrated with them, understanding how we achieve this blending will be paramount to progressing the field of Organisation Studies generally.

Declaration by author

This thesis is composed of my original work, and contains no material previously published or written by another person except where due reference has been made in the text. I have clearly stated the contribution by others to jointly-authored works that I have included in my thesis.

I have clearly stated the contribution of others to my thesis as a whole, including statistical assistance, survey design, data analysis, significant technical procedures, professional editorial advice, and any other original research work used or reported in my thesis. The content of my thesis is the result of work I have carried out since the commencement of my research higher degree candidature and does not include a substantial part of work that has been submitted to qualify for the award of any other degree or diploma in any university or other tertiary institution. I have clearly stated which parts of my thesis, if any, have been submitted to qualify for another award.

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Publications during candidature

Conference papers

Marshall, A. 2014. **Sensemaking in Second Life.** SLACTIONS 2013: Research conference on virtual worlds – Learning with simulations. Procedia Technology, 13: 107-111.

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Publications included in this thesis

No publications included, though I do make reference to the above papers in the thesis.

Contributions by others to the thesis

No contributions by others.

Statement of parts of the thesis submitted to qualify for the award of another degree

None.

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Keywords

Sensemaking, organising, virtuality, technology, digital, practice, ethnography, Yammer, telepresence, Second Life

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FoR code: 1503 Business and Management, 100%

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List of Abbreviations used in the thesis

2D (two-dimensional)
3D (three-dimensional)
ANZ (Australia and New Zealand)
AR (augmented reality)
ASIC (Australian Securities and Investments Commission)
BAM (business activity monitoring)
BPM (business process modelling)
CAD (computer-aided design)
CEO (chief executive officer)
CIO (chief information officer)
CMC (computer-mediated communication)
CSP (collaboration sales practitioner)
CST (Central Standard Time)
DL (distribution list)
EM (ethnomethodology)
ESN (enterprise social network)
EVW (Educators in Virtual Worlds)
F&I (fraud and investigation)
G&P (governance and process)
HASL (History Association of Second Life)
HCI (human computer interaction)
ICT (information and communication technology)
IM (instant message)
IoT (internet of things)
IS (Information Systems)
IT (information technology)
KM (knowledge management)
MOOC (massive open online course)
MMORPG (Massively Multi-player Online Role Playing Games)
MRT (media richness theory)
OS (Organisation Studies)
PPG (Process and Procedure Guide)
PST (Pacific Standard Time)
RL (real life)
SL (Second Life)

SLEF (Second Life educators' forum)

SP (the sensemaking perspective)

SU (State University)

VO (virtual organisation)

VR (virtual reality)

VT (virtual team)

VWC (Virtual Worlds Consortium)

Chapter 1 THE VIRTUALISATION OF THE WORLD

> Stone Age. Bronze Age. Iron Age. We define entire epics of humanity by the technology they use.
>
> – Reed Hastings, CEO Netflix

The aim of this thesis is to investigate how we organise in the modern virtual world. In the general consciousness, this virtual world is characterised by the rapid rise of various technologies that mediate everything we do, from catching up with friends to doing our banking. Related commentary has been characterised by bold optimism about the future of work, as well as cynicism about the effectiveness of virtual forms of organising over face-to-face interaction. This research does not buy into the debate about if and how virtual means of organising are better or worse than other more traditional forms. Rather, it is focused on investigating how our fundamental processes of organising are being transformed by the virtualisation of our world. I introduce this research topic in the proceeding chapter as follows. I begin by spelling out how virtual technologies are ubiquitous in modern life and that as such, many of our everyday activities are now carried out virtually. I then show that not only do our more general activities take place virtually but also organisational activities, such as innovation and knowledge management. While many scholars have been drawn to investigate these exciting new virtual organisational phenomena, I argue that there is a more fundamental question to be asked that helps us to understand how organising more generally takes place virtually. That is, "How does sensemaking, as the basis of organising, take place in virtual settings?" I conclude the chapter by outlining how this question will be addressed in the thesis.

1.1 Virtuality in everyday life

We now live in the "virtual age" (as opposed to the stone, bronze or iron ages). Modern life, in comparison to that of previous generations and civilisations, is defined by our ever-increasing reliance on virtual (digital, online, electronic) technologies. For example, since the advent of mainstream internet use in the 1990s, we have become somewhat obsessed with web-based technologies such as social media platforms (e.g. Facebook, Twitter, LinkedIn), online collaboration tools (e.g. Basecamp, Trello), online store fronts (e.g. eBay, Amazon, Etsy), content-sharing sites (e.g. Instagram, Pinterest, Flickr), online news feeds (e.g. The Conversation, Buzzfeed, Huffington Post), streaming music services (e.g. iTunes, Spotify, MySpace), aggregate services (e.g. WebJet, Travigo, iSelect), and online games (e.g. World of Warcraft, Minecraft, League of Legends). Even more remarkable is how quickly we have adopted these technologies. For example,

internet users worldwide grew from 16 million in 1995 to 3,345 million in 2015, and Facebook has acquired 1,000 million subscribers since its creation in 2004 (World Internet Stats, 2015).

In this virtual age we do not just use technology to get things done; we actually live much of our lives virtually. We socialise virtually – we meet people, debate politics, share stories, keep in touch, date people, marry people, have sex with people, join clubs and societies, and practice our faith virtually. We play virtually – we watch videos on YouTube, read online comics and magazines, listen to music, play online games, gamble in online casinos, and track family ancestry. We relax virtually – we flick through news articles on an iPad, read a book on a Kindle, get mobile sports updates on our smartphones, and listen to meditation podcasts. We learn virtually – we stream video lectures, access online journal databases, use online education tools such as massive open online courses (MOOCs), enrol in courses, chat in study forums, and seek information using Wikipedia. Finally, we work virtually – we communicate online, telework from home, store and share files on remote servers, and conduct trade of goods and services online.

1.2 Virtuality in organisations

Not only do our more general activities take place virtually but also organisational activities, from high level functions such as marketing and management to tactical activities such as payment-processing and customer feedback. Other common examples of virtual organisational activities include online advertising, online recruitment, virtual training, online customer support, company blogging, online timekeeping, digital archiving, social media promotions, and communication between colleagues. While many modern businesses conduct a significant portion of their activities virtually, there are other organisations that are almost entirely virtual. For example, globally distributed, open-source software engineers collaborate virtually to create software programs, which may then be downloaded and installed by the end user. This virtual product chain is further enhanced by the end user's ability to provide feedback virtually or even to make changes to the product themselves.

Further, some modern organisations conduct business in three-dimensional (3D) virtual worlds. For example, companies such as Dell, Coca-Cola, Nissan and Sun Microsystems have previously created virtual shopfronts in Second Life (Boellstorff, 2010). Second Life (SL) is a virtual world with millions of residents who embody avatars in order to have relationships, own property, build homes, work on projects, and play games. SL residents buy and sell virtual commodities and services (furniture for their virtual homes, clothes for their avatars, labour for the

building of sophisticated objects or animations), which supports a standalone virtual economy. The SL currency Linden dollars (named after Linden Labs, creators of SL) may even be converted into US dollars, providing "real" incomes for residents. There are also other 3D virtual worlds that are purpose built for organisations to help operate their business. For example, Vastpark and Olive facilitate 3D sales demonstrations and simulation training.

The rapid virtualisation of organisations and organising has led to an urgent need to better understand how organisational activities are carried out in virtual settings. This need has been felt particularly in the field of Organisation Studies (OS), but also in several other disciplines within the social sciences such as information science (see Burkhard & Horan, 2006; Fuller, Hardin, & Davidson, 2007; Gallivan, 2001; Greener, 2009) and communications (see Churchill & Erickson, 2003; Gareis, 2006; Lee, Shin, & Higa, 2007; Walther & Bunz, 2005). In the field of OS, focus has been on conceptualising and investigating the phenomena of virtual organisations (VOs) (Black & Edwards, 2000; Kasper-Fuehrer & Ashkanasy, 2004; Pedersen & Nagengast, 2008) and virtual teams (VTs) (Bell & Kozlowski, 2002; Lin, Standing, & Lui, 2008). Also, the more specific activities of these VOs and VTs has been examined, for example virtual trust (Kasper-Fuehrer & Ashkanasy, 2001), virtual decision making (Hague & Loader, 1999), virtual leadership (Pauleen, 2003), virtual collaboration (Peters & Manz, 2007; Pyoria, 2009), virtual innovation (Kohler, Matzler, & Fuller, 2009), virtual communities of practice (Zhang & Watts, 2008), virtual identity (Bers, 2001; Schultze, 2012), and virtual knowledge management (Cecez-Kecmanovic, 2004; Ratcheva, 2008).

The above-mentioned literature no doubt contributes to our understanding of virtual organisational activities. Yet my research is concerned with a more basic dimension of organising in virtual settings, namely *sensemaking*. Many scholars argue that sensemaking is the basis of all human activity (see Holt & Sandberg, 2011a, 2011b; Oswick, Fleming, & Hanlon, 2011). Indeed, the founding father of sensemaking Karl Weick (1969, 1979, 1995) positioned his theory of sensemaking as a means to understand organising more broadly. In doing so, "Weick made us see that "organization" is an outcome of an evolutionary process of organizing and directed attention to the sensemaking roots of this process" (Sandberg & Tsoukas, 2015: S8). This sensemaking is a cyclic process in which actors, in response to an interruption to the flow of an activity, retrospectively assign meaning to and act upon bracketed cues (Weick, 1995). In this way, actors *make* (enact) that which they *sense* (and further act upon) as they accomplish organisational activities. Therefore, without sensemaking there can be no organisational activity at all. Considering

that organisational activities are entirely dependent on the sensemaking that underpins them, a logical approach for this research (which aims to investigate how we organise in the modern virtual world) is to investigate how sensemaking occurs in virtual settings. Put another way, I intend to find out what fundamentally characterises organising in the modern virtual age by understanding how organisational actors make sense through their virtual activities.

1.3 Sensemaking and organising in virtual settings

Studying sensemaking specifically as a means to understanding organising more generally is common in the field of OS. For example, sensemaking has been studied as a means to understand the underpinnings of organisational crises (Maitlis & Sonenshein, 2010) and organisational change (Dunbar & Garud, 2009). Sensemaking has also been used as a lens to investigate other organisational phenomena, such as knowledge (Choo, 1996, 2002), innovation (Hill & Levenhagen, 1995) and learning (Thomas, Sussman, & Henderson, 2001). Yet how sensemaking (as the basis of organising and organisational activities) takes place in *virtual* settings has hardly been studied (Marshall & Sandberg, 2011; Sandberg & Tsoukas, 2015). Given how prolific virtual activities are nowadays and the fundamentality of sensemaking to such activities, that scholars have not investigated virtual forms of sensemaking is surprising and a major drawback in current literature. My study aims to address this shortcoming by asking, "How does sensemaking, as the basis of organising, take place in virtual settings?"

Virtual forms of sensemaking have not been studied to any significant degree in OS, but there are a few studies that take up this topic (Faraj, Kwon, & Watts, 2004; Hansen, Pike, & Bateman, 2011; Myers, 2007). The main contribution of these studies is that they show how aspects of our traditional understanding of sensemaking are applicable to the virtual setting. For example, they show that aspects of Weick's (1969) ecological process of sensemaking (enactment, selection, retention) may be enacted virtually by organisational actors (Faraj, Kwon, & Watts, 2004). However, there is a fundamental problem with the approach of many of these studies. Namely, scholars unquestioningly apply traditional notions of sensemaking (that were developed pre-virtual age) to the new virtual context, potentially blinding them from seeing what else may be going on. That is, by using a traditional sensemaking lens they "find what they are looking for" at the expense of seeing other unique, and perhaps more important, aspects of virtual forms of sensemaking that are simply not conceived of in the traditional framework. For example, what impact do hardware (e.g. screen, mouse) and software (e.g. interfaces), which did not exist when sensemaking theory was first established, have on sensemaking?

In sum, owing to the various ways in which virtuality has transformed the way we carry out organisational activities, it is logical to think that our underlying sensemaking may also have changed. Yet the existing research on sensemaking prevents us from uncovering the unique and interesting aspects of virtual organising that drew scholars' attention to it in the first place. As such, my research aims to develop a reconceptualisation of sensemaking through which the unique features of virtual forms of sensemaking and organising may be illuminated rather than obscured. A major contribution of this research is, therefore, enrichment of the lengthy and strong sensemaking tradition so that it remains relevant in the modern virtual age. A secondary contribution is to literature on organising and virtuality more broadly. Namely, I suggest ways in which the theoretical, empirical and analytical landscapes may be altogether reconceptualised so that we can see more of what is happening when modern day practitioners accomplish virtual organisational activities.

1.4 Organisation of the thesis

In Chapter 1 I introduced the research topic, which arose from curiosity about how organisational activities take place in today's virtual age. I proposed that sensemaking underlies all organisational activities and, therefore, that understanding how sensemaking takes place virtually will necessarily illuminate how organising more broadly is accomplished in virtual settings. An initial review of the literature revealed that we currently have very little understanding of how sensemaking takes place in virtual settings.

In Chapter 2 I commence my investigation of how sensemaking takes place in virtual settings. Here, virtuality is taken as the context from which organisational actors draw as they accomplish activities, and which may therefore inform sensemaking in various ways. In OS, virtuality has been defined and applied in various and inconsistent ways, and there are several problematic dualisms in the way scholars have theorised virtuality. Despite this disunity, I select a definition of virtuality as the backdrop to the study that mostly overcomes these issues. From this definition I elaborate three types of virtual work – VTs, remote control and simulation. Of these three types of virtual work, VTs best capture the kind of virtual organisational activities on which this thesis is focused (e.g. meetings, collaboration). These virtual activities and their underpinning technologies inform development of a virtuality continuum from which the study's fieldsites are selected.

In Chapter 3 I introduce sensemaking as the focus of the study (on the backdrop of virtuality). In particular, by reviewing, critiquing and problematising sensemaking, I show how the underlying assumptions of the traditional sensemaking perspective (hereafter: SP) limit its application to virtual settings. Namely, SP has recently been criticised for its dualist ontology that limits investigation of sensemaking to the cognitive sphere at the expense of material and embodied aspects of organising. These deficits are exacerbated in virtual settings because digital materials (e.g. textual and digital objects) and digital bodies (e.g. avatars) have vastly different properties to their physical equivalents. Thus, sensemaking (an embodied and material activity) is enabled, constrained and even altered in various ways by virtue of it taking place in the virtual setting. Because such aspects of virtual sensemaking cannot be grasped through a traditional sensemaking lens, a new theoretical approach is required.

In Chapter 4 I articulate an alternative, practice-based conception of sensemaking that overcomes the shortcomings of traditional approaches. Founded on the notion of entwinement of life and world (Sandberg & Dall'Alba, 2009), the practice-based approach embraces the critical, relational concepts of materiality and embodiment, as well as ongoing accomplishment, which have been overlooked in sensemaking research to date. Drawing on various facets of the practice literature, my new conception of sensemaking is founded on three pillars. First, I posit that activities and their constitutive doings (and sayings) are the building-blocks of sensemaking and organising (Schatzki, 1996). Second, I posit that activities and doings (that underlie sensemaking) are made sensible in practice by intelligibility (Heidegger, 1927 as cited by Riemer & Johnston, 2013). In short, intelligibility ensures that activities and doings make sense within the practice in which they are performed. Third, such activities (and thus sensemaking) are ongoing. Therefore, I re-define sensemaking (in virtual settings) as intelligible action that takes place on the basis of practice (Schatzki, 1996); that is, organisational actors make sense through the activities that comprise their practice.

Chapter 5, Methodology, outlines how this practice-based conception of sensemaking will be studied within three virtual settings. Through a hybrid traditional-virtual ethnography I seek to understand how practitioners make sense (act intelligibly) through their virtual organisational activities. Within this approach, participant observation (supported by in-depth interviews) affords me a lived experience of the practice at hand and the opportunity to partake in sensemaking as it unfolds. The analytic approach is to identify instances of sensemaking (as constituted by accomplishment of activities) in my data (fieldnotes, transcripts, videos, audio recordings,

organisational documents), then to determine the virtualising mechanisms (virtual sensemaking tools) that afford these sensemaking activities. For example, the activity of "chatting with a customer" may be afforded by the instant messenger tool. These instances of sensemaking – which take the form of both episodic sensemaking (resolutions to interruptions) and immanent sensemaking (ongoing accomplishment) – are then interrogated while keeping the sensitising concepts from the above-mentioned theoretical framework in mind. By this approach, unique features of sensemaking as it takes place in the virtual settings are revealed.

Chapters 6-8 are presented as three distinct studies of sensemaking in different virtual settings. In Fieldsite 1 I investigate the practice of governance and process in the virtual setting of Yammer (enterprise social network, a type of social media); Fieldsite 2 investigates the practice of salesmanship in the virtual setting of telepresence (video-based collaboration platform); and Fieldsite 3 investigates an educators' community in the virtual setting of SL (3D virtual world). In each fieldsite I demonstrate how sensemaking is enabled, constrained and altered by the virtual setting. In the process of data analysis, five dimensions of sensemaking in virtual settings emerge: matter, presence, time, place and appropriation. Within each dimension, I articulate five unique features of sensemaking as it takes place in each virtual setting.

Chapter 9 is a cross-fieldsite analysis. Here, by overlaying the findings from the three fieldsites on to the virtuality continuum, I answer the research question (How does sensemaking take place in virtual settings?) in two ways. First, I assert the unique features that characterise sensemaking across all the virtual settings (regardless of their level of virtuality). Second, I articulate various features of sensemaking that are specific to particular fieldsites and make inferences about which features of sensemaking become more or less pronounced depending on the level of virtuality of the setting. Finally, I draw out some anomalies in the results and present an alternative, matrix model of virtuality that may serve as a more effective analytical tool in future research.

In Chapter 10 I discuss these findings and articulate a practice-based theoretical account of virtual sensemaking. Then, to further illuminate the value of this account of virtual sensemaking, I compare it to traditional sensemaking. That is, by drawing out the differences between virtual and traditional sensemaking, we see how deficient existing understandings are in accommodating how organising takes place in the modern age. The findings of this research not only enrich sensemaking theory, but broader organisational theory too. I conclude the thesis with practical implications, limitations and opportunities for future research.

Chapter 2 VIRTUALITY AS A BACKDROP TO THE STUDY

In Chapter 1 I established the premise for this thesis. That is, owing to the virtualisation of the world, many of our everyday activities (such as shopping, banking and socialising) and organisational activities (such as management, design and communication) have been virtualised. This has led to the emergence of virtual social phenomena (e.g. telemedicine, online education, online dating) that have drawn avid curiosity from scholars. OS scholars in particular have conceptualised VOs and VTs as a means to investigate how organising is evolving in the virtual age. While this literature provides insight into factors by which to distinguish between the traditional organisation/team and its virtual counterpart, a more fundamental question may be asked: *how* do we organise virtually? This question shifts the focus from features of static virtual organisational entities (VOs and VTs) to the process of how organising is actually achieved in virtual settings; that is, the focus is on the process of organising rather than on the entity of the organisation. This re-focus is significant because even though we know that virtual technologies inform how we organise, we have little understanding of exactly how we carry out activities virtually. This study aims to address this deficit in our knowledge by asking, "How does sensemaking, as the basis of organising, take place in virtual settings?"

The aim of Chapter 2 is to explore, clarify and define the backdrop to the study – virtuality – on which sensemaking takes place. First, I explore the origins and general assumptions of the concept of virtuality before paying attention to how it has been understood in OS specifically. I find that virtuality has been defined and applied in various and inconsistent ways, and there are several problematic dualisms in the ways scholars have theorised virtuality. Second, I explore more progressive conceptions of sensemaking that overcome some of the key issues. Consequently, I select a definition of virtuality that is suitably aligned with this study. Third, I develop a virtuality continuum with two dimensions – virtual activities and enabling technologies – that is later used to select fieldsites. Finally, in the process of developing this continuum, I propose the inclusion of actualisation as a new category of virtuality that, unlike existing conceptions, accounts for the fact that we can now carry out brand new activities in totally unique ways. Here I argue that when actors accomplish activities with or within various technologies, they enact virtuality.

2.1 What is virtuality?

The concept of virtuality is not new. The terms virtuality, virtue and virtual have their genesis in the idea of the virtuous person, one who possesses a special force or power (Panteli & Chiasson, 2008: 5). Indeed, these terms are derived from the Latin *virtus* meaning strength and power (Shields, 2003). Another way to define the virtual is that which is "not actually, but as if" (Heim, 1993 as cited by Panteli & Chiasson, 2008: 5). In other words, "a virtual artefact is an event or entity that is real in effect but not in fact" (Sotto, 1998 as cited by Panteli & Chiasson 2008: 5). For example, a computer desktop is not an actual desktop (like the desk on which the computer sits), but the computer desktop behaves "as if" it were an actual desktop in that it houses (digital) documents.

In academic literature "the nature of virtuality has neither been well conceptualised nor fully explored" (Panteli & Chiasson, 2008: 1). In OS an accepted definition of virtuality is hard to find, but there is a prevailing assumption that virtuality is harnessed by traditional organisations to take advantage of information and communication technologies (ICTs) (Panteli & Chiasson, 2008). This sentiment is reflected in the two most common conceptions of virtuality in OS literature. First, a VO is "a collection of geographically distributed, functionally and/or culturally diverse entities that are linked by electronic forms of communication and rely on lateral, dynamic relationships of coordination" (DeSanctis & Monge, 1999: 693). Second, a VT, a sub-group of VOs (Colky, 2002), is "an interdependent group working on a project across time and space relying on information communication technologies" (Lin, Standing, & Lui, 2008: 1032). In both these definitions, ICTs are the defining dimension of virtuality; that is, ICTs virtualise organisational entities (e.g. organisations and teams) and activities (e.g. telework).

In everyday life, as well, we often consider something to be virtual if is it carried out using ICTs (computers, the internet, etc.). For example, if we complete an online training module at work, we refer to it as virtual learning. It makes practical sense for us to think of virtuality as being associated with the presence of ICTs because computers and the internet provide us with ways to virtually achieve activities that used to be carried out offline. For example, email enables us to virtually write and send letters to each other; that is, writing an email is "not actually but as if" we are writing a physical letter and posting it in the mail. However, two problematic and inter-related assumptions underpin this conception of virtuality. First, the virtual is taken to be synonymous with the digital; that is, ICTs are seen to *make* the activity virtual (e.g. a virtual chat session is the same thing as a digital chat session). However, this is a flawed assumption because there are many virtual

activities that pre-date digital technologies. For example, the humble written letter is, in fact, a virtual activity. That is, writing is a virtual form of spoken prose (reading a book is "not actually but as if" listening to an author tell a story). Indeed, in ancient times Plato considered the virtual written word to be inferior to embodied, oral delivery of knowledge (Panteli & Chiasson, 2008: 250). Yet, under the above-mentioned assumptions, our current understanding of virtuality is limited to the digital sphere.

Second, virtuality (and its associated virtual activities) is often seen as an "unreal" or secondary version of reality. For example, again in everyday life, we often delineate between the "virtual world" and the "real world" when talking about activities such as online gaming (avid online gamers are often criticised for not living in the "real world" and are encouraged to "get a real life" in the physical world). This idea that the virtual is not real unless it is rooted in a physical reality is problematic. For example, many modern organisations are 100% virtual. As previously mentioned, open-source software development organisations create virtual products that are traded online. Yet these organisations are no less real (consequential, meaningful) than traditional bricks-and-mortar organisations that produce physical goods for trade in physical shopfronts. Indeed, such open source organisations have immense impact on global markets by producing free products that compete with those of multi-nationals such as Microsoft. Thus, to treat the virtual as separate from the real is nonsensical, yet this is a prevailing assumption in academia and practice. In sum, scholars and practitioners alike have missed the point that "virtuality is not simply an extension of the traditional physical or structural, such as something that already exists, but it could also be a new and emergent entity" (Panteli & Chiasson, 2008: 5).

2.2 New ideas about virtuality

The above conceptions of virtuality have resulted in an overall dichotomy between the virtual/digital and the real/physical. As Chiasson (2008: 242-243) summarises, the virtual has been described as absent, asynchronous, inattentive and unreal, and has been pitted against the physical which is present, synchronous, attentive and real. Some scholars have begun to challenge such dualisms through more progressive conceptions of virtuality. For example, Dixon and Panteli (2008: 173) challenge the distinction between the digital (virtual) and the physical (real) by suggesting that many studies "do not adequately capture the complementaries that emerge in the combination of face-to-face and technology-mediated communications". Also, virtuality as a matter of degrees is becoming an accepted view in management studies (Panteli & Chiasson, 2008: 7). For example, Kirkman and Mathieu (2005) propose a 3D model of virtuality by which the "virtualness"

of teams may be assessed along three continuums: extent of use of virtual tools (the prevalence of digital communications); informational values (the richness of information communicated using virtual tools); and synchronicity (proportion of synchronous versus asynchronous communication). Further still, some scholars have moved towards an understanding of virtuality (in teams) as being defined by several factors called "discontinuities" (Dixon & Panteli, 2008) which include geography, culture, organisation, work practices, technology and time zone. Others have introduced further dimensions such as time, space, absorption, substance and identity (Chiasson, 2008: 242-243). Yet these conceptions do not overcome the dichotomies that underpin them; they merely flesh out the layers that comprise the gap between the virtual/digital and the real/physical.

In contrast, some scholars have sought to confront these dichotomies. First, Overby (2008) offers a conception of virtuality that challenges the common lack of differentiation between the virtual and the digital. More specifically, he challenges our everyday assumption that virtual activities and digital activities are one in the same and, therefore, that digital technologies *make* activities virtual. Namely, in his "process virtualization theory", rather than defining the virtual as the presence of the digital, Overby (2008) defines the virtual as the absence of the physical. "A virtual process is a process in which physical interaction between people and/or objects has been removed" (Overby, 2008: 278). Unlike others, this theory acknowledges that many virtual entities are not digital at all. An example of a non-digital yet virtual activity is (paper) catalogue shopping. When a shopper selects a product and orders it via mail, the shopper is "divorced from physical interaction" (Overby, 2008: 278) with both the seller and the product; the process is therefore virtual. In this view, ICTs (the digital) have little to do with the definition of virtuality and more to do with how virtuality is most typically manifest in the modern world. In other words, "the main enabler of most contemporary virtual processes is IT… However, it is not required for virtualization" (Overby, 2008: 178). Overby refers to the technologies that virtualise processes as "virtualising mechanisms" (e.g. the paper catalogue is the virtualising mechanism for virtual shopping).

Second, Boellstorff (2008) explicitly addresses the problem of dichotomising the real and the virtual. He argues that all activities (whether they are virtual or physical) are real, but the activities that take place virtually are not actual. For example, during his three year anthropological study of/in SL, Boellstorff witnessed virtual marriages that were real with real emotions, which had real implications for real people, but these marriages were not actual in the sense that they were not recognised as legitimate in the actual world. Here, real loosely means consequential or meaningful,

and actual is loosely synonymous with physical; that is, a physical marriage in the physical world is actual, whereas as a virtual marriage in the virtual world is not actual (though it is real/consequential). Deleuze, a prominent philosopher of virtuality, further clarifies this difference between the actual and the virtual when he says that the "virtual is opposed not to the real, but to the actual. The virtual is fully real in so far as it is virtual ... the virtual must be defined as simply part of the real object" (Deleuze, 2004 as cited by Boellstorff, 2008: 21). In other words, the actual (physical) world and the virtual world are defined as parts of the whole of the real world. This progressive conception of virtuality acknowledges that virtual activities are not mere substitutes for, or extensions of, reality; the virtual is real in its own right.

Table 1 draws out the key terms in the above discussion and how each term has evolved from traditional to progressive conceptions in the literature. These key terms are now used to articulate a suitable conception of virtuality for this study.

Term	**Traditional definition**	**Problem with traditional definition**	**Progressive definition**	**Example**	**Reference**
Digital	Synonymous with the "virtual"	Digital technologies are not inherently virtual, though they sometimes facilitate virtualisation	The presence of ICTs	Email, teleconferencing, e-shopping, avatar	Common sense
Virtual	The presence of the digital (only)	Excludes all non-digital entities from being virtual	The absence of the physical (but not necessarily the presence of the digital)	Mail-order catalogue, telephone, instant messaging, avatar	Overby, 2008
Real	That which is physical (only)	Excludes all non-physical entities from being real	That which is consequential, meaningful	An online and/or offline romance, a home owned either online or offline	Boellstorff, 2008
Actual	Synonymous with the "real"	Excludes all virtual entities from reality	That which is (or approaches) the physical, i.e. the "actual" world	Trees, ocean, buildings	Deleuze, 2004

Table 1: Key terms used to articulate a suitable definition of virtuality.

2.3 A suitable conception of virtuality

Amongst the conceptions of virtuality explored above, it is necessary to define an appropriate perspective for this study. Bailey, Leonardi and Barley (2012: 1485) offer a simple

definition that resonates with some of the more progressive thinking outlined above: "virtuality occurs when digital representations stand in for, and sometimes completely substitute for, the physical objects, processes or people they represent". For example, the text of an email stands in for or represents the person with whom one is communicating. Here, email is the mechanism that virtualises the activity of communicating. This definition resonates with the above-outlined progressive conceptions in various ways. First, the assertion that the virtual is defined by the absence of the physical is maintained. That is, owing to the presence of digital representations, physical objects, people and processes are no longer present. Second, the inclusion of the word "digital" in this definition is consistent with the observation that the most common virtualising mechanisms in modern times are digital technologies. The authors do not, however, synonymise the digital and the virtual (as others have done). Instead they explain that where digitisation "involves the creation of computer-based representations of physical phenomena" (Bailey et al., 2012: 1485), virtuality is the resulting state of these (digital) representations standing in for physical entities. In other words, the digital is not virtual in itself; digital technologies are virtualising mechanisms. Third, in their qualification that digital representations may "completely substitute for" physical entities, the authors recognise that virtual activities can be real in their own right. That is, virtual activities need not be connected to the physical world in order to be real and consequential.

Bailey and her co-authors' work is further useful to my study because it proposes a new way to categorise different types of virtual work (or virtual activities). Namely, as summarised in Table 2, the authors identify three types of virtual work based on the different types of representations that are enabled by the digital technology in use. First, VTs operate *with* and/or *on* representations of people and objects. For example, when chatting on instant messenger each participant operates *with* the textual representations of the other person. Where a person operates *on* representations, the representations are able to be manipulated, for example, an architect working with computer-aided design (CAD) software manipulates the drawing that represents the physical building being designed (Bailey et al., 2012: 1487). Second, in remote control activities people operate *through* representations that meditate between people and objects, rather than people and people (which is most often the case in the VT activity). For example, a fireman works *through* video representations of a burnt out house displayed by a remote control robot so that they can virtually search for victims. The third virtual activity is simulation: "rather than merely mediating relationships with objects or people, some new digital technologies promise, if only temporarily, to eliminate the need for a connection altogether" (Bailey, et al., 2012: 1488). For example, Dodgson, Gann and Salter (2007: 853) studied how fire engineers experimented with different procedures within digital

simulations of real life situations so that they could improve fire control and management practices. "In such cases, virtual no longer means working with distant objects or people via representations that stand for them: virtual means working solely with representations that substitute for the object or person" (Bailey et al., 2012: 1489).

	Type of virtual work			
	Virtual teams	**Remote control**	**Simulation**	**Actualisation**
Role of representations	People operate *with* or *on,* representations of people and/or objects	People operate *through* representations of objects	People operate *within* representations of people and/or objects	People make presentations of people (themselves) and/or objects
Example of virtual activity	- Online project collaboration	- Telemedicine (remote surgery)	- Simulation training	- Virtual worlding - Gaming
Example of enabling technology	- Phone/email/chat - Social networking - Virtual conferencing	- Robots	- 2D models - 3D virtual reality	- 3D virtual worlds

Table 2: Types of virtual work (adapted from Bailey et al., 2012: 1490).

Extending the above work I suggest that in some instances, digital entities may not be representations of any person or object beyond the reality of the virtual setting. That is, actualisation (an extreme version of virtualisation) may occur when digital people, objects and processes exist in and of themselves. For example, highly sophisticated virtual technologies (such as virtual reality) may become so lifelike or "real" as to appear actual. In this way actualisations are not just representations of physical realities, they are new realities in and of themselves. By this I suggest, somewhat controversially, that actualisations may be both virtual and actual. Until now, these terms have been treated as opposites (recall Deleuze's assertion that the virtual is opposed not to the real but to the actual). An example of actualisation may be found in SL. In this 3D virtual world, people may choose to create an avatar that expressly *mis*represents who they are in the physical world; that is, they present a version of themselves anew that is independent of the physical world. In this way, the avatar is a virtual actualisation that is not founded in any physical reality. In the same way, virtual objects in 3D virtual worlds may not necessarily represent physical objects. For example, weapons in video games are created, used and traded virtually. While these weapons can resemble physical weapons, they have evolved into tools with functions that have relevance and application only in the virtual world for which they were created. In this sense, the virtual objects become actualised within the virtual reality. Deleuze's support of this notion of the virtual approaching the actual is evidenced in the following excerpt:

> Deleuze speaks of actualization as a dramatization that enacts a simulation rather than a copy of an original image … It is a 'contraction' of virtualities, which come into being through an indexical leap rather than continuity with an original. Yet the virtual continues to inhere 'within this actual dispersion as that which both constitutes it and into which it dissolves' (Shields, 2003: 33).

2.4 Virtuality continuum

Drawing on the above discussion, I now propose a virtuality continuum (see Figure 1) as a tool for determining the level of virtuality of virtual settings in which organising takes place. The fieldsites (i.e. the virtual settings) for this study will be selected using this continuum. Here (as will be explained further in Chapter 5) a virtual setting is taken to consist of both the practical activities of participants and the technology that enables them to carry out such activities. Furthermore, as shown in Figure 1, the level of virtuality of the virtual setting is also determined by these two factors: the type of activity being undertaken and the type of technology that enables the virtual activity.

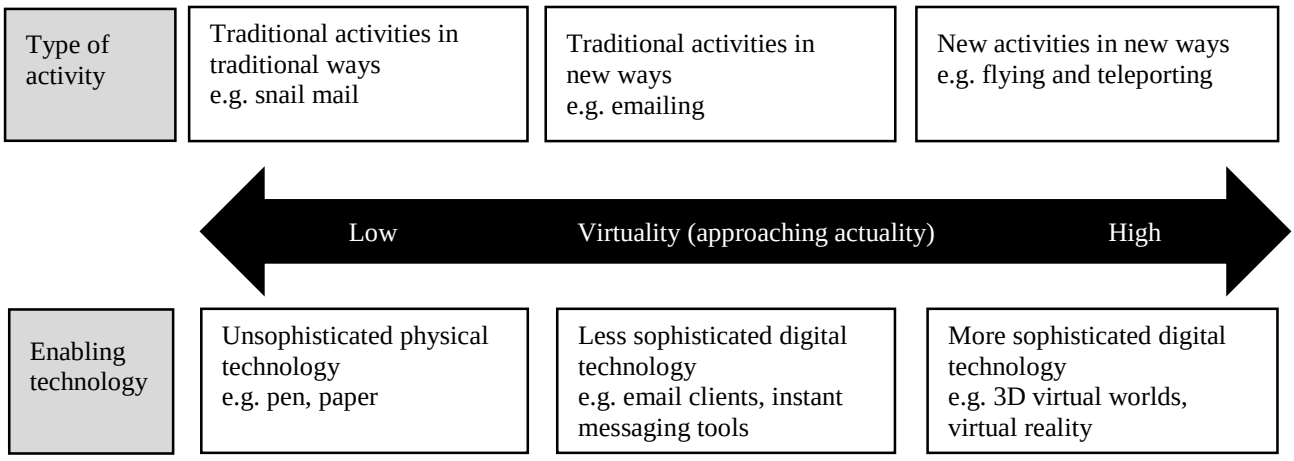


Figure 1: Virtuality continuum.

First, referring to the top level (type of activity), this continuum is predicated on the notion that virtuality is enacted by people who carry out activities through technologies. In other words, it is only through carrying out activities that people may enact the (digital) representations that stand in for the physical people, objects and processes they represent. In a general sense, the activities in this continuum (through which virtuality is enacted) belong to Bailey et al.'s (2012) VT category (see Table 2), where people operate with or on representations of people and/or objects. For example, in the activity of "chatting" participants operate *with* the instant message (IM) that stands in for the other person. As the level of virtuality increases, participants tend towards operating

within digital representations, as is the case in 3D virtual worlds where participants operate from within the synthetic environment.

Second, referring to the bottom level (enabling technology), for a virtual activity to occur there must always be a virtualising mechanism. For example, virtual chatting is not possible without an instant messaging tool. Conversely, a technology may not be virtualised unless it is enacted by people carrying out activities (i.e. the instant messaging tool is not inherently virtual). As such, the activity of chatting is virtualised by the instant messaging technology, and the instant messaging technology is virtualised by the activity of chatting. In this way, virtuality is enacted by actors through their accomplishment of activities in virtual settings.

To sum up the continuum, the low level virtual settings (on the left) are likely to be traditional bricks-and-mortar organisations where the mechanisms that virtualise activities are physical and relatively unsophisticated (e.g. pens and paper are unsophisticated technologies that enable us to carry out the traditional activity of conversing via the written word). At the other end of the scale (on the right), higher level virtual settings are characterised by new activities that are enabled by modern, sophisticated, digital technologies (e.g. sophisticated 3D virtual worlds enable us to fly and teleport from place to place via embodied avatars). In the centre of the continuum, a middle ground is occupied by more traditional activities being carried out through technologies that are more sophisticated than physical tools but less sophisticated than advanced digital tools. Of course there are blurred lines between which activities are deemed traditional and new, and which technologies are deemed sophisticated or unsophisticated. As such, the purpose of this continuum is not to precisely categorise virtual settings but to guide fieldsite selection so that the findings are able to be somewhat generalised.

Here it is important to clarify my stance on the concepts of 'technology as medium' and 'technology as tool', the distinction between which is particularly emphasised in Information Systems (IS) research. Generally in IS, technology has evolved from being considered a *tool* for certain work tasks to a *medium* for inter-personal interaction and social communication (Perrone, Repenning, Spencer & Ambach (1996). In this thesis, virtual team activities (on which this research is focused) involves technology as a medium for sensemaking. Sensemaking, however, is not limited to social interaction between actors; it also involves interaction with things (both physical and digital) for completion of tasks. As will be explained further in Chapter 4, when actors carry out sensemaking in virtual settings, technology may be conceived as a taken-for-granted *medium* for

sensemaking ("equipment") until there is an interruption, at which point the technology becomes a *tool* to repair the activity at hand.

I also acknowledge that other disciplines, specifically the field of computer-mediated communication (CMC), may have informed my conception of virtuality and the virtuality continuum. For example, CMC scholars were amongst the first to grapple with issues of technological mediation and there are many studies (Jones, 1994; Walther, 1996, 1995, 1993, 1992) that make comparisons between mediated communication and facto-to-face communication. Other CMC scholars have made further contributions. For example, over twenty years ago Rheingold (1993) articulated virtual communities as being "social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace". A few years later Porter (1997) edited one of the first collections of articles on internet culture. And more recently, Herring (2007: 1) produced a "faceted taxonomy of computer-mediated communication" to aid researchers in classifying technologies by synthesising "aspects of technical and social context that influence discourse in CMC contexts". While this body of CMC work is indeed relevant to my study, owing to word limit constraints I decided to focus my literature review on theory situated in the sensemaking and organising perspectives.

2.5 Chapter summary

In this chapter I have explored and disentangled how virtuality is conceptualised in everyday and academic life. After selecting a definition of virtuality that overcomes several issues identified in the literature, I proposed a virtuality continuum from which fieldsites for the study will be selected. Unlike previous approaches to conceptualising degrees/levels of virtuality, this virtuality continuum is focused on the types of virtual activities that are made possible by enabling technologies, rather than just on the a priori features of the technology itself. As will be discussed in Chapter 5, this research is focused on the virtual activities that occupy the high end of the continuum for two reasons. First, the new, sophisticated activities/technologies are the most representative of modern organising and the direction in which it is headed. Second, these activities are most likely to provide insight into the novel sensemaking processes that underpin them. Now, having defined virtuality as the backdrop of the study, in Chapter 3 I turn attention to the focus of this research – sensemaking.

Chapter 3 SENSEMAKING AND VIRTUALITY

The previous chapter culminated in a virtuality continuum from which three fieldsites will be selected (discussed later in Chapter 5). Now in Chapter 3 I introduce sensemaking as the focus of the thesis (on the background of virtuality). First, I reiterate and elaborate the argument made in Chapter 1 that sensemaking underlies all organising and is therefore a logical focus for this study. I then articulate the main features of sensemaking, which is largely founded on Karl Weick's seminal works. Within this tradition I summarise what we already know about sensemaking in virtual settings. In doing so, I reveal that hardly any studies exist on this topic, and those that do provide limited insight into virtual forms of sensemaking and organising. To investigate the source of these limitations, I undertake a broader critique of SP in OS. I find that SP is steeped in a dualist ontology that restricts our understanding of sensemaking in several ways. For example, overemphasis on the role of cognition in sensemaking detracts from the role of the body, senses and emotions. I further find that these deficits are exacerbated in virtual settings. Therefore, a new approach is required. I conclude the chapter by alluding to a practice-based approach (as an alternative to the traditional sensemaking approach) which provides a pathway to broaden our conception of sensemaking so that it may enhance, rather than limit, our understanding of how organising takes place virtually.

3.1 Why sensemaking?

Sensemaking is one of the most influential theories in OS; it contends that how people make sense of their environment determines their actions (Holt & Sandberg, 2011a, 2011b; Oswick, Flemming, & Hanlon, 2011). Exactly what sensemaking entails will be explored shortly. Now, for the purposes of justifying its selection as the focus of the study, I provide a high level account of how sensemaking underlies all organising. The overall point of sensemaking is that people make sense and then act upon the sense they have created (Weick, 1995); that is, sense comes before action. Furthermore, people make sense (and act) in response to an interruption to what they are doing. For example, a telemarketer may experience an interruption when the customer's voice drops out. The telemarketer then "makes sense" that the call has been disconnected, and their resulting action is to redial. If we consider how these sensemaking processes take place in the virtual setting, we will necessarily gain insight into how organising more generally takes place virtually. Here we see that sensemaking emphasises organisational process (how we do things) rather than outcomes (what we have done). As discussed in Chapter 2, this approach contrasts with previous studies that have mainly sought to describe virtual entities (such as VOs and VTs) and their static characteristics.

Many scholars have investigated sensemaking as a means to understand broader organisational phenomena (which is the approach I intend to take). Sandberg and Tsoukas (2015) identify a number of such studies in the fields of strategy and organisational change. These studies draw on the sensemaking concept of interruptions to shed light on how organisations cope with disruptions (e.g. mergers, whistleblowing, technical failures, managerial errors), which may be planned or unplanned, major or minor (Sandberg & Tsoukas, 2015). Dunbar and Garud's (2009) investigation of the Columbia shuttle is a seminal example of a study that has employed sensemaking to understand organisational responses to major unplanned events (i.e. catastrophes). In this case "technical failures triggered intensive sensemaking efforts among NASA's personnel about what was going on and how to rescue the Shuttle and its crew" (Sandberg & Tsoukas, 2015: S13). As another example, Maitlis and Sonenshein employ sensemaking to understand "how crises unfold in organizations, and how emergent crises might be more quickly curtailed" (2010: 551). By this approach Maitlis and Sonenshein show how, in "turbulent" situations, shared meanings and emotions are co-constructed and socially enacted rather than expressed and/or experienced by individuals. Here, sensemaking theory enables the authors to emphasise processes of social construction of reality (organis*ing*) rather than the outcomes of those processes (organisat*ion*). In a similar way, my study seeks to understand the sensemaking processes that underlie broader organisational activities. Crucially, however, my study deviates from these studies in that it takes place in virtual rather than traditional settings. As we will see, translating sensemaking into the virtual setting presents significant challenges that have not been addressed in the literature to date.

3.2 What is sensemaking?

There is no unified definition of sensemaking. Sensemaking can be thought of as a cognitive process involving individual thinking processes such as perception, interpretation and memory (e.g. Harris's 1994 investigation of individuals' organisation-specific schemas). On the other hand, sensemaking can be thought of as a process of social construction of reality by groups (e.g. Maitlis' 2005 investigation of collectives' patterns of interaction that constitute organisational sensemaking). Other strains of sensemaking focus on linguistic, discursive and narrative processes (Boudes & Laroche, 2009; Cunliffe & Coupland, 2012; Weick, 2011). These approaches, which are aligned with the recent move towards social constructionism in OS, suggest that "collective narratives create shared meanings around events … and help individuals to interpret their actions in light of their obligations and to understand how they should/should not act in particular social contexts" (Cunliffe & Coupland, 2012: 66). Evidently, sensemaking has evolved over time from an

individual-cognitive to collective-social phenomenon (Brown, Colville & Pye, 2015; Maitlis & Christianson, 2014; Tsoukas & Sandberg, 2014).

Since the term sensemaking was coined over 40 years ago (Weick, 1969, 1979) the theory been broadened to be conceived of as a theoretical lens, paradigm and perspective (Maitlis & Christianson, 2014). As alluded to above, the main thrust of the development of sensemaking has been to pioneer a fundamental shift in OS from focusing on organisat*ions* as entities to organis*ing* as process. In this view, sensemaking is the process of restoring sense in the face of an interruption. More specifically, sensemaking occurs when a person who is interrupted in the flow of action attends to and brackets specific environmental cues that help them to interpret and act upon the interruption. Moreover, through a cyclic process of interpretation and action, the sensemaker enacts a new, more ordered environment from which further cues can be drawn (Maitlis & Christianson, 2014: 67). In this way, sensemaking is not a just a process of restoring order to the world, it is a process of (re)creation of the world. SP has been instrumental in developing the process-orientation in OS (Hernes & Maitlis, 2010). Furthermore, owing to its more recent tendency towards a relational ontology, SP has also contributed to the social constructionist, interpretative, phenomenological and practice turns in OS (Brown, et al., 2015).

SP and its contribution to OS is largely credited to Karl Weick, the founding father of sensemaking. Since publishing the *Social Psychology of Organising* in 1969, Weick has dominated OS literature on the topic of sensemaking (Anderson, 2006; Oswick, Fleming & Hanlon, 2011; Sandberg & Tsoukas, 2015; Sutcliffe, Brown, & Putman, 2006). Not only has he published consistently on his own (Weick 1969, 1979, 1985, 1988, 1991, 1995, 2001, 2003, 2009) he has partnered with many others (Daft & Weick, 1984; Weick & Roberts, 1993; Weick & Sutcliffe, 2011; Weick, Sutcliffe, & Obstfeld, 2005) and influenced a whole generation of OS scholars. Indeed, Weick's work has been applied in areas as diverse as strategy (Kurtz & Snowden, 2003; Schneider, 1997), decision making (Klein, 2004; Snowden, 2005), knowledge management (Choo & Johnson, 2004; Thomas, Sussman, & Henderson, 2001), trust in organisations (Adobor, 2005), identity (Ashforth, Harrison, & Corley, 2008), and organisational change (Gioia & Chittipeddi, 1991; Maitlis & Sonenshein, 2010; Weick & Quinn, 1999). Owing to his dominance in the field of OS, Weick's work has largely become representative of sensemaking generally.

Because it was founded at a time that predates modern virtual technologies, we can infer that the key features of Weick's conception of sensemaking (described below) are rooted in traditional organisational contexts. That is, the key features (subliminally) refer to sensemaking as it occurs in

physical, face-to-face settings. We do not know, however, if and how Weickian sensemaking is applicable to the modern virtual age. Put another way, because we know that modern virtual technologies greatly inform the way we organise, we may question whether Weick's account of organising holds true in modern virtual settings. Nonetheless, I review the few studies that have (unquestioningly) applied Weick's sensemaking theory in the virtual setting. I show that taking Weickian sensemaking for granted (as most have done) is a flawed and undesirable approach for the study of how sensemaking takes place virtually. In order to overcome the issues raised, and thereby uncover what is unique about sensemaking in virtual settings, a new approach is required[1].

3.2.1 Karl Weick's conception of sensemaking

Although sensemaking has evolved over time and has had many contributors, sensemaking as we understand it today is entrenched in the Weickian perspective. In Weick's (1967, 1979) first articulation of his theory, sensemaking was presented as an ecological process consisting of three stages: enactment, selection and retention. First, enactment sees sensemakers bracket, frame and label an aspect of reality; that is, they "carve out" a "cue" (Weick, 1995: 3) and assign it a meaning. Second, selection is a process of communication between sensemakers to reduce equivocality (multiplicity of meaning) and thereby achieve a consensus of meaning; this involves a cycle of acting, responding and adjusting. Finally, retention describes how sensemakers' interpretation of an event and consequent actions reinforce shared meaning. This three-stage process, called a sensemaking episode (Weick, 1969, 1979, 1995), positions sensemaking as a micro-social phenomenon, i.e., the processes of enactment, section and retention refer to repairing interruptions to small breakdowns, such as misinterpretation of a social cue.

Weick's (1995) later work, however, refers to sensemaking at a macro-social level. In this vein, Weick's seminal book *Sensemaking in Organizations* (1995) provides the most complete description of what sensemaking is and is not (Maitlis & Christianson, 2014). In particular, it outlines seven properties of sensemaking (identity, retrospect, enactment, social, ongoing, cues and plausibility), which have been referenced and reiterated many times by Weick and other authors

[1] What such an alternative approach may reveal cannot be pre-empted. That is, I cannot predict exactly why current conceptualisations of sensemaking falter when attempting to explain virtual sensemaking, but I intend to find out.

(e.g. Weick et al., 2005). These seven properties of sensemaking, outlined below, are at the heart of how sensemaking is conceived and applied in OS literature. I could not improve on Marshall & Sandberg's (2011: 4-5) succinct summary of the seven properties, so I have quoted the authors directly.

> First, sensemaking is grounded in identity construction. "Who we think we are as organizational actors shapes what we enact and how we interpret" (Weick et al., 2005:416). The reverse is also true; our identities are constituted out of the process of interaction with the environment through sensemaking (Weick, 1995: 20). The second property, that sensemaking is retrospective, suggests that "people can know what they are doing only after having done it" (Weick, 1995: 24). It is only by looking back on our lived experience of our doing that we are able to notice and extract cues from that lived experience, and create a sense of our doing. Third, Weick's concept of enactment describes processes of extracting cues, making sense of those cues, and acting on the sense made; that is, making the sense real in its consequences. In this way, sensemaking is enactive of sensible environments because "(people) act, and in doing so create the materials that become the constraints and opportunities they face" (Weick, 1995: 31). Fourth, sensemaking is social because "[our] conduct is contingent on the conduct of others, whether they be imagined or physically present" (Weick, 1995: 39). Our projects, intentions and beliefs that shape our sensemaking "do not grow within us but between us" (Weick, 1995: 39). What is less obvious is that if other people are not in the immediate environment, the idea of them is an adequate substitute for sensemaking to occur. Fifth, sensemaking is ongoing in that "people find themselves thrown into ongoing situations and have to make do if they want to make sense of what is happening" (Weick, 1995: 44). Conflictingly, Weick asserts on one hand that sensemaking never ends, and thus never really starts, and on the other hand he says sensemaking begins with interruptions to ongoing activities. Sixth, sensemaking is focused on and by extracted cues, which are "simple, familiar structures" (Weick, 1995: 50) on which to build a larger sense of what is happening. Again conflictingly, Weick describes these cues as interruptions or surprises, but also as familiar. Nonetheless, these extracted cues are taken to represent the entire datum and each cue "highlights a distinct implication that was not visible in the undifferentiated object" (Weick, 1995: 50). Inherent here is Weick's seventh property, that sensemaking is driven by plausibility rather than accuracy; we do not need the whole story or all the details in order to make sense, just enough to get by. Although extracted information is less accurate than the whole dataset, it is more understandable (Weick, 1995: 61-62).

In sum, Weick's theory has evolved from emphasising mirco-level processes to focusing on macro-level properties. However, the foundations and assumptions of the theory have not changed. As such, micro-processes of sensemaking should be seen to underpin macro-level sensemaking. In line with this, my conception and analysis of sensemaking in this thesis occurs at the micro-level, which will result in a basic understanding of sensemaking that underpins all organising. As we will see, however, there are significant problems with adopting Weick's theory *per se* when investigating sensemaking as the basis of organising in virtual settings.

3.3 Existing knowledge on sensemaking in virtual settings

Having introduced the notion of sensemaking and established Weick's perspective as the dominant paradigm, I now investigate what we already know (and do not know) about how sensemaking takes place in virtual settings. To do this, I undertake a review of literature in which Weickian sensemaking has been investigated explicitly (as the focus of the research) and implicitly (as a lens through which other organisational phenomena are examined) in the context of virtual, online, electronic and/or technological settings. I begin with OS studies and then move to include Information Systems (IS) studies in which Weick's (and others') conception of sensemaking has been applied. This will provide a basis from which to identify problems with existing knowledge and approaches to the research topic.

As a prelude, in 1985 Weick published an article considering how "electronic contexts" might impact sensemaking in organisations. Marshall & Sandberg (2011: 6), whom I paraphrase below, state that Weick gives insight into how "terminal work" (work at a computer) can compromise sensemaking in five ways: (1) 'action deficiencies' mean that "a crucial source of data-feedback generated by direct, personal action - is absent" (Weick, 1985: 56); (2) 'comparison deficiencies' mean that, because computers have inherent assumptions (and are a single source of data) they cannot provide multiple perspectives (which are necessary to make sense); (3) 'affiliation deficiencies' mean that sensemakers have fewer means by which to build a shared "social reality" (Weick, 1985: 59); (4) 'deliberation deficiencies' mean that the high paced nature of computers limits sensemakers' opportunities to deliberate during sensemaking; and (5) 'consolidation deficiencies' mean that sensemakers refrain from consolidating ideas generated in terminal work because they compare them with goings-on outside the terminal. Here, Weick says sensemakers must "reach outside the system" entirely so as to gain a "different set of assumptions to understand what is happening in the system" (1985: 61). It is clear that Weick believes that sensemaking is not possible (or is at least significantly hindered) within a purely electronic context. Indeed, social interaction of any kind using the monolith computers of 1980s would have been inconceivable at the time Weick wrote this article. Yet, with modern technologies that enable us to smoothly interface with each other and the world, it is now obvious that sensemaking can and does take place in virtual settings.

3.3.1 Organisation Studies (OS) literature

In OS, scholars have shown that aspects of Weick's ecological sensemaking process are evident in virtual settings (as they are in more traditional settings). For example, Herrmann (2007) finds that the ways stakeholders make sense of the performance of an investment company via an online forum is underpinned by cognitive processes involved with the selection phase of Weick's (1969, 1979) ecological model. Similarly, in a study of how internet users produce the web browser, Faraj, Kwon and Watts (2004) take their point of departure from the processes of bracketing, framing and labelling that comprise the enactment property of ecological sensemaking. Through this approach the authors uncover three social processes that enable actors to co-construct the web browser: inscribing, translating and framing, which form a spiral pattern of action and interaction with beliefs, strategies, artefacts and routines.

There are a few OS studies that contribute to our current understanding of sensemaking in virtual settings by taking a discourse/language/narrative approach. For example, Berente, Hansen, Pike and Bateman (2011) investigate how individuals assess (make sense of) the organisational value of virtual worlds. Practitioners were asked to spend time in SL and afterwards write retrospective essays about the perceived value of the virtual world as a place to do business. Then the texts were analysed to identify patterns of discursive sensemaking employed by the individuals, showing that claims about the organisational value of virtual worlds centred around four value categories: current value, future value, contingent value and no value. Similarly, Bean and Eisenberg (2006) investigate employees' sensemaking processes as they transition from traditional officing to nomadic (virtual) work. Again, the authors asked the participants to reflect on their experiences (this time in interviews), finding that employee sensemaking "was anchored by frames relying on identity, culture, or structure as the primary stabilizing discourse" (Bean & Eisenberg, 2006: 210).

The above studies have employed sensemaking by positioning it as the focus of the research, i.e., cognitive, social or discursive sensemaking processes are the phenomena under investigation. Other studies, however, use sensemaking as a *lens* through which to investigate other organisational phenomena (e.g. a study of the phenomena of 'decision making in teams' could employ a sensemaking lens, which would emphasise *how* people collectively make decisions in teams rather than *what* decisions tend to be made). For example, in a study of the phenomenon of 'knowledge management (KM) in technological settings', Cecez-Kecmanovic (2004) develop a 'sensemaking model of knowledge' that "enables better and deeper understanding of knowledge management in

organisations and the role of information technologies (IT) in these processes". By this approach, the author identifies four types of knowledge in the virtual context that correspond to four levels of sensemaking (individual, collective, organisational and cultural). Similarly, in the field of IS (discussed in more detail later), Jensen, Kjærgaard and Svejvig (2009) show how specific constructs from sensemaking (bracketing, enactment and identity), in conjunction with institutional theory, shed new light on the phenomenon of 'information systems implementation'. Their findings relate to three levels of technology implementation: organisational field, organisational/group and individual/socio-cognitive.

These studies show how aspects of more traditional sensemaking are viable in virtual settings. Some OS scholars have, however, uncovered some features of sensemaking that are *unique* to virtual settings (i.e. features that are not directly imported from traditional sensemaking theory). For example, Myers' (2007) investigation of the relationship between virtual communication, emotion and sensemaking finds that the very nature of mediated communication channels (namely their explicitness, irrevocability and publicness) enhance sensemakers' commitment behaviour. Also, Gephart (2004) employs two different sensemaking frameworks to re-interpret findings from previous studies of human computer interactions and CMC at work. Here Gephart goes beyond the standard, Weickian conception of sensemaking to include a social-interaction model (based on an ethnomethodological perspective) that focuses on sensemaking in situ (Garfinkel, 1967; Lynch, 1997; Leiter, 1980). By this approach, Gephart (2004: 481) is able to "supplement general conceptions of sensemaking with explicit tools for detailed analysis of computer-mediated interaction". Gephart's main contribution is the articulation of four sensemaking practices (reciprocity of perspectives, normal norms, etcetera principle, and descriptive vocabularies as indexical expressions) that play out differently in virtual settings than in traditional work places. For example, errors and clarifications in traditional settings are remembered whereas in the virtual setting they are readily recorded.

3.3.2 Information Systems (IS) literature

Sensemaking as it is understood in OS has been applied in the field of IS, which is of particular relevance to this research. For example, in 2011 the *International Journal of Human-Computer Interaction* published a special issue on sensemaking with the aim of expanding and challenging notions of sensemaking in IS research. Traditionally, sensemaking in the human-computer interaction (HCI) domain has been grounded in applied psychological research, such as systems engineering and human factors (see Dervin, 1999; Klein, Moon & Hoffman, 2006; Pirolli

& Card, 1999; Russell, Stefik, Pirolli, & Card, 1993). However, this special issue deviates from the HCI sensemaking tradition to take in Weick's "collaborative sensemaking" perspective (Pirolli & Russell, 2011: 5). For example, Paul and Morris (2011) investigate collective sensemaking in collaborative web search. By studying how groups, rather than individuals, seek (search for) and interpret (make sense of) information on the web, the authors describe synchronous and asynchronous forms of collective sensemaking and challenges associated with them. They further identify two strategies employed by participants to find information (namely search-led and sensemaking-led approaches) and discuss the different outcomes afforded by each strategy.

A seminal example of how Weickian sensemaking has been applied in IS research to shed light on organisational phenomena is Orlikowski and Gash's (1994: 174) articulation of "technological frames". Here technological frames, loosely understood as interpretations, are said to be produced through actors' sensemaking about technological development, use and change in organisations. Such frames consist of "assumptions, knowledge, and expectations, expressed symbolically through language, visual images, metaphors, and stories" (Orlikowski & Gash, 1994: 176). The authors explore how congruence or non-congruence between the technological frames of key groups of actors (technologists and users) impacts implementation of a groupware product. They find that there are three domains of technological frames (nature of technology, technology strategy, and technology in use) by which to compare the two groups. In this way, the socio-cognitive concept of technological frames (inspired by OS-style sensemaking) enables the authors to examine how different actors arrive at different interpretations of technology.

In sum, the main thrust of our existing understanding of sensemaking in virtual settings in OS/IS is that (1) Weick's ecological processes of sensemaking (enactment, selection, retention) somewhat holds true in virtual settings; (2) the sensemaking lens is helpful to make more transparent how organising more generally (learning, knowledge, etc.) is carried out virtually, specifically by drawing together the various levels of organisational analysis; (3) discourse approaches to sensemaking may be observed in virtual settings through practitioners' retrospective accounts of activities; (4) there are some nuanced ways in which sensemaking in virtual settings deviates from the traditional sensemaking model (e.g. that sensemaking in the virtual setting is public and recorded increases sensemakers' commitment to their practice (Myers, 2007)); and (5) OS-style sensemaking suggests that how people appropriate (make sense of) technologies may be more a matter of co-constructed meaning than users' correct or incorrect interpretation and application of the technology as intended by the developer (Orlikowski & Gash, 1994).

On the other hand, the OS/IS literature review exposes two large deficits in our existing knowledge of sensemaking in virtual settings. First, sensemaking has hardly been studied in virtual settings; that is, I could only find a handful of studies in the literature. This is both surprising and concerning when we consider that sensemaking is foundational to all organising and that virtual settings are ubiquitous in the modern world. Second, the studies that do exist have major shortfalls. Namely, they unquestioningly employ Weickian sensemaking theory without considering its applicability to the virtual context. As mentioned earlier, using the traditional sensemaking lens to investigate how sensemaking takes place virtually may cause scholars to overlook some aspects of sensemaking that are unique to the virtual setting. In other words, using the traditional framework may prevent us from seeing other processes/features that may accompany or even replace traditional ones. In response to these deficits, my study expressly investigates sensemaking (per se) as it takes place in virtual settings. That is, I will not blindly retain the assumptions of traditional sensemaking approaches that, as we have seen, may limit and even compromise findings. Instead, I will seek an alternative approach that illuminates what is unique, new and interesting about sensemaking in virtual settings. To begin developing this new approach, I now undertake a comprehensive critique of SP generally, and as it applies to virtual settings specifically.

3.4 Review and critique of the sensemaking perspective (SP)

The aim of the following review/critique is to identify the assumptions that underlie sensemaking and to examine if and how they are applicable to virtual contexts. I begin by outlining what SP stands for overall. I then consider the recent critique scholars have made of this conception of sensemaking and, further, which deficits are particularly disruptive when applied to virtual settings. Three core concepts emerge as being particularly important to this study: materiality (the role played by materials and things in constituting action); embodiment (the role of the body in enacting sense); and ongoing accomplishment (the way we accomplish activities and therefore make sense in the flow of action). By this approach we broaden our understanding of SP so that it may embrace rather than marginalise these critical concepts as they apply to virtual settings.

3.4.1 What does SP stand for?

Within the complex evolution of SP, "unarticulated differences and disconnected conversations (have caused) confusion about the sensemaking literature and a lack of clarity about where future research on sensemaking should be directed" (Maitlis & Christianson, 2014: 59, parentheses added). As such, while sensemaking is a prolific and highly-adaptable concept,

grasping it in its entirety is difficult. Recently, scholars have attempted to reconcile the breadth and depth of research on, and approaches to, sensemaking. For example, in their recent comprehensive review and critique of sensemaking, Sandberg and Tsoukas (2015) articulate the major constituents of sensemaking which, taken together, summarise and clarify what sensemaking generally stands for. Namely, sensemaking occurs in specific episodes in which interruptions to flow are restored by the sensemaker through a process of creation, interpretation and enactment. These sensemaking episodes are triggered by ambiguous events, which may take the form of major planned events (e.g. a corporate change initiative), major unplanned events (e.g. crisis or catastrophe), minor planned events (e.g. new policy implementation), or minor unplanned events (e.g. misunderstanding between colleagues). Resolving these triggers/events generates specific outcomes, namely restored sense, restored action, non-sense, and no restored action. This process is influenced by several situational factors including contexts, cognitive frames, language, identity, politics, emotion and technology (Sandberg & Tsoukas, 2015). This synopsis of SP is supported by others who have attempted to unify the fragmented understanding of sensemaking in OS, mostly notably Maitlis and Christianson (2014).

Despite the work that has been done to clarify sensemaking, very little scholarly critique has been directed at SP. Sandberg and Tsoukas (2015: S7) observe that "unless the core concepts, constituents, and assumptions of SP are systematically reviewed and critically scrutinised, it is unlikely for SP to be creatively advanced". In line with this suggestion, I now undertake a critique of sensemaking generally and then as it applies to virtual settings specifically.

3.4.2 General critique of SP

Recently, some scholars have answered the call to critique and thereby advance SP in OS (Brown, et al., 2015; Holt & Cornelissen, 2013; Sandberg & Tsoukas, 2015). This body of work suggests that SP suffers from several enduring limitations (Brown et al., 2015; Sandberg & Tsoukas, 2015). First, the entrenchment of retrospective sensemaking as a cornerstone of SP has meant that the possibility of future-oriented (prospective) sensemaking has been dismissed. This is a problem because we do not just make sense about the present (or past); we also make sense about the future. Further, the future is much more uncertain and ambiguous (than the present/past) and therefore requires different kinds of sensemaking efforts (Stigliani & Ravasi, 2012 as cited by Sandberg & Tsoukas, 2015). Second, the notion of "process" in SP remains relatively vague. Namely, it is not clear whether "enactment" constitutes all or only part of the sensemaking process. Further, the process of sensemaking has been described as both linear (inter-action between sense

and action), and more recently circular (intra-action between sense and action). This paradox in the relationship between sense and action (as both separate and entwined) reflects a broader ontological contradiction in SP. Namely, the world is conceived of as a "collection of objects with specific properties" (Sandberg & Tsoukas, 2015: S19) *and* as being entwined in a relational whole.

Third, the concept of "sense" is insufficiently developed in SP. Sense is confusing because it takes on various, inconsistent meanings (e.g. perception, interpretation, understanding, reflection); it also neglects how bodily senses are implicated in sensemaking. This is a problem because sensemaking, which (by Weick's own admission) is heavily steeped in action, cannot be confined to the cognitive sphere. That is, what we think, feel and do is always mediated by our bodies, not just our minds. Therefore bodies are not peripheral but rather central to sensemaking. Finally, SP's focus on micro-contextual factors (such as cognitive frames) has led to neglect of bigger picture factors and epistemes such as institutional rules and norms, power and politics, and technology. This is a problem because sensemaking take places on the backdrop of much broader (political, cultural, institutional) contexts than just the immediate environment.[2] These final points are particularly pertinent when we consider how sensemaking takes place in virtual settings. For example, it is not clear what role our bodies play in sensemaking in virtual settings from beyond the keyboard or computer screen.

I conclude this general critique of SP by drawing attention to a broader criticism of SP to which many of the above-mentioned issues belong. Namely, SP is steeped in a dualist ontology, which is the "prevailing logic of scientific rationality within OS and social science more generally" (Sandberg & Tsoukas, 2016: 185). Dualisms (such as mind/body, cognition/action and structure/agency) in social science broadly, and SP specifically, are problematic because they limit scholars' capacity to describe contemporary organisational phenomena that are "increasingly understood to be complex, dynamic, distributed, mobile, transient, and unprecedented" (Feldman & Orlikowski, 2011: 1). For example, the dualist view of sensemaking (which distinguishes between sense and action) thwarts scholars' attempts to understand the process as a more complex,

[2] Another common critique is that a literal interpretation of sensemaking reduces reality to subjective understanding because it suggests that sensible environments are wholly enacted by people. However, from a phenomenological perspective for example, environments are not literally brought into being through enactment, but instead are brought into *awareness* by enactment.

symbiotic intra-action experienced by sensemakers as they "act their way into sense" (Weick, 2009 as cited by Sandberg & Tsoukas, 2015: S19). A further critique of the dualist view of sensemaking is that it distinguishes between the roles of the mind and body in accomplishing activities (mentioned earlier). Here, cognising is taken to principally account for actors' sensemaking, therefore embodied sensemaking is ignored. In recent times, sensemaking theorists (including Weick) have somewhat progressed sensemaking from cognising (e.g. reflection, cognition, causal maps) towards more relational conceptions (e.g. language, activities). However, Sandberg and Tsoukas (2015) observe that scholars tend to (perhaps unknowingly) revert back to traditional, dualistic conceptions of sensemaking in their application of the theory for the sake of analytical convenience, for example.

3.5 Deficiencies in SP are exacerbated in virtual settings

A general criticism of sensemaking literature is that the macro contextual factor of technology, which underlies virtual forms of organising, has been largely ignored (Brown et al., 2015; Sandberg & Tsoukas, 2015). This is deeply concerning given the ubiquity of technology in modern organisational activities. Not only that, where technology *has* been considered in the study of sensemaking and organising, further problems arise. Namely, sensemaking is conceptualised as being separate from the technology that enables it. More specifically, technology is often seen as "outside" the process of sensemaking as either (a) a trigger to sensemaking episodes (Bean & Eisenberg, 2006) or (b) a mere influencing factor on the outcome of sensemaking (Cecez-Kecmanovic, 2004).[3] In the modern workplace, however, organisational activities are anything but "outside of" technology; sensemaking is heavily reliant on, and deeply embedded in technology. Indeed, to treat technology as auxiliary to sensemaking and organising (as a trigger or external factor) is nonsensical, yet this is the current approach of much research in OS. This will be corrected in my study through investigating how virtual activities are accomplished through sensemaking with and within various technologies.

[3] Exceptions to these two approaches – articles in which technology is expressly integrated into the conception of sensemaking from the outset – tend to come from IS papers that adopt a sensemaking lens to investigate another phenomena; for example, Orlikowski and Gash's (1994) work on technological frames which reveals what users take for granted in their sensemaking about a new platform, as mentioned earlier.

These broader criticisms of existing literature on sensemaking in virtual settings are underwritten by more specific limitations, some of which were identified in the earlier general critique of SP (i.e. over-emphasis of retrospective sensemaking, confusion about the process of enactment, and insufficient development of the notion of sense). Many of these limitations are exacerbated when we consider them in virtual settings. As such, I now extend the critique by honing in on aspects of SP that are particularly problematic in the virtual setting. Namely, I discuss how materiality (how materials or things are involved in accomplishment of activities), embodiment (how the body mediates, and therefore enables and constrains, our activities), and ongoing accomplishment (how we act in the flow of activities) have been overlooked. As we will see, the omission of these crucial concepts from existing studies (and mistreatment of these concepts in cases where they have been considered) may be traced back to broader issues associated with the dominant, dualist paradigm that characterises much sensemaking and organising literature.

3.5.1 Materiality

The notion of materiality has traditionally received little attention in SP; however, it is gaining more attention from scholars who wish to focus on the role of non-humans in organisational activities (Latour, 1996, 1999; Leonardi, 2010, 2012). These non-humans may include objects (physical items), artefacts (items that represent other things), or tools (items that are used to carry out activities). Such materials actively participate in meaning making by mediating our experience of the world; they also interrupt our meaning-making when they impede, rather than facilitate, our activities. For example, boardrooms give order to organising by providing a place in which to carry out the activity of a board meeting. On the other hand, an extension lead left across the boardroom doorway may interrupt the meeting if someone trips over it. Materiality "may also destabilize (our activities) in the sense that material objects may help to create new action and thus new ways of knowing" (Svabo, 2009:365, parentheses added). In this sense, materials enable us to carry out activities that would not be possible without them. For example, physical rulers enable us to more accurately measure things than if the ruler was not used.

It is clear that physical materials (e.g. clothes, furniture) enable, constrain and alter organising in more traditional organisational settings. In the same way, a priori features of technology, both software (e.g. digital interfaces, functions, networks) and hardware (e.g. physical keyboard, screen, mouse), enable, constrain and alter virtual forms of sensemaking and organising. Further, as discussed in Chapter 2, digital technologies (materials) give rise to brand new activities (and therefore means of sensemaking and organising) that were not previously possible in physical

settings. For example, geographically dispersed architects can now collaboratively design and build digital prototypes in 3D virtual worlds (Bailey et al., 2012). Here, the role of digital materials is not limited to mediating traditional activities; indeed 'designing' may take place within (rather than merely with) digital material realities, which is a new activity. Here, technological materials are not just stabilisers/destabilisers of sensemaking (i.e. conceived of as outside the organisational activity). Instead, we may argue that technological materials are entwined with, and/or constituted in, the process of organising. In this vein, sensemaking in virtual settings may give rise to a unique of type of "digital materiality" (Yoo, Boland, Lyytinen, & Majchrzak, 2012: 1398). For example, textual materials (e.g. forum posts and profile pages) in social media, and simulated materials such as 3D objects (virtual weapons, clothes or furniture), are bound up in our sensemaking.

3.5.2 Embodiment

Some scholars have recognised the lack of attention paid to the role of the body in organising generally and sensemaking specifically. "Sensemaking is generally theorised as a disembodied cognitive activity, and while the role of emotion is sometimes acknowledged, the broader issue of embodiment is not studied as an integral part of the process" (Cunliffe & Coupland, 2012: 68). Sandberg and Tsoukas (2015) agree that by conceptualising sensemaking as something deliberate – that is, mindful enactment – investigation of sensemaking is limited to the cognitive sphere and therefore excludes the body. This is problematic because our body is the ubiquitous mediator of our existence – we cannot do or think anything but with/through our body. Therefore, to exclude our bodily senses and actions from how we make sense of the world is nonsensical. Further, embodiment "captures important experiential, sensorial aspects of what goes on between the tool and the human" (Svabo, 2009: 366). For example, a steering wheel and the person driving a car are "one" in the throw of action. Likewise, a gamer is "one" with the controller when playing a computer game. As such, we must consider the complex, entwined relationship between bodies and materials that unfolds in the process of carrying out activities.

Perhaps because we cannot take our bodies with us into virtual settings, scholars have tended to ignore the role of the body in virtual forms of sensemaking and organising. However, owing to the centrality of the body in all activities, we must not ignore but rather question its significance. For example, how do we use our bodies in text-based virtual settings such as email? How does the severe lack, if not total absence, of facial cues and vocal tone enable and constrain our sensemaking? Further, in relation to virtual worlds, Schultze (2010: 436) raises questions about what it means to have a body at all.

> In computer-mediated communication our bodies seem to become irrelevant and only the presence of our minds matters. However, by emphasizing and problematizing the digital body, virtual worlds offer us an opportunity to become aware of and explore the role of the physical body in communication, and well as the implications for disembodied interactions.

Indeed, we do not cease to be connected to our bodies when we sit in front of a computer. Rather, owing to the virtual setting, we express emotions, make gestures and experience moods in novel ways (Dreyfus, 2001, 2009; Schultze, 2010). Yet how these novel, virtual forms of embodiment inform sensemaking has not been researched. Contrastingly, my study will pay particular attention to embodied sensemaking and thereby overcome deficiencies in current research.

3.5.3 Ongoing accomplishment

The above assertions that the material and embodied aspects of sensemaking and organising should be given more attention by scholars is accompanied by a related issue. Namely, the prevailing emphasis on cognition and finite processes in SP causes researchers to neglect what happens *in between* mindful states of sensemaking; that is, the sense that is made in the flow of action. Sandberg and Tsoukas (2011) refer to this ongoing, always happening, mundane, and often subliminal form of sensemaking as ongoing accomplishment. They say that actors, immersed in practice, spontaneously respond to the situation at hand by way of "absorbed coping" and a feeling of being "at one" with their activities, tools and context. For example, expert pilots experience themselves as flying rather than flying an aircraft (Dreyfus & Dreyfus, 1986 as cited by Sandberg & Tsoukas, 2015). In the same way, when software engineers write programs, they are not necessarily conscious of the hardware and software that mediate the activity, they are just coding. As such, sensemaking does not only take place within mindful, finite episodes as suggested by traditional notions of sensemaking; sensemaking also occurs during ongoing accomplishment in the flow of action.

Paying attention to ongoing accomplishment as part of the sensemaking process is particularly important in virtual settings. For example Orlikowski (2000) coined the notion "technologies-in-practice" to, among other things, describe how users make sense of information technology (IT). "Through their regularized engagement with a particular technology (and some of its inscribed features) in their ongoing practices … (actors) recurrently enact technological structures" (Orlikowski, 2000: 8, parentheses in original). These technological structures are not a priori features of technologies to be encountered and negotiated (as in sensemaking episodes), rather they are emergent in humans' recurrent use of technology (as in ongoing accomplishment).

Here the role of ongoing practices (i.e. ongoing accomplishment) is integral to the process of sensemaking about both the technology at hand *and* the activity being carried out with and/or within that technology. As such, a focus on ongoing accomplishment in this research will be a novel approach that may reveal new and interesting ways that people make sense in virtual settings.

3.6 Chapter summary

In this chapter I have argued that sensemaking underlies all organising and is therefore a logical focus for this study. I have demonstrated that other scholars have successfully taken this approach to researching various organisational phenomena in traditional settings (such as strategy and crisis). However, my study is one of the first to investigate sensemaking as the basis of organising in the virtual setting. I have shown that the few studies that do exist in this area offer little guidance because they have major shortfalls. In particular, the literature overlooks some critical concepts (materiality, embodiment and ongoing accomplishment) that become exacerbated when translated into the virtual setting. Foregrounding these more relational concepts of sensemaking is unmanageable within the Weickian sensemaking tradition. As such, a more basic and broad ontology is required for this study, namely a practice-based approach that is predicated on the notion of entwinement. As we will see in Chapter 4, reconceptualising sensemaking from a practice perspective will enable me to embrace those very aspects of sensemaking that have been under-theorised to date but which are critical to our understanding of sensemaking in virtual settings.

Chapter 4 A PRACTICE-BASED CONCEPTION OF SENSEMAKING

This study is concerned with investigating how sensemaking, which underlies all organising, is accomplished in the modern virtual context. Chapter 3 revealed there is a distinct lack of studies on how sensemaking takes place in virtual settings and those that do exist are deficient and flawed. The aim of Chapter 4 is to reconceptualise sensemaking from a practice perspective and thereby overcome the limitations of traditional approaches to studying sensemaking in virtual settings. First, I define practice and recount the practice turn in OS. I then explore how the concept of practice has been applied in studies set in virtual contexts. In doing so, I explicate what practice theorists have emphasised in order to overcome the problems of traditional approaches to social science that are rooted in scientific rationality (Sandberg & Tsoukas, 2016). I also demonstrate how practice approaches inherently incorporate the key concepts of materiality, embodiment and ongoing accomplishment identified in Chapter 3 as critical to this study.

Second, I articulate Heidegger's relational ontology as the basis of the practice tradition and demonstrate its relevance to the study of sensemaking in virtual settings. Third, I articulate a practice-based conception of sensemaking (in virtual settings) founded on the notion of entwinement (Sandberg & Dall'Alba, 2009), which underscores Heidegger's relational ontology. More specifically, in developing the pillars of the theoretical framework, I draw on Schatzki's (1996, 2001) notion of activities as the building blocks of practice (and thus sensemaking and organising), complemented by Heidegger's notion of intelligibly, which gives sense to these activities in practice. I further suggest that sensemaking, from a practice perspective, takes two forms: immanent sensemaking and episodic sensemaking. Finally, I redefine sensemaking (from the practice perspective) as intelligible action that takes place on the basis of practice.

4.1 What is practice?

The term practice can be conceived of as both a noun and a verb. As a noun, a practice is a field of activities such as accountancy, hospitality and academia. As a verb, practice is the doing of such activities. For example, the practice (noun) of academia involves the practicing (verb) of various activities such as researching and teaching. However practices are not merely the sum of individuals' activities; nor are practices merely subsets of broader societal structures. Instead, practices are the site where "understanding is structured" and "intelligibly (is) articulated" (Schatzki, 1996: 12, parentheses added). In this way, practices both constitute and house social phenomena (Nicolini, 2012:173). Put differently, practices are both the process and outcome of

organising. Practices may be studied in their own right or provide means to study other organisational phenomena. For example, one may study the processes by which the practice of academia itself is accomplished. By contrast, the practice of academia may be studied to investigate how skills are taught and learned between novices (students) and masters (professors). In this way, "practices are not only pivotal objects of analysis … but also the central social phenomenon by reference to which all other social entities, actions, institutions and structures are to be understood" (Schatzki, 1996: 11). In my study, practice is conceived as the "site" (Nicolini, 2011) or place to study the social phenomenon of sensemaking. This approach acknowledges that "knowing (sensemaking) is both sustained in practice and manifests itself through practice" (Nicolini, 2011: 602, parentheses added). As such, from a practice perspective, sensemaking is both the process and outcome of accomplishment of (the) activities that comprise (a) practice.

4.2 The practice turn in organisational theory

Practice theory has its origins in a broad, long-standing, philosophical critique of scientific rationality (Sandberg & Tsoukas, 2016). Practice theorists reject the understanding of social phenomena as that which is represented by independent subjects (e.g. scholars) who, through a dualistic subject-object ontology, aim to rationally represent knowledge about the world. Instead practice theorists argue that "there is an understanding manifested in human action and activities that is more basic than the explicit representations that actors and social scientists form" (Sandberg & Tsoukas, 2016: 185). Our engagement in practice presupposes our ability to make distinctions between ourselves and the social world. As such, practice (specifically our ways of being) "enables us to make sense of ourselves, others, and things we use, deal with and encounter in our everyday activities (Sandberg & Dall'Alba, 2009: 1354).

Nicolini (2012) suggests that practice theories are united with each other but radically different from more traditional organisational theory (which is aligned with scientific rationality), in five ways: (1) practice theories foreground the importance of activity, suggesting that underneath or behind recognisable formation of organisation (e.g. a queue) is (re)productive work; (2) practice theories bring to the fore the role of the body and materials in all social activities; (3) practice is neither mindless repetition (of societal norms) nor complete invention (by the individual); (4) practice theories suggest that "knowing" is a set of practical methods (such as how to feel, what to expect, and how to speak) that are acquired through partaking in practice with others; and (5) practice theories (re)affirm the central roles of power and interests as constitutive elements of social reality.

By emphasising one or more of the above five features of practice theory, scholars have been able to challenge various dualisms in organisational theory (such as structure/agency, mind/body, cognition/action and objectivity/subjectivity) (Feldman & Orlikowski, 2011; Schatzki, 2001). For example, practice theories enable scholars to reconceptualise organisational "knowledge" as organisational "knowing". Recasting knowledge as being acted out socially in the world (knowing) rather than as a static entity in the mind (knowledge) enables us to take seriously the "philosophical insight that explicit interpretations are necessarily based on specific social practices, which transcend unhelpful dualisms" (Feldman & Orlikowski, 2011: 1242). As another example, Gherardi (2000) suggests that Bourdieu's account of practice as "habitus" – a form of knowing-in-practice inscribed in bodies that operates at the pre-conscious level and which generates practice (Nicolini, 2012: 67) – helps us better understand the relationships between explicit and tacit knowledge and, moreover, to debunk the distinction between them.

4.2.1 Practice theory in virtual settings

The above discussion has implicitly referred to how practice theory has been understood and applied in traditional settings. However practice theories have also been applied to virtual settings. In particular, Giddens' structuration theory has proved attractive to scholars (Barley, 1986; DeSanctis & Poole, 1994; Orlikowski, 1992) as a means to dismantle dualisms that arise in studies set in technological contexts. Such dualisms are most obviously expressed in the analytic distinction often made between users of technology and the technology itself. Orlikowski's (2000) concept of technologies-in-practice[4], an extension of Giddens' (1984) structuration theory, is a notable example of how practice theory has been applied in virtual settings in order to challenge this user/technology dualism. As reflected in the excerpt below, Orlikowski argues that although technologies may exhibit inscribed or inherent properties, it is only when technology is used in recurrent social practices that features of that technology can be said to structure agents' actions.

> Through their regularized engagement with a particular technology (and some or all of its inscribed properties) in particular ways in particular conditions, users repeatedly enact a set of rules and resources which structures their ongoing interactions with that technology. Users' interaction with technology is thus recursive – in their recurrent practices, users shape the technology structure that shapes their use (Orlikowski, 2000: 407).

[4] This article was also cited in Chapter 3 to illustrate a separate point – that sensemaking (in virtual settings) often involves/is constituted by ongoing accomplishment of activities.

Studies like this have helped scholars find a middle ground in the debate between strict determinism and extreme social constructivism, which is a broader, more fundamental dualism (Nicolini, 2012). While determinists think of technology as a fixed entity that impedes upon us and our activities, social constructivists conceive of technology as a malleable tool whose meaning is wholly enacted by users. In contrast, practice theory enables scholars to conceive of technology and social actors as being co-constituted through practice, thereby transcending the either/or dualisms.

Having provided an introduction to the practice turn, and shown how practice theory has been successfully applied in virtual settings, I now explore more deeply the philosophical underpinnings of practice (namely Heidegger's relational ontology). Here I follow Sandberg and Dall'Alba (2009) in elaborating entwinement as a means to conceptualise the practice-based approach of my research. The aim is to articulate a vocabulary by which to talk about the entwined elements of organising and sensemaking without compromising the relational whole of practice. I also explore how the notion of entwinement embraces the key concepts of materiality, embodiment and ongoing accomplishment specifically in the context of virtual settings.

4.3 Heidegger's relational ontology

In the field of OS, the most developed practice theories are those of Pierre Bourdieu (1977, 1984, 1990, 1998), Anthony Giddens (1976, 1979, 1984), and more recently Ted Schatzki (1996, 1997, 2001, 2002, 2010) (Sandberg & Tsoukas, 2016). Despite their varying contributions, Heidegger's existential ontology forms the philosophical basis of all these practice theories. Indeed, Heidegger's is (arguably) the most compressive and consistent account of practice in social science (Sandberg & Tsoukas, 2016). Like many phenomenologists, Heidegger draws on Husserl's (1970) conception of the life-world which describes "the everyday world with which we are inevitably intertwined and which we take for granted" (Sandberg & Dall'Alba, 2009: 1353). Heidegger extends Husserl's epistemological insights about how we come to *know* things through "lived experience" in the world by proposing an existential ontology about what it means to *be* in the world. Here, "being in the world" is our primary mode of existence. To reiterate an earlier point, Heidegger suggests that "being in the world comes before a subject-object distinction, because it is our way of being that enables us to understand ourselves as subjects and objects as particular objects" (Sandberg & Dall'Alba, 2009: 1354).

Though it is increasingly influential in social science generally and OS specifically, Heidegger's relational ontology is highly complex and difficult to comprehend, notwithstanding

that many scholars rely on English translations and interpretations of the original German prose (e.g. Dreyfus, 1991). In an attempt to unify our understanding of practice, Sandberg and Dall'Alba (2009: 1359) propose a life-world concept of practice that reflects Heidegger's relational ontology in OS. In doing so, the authors argue that "our most basic form of being (in the world) is entwinement: we are never separated but always already entwined with others and things in specific socio-material practice worlds" (Sandberg & Tsoukas, 2011: 343, parentheses added). Within these practice worlds, practitioners and their practices (e.g. a professor and their research) are inseparable because they co-constitute each other within practice. As such, the notion of entwinement is fundamentally opposed to scientific rationality because it conceives of the world as a relational whole, immediately dismantling the dualisms practice scholars have sought to overcome, as discussed above.

The life-world vocabulary developed by Sandberg and Dall'Alba (2009) is founded on the notion of entwinement. Beginning with "entwinement in practice worlds", the authors stipulate that "aspects of practice such as activities, knowledge, people and equipment are intertwined with, and take their meaning from, practice worlds" (Sandberg & Dall'Alba, 2009: 1359). Thereafter, the authors introduce further terms to articulate other facets of practice, namely "ways of being", "being with others", "equipment" and "lived body". Two terms are particularly relevant to this study because they deepen our understanding of some of the critical concepts identified in the literature review. Equipment (like materiality) refers to the role of non-humans (materials, things) in actors' ability to enact shared know-how through activities. Also the lived body (like embodiment) plays an important role in providing actors with access to the practice world in which meaning is socially enacted. Finally, though not explicitly named in the vocabulary, the concept of absorbed coping (like ongoing accomplishment) helps to demonstrate that our lived experience of accomplishing activities through equipment and bodies is largely taken for granted. That is, we cannot step outside our practice worlds and often we are not aware of our being within them. Each of these terms is now explored in more detail.

First, in Heidegger's view, the materials that are entwined in practice worlds, including raw materials, tools, instruments, buildings, clothes and models, may be referred to as equipment. Equipment draws its meaning from how it is employed as part of activities in practice. As such, equipment "is not primarily defined by qualities such as hardness, sharpness and heaviness, but by its usefulness in carrying out those activities" (Sandberg & Dall'Alba, 2009: 1358). For example, the professor's lectern is defined by its capacity to facilitate speaking to a room of students, not by

its explicit weight, texture or colour. That is, the objective characteristics of the lectern are quite meaningless outside of the practice of academia and the activity of teaching. In sum, from a relational perspective, the key concept of materiality is re-framed as equipment, which emphasises the entwined nature of material things in practice.

Second, the notion of the lived body provides deeper insight into how the body is entwined with the social and material practice world (Sandberg & Dall'Alba, 2009). That is, we carry out activities by and through our lived body's enactment and experience of practice. In this way, our bodies constitute and are constituted by practice. Further, "we are not limited to the boundaries of our body, however, but our body extends into and incorporates things in the world" (Sandberg & Dall'Abla, 2009: 1358). For example, the professor's body is not separate from, but entwined with, the lectern in the activity of teaching. Here lived body, somewhat synonymous with the key concept of embodiment, reminds us that our body is dynamic and mangled in practice, not a passive bystander to organising. Therefore sensemaking, which underpins all activities, is a largely embodied rather than strictly cognitive process. In this way, "embodied know-how (sensemaking) is performative; it is not a matter of "I think that" but of "I can" (Merleau-Pony, 1962/1945 as cited by Sandberg & Dall'Alba, 2009: 1358, parentheses added).

Finally, Sandberg and Dall'Alba (2009) and others (Feldman & Orlikowski, 2011; Sandberg & Tsoukas, 2011) show how entwinement reflects the key concept of ongoing accomplishment. Absorbed coping (Dreyfus, 1991), almost synonymous with ongoing accomplishment, is said to be our primary mode of engagement with the practice world. Here "actors are immersed in practice without being aware of their involvement in it: they spontaneously respond to the developing situation at hand" (Sandberg & Tsoukas, 2011: 344). Further, Heidegger asserts that it is only when we are interrupted in our absorbed coping that we notice our practicing as being distinct from the relational whole of the practice world. Yet in resolving such interruptions, we must still draw on and act within the relational whole of practice. In other words, our ability to resolve such breakdowns is entrenched in the practice at hand "because our deliberate attention to what has become unavailable remains dependent on the practical activity" (Sandberg & Tsoukas, 2011: 344).

4.3.1 Entwinement in virtual settings

The above discussion of Heidegger's relational ontology and the life-world vocabulary has been set in the context of more traditional settings. Thus, the notions of equipment (materiality) and lived body (embodiment) have largely related to the entwinement of physical materials and physical

bodies in absorbed coping (ongoing accomplishment). However, these concepts are equally applicable to the virtual setting. Indeed, Riemer and Johnston's (2013) paper is an exemplary illustration of how the notion of entwinement (the foundation of Heidegger's relational ontology) may be applied to the study of technology and organising. Namely, the authors employ the notion of equipment to shed light on aspects of IT in use that are ignored by the traditional Cartesian ontology (like scientific rationality). In telling two stories (one dualist and one relational) of technology appropriation, the authors show that what appeared in the original (Cartesian) story as the

> unfortunate aftermath to an otherwise clean task-technology-fit story becomes the main plot in the story when viewed from an equipment perspective. Consequently, a story that formerly ended with IT implementation now, at best, only accounts for half the story (Riemer & Johnston, 2013: 282).

As such, not only does entwinement curb problematic conceptions of technology as either wholly deterministic or passive players in technology appropriation, it enables the authors to "invert the relationship between what counts as central and peripheral" in organising (Riemer & Johnston, 2013: 274).

More specifically, Riemer and Johnston (2013) exploit the notion of equipment by conceptualising technology as either equipment or objects depending on how they "come to hand" to actors. To explain, humans may encounter non-humans (such as technology) as either ready-to-hand or present-at-hand. When an entity is ready-to-hand it is "encountered in fluent use as a means for a practice" (Riemer & Johnston, 2013: 276) and is thus known as equipment. In this regard, the entity is defined by its "in-order-to" in the practice world. On the other hand, when an entity is present-to-hand it is "encountered in a more distanced, reflective way" (Riemer & Johnston, 2013: 277) and is thus known as an object. In this case, the entity is defined by its properties (e.g. brightness) rather than its use in practice. For example, in social media a "like" button may show up as equipment to the seasoned user who is adept to the practice of distributed decision making using such technology. That is, the like button is encountered as an in-order-to vote on an idea, rather than a symbol of a thumb pointed upwards; that is, a present-to-hand object encountered by way of its properties.

4.4 A practice-based conception of sensemaking in virtual settings

Above I have shown that Heidegger's relational ontology, which underpins practice theories generally, is specifically helpful to my study in three ways. First, a focus on entwinement generally helps to overcome problematic dualisms in investigating social phenomena (such as sensemaking

and organising). Second, the relational ontology embraces the three core organising concepts of materiality, embodiment and ongoing accomplishment, which take on new meaning in virtual settings. Finally, the notion of entwinement and its related concepts are equally applicable to organising in virtual settings as more traditional ones. More specifically, conceptualising technology as being entwined with, rather than separate from, users and action helps reveal the whole story of how organising is accomplished in virtual settings. In light of this, I now take a practice lens directly to the notion of sensemaking, which underpins all organising. More specifically, I develop a practice-based conception of sensemaking in virtual settings that draws out and links together some key concepts of practice. This results in a three-pillared theoretical framework for the study: (1) activities are the building blocks of sensemaking; (2) activities are made sensible by intelligibility; and (3) activities and sensemaking are ongoing.

4.4.1 Activities are the building blocks of sensemaking

Practice theorists conceive of practices as "embodied, materially mediated arrays of human activity centrally organised round shared practical understanding" (Schatzki, 2001: 2). This suggests that arrays of activities comprise the overall practice at hand. For example, researching and lecturing are activities that comprise the practice of academia. Further, these activities are comprised of smaller elements which, according to Schatzki (1996), are "doings" and "sayings". Doings are basic bodily acts that in a certain circumstance amount to carrying out an activity (Schatzki, 1996: 38). For example, pointing and pacing are basic bodily doings that amount to the activity of lecturing within the practice of academia. Further, sayings are a subset of doings of the linguistic kind; that is, speech acts. For example, saying "I do" in a wedding ceremony is a doing that helps constitute the practice of marriage (Schatzki, 1996).

It is clear that activities (comprised of doings and sayings) are central to practice. Similarly, activities are a foundational feature of sensemaking. In particular, Weick's assertion that sensemaking is ongoing (one of the seven key features outlined in Chapter 3) emphasises that sensemaking relies on accomplishment of activities. "People are always in the middle of things" (Weick, 1995: 43); that is, we are constantly performing activities. Weick further says that "to understand sensemaking is to be sensitive to the ways in which people chop moments out of (these) continuous flows" of activity (1995: 4, parentheses added). It seems, therefore, practice theories and SP intersect at the notion that activities underlie human organising. I further posit that sensemaking (which underlies all human organising) is akin to the accomplishment of activities in practice. As such, activities (and their constitutive doings and sayings) are taken as the unit(s) of analysis of

sensemaking in this study. Importantly, these activities and doings are observable phenomena in the empirical sites. This is in contrast to alternative approaches where the foci of the research are tacit. For example, practice theorists often study structures and sensemaking theorists often study cognitive frames, both of which are empirically invisible.

4.4.2 Activities are made sensible by intelligibility

From a practice perspective, sensemaking is not only comprised of activities and doings. That is, activities on their own are meaningless outside of the broader practice in which they are carried out; activities and doings only make sense when they are carried out on a backdrop of intelligibility within the practice world (Nicolini, 2012; Riemer & Johnson, 2013; Schatzki, 1996). This intelligibility may be understood as the tacit, practical sense (or many senses) that informs our activities in a given time and place. Intelligibility has two dimensions: *how* things make sense (world intelligibility) and *what* makes sense to do (action intelligibility) (Schatzki, 1996). Taken together, Schatzki (1996) says these dimensions provide a general understanding of the context of activities, a sense of how to proceed, and a sense of what would bring the activity to a conclusion. More specifically, what makes sense to do and how to do it is rooted in our moving towards an end, to complete a task/project, and for a purpose. In this "teleological" approach or "ends orientation" (Schatzki, 1996) to activities, practices signify to us what specific doings and sayings make sense (or do not make sense) for us to carry out.

Intelligibility does not connote an explicit, fixed sense of how things are or should be. Rather, intelligibility is ever-evolving and is (re)produced in practice. As Schatzki (1996: 38) notes, "the texture of practices that constitutes the unarticulated background of our sense making is not a static repository as much as a living part of our dealing with the world to which we turn constantly in our daily lives". In this way, we act and make sense on the basis of our intelligibility which, in turn, is constituted in our activities. In other words, what makes sense for us to do (what is intelligible) is informed by practice which, in its doing, (re)produces our sense of the practice. For example, it makes sense for a professor to do research because the practice of academia demands it. And as the professor performs the activity of research through various doings (e.g. interviewing participants using particular words in a specific tone of voice), they (re)produce their sense of the practice.

4.4.3 Activities and sensemaking are ongoing

Entwinement connotes there is no distinction between the constitutive elements of sensemaking (i.e. activities and intelligibility), and therefore that there is no beginning or end to the process of sensemaking. Further our primary mode of engagement with the practice world, and therefore the means by which we make sense as we carry out activities, is absorbed coping (Dreyfus, 1991). Within this absorbed coping sensemaking is understood to take place in the ongoing present[5] (Maitlis & Christianson, 2014; Weick, 1995); that is, in the unconscious flow of immediate human activity. In this way, absorbed coping points towards a process of sensemaking that substantially differs from the traditional conception of the sensemaking episode in which actors attempt to retrospectively restore sense following an interruption. As Sandberg and Tsoukas (2015) note, what we do in between deliberate efforts to repair an interruption (i.e. in between sensemaking episodes) is not senseless. Here, the authors draw on the notion of absorbed coping specifically (and entwinement generally) to develop the concept of "immanent sensemaking". Immanent sensemaking describes how people "go on doings things that they routinely do without deliberately thinking about how they do them" (Sandberg & Tsoukas, 2015: S25). The authors do acknowledge that this immanent sensemaking (absorbed coping) may be interrupted or break down completely. Then, when sense is restored, sensemakers return to the flow of activity. Immanent sensemaking thus gives a name to the type of sensemaking that takes place in between more traditional sensemaking episodes. As such, my practice-based conception of sensemaking takes two forms: immanent sensemaking, which is akin to ongoing accomplishment/absorbed coping; and episodic sensemaking, in which interruptions to activities are restored.

4.5 Chapter summary

This chapter has presented a practice-based conception of sensemaking to replace traditional conceptions that overlook key, relational facets of organising. Through the central notion of entwinement, I have shown that this practice-based approach embraces the key concepts of materiality, embodiment and ongoing accomplishment, which are particularly critical to the study of sensemaking in virtual settings. In developing the theoretical framework I made a number of assertions. First, activities are the building blocks of both practice and sensemaking. Activities and

[5] This feature of sensemaking is a source of contradiction in Weick's (1995) account of sensemaking; that is, sensemaking is said to take place in finite sensemaking episodes *and* to be ongoing.

their constitutive doings (and sayings) are thus the unit of analysis for this study. Second, activities (and doings/sayings) make sense because they take place on the background of intelligibility (sense(s)) within practice worlds. Third, while absorbed coping sustains immanent sensemaking, it is subject to various interruptions/breakdowns from which episodic sensemaking arises. Off the back of these three pillars I assert that sensemaking takes place on the basis of practice; that is, practice provides sensemakers a higher order sense(s) towards which to act. In this way, sensemaking may be thought of as the intra-action between activities and intelligibility[6], which in this study is mediated by technology. According to this practice-based conception of sensemaking, activities, intelligibly and technology are bound up in a relational whole, and the life-word vocabulary (materiality/equipment, embodiment/lived body and ongoing accomplishment/absorbed coping) helps us to maintain the integrity of this entwinement.

In Chapter 5 I demonstrate how I situate and apply the practice-based conception of sensemaking in the virtual setting. More specifically, I describe how I will investigate sensemaking as it takes place in three different virtual settings: Yammer (enterprise social network), telepresence (video-based collaboration platform), and SL (3D virtual world). Understanding how activities are accomplished, and therefore sense is made, across all these settings will help me to formulate a general account of how sensemaking takes place in virtual settings. As will be demonstrated, to analyse sensemaking in these virtual settings I am guided by the practice-based conception of sensemaking. Namely, I identify instances of episodic and immanent sensemaking in the data and the specific technological tools that underpin them. By interrogating these instances of sensemaking, while keeping the sensitising concepts in mind, I show how sensemaking is enabled, constrained and altered in the virtual settings.

[6] Because activities and doings (the building blocks of sensemaking) cannot be separated from the intelligible background on which they are carried out, the distinction between intelligibility and activities in a practice-based conception of sensemaking is analytic only.

Chapter 5 METHODOLOGY

In Chapter 4 I outlined a practice-based conception of sensemaking that overcomes key deficits in existing sensemaking literature. Now in Chapter 5 I demonstrate how I answer the question of how this practice-based sensemaking takes place in virtual settings. First, I (re)establish virtuality as the general research setting. I then explain how fieldsites were selected using the virtuality continuum from Chapter 2, and provide a brief background to each fieldsite. Second, I outline ethnography as my chosen methodological approach, specifically a hybrid traditional-virtual ethnography. I explain what ethnography generally stands for and justify its selection for this study against other methodological options; I also outline its compatibility with the theoretical framework. Third, I explain how data were generated in each fieldsite and outline participant observation as the principal form of data collection, which was supported by interviews. Fourth, I explain how data were analysed both within and across fieldsites. Throughout the chapter I show how the theoretical framework (the practice-based conception of sensemaking) guided data collection and analysis as well as presentation of the findings. I also discuss methodological and ethical issues arising from the hybrid traditional-virtual ethnographic approach and how despite various challenges, the findings may be justified.

5.1 Fieldsite selection

As explained in Chapter 2, virtuality is the backdrop on which sensemaking largely takes place in the modern world. That is, sensemaking takes place with and within digital technologies. The fieldsites for this study were selected from the virtuality continuum (see Figure 2), which reflects the various traditional and new activities that are enabled by a range of less and more sophisticated technologies. I undertook a number of considerations in choosing fieldsites from this continuum. First, the fieldsites were selected from the high end of the continuum (as indicated by the shaded area) because they best represent the more sophisticated kinds of organising that characterise the modern virtual world. Second, the decision to take three fieldsites was made on the assumption that developing a generalisable account of sensemaking in virtual settings is only possible if multiple fieldsites are compared. In others words, taking three fieldsites from different sections of the continuum ensured that the resulting findings are not restricted to one type or level of activity or technology. Third, when selecting specific organisations to partner with, I ensured each organisation was using a digital technology to carry out (at least some of) their core activities. I also made sure the organisations were also suitably diverse in terms of their industry, the types of practices (activities) they performed, and the types of technology used in practice. Finally, I ensured

that the organisational gatekeepers allowed me to both observe and interview practitioners in their natural settings so I could understand how activities were carried out using different technologies. I used these criteria in combination with convenience sampling (referrals from my professional network) to engage with suitable organisations.

I now briefly describe each fieldsite in terms of the two dimensions of virtuality outlined in Chapter 2; that is, the type of activities that characterise the practice and level of sophistication of the enabling technology. I also explain in more detail why I selected the fieldsites and how I expected the qualitative differences between them might impact the results of the study.

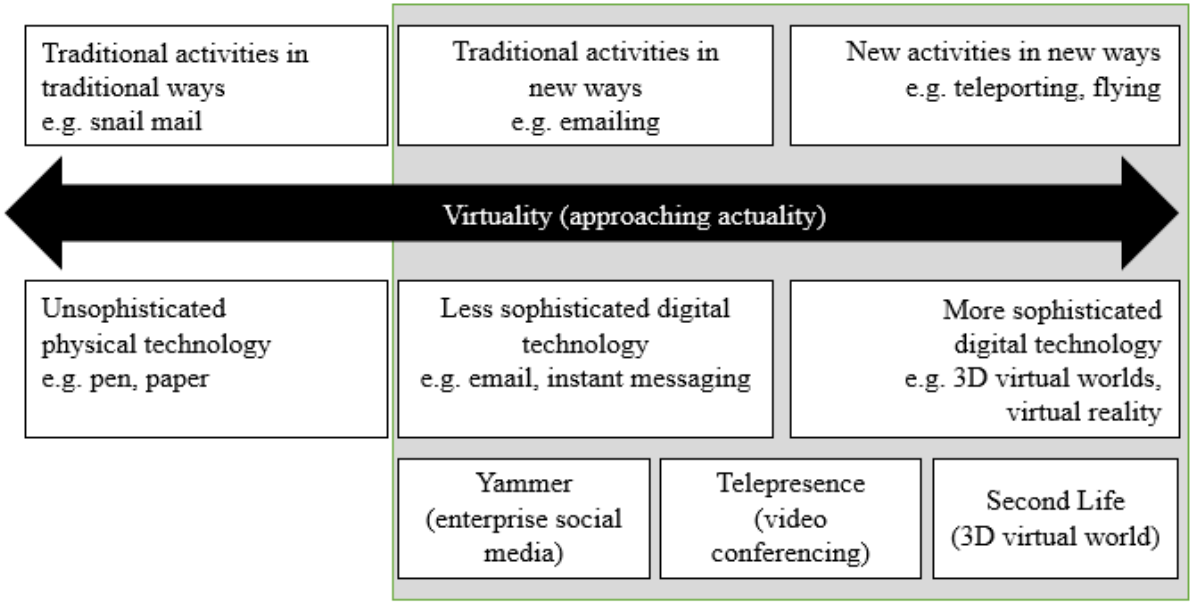


Figure 2: Fieldsite selection using the virtuality continuum.

Fieldsite 1 is a financial institution (Finsure) in which the practice of governance and process (G&P) was carried out using Yammer (version 4.1.1). Yammer is an enterprise social network (ESN), a type of social media that is tailored to distributed businesses to enable staff to communicate and collaborate over distance. Similar in appearance and function to Facebook, Yammer enables users to form groups and contribute to conversations via posting, commenting, liking and sharing. I was embedded in a small, distributed team that is responsible for G&P consulting across their division to help local areas implement and improve insurance claim processes. Yammer is employed by this team to coordinate projects, share knowledge within and outside the team, and engage stakeholders across their division. I was employed as a part-time intern in the G&P team from August to October 2012 (total of 33 days in the field). I was

introduced into the field by the team leader and reported daily to the communications lead. With a background in organisational communication, I was aptly embedded in the communications sub-team. I worked each day alongside my colleagues (who were also my research participants) and I occupied a hot desk in the open plan office. The main data sources for this fieldsite are Yammer threads comprised of text and images. For the sake of clarity, the threads presented in Chapter 6 are replicas of the original screenshots.[7] These threads are supplemented with interview transcripts, extensive fieldnotes, screenshots of Yammer, organisational documents and other data.

Fieldsite 2 is a global technology firm (Vitec) in which the practice of salesmanship was carried out using telepresence (release 1.8). Telepresence is a video-based collaboration platform that enables users to communicate over distance via high quality and persistent video, audio and screen sharing technologies. In this fieldsite I was embedded in a distributed sales team with national and international members. I was able to observe salesmen (all male participants) as they used various modes of telepresence to communicate with colleagues, partners, suppliers and customers across the globe. In this fieldsite data collection took place in two sittings over a total of four weeks (August and December 2013) during which time I conducted observations and in-depth interviews (both face-to-face and via telepresence). I was introduced to the participants by a high level manager and all interviews and observations were arranged through him. I was given access to all the meeting and telepresence rooms in the Brisbane office I required so I could come and go as I pleased. For the sake of confidentiality, I was unable to record (many of) the sales meetings of my participants in real-time[8]. As such, the main data sources for this fieldsite are fictitious accounts of the types of meetings that Vitec salesmen carry out via various telepresence platforms. To construct these accounts I sought verbal descriptions of meetings and samples of audio/video recordings of internal and customer meetings, supplemented by some first-hand observations, interview transcripts, extensive fieldnotes, organisational documents, and other data.

[7] Extreme care was taken to reproduce the threads as accurately as possible, including letter and paragraph spacing, text colour, spelling and capitals/lower case. Typos in posts/comments in the original are retained in replica threads.

[8] Throughout this thesis the term ‘real-time’ should be read as ‘linear clock time’, that is the concept of time which we take as given in everyday life. Use of the word ‘real’ in this instance should not be conflated with the distinctions made in Chapter 2 between the ‘physical’, ‘digital’, ‘virtual’ and ‘real’.

Fieldsite 3 is a globally distributed educators' community that uses SL (a 3D virtual world) to carry out personal and professional activities. In SL users embody avatars in order to build infrastructure, operate businesses, and attend events depending on their interests and goals. I was embedded in a group of educators who were trying to progress the use of 3D virtual worlds (and other technologies) in primary, secondary and tertiary education. Educators' community members use SL to network with like-minded people, stage education-related events such as conferences, meetings and workshops, and socialise and have fun with friends. I was a legitimate and contributing member of the SL educators' community for three months (September to November 2013) during which time I used Second Life Viewer version 3.6.9. My first interaction with the community was my attendance at one of the largest annual educators' conferences in SL. As I did with all the groups/events I participated in, I sought permission from the organisers to collect data and I disclosed my status as a researcher in my avatar profile. Apart from these formalities, I was able to participate in the educators' community uninhibited. The main data sources for this fieldsite are accounts of actual interactions that I participated in during my time in SL. Because there are many parallel discussions taking place in these accounts (via voice, text and bodily avatar interactions), in Chapter 8 I have summarised the interactions into narrative accounts instead of providing raw data. These accounts are informed by interviews transcripts, extensive fieldnotes, screenshots, audio/video recordings, and other data.

These fieldsites were selected iteratively throughout the course of the research. I selected Yammer at Finsure as my first fieldsite because, at the time, ESNs were becoming popular and Yammer was the ESN of choice in corporate Australia. I was introduced to Yammer Inc. through a professional connection and Yammer Inc. in turn suggested Finsure (one of their longest-held clients). I expected that this text-based technology platform would enable sensemakers to collaborate over distance at the expense of more intimate exchanges. Fieldsite 2, telepresence at Vitec, was selected because of its capacity to connect people over distance in a far more immediate way. I expected that sensemaking in this environment would be far richer than in Fieldsite 1, but I remained intrigued by what might be possible, rather than what might be lost, *because* of the heavy mediation of text-based communication. Fieldsite 2 became available to me through a contact of my second supervisor. Finally, Fieldsite 3 had to "push the boundaries" in terms of technological sophistication and the novel activities that could be accomplished. While 3D virtual worlds were not particularly in favour at the time of data collection, they presented an exciting opportunity to delve into a whole other level of virtual sensemaking. I expected that the avatar experience would drastically contrast with the more conventional interactions via text and video, but I was unsure

how. I selected the educators' community is SL because it seemed to be one of the most active and engaged groups doing "serious" work in-world. This educational group in some ways contrasted with the corporates of Fieldsites 1 and 2 (which were selected due to the fairly 'normal' office work being undertaken). However, I found that the core activities (e.g. meetings, conversations, preparing documents) were fairly similar, and thus comparable, across settings.

5.2 Ethnography

Having outlined the fieldsites and how they were selected using the virtuality continuum, I now outline the ethnographic methodology I used to investigate how sensemaking takes place in each fieldsite. I begin by justifying my choice of ethnography as my methodological approach and explaining it in more detail. I then describe how, through ethnography, I apply the practice-based conception of sensemaking to the virtual fieldsites. In the remainder of the chapter I identify methodological and ethical issues that arise and how they will be overcome. I also outline how the findings will be presented in Chapters 6 to 9.

5.2.1 Why ethnography?

Ethnography is a "general research attitude" (Flick, 2006: 227), rather than a specified step-by-step process, that is centrally concerned with understanding a context from the members' standpoint. Ethnography both sympathises with, and differs from, other methodological approaches I considered for this study, namely ethnomethodology (EM) and case study. First, EM aims to understand "how people produce social reality in and through interactive processes" (Flick, 2006: 68) – an aim I pursue in this research; that is, I want to know how people make sense (produce their reality) through coordinated activities (interactive processes) specifically in virtual settings. Scholars of HCI have used EM (specifically the more recent "studies of work" approach) to investigate how people produce social order through technology-enabled conversational practices (see Button & Sharrock, 2009). Indeed, this strain of HCI-EM research shares common ground with my research. For example, both are concerned with illuminating how mundane actions socially produce organisations and organising. Although EM is a viable option for investigating sensemaking in virtual settings, I have elected ethnography because it allows me to not only zoom in on the details of interaction (as per EM), but also to zoom out on broader contextual factors that are emphasised in the practice approach.

Second, the case study approach "involves using one or more cases to create theoretical constructs, propositions and/or midrange theory from case-based, empirical evidence" (Eisenhardt

& Graebner, 2009: 25). My study sympathises with the case study approach in that I intend to build theory (more specifically, a theoretical account of virtual sensemaking) from thick description and investigation of several empirical fieldsites. In the pure case study approach, theory is developed inductively; that is, "theory is emergent in and developed by recognising patterns of relationships among constructs within and across cases and their underlying logical arguments" (Eisenhardt & Graebner, 2007: 25). In contrast, my study is not purely inductive; it is informed by a theoretical framework that expressly sensitises me to particular concepts (such as embodiment and materiality). In this way, I employ an abductive method of data collection and analysis in which I constantly move between data and theory, gradually building up a sense of what is going on (Timmermans & Tavory, 2012).[9]

5.2.2 What is ethnography?

Having chosen to pursue ethnography among the methodological options, I now describe it in more detail. While traditional ethnography tends to involve pure observation and description of social processes, modern ethnographers are more interested in "understanding social processes of making these events from the inside by participating in the processes' developments" (Flick, 2006: 23). Organisational ethnographers do this by embedding themselves in organisations so they can observe and participate in ordinary activities. That is, ethnographers are "in the midst of doing whatever it is they (practitioners) do every day, with whatever is required to do it" (Miettinen, Samra-Fredricks, & Yanow, 2009: 1315, parentheses added). Unlike other social researchers who aim to objectively study social phenomena, ethnographers expressly intend to become subjectively involved in the phenomenon. Further, because interaction with things is involved in the process of conceptualising (making sense of) one's surroundings, language cannot be privileged over acts in an ethnographer's account of practice (Miettinen et al., 2009: 1315). As such, both language and actions, observation and participation, are crucial for constructing plausible accounts of practice. This justifies my choice of data collection methods (participant observation supplemented by interviews), which are discussed later on.

The specific methodological approach of this research is closely aligned with what Nicolini (2012: 217-218) calls the "ethnography of practice approach". He refers to this approach as a

[9] Both EM and case study may employ ethnographic data collection and analysis methods, as my study does. However, my study adopts the broader philosophy of ethnography.

"package" where "ontological assumptions" (the basic assumption of how the world is) and "methodological choices" (how to study things so that a particular ontology materialises) work together (Nicolini, 2012: 217). For example, surveys and interviews alone are unsuitable methods for studying practices because they are "unfaithful to the processual ontology that underpins the ethnography of practice. Studying practice-based practice-building exclusively by *post-hoc* verbal accounts is therefore an oxymoron" (Nicolini, 2012: 217-218, italic in original). Likewise, the practice-based conception of sensemaking can only be genuinely investigated using methods that honour the underlying ontology (and epistemology) which, in this study, is Heidegger's relational ontology (as discussed in Chapter 4). To recap, Heidegger's ontology states that it is only by "being in the world" that we are able to understand ourselves, others, and our actions. Ethnography (of practice) is aligned with this ontology because it provides me (the researcher) access to the lived experience of actors as they accomplish activities virtually. Nicolini (2012: 217) says, "practice is perfectly happy to stay in the background supporting our daily commerce with the world without the need to come under the spotlight". Therefore, only by being ethnographically involved with the everyday activities of practitioners can I bring to the fore the phenomenon of sensemaking in virtual settings.

5.2.3 Applying the theoretical framework

Building on the argument above, I now explain in more detail why an ethnographic methodological approach is particularly well suited to this study of sensemaking as it takes place in virtual settings. Namely, a practice-based conception of sensemaking focuses attention on accomplishment of activities; correspondingly, the ethnographic methodology enables me to access and participate in such activities as they are accomplished in practice. In this way, the ethnographic approach allows me to operationalise the practice-based conception of sensemaking, as explained below.

As outlined in Chapter 4, the theoretical framework is comprised of three pillars. First, activities (comprised of doings and sayings) are the observable focus of sensemaking and basic unit of analysis. Second, intelligibility (comprised of sense) gives meaning to these activities, doings and sayings. Third and finally, this intra-action between activities (doings/sayings) and intelligibly (sense) – that is, sensemaking – is ongoing. Further, this ongoing, immanent sensemaking may be interrupted and result in episodic sensemaking. In this study, I investigate how this practice-based conception of sensemaking takes place in virtual settings. To explain, in each fieldsite practitioners undertake activities (with or within a technology) in pursuit of intelligibility. At a more granular

level, the individual doings (that comprise activities) are carried out through specific tools[10] (that comprise the technology). For example, in Yammer the doing of "agreeing" is carried out using the "like" tool.

I now illustrate how I applied the theoretical framework to the empirical settings using Fieldsite 2 (telepresence) as an example. As indicated by the black arrows in Figure 3, this study of sensemaking in virtual settings investigates the intra-action between activities and intelligibility as meditated by technology. In sum, Figure 3 should be read as follows: (1) activities are the unit of analysis (small circle); (2) when actors carry out activities (i.e., make sense, as signified by the black arrows) they act towards intelligibility (large circle); and (3) this process takes place with and within technology (middle circle). Each of these elements is now explained in more detail.

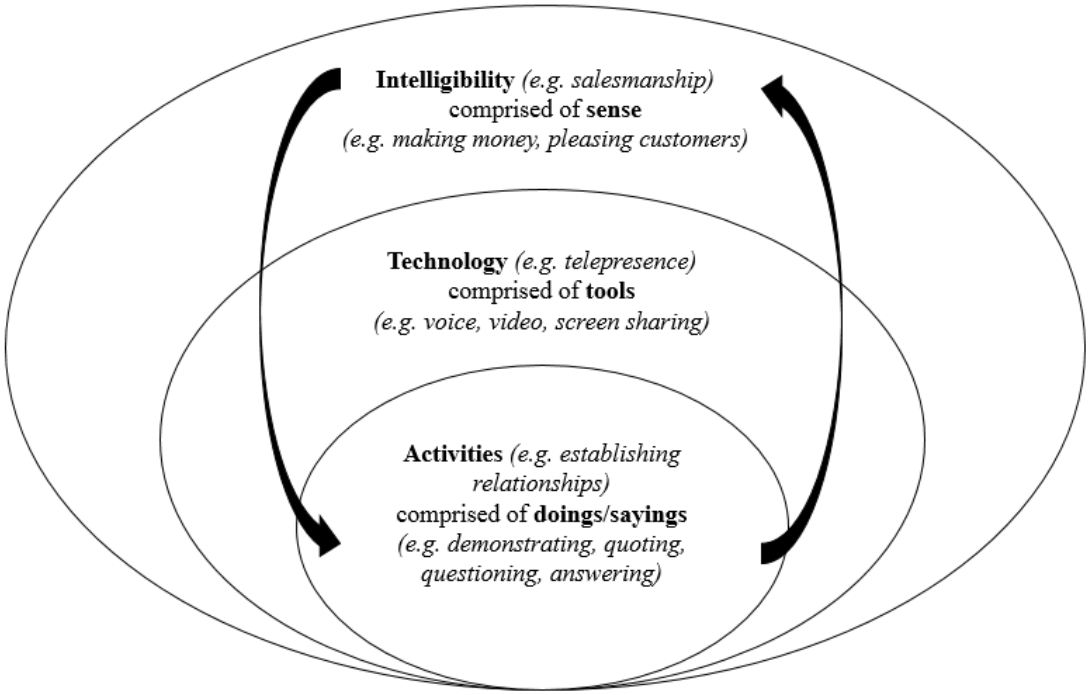


Figure 3: Applying the practice-based conception of sensemaking in Fieldsite 2 (telepresence).

First, activities (small circle) are the observable focus of, and unit of analysis for, sensemaking. In each fieldsite, an organisational practice (e.g. salesmanship) is characterised by the practitioners' key activities, which may be broken down into individual doings and sayings. For example the practice of salesmanship, through activities such as establishing customer relationships,

[10] These "tools" are akin to the "virtualising mechanisms" (Overby, 2008) mentioned in Chapter 4.

may include doings such as demonstrating, showing and questioning. Further, these doings are enabled by specific technological tools. For example, in telepresence the doing of excusing one's self from the conversation is carried out using the mute button.

Second, practitioners carry out (parts of) their key activities with or within a technology (middle circle) comprised of tools. As such, technology mediates the sensemaking loop between activities and intelligibility. Technology appears to sensemakers as either equipment or objects, depending on the type of sensemaking taking place (immanent or episodic). Namely, if the technology is employed seamlessly in the flow of action, sensemaking is immanent; if the technology "gets in the way" of the activity and must be overcome, sensemaking is episodic. For example, if sensemakers experience a conversation via telepresence as if they are in the same room, sensemaking is immanent. If there are technical problems such as audio failure, sensemaking is episodic. Of course other non-technological interruptions, such as someone arriving late to the meeting, may also incur episodic sensemaking.

Third, intelligibility (large circle) gives meaning to the activities that are carried out by sensemakers. In other words, practices signify to practitioners what makes sense to do. For example, in Fieldsite 2 I followed a group of salesmen as they carried out their practice of salesmanship, which gave intelligibility to all their activities. That is, salesmanship encapsulates the teleological ends, tasks/projects, or purposes that salesmen move from and towards as they act. This sensemaking may be experienced by the practitioners in two ways: immanently (in flow) or episodically (resolution of interruptions). Here, if an activity is unintelligible the source of interruption to sensemaking may be the content of the activity (e.g. a salesman misunderstands a customer's question) or a glitch in the technological platform (e.g. the audio drops out), as mentioned above.

5.3 Ethnography in virtual settings

Having explained how the practice-based conception of sensemaking may be applied to the virtual fieldsites, I now I discuss how ethnography (a methodology with long-standing roots in more traditional settings) was carried out in the virtual settings. Modern times present new challenges for ethnography. Miettinen et al. (2009: 11) note that "being there", the traditional hallmark of ethnographic study, has become difficult given the "increasing fragmentation, complexity, mobility, pace, and technological intermediation of organizational life". Indeed, some scholars have already modified ethnography to account for such challenges, referring to these new methods as virtual

ethnography (Boellstorff, 2008; Hine, 2000, 2005), digital ethnography (Masten & Plowman, 2003), cyber-ethnography (Ward, 1999), and netnography (Kozinets, 2010, 2012). Kozinets (2015: 1) defines virtual ethnography (netnography) as "a specific approach to conducting ethnography on the internet. It is a qualitative, interpretive research methodology that adapts traditional ethnographic techniques to the study of social media" and other online platforms. Virtual ethnography is distinct from traditional ethnography is various ways. For example, the ethnographer usually conducts all data collection via the internet without the need to engage with participants face-to-face. However, my fieldsites demanded that I conduct data collection in a combination of traditional and virtual settings. As such, I developed a hybrid traditional-virtual ethnographic approach. In doing so I encountered various methodological and ethical issues, as discussed below.

5.3.1 Methodological issues

The hybrid traditional-virtual ethnography presented a range of methodological issues. First, I needed to decide on the degree to which I should conduct the ethnography virtually. Kozinets (2010) suggests that deciding whether a pure virtual ethnography is appropriate or not depends on the type of fieldsite(s) under study. Namely, online communities (which exist mostly online) should have a primarily netnographic focus, whereas in communities online (which exist mostly offline but with online components) virtual ethnography should play a supporting role (Kozinets, 2010: 65). In my study, there were a mixture of communities online (Fieldsites 1 and 2) and online communities (Fieldsite 3), and therefore a hybrid approach was required. Fieldsite 1 was a more traditional ethnography as I was physically embedded in the organisation, but I was engaged in online activities in Yammer and other technologies. Similarly in Fieldsite 2 I travelled into the physical Vitec headquarters to conduct my interviews and observations. However, once there, much of the interaction was via telepresence, so virtual ethnographic techniques came to the fore. Fieldsite 3 was a purely virtual ethnography; all interaction and data collection (apart from two face-to-face interviews) was carried out virtually in SL (and other platforms such as Skype and Facebook).This decision to employ a combination of traditional and virtual ethnography, which I call a hybrid-traditional ethnography, is supported in the literature. For example, Murthy (2008: 849) says that multimodal ethnography provides more compressive accounts of reality "especially with the inclusion of conflictual or ambiguous data from social networking sites, anonymous chat rooms, and blogs". Moreover, Gershon (2011: 1005) argues that interviewing and observing participants both on and off the internet enables researchers to "place internet use in larger social contexts and provide them with necessary data to counter over-arching myths".

Second, the experience and handling of time and space during the hybrid-traditional ethnography was particularly interesting and challenging. From a temporal perspective, the virtual settings enabled a combination of synchronous and asynchronous interaction and I collected both real-time and retrospective data. In Fieldsite 1, I participated in real-time Yammer threads as well as collected archived group discussions. Paechter (2013: 12) says there can be discrepancies between "archival reading" of posts/threads and the "real time experience of being a member of the community". Because I was personally involved in many threads, I was able to use my experience of the community to make credible interpretations. I also asked interviewees to recount their experience of particular threads to help inform my interpretation of the data. In Fieldsite 2, data collection took place in real-time and I was able to video record some interviews and meetings. Fieldsite 3 was a temporally complex fieldsite. Notably, time zone differences between members of the international educators' community were a constant challenge (e.g. I attended the initial conference while in Australia and found myself awake at all hours of the day and night). The rest of the SL data was collected during a three month placement in Texas, USA. As SL runs on Pacific Standard Time (PST), it was much easier to participate while in the Central Standard Time (CST) zone. Most participants in the community were American and adjusted to the time zone differences quite easily. Others in Europe and the UK had more difficulty.

In spatial terms, ethnographers have traditionally defined the boundaries of their studies by placing physical parameters on the group of interest, but this cannot be achieved in virtual settings (Hine, 2000: 64). As such, my fieldsites boundaries were largely defined by the practices of participants, which spanned across virtual and physical spaces as the study unfolded. For example, Fieldsite 1 included attending physical meetings with G&P practitioners as well as participating in other activities via the intranet, email and instant messaging. In Fieldsite 2 data collection was largely restricted to telepresence interactions. However, interviewees were asked to consider how telepresence worked in conjunction with other technologies and face-to-face interactions. I also observed participants moving between virtual platforms in the sales meetings and asked about the various physical places from which they participated. In Fieldsite 3, participation in the educators' community groups led me to many virtual places within and outside SL, such as Facebook groups and Google Plus circles. Overall, the fieldsite boundaries were not limited to the physical or virtual settings in which the investigations began; the boundaries of the sites were defined by the activities associated with the practice.

5.3.2 Ethical considerations

Ethnographic approaches to data collection present various ethical challenges which may become further complicated in virtual settings. General ethical considerations that apply to this study include gaining informed consent from participants, avoiding harm in collecting data (in this study mainly social/psychological harm), ensuring confidentiality of data, and doing justice to participants in analysing data (Flick, 2006: 44-45). Applying these ethical guidelines in virtual settings presented further ethical challenges. As Paechter (2013: 14) says "we need to rethink some of our practices and their meaning as we take them into online areas", a sentiment echoed by seminal authors in the field of virtual ethnography field including Hine (2000, 2005) and Kozinets (2010). I now consider three of the most pertinent ethical issues associated with data collection in my study and outline strategies I employed to minimise risk.

First, unlike in traditional ethnography, much virtual ethnographic data "is not given specifically, in confidence, to the researcher" (Kozinets, 2010: 143). As such, consent in virtual settings may not be explicit; that is, the researcher may only be able to gain implied consent by way of an online "accept" button instead of a hand-signed form. While informed consent should be obtained where it is practically possible, some online data may not require consent because it is classed as public information (e.g. archived messages on a public blog or statistics relating to hits on a website). In my research, it was unfeasible to attempt to gain consent from every one of the hundreds of participants I came into contact with both online and offline. As such, I obtained gatekeeper consent from organisational leaders to collect participant observation data. In Fieldsites 1 and 2 the gatekeeper was a line manager, and in Fieldsite 3 the gatekeepers were administrators of the online groups. For interviews, however, I obtained written consent from each participant. It must be noted that in Fieldsite 3 (SL), though most participants seemed to reveal their true identities, it was impossible to verify if the person I gained consent from was the same person in "real life" (Madge & O'Connor, 2002).

Second, there are important considerations when deciding whether to name individuals and organisations by their real and/or online pseudonyms. In my study, some individuals and organisations wished to remain anonymous, while others were happy to receive any publicity that might result in being included in a published work. For consistency, I decided to keep all individuals and organisations anonymous. In online settings, direct quotes and pseudonyms are easily searchable in most communities, which makes providing participants' anonymity even more difficult. As such I replaced all real names and online pseudonyms with aliases. In her study of an

online divorce support community, Paechter (2013) goes further to ensure participants' anonymity by using two different aliases when the same person posts twice. This helps prevent anyone who might search the online content from "joining the dots" between posts and people in order to figure out the identity of a participant. Paechter (2013) also says she "will not connect interview data in any way with individual postings" (Paechter, 2013: 11). Paechter (2013) acknowledges that such an approach may hinder the research, but says it is necessary because the divorce support community site contains highly personal information. In my research, which mainly involves professional rather than personal communities, I decided not to take these extra measures suggested by Paechter (2013). It was important for me to be able to profile the key informants in my research, which is expressly achieved through corroborating what people say they do (in interviews) with what they actually do in practice (as evidenced in participant observation).

Finally, Hine (2000) says that lurking (being in a virtual environment unbeknownst to other people in that environment) is a key issue. For example, researchers can lurk in an online forum by watching others' interactions unfold but not participating. Some scholars argue that lurking is a valid way to conduct virtual ethnography because the researcher has less impact on the site under investigation. However in these studies, unlike my study, emphasis is on observation rather than participation, which constitutes passive virtual ethnography (Freidenberg, 2011). As an active participant in the field, I took every practicable measure to conduct my research as transparently as possible. For example, I was always forthcoming with my intentions as a researcher including what kind of data I was collecting and what I would do with it. In Fieldsites 1 and 2 lurking was a minor concern because people usually met me in person before interacting with me online either on Yammer (where I used my full name and profile picture) and telepresence (where they could see my face and body). To avoid lurking in SL (Fieldsite 3), while I used an alias (Sadie Juan Eighty) for my avatar, my real name, project description, and contact details appeared in my profile. Also, at the start of meetings, I introduced myself with my actual name and stated my status as a PhD student/researcher.

5.4 Data collection

Having described the methodological and ethical issues that arose from my hybrid traditional-virtual ethnographic approach and how they were resolved, I now describe specific methods by which data was collected in each fieldsite. I begin by emphasising two points. First, I was able to capture sensemaking as it happened in real-time in the field. Second, I was able to generate and collect enormous amounts of data within the empirical fieldsites. I then provide more

detailed accounts of the two principal data collection methods, participant observation and interviews, and discuss how they were informed by the theoretical framework. I also address further issues associated with each data collection method and how they were overcome.

Ethnography is principally about "being there" (Miettinen et al., 2009: 11). Being there enables the researcher to experience and capture the phenomenon under investigation *in situ*; that is, when and where it occurs. This approach to data collection is unique to the ethnographic methodology; in many other approaches (such as EM and case study) much of the data is collected in retrospect. For example, EM often involves obtaining and performing conversation analysis on naturalistic data (e.g. written and verbal texts) that were created independent of the researcher prior to them entering the field. As well, data used in case studies are often existing organisational documents such as strategy or policy documents (though this is often substituted with real-time interviews). In contrast, the main data for this study were generated in real-time by (or in conjunction with) the researcher. For example, in Fieldsite 1 I made real-time contributions to Yammer threads that I was then able to download, save and print from the Yammer platform. Other real-time data captured in the field include extensive fieldnotes, videos, audio recording, photos and screenshots of the technology systems. As shown in Table 3, this data was supplemented by interviews (explored later) and retrospective data in the form of organisational documents, such as social media and IT policies.

Data source	**Fieldsite 1 (Yammer)**	**Fieldsite 2 (Telepresence)**	**Fieldsite 3 (Second Life)**
Interviews	10 informants (11.25 hrs)	10 informants (10.5 hrs)	10 informants (11.5 hrs)
Audio recordings	5 recordings	9 recordings	NA
Video recordings	2 recordings	6 recordings	26 in-world recordings
Chat transcripts	39 Yammer threads	NA	52 instant/nearby chat threads
Photos/screenshots	12 photos, 39 screenshots	37 photos	201 screenshots
Fieldnotes	110 pages	34 pages	71 pages
Organisational documents	27 documents	7 documents	5 documents

Table 3: Summary of collected data.

I spent a total of approximately eight months in the field collecting ethnographic data. In doing so, I loosely followed Spradley's (1980, as cited by Flick, 2006: 220) three phases of participant observation: descriptive observation (non-specific description), focused observation (narrowing of essential information), and selective observation (finding of further evidence). Further, three types of data were collected: archival data – copies of pre-existing communication

that I was not involved in generating (e.g. "about" pages, project documents, old threads), elicited data – data which I as the researcher co-created with community members through personal and communal interaction (e.g. text chat transcripts, screen shots, videos of meetings), and fieldnote data – my own observations of the community and reflection on my own membership to the community (e.g. research diary) (Kozinets, 2010). As reflected in Table 3, this approach enabled me to collect various and large amounts of data; this had a triangulation effect that helped me to better understand the phenomenon (Fetterman, 1989 as cited by Alvesson & Skoldberg, 2009). On the other hand, having to be there to collect all this data was time consuming and it was difficult to know in advance when and where the best empirical data would be generated. To help overcome this, I asked interviewees for tips about upcoming events that might be particularly relevant to my study. Now I provide a more detailed account of the key data collection activities: participant observation and interviews.

5.4.1 Participant observation

Participant observation was the principal data collection method used in this study. Miettinen et al., (2009: 1315) note that "the organisational ethnographer is … likely to slide along the continuum from full participation to 'pure' observation, and back, as she moves from the situationally-appropriate role adopted for the purpose of 'being there' to the more scientific-observer role adopted for interviewing". Indeed, the data I collected reflects this approach. For example, the audio and video recordings capture my active participation in the activities of the participants, while my fieldnotes capture my observations and reflections following the activity. I kept my university-issued laboratory notebook with me at all times during the ethnography and ensured all entries, both short notes and long reflective pieces, were accompanied by the date and time of noting. Generation of this participation observation data was informed by the practice-based theoretical framework. Namely, I documented specific activities as they were carried out by practitioners in the organisational settings; I did this in both virtual and non-virtual contexts so that I could gain a holistic understanding of the practice. Further, my understanding of the key activities of the practitioners was developed iteratively throughout data collection; that is, I did not go looking for predetermined key activities in the data – the data indicated to me what activities were important to the practice at hand.

When participating in these key activities, my aim was to gain deep insight into the lived experience of participants in each fieldsite (Kozinets, 2010) (e.g. what it is like to be a salesperson). Moreover, "participation (was) active and visible to other community members" (Kozinets, 2010:

96, parentheses added). As much as possible I was "one of the team" in order to experience firsthand the thoughts and actions required to accomplish activities. As well, participant observation followed a natural progression of increasing involvement and engagement. For example in Fieldsite 1, as my time and commitment increased in Yammer, participation moved from posting comments, learning norms and asking questions, to gaining a sense of community membership, reflecting feedback, getting involved in projects, and even taking leadership roles (Kozinets, 2010: 97). Similarly in Fieldsite 3 (SL), over the course of the ethnography I progressed from being a "newbie" to being asked to speak at in-world events. As such, in each fieldsite I initially adopted an outsider position with the goal of becoming an insider over the course of the ethnography to generate "richer, thicker descriptions that are more likely to reflect the 'actual' community" (Paechter, 2013: 5).

This combination of insider/outsider positions, often held concurrently, presented challenges in my research. In Fieldsite 1 it took time to develop trust with participants who were concerned about being identified in the report I was to supply to management at the conclusion of my research. I overcame this hurdle by ensuring anonymity of participants and building personal rapport with each of them. Indeed, over the three months spent at Finsure I came to be considered "one of us", as one G&P team member put it. I began my work in Fieldsite 2 as an outsider in that I had no experience in technology sales or with the telepresence platform. I thus had to build rapport quickly with participants before or at the beginning of interviews, which I achieved by interacting with them in the lunch room or in hallways between appointments (where possible). My observations gave me further insight into the practices of the salesmen, but I remained somewhat an outsider for the duration of data collection because I could not participate directly in the sales practice (for customer confidentiality reasons). Conversely, in Fieldsite 3, owing to there being other researchers and university-level educators in the group, I was able to quickly adopt an insider position. I found the cohort to be very welcoming and interested in my research, and group leaders were generally quick to give their consent for me to participate in their events.

Finally, ethnographic data is not merely collected, it is generated. That is, as mentioned previously, ethnographers co-construct the data (observations, interviews, etc.) that become the subject of analysis. This presents methodological issues because "direct observation does not produce data on what is actually occurring but involves interpretations, inferences, and narrations about what is occurring" (Sandberg & Pinnington, 2009: 1150). So that accounts of practice may be generated and interpreted authentically, a reflexive approach may be taken. In their ethnographic

investigation of professional competence, Sandberg & Pinnington (2009) suggest using a combination of observations and interviews to build a cohesive picture of the practice under investigation, which was my precise approach. To achieve further reflexivity I also collected various other contextual data (e.g. chatting causally with research participants and collecting organisational documentation), which informed by interpretations.

5.4.2 Interviews

During and following participant observation, I conducted interviews with practitioners in each fieldsite. This is a common tactic of ethnographers to build rapport with participants, clarify their understanding of their observations in the field, and gain insight into aspects of practice that may not have been evident in participant observation data (Sandberg & Pinnington, 2009). Ten people from each fieldsite were selected as key informants. These informants were people with whom I developed strong professional relationships during the ethnography and/or those whose interviews were particularly insightful. Interviewees were selected using a theoretical sampling method in which "decisions about choosing and putting together empirical material … are made in the process of collecting and interpreting data" (Flick, 2006: 125). This is consistent with the iterative approach of the study. Where possible, the sample of interviewees included a range of sex, age, occupation, race and other demographic characteristics.[11] Interviews were conducted offline (face-to-face) and online (Skype, telepresence and SL) and all of them were recorded (audio, video or both) and transcribed by me. Interviews ranged from between 40 minutes and two hours and some interviewees were interviewed more than once.

There are many types of interviews in qualitative research, from open-ended, "focused" interviews (in which interviewees' unguided reactions to stimuli are recorded) to the more structured, "semi-standardised" interview (in which the subject of investigation is gently suggested by the interviewer and followed up with theory-driven questions) (Flick, 2006). My interview method was guided by both the ethnographic methodology and the practice-based theoretical framework. Namely, I began with the basic concept of an ethnographic interview, which is typically employed alongside or as part of participant observation, and modified it to meet the specific needs of my research topic. As suggested by Flick (2006), my interviews followed the following basic

[11] This was not possible in Fieldsite 2 (telepresence) in which all participants were white, middle-aged men (which is typical of the IT industry). Also the actual identities of participants in Fieldsite 3 (SL) could not be known for sure.

structure. I began with a specific request to hold an interview and gained informed consent from the interviewee. I then provided the interviewee with an introduction to the research project and explained the types of questions I intended to ask (i.e. semi-structured) and how they should respond (i.e. open-ended, self-guided responses). As the interviews progressed I probed further into interviewees' account of their practice in the virtual setting by, for example, asking them to describe in detail what they thought or felt before, during and after a particular activity. In Appendix A I provide an example of my "interview guide" (Flick, 2006), which includes some introductory bullet points and a set of sample questions that reflect my intention to move from broad, general descriptions of the practice to more specific examples of how particular activities are carried out virtually.

Alvesson (2003) articulates a number of issues that may arise in such qualitative interviews, two of which have particular relevance to my study. First, interviewees often establish and perpetuate their own assumptions about the research within the interview "in order to be cooperative and competent" (Alvesson, 2003: 19). This can result in the interviewee answering questions in a particular way according to their own idea of what the research is about, which may not reflect the actual intent of the researcher in asking the questions. For example, in Fieldsite 1 (Yammer) I found that interviewees generally tended to talk about the objective features of Yammer as a platform, rather than about their own personal experiences with it. There was a further tendency of interviewees to over-emphasise the benefits of Yammer (especially in the communications sub-team). This reflected their assumption that I was spending time in their team to make an assessment of the usefulness and viability of Yammer in the organisation. As this trend emerged in the interviews, I adjusted my interview introduction to explicitly state I was not there to assess whether Yammer was "good" or "bad", just to understand how it was used in everyday practice. Despite this, interviewees would gravitate back to listing the features of Yammer, and I would gently guide them back to the research focus by asking them to give specific examples of how they had used Yammer to carry out a particular activity. Also, to curb bias, I maintained reflexive awareness of my own and others' views and deliberately sought out interviewees who could provide different perspectives.

Second, interviewees partake in impression management; that is, they engage in "moral storytelling" and "promotion activities" which may cause them to hold back on some issues so as not to break taboos (Alvesson, 2003: 21). On the other hand, interviewees' (often unconscious) inclination to preserve an impression of themselves or their organisation may cause them to inflate

aspects of their practice. For example in Fieldsite 2 (telepresence), all the interviewees were salesmen and thus were overt advocates of telepresence. As such, almost all of their accounts of using telepresence were told in a positive light. They often emphasised the ways in which the technology made work more efficient, as if I were a customer looking to purchase this technology. As such, I expressly asked interviewees at the start of the interview to set aside their sales pitches and just talk to me about their own experience of the technology. I also discussed the types of biases salesmen have about telepresence directly with the manager (gatekeeper).

Finally, my interviews were shaped and informed by the practice-based theoretical framework for the study. Namely, a practice perspective sees interviewing as a mode of knowledge production in itself (Alvesson, 2003: 13); that is, a form of collective sensemaking. As such, I embraced the notion that I (the interviewer) was involved in co-constructing the activity of the interview, the content of which would become data for analysis. As such, in collecting and analysing interview data I adopted a general reflexive stance. Alvesson (2003: 25) says "reflexivity for me stands for conscious and consistent efforts to view the subject matter from different angles and to avoid or strongly privilege a single, favored angle and vocabulary". In conducting my interviews, reflexivity involved ensuring that I refrained from imposing my own biases and agenda on to the interviewees. Instead, I allowed each interviewee to freely discuss issues and events that they thought were relevant while, with the theoretical framework in mind, gently guiding them back to the research topic if the conversation strayed. As we will see, this reflexive approach was carried into the data analysis phase which I describe in the next section.

In sum, data collection was informed by both the ethnographic methodology and the theoretical framework. First, the principal mode of data collection was participant observation, a hallmark of ethnography, which involved generating and gathering data from many different sources in real-time, such as videos, photos, audio recordings and fieldnotes. This was complemented by interviews conducted with 10 key informants from each fieldsite. The interview questions were guided by my research question with an emphasis on how practitioners accomplished activities in, and therefore made sense of, their practice in the virtual setting. I also referred interviewees to specific activities as they took place in the virtual setting and asked them to reflect on what they were doing, thinking and feeling at the time. As a participant in data generation and collection, I reflexively embraced my role in co-constructing the data within the fieldsite. Throughout, I identified and addressed issues associated with collecting data in the virtual setting.

5.5 Data analysis

Following data collection, I was immersed in the data and engaged in the analysis process for approximately 12 months. There are two basic approaches to analysing qualitative data: (1) coding the material has the aim of categorising and/or theory development and (2) sequential analysis of text aims to reconstruct the structures of the text and of the case (Flick, 2006: 296). Following the former approach, the aim of this study is to articulate a theoretical account of sensemaking in virtual settings using "progressive iterative focusing techniques" (Paechter, 2012: 2). My specific approach, however, was not purely iterative; it involved a dialogue between theory and data called "abstraction" (Timmermans & Tavory, 2012). To abstract a theoretical account of sensemaking in virtual settings from (in conjunction with) the data, I initially employed theoretical coding techniques whereby concepts and categories emerged from the data (Miles & Huberman, 1994). By this approach, I arrived at five sensemaking dimensions, which were then analysed to identify relations within and between the fieldsites. During this process, theory (in this case the practice-based theoretical framework) was constantly consulted to sensitise me to specific, relevant concepts, namely materiality, embodiment and ongoing accomplishment. Now I explain this data analysis process in detail beginning with the narrowing of the large dataset to a more manageable size.

5.5.1 Working with the data

My ethnographic field work generated an enormous amount of data, which was all the more daunting because the research problem was open-ended (Eisenhardt & Graebner, 1989: 540). That is, while I had a theoretical framework to guide me, I did not go in to data analysis with preconceived ideas about the results I would obtain from the study. To reduce the data set to a manageable size, I used the theoretical framework. To explain, the framework says sensemaking takes place through accomplishment of practical activities which, in this study, are carried out with and/or within a particular technology. As such, I set about identifying accounts in the participant observation data that were representative of the key activities of the practitioners as they were carried out virtually[12]. For example, in Fieldsite 1 I searched for Yammer threads in which I could

[12] The key activities of practitioners in each fieldsite were touched in section 5.1 and will be explained in detail in each of the findings chapters (6 to 8).

clearly see the key activity of ‘engaging stakeholders’ unfolding. As another example, in Fieldsite 3 I searched for videos that captured SL educators carrying out the key activity of ‘playing’. These empirical accounts of key activities became the new, reduced dataset; that is, I chose one empirical account to exemplify each key activity of practitioners in each fieldsite.

5.5.2 Analysing the data

I now describe the steps I took to analyse the above-mentioned accounts. In doing so, I adopt Miles and Huberman’s (1994, as cited by Kozinets, 2010: 119) six stage qualitative analytic process which is carried out in a circular, iterative manner (rather than a linear order). The below description is a high level overview of the process of data analysis as conducted across all three fieldsites. How data was handled specifically in each fieldsite is explained in Chapters 6 to 8.

First, “coding” involves inductively affixing categories to data to draw out an initial, loose reading of the data. In my dataset this involved identifying instances of both immanent and episodic sensemaking within the accounts of key activities. I was able to see episodic sensemaking where there were obvious (and subtle) interruptions to the activity at hand. Namely, when it became apparent that a practitioner was confused about something, I zoomed in on that part of the account to determine what caused the interruption and how it was resolved. In doing so, I identified the specific features of the enabling technology (Yammer, telepresence, SL) that were the disruptors and/or means of repairing sense. For example, in Fieldsite 2 (telepresence) glitches with the audio/video technology sometimes caused breakdowns, while being able to add someone to a video meeting (e.g. to answer a question) contributed to resolving interruptions. Immanent sensemaking was more difficult to identify owing to its ongoing, subliminal nature. To identify this type of sensemaking in the accounts I asked myself, “What else is going on here?” In doing so, I was able to identify aspects of the activity that seemed to be taken for granted by participants (including myself). In other words, I thought about all the actions that I and others were taking without thinking about them. For example, in Fieldsite 1 (Yammer) I noted that, although easily overlooked, the act of “showing up” via a profile picture is critical to being able to accomplish activities in Yammer.

Second, "noting" involves reflecting on the data or 'memoing', which involves documenting "impressions, associations, questions, ideas, and so on" (Flick, 2006: 279). In my study, as I coded the accounts for instances of immanent and episodic sensemaking, I made general notes about how the activities were being carried out with and within the technology. Namely, I identified the specific tools that enabled particular activities to be carried out virtually. Here I considered how the presence of the technology changed the way the activity would otherwise have been carried out had it taken place in a more traditional setting. Table 4 is an example of the type of noting I carried out in Fieldsite 1 (Yammer).This is a simplified version of the more complex analysis which is reflected in the presentation of findings in Chapters 6 to 8. In this noting stage I began to formulate categories, namely dimensions of sensemaking in virtual settings, which became the focus of the next stage of analysis.

Sensemaking (immanent or episodic)	**How carried our virtually (virtual sensemaking tools)**	**Notes**
Congratulating a colleague (immanent)	- Write a message in a group - @mention the target person to get their attention	- This is a very public way to express congratulations - In traditional setting would probably just say in person, which is more private
Asking for more information about an issue (episodic)	- Asks the follow up question using 'in reply to'	- Using 'in reply to' ensures continuity of the topic (i.e. the question doesn't get mixed up in other posts) - In traditional setting, could look at person to direct the follow up comments to a particular person
Proposing an idea (immanent or episodic)	- Uploads a prepared document to a group - @mentions people with particular interest/influence	- This approach limits the discussion to the most relevant people who may attend to it at their leisure - In traditional setting, would call a meeting or bring it up at a group meeting in which people may be put 'on the spot'

Table 4: Example of noting activities during data analysis.

Third, "abstracting and comparing" involves sorting and sifting materials to identify similar phrases, shared sequences, relationships and differences, as well as a comparison of the abstracted data. I achieved this by confronting the data with "basic questions" including what, who, where, when, and how (Flick, 2006: 300). As shown in Table 5, during this process I developed guiding questions to further open up the data.

Category	Guiding questions
What	What do people make sense of in the virtual setting? What matters in sensemaking? How are things or concepts, which are the focus of activities and sensemaking, represented in virtual settings?
Who	Who are the people that make sense of key activities in the virtual setting? How do people 'show up' for sensemaking in the virtual setting?
Where	Where does sensemaking, in carrying out key activities, take place in the virtual setting? In what spaces/places do people participate in sensemaking in virtual settings?
When	When does sensemaking, in carrying out key activities, take place in the virtual setting? What order/disorder is there to sensemaking in the virtual setting?
How	How, by what skills, do people make sense of key activities in the virtual setting? What form do these skills take? How are they represented in the virtual setting?

Table 5: Process of developing guiding questions for data analysis.

Through various rounds of abstraction within and across the three fieldsites, I arrived at the following dimensions of sensemaking in virtual settings: matter (the 'stuff' of sensemaking, material things that are implicated in sensemaking); presence (who sensemakers are and how they show up for sensemaking); place (where sensemaking takes place, both virtually and physically, and how sensemakers occupy these places); time (when and in what order sensemaking takes place); and appropriation (how practitioners use and master the technology that enables their sensemaking). These dimensions were influenced by the sensitising concepts from the theoretical framework. For example, my interpretation of the "what" of sensemaking was influenced by the materiality concept, and my interpretation of the "who" of sensemaking was influenced by embodiment.

Not only did my theoretical framework inform my abstraction process; the data pushed back on the framework, enabling me to refine it along the way. For example, the data "bit back" (Schatzki 1996) at the categories that emerged from the five crude questions (what, who, where, when, and how) before I arrived at the final dimensions of sensemaking in virtual settings. Also, the framework led me to broaden my understanding of immanent sensemaking from sense made in-between episodes to include that which occurs in the background or in parallel with episodic sensemaking. As well, I tweaked the theoretical framework to accommodate my evolving understanding of the relationship between activities (comprised of doings), intelligibility (comprised of sense), and the technology (comprised of tools) in relation to sensemaking. For example, I experimented with the form and shape of Figure 3 (e.g. circles, blocks, process

diagrams) to best represent the intra-action between activities and intelligibility (i.e. sensemaking) as mediated by technology.

Also within the abstracting and comparing phase of data analysis, I established ways in which sensemaking was enabled and constrained by the virtual settings. To do this I made comparisons between my emerging understanding of sensemaking in virtual settings and traditional notions of sensemaking. For example, telepresence enables sensemakers to express emotions through voice and video, but in Yammer sensemakers' emotions are constrained to keyboard symbols (emoticons). Both these means of expression challenge traditional notions of sensemaking in which interaction is relatively unmediated (i.e. face-to-face). As such, I was further able to articulate how sensemaking is altogether altered by the virtual setting where expression of emotion is concerned

Fourth, "checking and refinement" sees the researcher return to the field (where possible) to isolate and check understandings. In my study, this was somewhat achieved during the early stages of analysis which occurred during collection of the data. Namely, I used my fieldnotes to guide theoretical sampling of field data and interviewees throughout the extended period of time I spent in the fieldsites (from four weeks to three months). However, most of the analysis took place after data collection.

Fifth, "generalising" involves elaborating a small set of generalisations to explain consistencies in the dataset. In my study this involved overlaying my results from each fieldsite onto the virtuality continuum developed in Chapter 2. This enabled me to draw conclusions about how sensemaking takes place generally in virtual settings (across varying degrees of virtuality), and also to draw conclusions about how sensemaking takes place differently depending on the level of virtuality of the setting. By this approach, as explained in Chapter 9, I am able to answer the research question, "How does sensemaking take place in virtual settings?"

Finally, "theorising" sees the researcher confronting generalisations with a formalised body of knowledge. As per Chapter 10, this involved confronting the literature in the fields of sensemaking, organising and virtuality with my findings, and developing a practice-based account of virtual sensemaking.

Figure 4 summarises the process of data analysis, including justifying the findings which I address now.

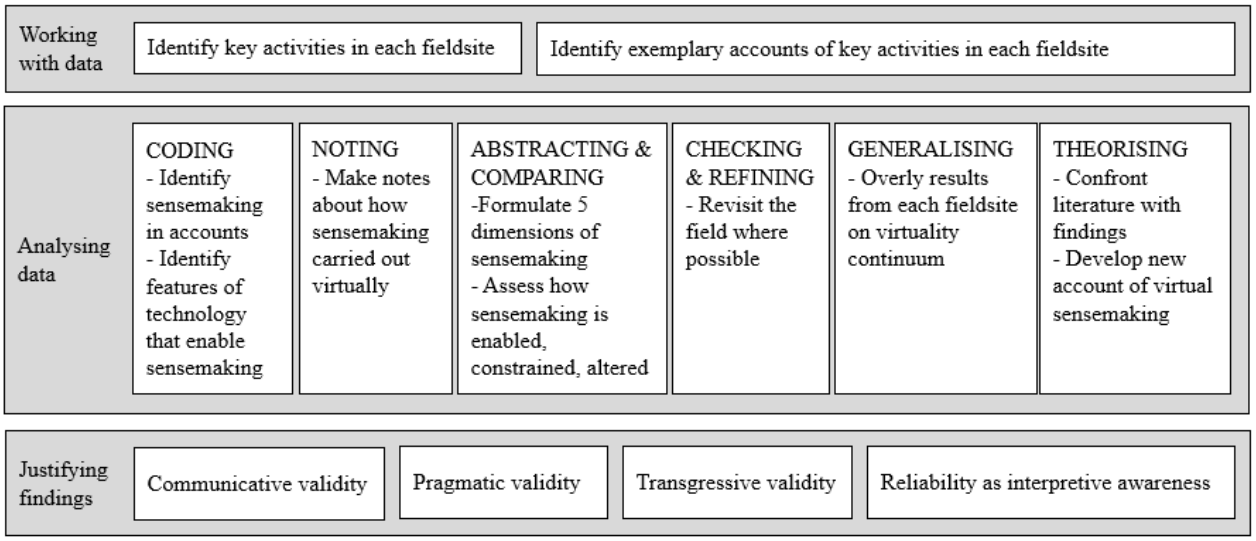


Figure 4: Summary of data analysis process.

5.5.3 Justifying qualitative claims

As mentioned earlier, reflexivity was adopted in my ethnographic approach to both data collection and analysis; such an approach (along with guidance from the theoretical framework) helps me to justify the claims made in the results chapters of this thesis. While ethnography indeed "gives scope to the researcher's person and allows for a flexible stance in relation to the data" (Alvesson & Skoldberg, 2009: 86), there are also risks to this fairly unstructured approach. These risks include imposing the theory too heavily on the data so as to make it fit or, conversely, discarding a theory prematurely because the data does not agree with it. Alvesson and Skoldberg (2009) further warn that there are various risks to ethnographic data analysis, specifically inductive analysis. Namely, it is somewhat naïve to think that findings may "emerge" from the data, i.e., data do not simply "appear" to the researcher who has apparently no preconceived ideas about what they may find. Conversely, my research acknowledges the dual role of data *and* theory in producing findings and, further, in the reflexive, dual role of the researcher as subjective participant and objective observer. As Kozinets (2010: 97) says, the virtual ethnographer "will try to balance the reflexive, autobiographical, subjective mode of the engaged cultural participant with the objectifying precision of the scientific observer".

As discussed in Chapter 4, interpretative approaches to research that employ iterative methods aim to investigate social phenomena (such as sensemaking) that are not accessible through traditional objective methods. This poses a dilemma in the analysis of the data in my study, as

summarised by Sandberg (2005:45): "at the same time advocates of interpretive research deny the possibility of producing objective knowledge, they want to claim that the knowledge they generate is true in some way or another". In this thesis, I seek to make true or trustworthy (valid and reliable) claims about how sensemaking takes place in virtual settings. In qualitative research traditionally, validity refers to the "question of whether researchers actually see what they think they see" (Flick, 2006: 371). In ethnographic research more specifically, reliability refers to "the quality of recording and documenting data" (Flick, 2006: 369) and the consistency with which it is interpreted. Justifying research in these ways is notoriously difficult to do because the concepts of validity and reliability themselves (which emphasise objectivity and universality of truth claims) are paradigmatically opposed to interpretative research (such as mine). In the face of this dilemma, I selected Sandberg's (2005) four-pillar framework for justifying knowledge produced within interpretative approaches because it comprehensively addresses the previous criticisms of justifying qualitative research.

First, "communicative validity" involves establishing a community of interpretation between me (the researcher) and participants to justify coherence of interpretation of the topic. This was achieved by getting to know the participants in context, becoming "one of them", and partaking in a shared discourse about the activities being undertaken. For example, I built rapport with informants prior to and during interviews/participation. I also sought feedback on my interpretations by providing a report to the host organisation in Fieldsites 1 and 2, and presenting preliminary findings of my research at in-world events in Fieldsite 3. I also discussed my preliminary findings that emerged during data collection with research participants.

Second, "pragmatic validity" involves recognising inconsistencies between what people do and what people say they do. This was achieved by triangulating participant observation data with interview and other data. For example, in interviews I directly asked people what they thought and felt as they carried out activities that I observed in the field; that is, I asked them about their experience of making posts in Yammer, making comments in telepresence, or moving around in SL. Also, by working with the same people over extended periods of time, I was able to observe consistencies and inconsistencies in participants' behaviours (and explanations of their behaviours) across activities and contexts. As well, owing to my extended immersion in each fieldsite, I was able to ask people to show me (point to people, things and places) that they referred to in their accounts of activities (e.g. pointing to a thread post in Yammer, demonstrating how to position a camera in telepresence, or showing me through a building in SL).

Third, "transgressive validity" involves recognising ambiguity, complexity and multiplicity of meaning in the data, and how taken-for-granted assumptions influence interpretations. This was achieved by actively challenging the consistencies that arose in the data and considering alternative readings of the data from different perspectives. For example, in all three fieldsites I challenged the prevailing sentiment that the platform in use was effective in facilitating practice. That is, I did not just consider how activities (and thus sensemaking) are enabled and improved by the technology. I also considered ways in which activities (and thus sensemaking) were undermined or constrained by the technology. Drawing out these negative aspects proved challenging in all fieldsites because the most visible and accessible participants were usually advocates of the technology. Further, gaining a comprehensive understanding of sensemaking would have been undermined if I had only documented the disorderly, interrupted activities (as in episodic sensemaking) and not smoothly executed activities (as in immanent sensemaking).

Fourth and finally, "reliability as interpretive awareness" involves validating the process by which claims of truthful interpretations are made. This was achieved by demonstrating how interpretations were controlled and checked throughout data analysis. For example, I explicitly used the practice-based theoretical framework to sensitise me to particular concepts. In parallel, I used the five crude categories (what, who, where, when and how) to open up my mind to broader interpretations. Indeed, as mentioned previously, the concepts of materiality and embodiment (from the theoretical framework) are reflected in the first two of the five dimensions of sensemaking that were abstracted form the data: matter (derived from asking what we make sense of) was informed by materiality; and presence (derived from asking who sensemakers are) was informed by embodiment. However, this sensitisation did not prevent me from being open to other pertinent dimensions that emerged in parallel. Namely, the remaining crude categories broadened the sensemaking dimensions to include: place (derived from asking where sensemaking takes place); time (derived from asking when sensemaking takes place); and appropriation (derived from asking how sensemakers negotiate the technology).

5.6 Presenting the findings

The findings for each fieldsite are presented in Chapters 6, 7 and 8. In each chapter findings are laid out in four stages, which are summarised in Figure 5.

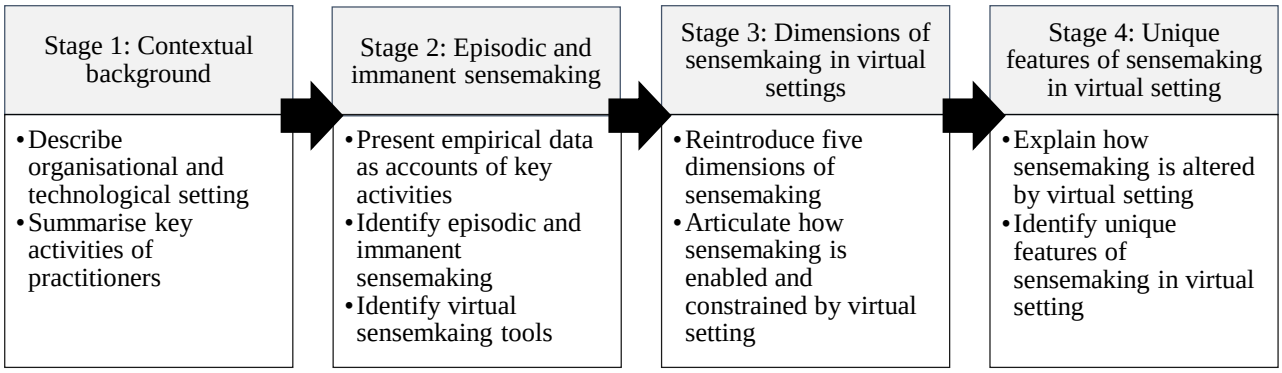


Figure 5: Summary of presentation of findings.

In Stage 1 I provide a detailed contextual background to the fieldsite, including the overall organisational setting, the main technology(s) used by participants, and the key activities that constitute their practice.

In Stage 2 data are presented in the form of accounts that exemplify the key activities of practitioners. In Fieldsite 1 (Yammer) I provide transcripts of Yammer threads that were produced by participants. In Fieldsites 2 (telepresence) and 3 (SL) I provide narrative accounts of events that typically comprise key activities. In each account, as per the theoretical framework, I articulate the intelligibility towards which actors move as they carry out key activities, as well as how these activities are broadly accomplished with and within the underlying technology. Also within each account, I illuminate instances of sensemaking (both immanent and episodic) as explained in detail below. Here I reiterate important concepts established in Chapter 4.

A practice-based conception of sensemaking posits sensemaking as being akin to ongoing accomplishment of activities; that is, immanent sensemaking. Further, the ongoing activities that comprise immanent sensemaking are themselves comprised of smaller units called doings and sayings (Schatzki, 1996) (e.g. the activity of lecturing is comprised of doings such as pacing and pointing). Put simply, (immanent) sensemaking is constituted by activities which are, in turn, constituted by doings (and sayings). In this way, sensemaking (in the immanent sense) and doings are two sides of the same coin. As such, in the findings chapters I refer to the doings that comprise immanent sensemaking as "doings of sensemaking". These doings all have the suffix "ing" to

emphasise their process orientation (e.g. the actor is stating, sharing, commenting). I use colour-coded annotations down the right hand side of each account to indicate where doings of immanent sensemaking appear in accounts.

Episodic sensemaking occurs in response to an interruption to ongoing accomplishment of activities (immanent sensemaking). In response to such interruptions, sensemakers perform "acts of sensemaking" to restore the activity at hand (e.g. if student A yells out a question while student B is speaking, the lecturer resolves the interruption by telling student A to ask their question in turn). In the findings chapters these acts of sensemaking all end in "s" to emphasise their deliberate, finite nature (e.g. the actor questions, answers, agrees). I use colour-coded annotations down the left hand side of the accounts to highlight the acts that comprise episodic sensemaking.[13] In identifying instances of immanent and episodic sensemaking (and their constitutive doings and acts respectively), I also identify the virtual sensemaking tools (such as the posting, liking and commenting tools) that enable doings/acts to be carried out in the virtual setting.

In Stage 3 of presenting the findings I reintroduce the dimensions of sensemaking in virtual settings established earlier in this chapter: matter, presence, place, time and appropriation. Here I discuss how sensemaking is both enabled and constrained by the virtual setting within each dimension.

In Stage 4 I discuss how sensemaking is altogether altered because it takes place virtually rather than in traditional settings. I conclude each findings chapter by illuminating the unique features of sensemaking as it takes place in the virtual setting. To be clear, when I identify unique features of sensemaking as it takes place in each fieldsite I mean to suggest that particular distinctive features of each "technology cluster" (e.g. social media, video-based technology, 3D virtual worlds) produce unique outcomes for sensemaking. As will be explained in more detail below, the use of the term "unique" to describe features of sensemaking as they take place virtually should not be interpreted as if these features can *only* pertain to Yammer, telepresence or SL. Rather

[13] The distinctions made between doings and acts of sensemaking are slight; that is, doings and acts may appear to be one in the same. However, differentiating them analytically helps me to more clearly illuminate both immanent and episodic sensemaking in the data.

these unique features of sensemaking are novel in comparison to how sensemaking takes place in more traditional settings.

5.7 Cross-fieldsite analysis and discussion

In Chapter 9 I bring the findings together in a cross-fieldsite analysis. Namely, I overlay the findings from each fieldsite on the virtuality continuum developed in Chapter 2. I then analyse if and how each of the unique features of sensemaking (five in each fieldsite) may be applied to the other two fieldsites. In doing so, I draw conclusions about which features of sensemaking endure across all virtual settings and which ones are specific to a particular setting. I also make inferences about how features of sensemaking change as the level of virtuality of the setting increases or decreases. In these cross-case findings I am not claiming a strict linear relationship between the virtuality of the setting and the extent to which particular sensemaking features occur. Rather, I argue that I may make reasonable claims about how the features of sensemaking may evolve or change with the level of virtuality of the setting. For example, it may be assumed that the more sophisticated the enabling technology, the more sensemakers may be immersed in, and therefore feel unified with, technology. By this approach, I aim to make high level, general claims that help synthesise the complex findings into an account of virtual sensemaking that is practicable for use in future research (presented and discussed in Chapter 10).

In making the cross-case comparison and articulating an account of virtual sensemaking, I acknowledge several, more specific issues regarding of the generalisability of the findings. First, because each fieldsite is confined to one technological platform, I accept that the fieldsites (Yammer, telepresence and SL) cannot definitively represent the full spectrum of technologies (on the virtuality continuum or in practice). However, these fieldsites *do* share characteristics with other platforms within their technology clusters (social media, video-based technologies and 3D virtual worlds). For example, in Yammer (as in almost all social media platforms) users have a profile picture. How being represented by a photo impacts sensemaking will therefore be largely uniform across social media technologies. As such, the findings are somewhat generalisable beyond the specific fieldsites in which the research was conducted. Further my research does not ignore, but rather extends, existing research that illuminates distinctive features/functions of virtual technologies within the relevant clusters (e.g. Riemer, Scifleet & Reddig's (2012) previous work investigating Yammer). Namely, I illuminate the *implications* of distinctive features/functions of technologies specifically for *sensemaking* as it takes place virtually.

Second, the types of activities undertaken by practitioners in each fieldsite are not representative of all organisational practices (in different organisations, industries, countries, etc.). As such, my findings about how sensemaking takes place virtually are not definitively applicable to all virtual activities in all contexts. However, as shown in the findings, many activities undertaken by practitioners in the fieldsites are common-place in organisations generally. For example, presenting slides, having a meeting, and discussing options are common to almost all organisational settings. As such, I can reasonably make some claims about how activities are accomplished, and therefore how sense is made, across the three fieldsites and in virtual organisational settings generally.

5.8 Chapter summary

In this chapter I have outlined the methodology by which I investigated the research question, "How does sensemaking, as the basis of organising, take place in virtual settings?" I first showed how the three fieldsites were selected and introduced a hybrid traditional-virtual ethnography as the methodological approach for collecting and analysing data. I explained the ontological alignment of ethnography with the practice-based theoretical framework and addressed relevant methodological and ethical issues. Thereafter, I described the key data collection methods in detail (participant observation and interviews) and addressed issues arising from them. I then outlined the data analysis approach and how I am able to justify my interpretation of data by establishing qualitative validity and reliability. Finally, I described how I will present the findings and cross-case analysis. In the next chapter I provide the results for Fieldsite 1 (Yammer) following the above-described process. I repeat this process in Chapters 7 and 8 to reveal the results for Fieldsite 2 (telepresence) and Fieldsite 3 (SL), respectively.

Chapter 6 FIELDSITE 1 FINDINGS – YAMMER

In the previous chapter I outlined the ethnographic approach by which I investigate the question of how sensemaking takes place in virtual settings. I now apply this methodology to three fieldsites, starting with Yammer. As described in Chapter 5, I present the findings in four stages. I begin with a detailed description of the fieldsite, moving from general information about the organisational setting to specific information about the key activities of practitioners and the virtual technologies used to carry them out (principally Yammer). The second stage involves presenting empirical accounts that exemplify the practitioners' key activities. Here I articulate the intelligibility of the activity (comprised of sense(s) towards which sensemakers act) as well as how these activities are broadly accomplished through technology. Also within these accounts, I identify instances of both immanent sensemaking (which is ongoing) and episodic sensemaking (which occurs when immanent sensemaking is interrupted). I also identify the "doings of sensemaking" and "acts of sensemaking" that constitute immanent and episodic sensemaking, respectively. I further draw out the specific virtual sensemaking tools that enable sensemaking to be carried out virtually. In Stage 3 I reintroduce the dimensions of sensemaking in virtual settings that were arrived at during data analysis: matter, presence, place, time and appropriation. Within these dimensions I explore how sensemaking is both enabled and constrained by Yammer. The fourth and final stage involves articulating how sensemaking is altogether altered by Yammer. I thereby identify five unique features of sensemaking in the virtual setting of Yammer: textuality, degrees of presence, locational variability, temporal disorder, and user resilience.

6.1 Contextual background

Finsure Group is one of the largest financial institutions in Australia and is a prominent player in the general insurance, banking, life insurance and superannuation sectors. Finsure Group employs 15,000 people in Australia and New Zealand and is a Top 20 ASX-listed company. I was an intern in the personal insurance arm of the organisation, which oversees all business relating to home and motor insurance. Within personal insurance, the distribution division sells insurance and the claims division processes insurance claims. I was embedded in the claims division, which was largely comprised of call centre workers who liaise with customers regarding their claims. These workers fall into two departments: home claims and motor claims. There are three other smaller departments within the claims division. First, the recovery and settlement department works to recover money from other parties (e.g. the insurance company of the at-fault driver in an accident). Second, the procurement department engages suppliers (e.g. car hire companies) to get the best

deals on services for customers. And third, the fraud and investigation (F&I) department monitors claims processing and deals with irregular or suspicious claims. I was embedded in the F&I department within the claims division.

The F&I department is comprised of a number of specialist teams. The property investigation and motor investigation teams deal with irregular property and motor claims, respectively. The national intelligence team collect and analyse data to identify and predict fraudulent cases. The quality assurance team is responsible for continuous auditing of the claims processing lifecycle to ensure the business meets its regulatory obligations (e.g. customer privacy). Finally, the governance and process (G&P) team's role is to document and improve all processes relating to the management of claims across the division. In this way, G&P's place within the F&I department is quite arbitrary; the G&P team's mandate is to service all departments within the claims division. A summary of the organisational hierarchy, starting with the personal insurance arm of Finsure Group, is in Figure 6. I have highlighted the arm, division, department and team within which I was embedded.[14]

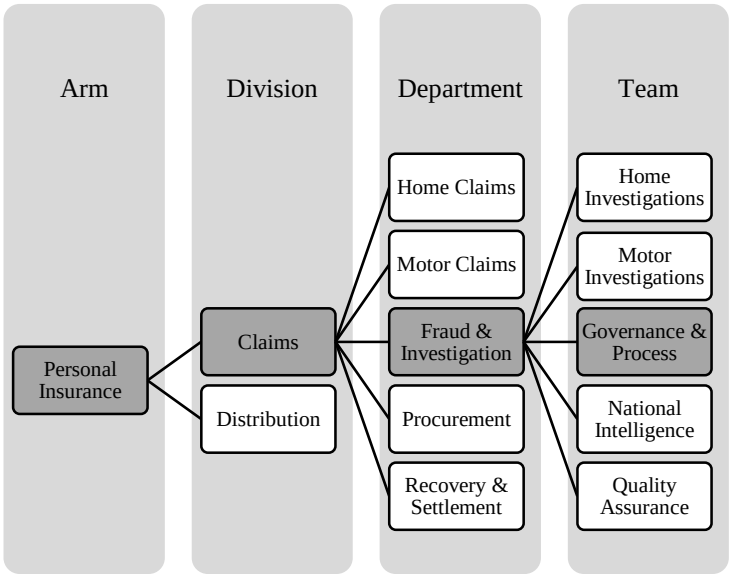


Figure 6: Summary of Finsure Group's organisational hierarchy.

[14] I have not included details of the departments and divisions that fall outside the claims division and F&I department because this level of detail is unnecessary.

6.1.1 Governance & process (G&P) team

The G&P team's primary role is to ensure that the claims division operates efficiently, effectively, and in accordance with standards stipulated by industry bodies such as the Australian Securities and Investments Commission (ASIC). The G&P team consists of three core functions: governance, process and communications. First, the governance function documents (writes, edits, stores, updates) the processes of the claims lifecycle from lodgement to closure. Second, the process function continuously assesses the claims lifecycle (both the processes themselves and systems that facilitate them) and makes recommendations for improvements to efficiency. Third, the communications function makes claims staff aware of processes that are relevant to their jobs and any changes to processes. The communications function also fields questions about ClaimsCenter, the web-based system used to manage claims, through their Claims System Help Desk. As a former corporate communications worker, I was aptly embedded in the communications function. At the time of my internship, this G&P team (including me) was mostly located in the same office in Brisbane, with the exception of one governance employee in Sydney. The broader F&I department and broader claims division were spread across Australia.

Key activities of the G&P team

The overall purpose of the G&P team is to ensure that all claims processes are correct and up to date, and that these processes are implemented properly across the division. G&P carry out this mandate by acting as an internal consultancy to the claims division. As a consultancy, the three functional areas of the team (governance, process and communications) work together to provide information, resources, advice, expertise and support to claims division staff at every stage of the claims processing lifecycle. The key activities undertaken by G&P team members are coordinating projects, sharing knowledge, and engaging stakeholders. These activities were identified iteratively and were adjusted many times throughout data collection and analysis to ensure the whole practice of the G&P team could be encapsulated by them. For example, I began with the official sub-functions of the G&P team (governance, process and communications) and interrogated them to arrive at the three activities identified above. Each key activity is described below with examples of relevant work, which will be referenced in the presentation of findings.

Coordinating projects

Most G&P activities are centred on implementing changes to processes within the claims division (e.g. as per the Code of Conduct). Project teams are formed to administer such change projects; these teams are often comprised of employees already in the same function (e.g. process) but often include staff from other G&P functions (e.g. governance or communications), the broader claims division, or other divisions. For example, projects that involve making changes to technical systems often include staff from the IT division. An example of coordinating projects is a pilot project to introduce Business Activity Monitoring (BAM)[15] software into the claims process (by integrating it with existing claims processing tools). The project team worked with a single claims process: glass-only motor claims. Team members consulted with employees/leaders in the motor claims department to map the glass-only claims process. Once the pilot plan was finalised, the BAM project team worked with IT developers to integrate BAM with other software and hardware, which included structural changes to the ClaimsCenter platform (e.g. changes to system-generated dashboards and alerts for managers). This involved elaborating "cards" (pieces of work) that needed to be completed, documenting the specific requirements for each card, tracking the development of cards, and updating team members about progression of cards.

Sharing knowledge

The G&P team act as a knowledge centre for the claims division. More specifically, G&P team members manage, update, host and author documents relating to how claims should be processed. This is achieved through the Process and Procedure Guide (PPG) – a searchable database of documents (housing approximately 1,400 processes) that is accessible to all claims staff. Some claims staff (mainly change managers) are able to apply their local expertise by adding and modifying documents in the PPG; these people are referred to as PPG contributors. However as owners of the PPG, G&P staff are ultimately responsible for the content. Tasks involved with knowledge sharing (through the PPG) include recruiting and training PPG contributors, moderating the changes made to documents, creating and formatting new process documents, requesting and implementing feedback on the PPG system (e.g. through surveys and ad hoc comments), and answering queries from PPG contributors. More broadly, the G&P team members (seen as a kind of

[15] BAM is the technological component of Business Process Modelling (BPM) which involves monitoring the progress of real-time processes, detecting problems and identifying their root causes, and reporting on processes to make improvements.

internal consultancy) are also conduits of knowledge sharing across the claims division in less formal ways. Namely, G&P staff receive operational queries via phone, email, instant messenger, video conferencing, face-to-face meetings and Yammer.

Engaging stakeholders

In order to execute their various projects and share knowledge across the division, G&P staff need to engage stakeholders outside their immediate team. To achieve this key activity the G&P team employ a network structure called the "hub and spoke" model. In this model, G&P (the hub) work closely with change managers[16] (the spokes) who are embedded in each of the claims departments in the personal insurance arm (i.e. home claims, motor claims, F&I, recovery and settlement, and procurement). The communications function used this hub and spoke model to engage stakeholders about a project to reform operational communications across the division. The aim of this new "Comms Framework" was to standardise and automate the process of sending out messages and to make the content and layout consistent. As the Comms Framework project was in its infancy, the G&P communications function was focused on selling the idea of the framework and gaining feedback on the approach. This involved engaging stakeholders via face-to-face meetings and PowerPoint presentations to explain the design of the new framework and to try to convince decision makers of its value. The G&P communications function also published the Comms Framework on various relevant Yammer groups and fielded questions via thread conversations.

Virtual technologies used to carry out key activities

In their key activities of coordinating projects, sharing knowledge and engaging stakeholders, G&P staff deal with large amounts of digital information and communicate with each other and stakeholders using various virtual and non-virtual tools. Face-to-face interaction is common amongst co-located workers (e.g. each function has weekly meetings and daily "stand ups" where they stand up at their desks and check in with each other). Various virtual tools, however, enable both co-located and geographically separated parties to collaborate over distance and to

[16] Change managers are the contact people "on the ground" in each department who liaised with G&P to help execute projects and share information. They are often PPG contributors.

document their work. The main virtual tools G&P staff use for carrying out their key activities are email and instant messaging, along with SharePoint, video-conferencing and Yammer.

First, email (Microsoft Outlook) is the tool for sending official messages and documents to relevant parties, such as progress reports or meeting minutes. The associated Outlook calendar is also used to schedule formal meetings. Second, instant messaging (Microsoft Lync) is used for less formal messages. Users of Lync instant messaging are able to add other employees to their contact list and the interface displays the status of these contacts (online, away, offline). Third, Microsoft SharePoint is the content management system used throughout the organisation, which enables version control and easy access to documents by both G&P staff and their stakeholders. SharePoint is also the technology that hosts the PPG, as described earlier. Fourth, video-conferencing is used to host formal meetings between geographically separated employees. G&P staff report frequent technical issues and over-booking of the system. Thus, for meetings with only a few participants, G&P staff often elect to use the telephone or Lync's desktop video function. Finally, Yammer is mainly used for ad hoc and informal communication between team members (and with stakeholders) to share information or updates, link to industry-related publications, post photos of their work or home life, and congratulate each other on a job well done or a work anniversary. Unlike the other major digital tools mentioned above, Yammer is not integrated with any other tools.[17]

6.1.2 Yammer - Enterprise Social Network (ESN)

In this fieldsite Yammer was the principal technology through which I investigated how sensemaking takes place in virtual settings. At the time of my internship, the Yammer Inc. website (2012) said:

> Yammer brings the power of social networking to your company. Yammer is as easy to use as great consumer software such as Facebook and Twitter, but is designed for company collaboration, file sharing, knowledge exchange, and team efficiency.

In other words, Yammer is a social media platform with features similar to Twitter and Facebook but modified to meet the commercial needs of business, thus the term *enterprise* social network

[17] During my internship Yammer Inc. was acquired by Microsoft Corporation and integration between Yammer and the other Microsoft tools was planned.

(ESN). Yammer (and other ESNs like Tibbr and Jive) enables organisations to create private social networks that are accessible only to employees who login using their corporate email details. Like most social networking platforms, Yammer enables users to create a profile with basic information (name, job title, expertise, interests, etc.) and a profile picture. Yammer also has typical social media functions such as likes, hashtags, @mentions, shares, attachments, private messages and search.

Yammer is underpinned by two key organising principles; that is, content on Yammer is created and consumed in two main ways. First, Yammer is a microblogging platform that enables users to share bite-size pieces of information (text, links, videos, etc.) in the form of posts. These posts appear in the personal feed (called My Feed) of users who "follow" the person who made the post. Users can also view the All Company feed which includes posts from all users, not just followed users. Second, users are able to create groups in Yammer for more focused discussions on specific topics. When users join a group, the posts from that group appear in their My Feed. Users can also go to the group's homepage to see and make posts. When viewing a group or feed, users have the ability to comment on others' posts. These conversations are called threads. Threads about company-wide initiatives/issues generally appear in the All Company feed, and threads about local issues or specific projects generally appear in groups and My Feed.[18] Figure 7 shows a screenshot of the Yammer interface.

[18] Since its inception in 2008, Yammer has evolved significantly and continues to introduce and retire features according to customer feedback and technology updates. Moreover, this study was focused on the web-based version of Yammer rather than the mobile application, which was not used frequently by participants in the study.

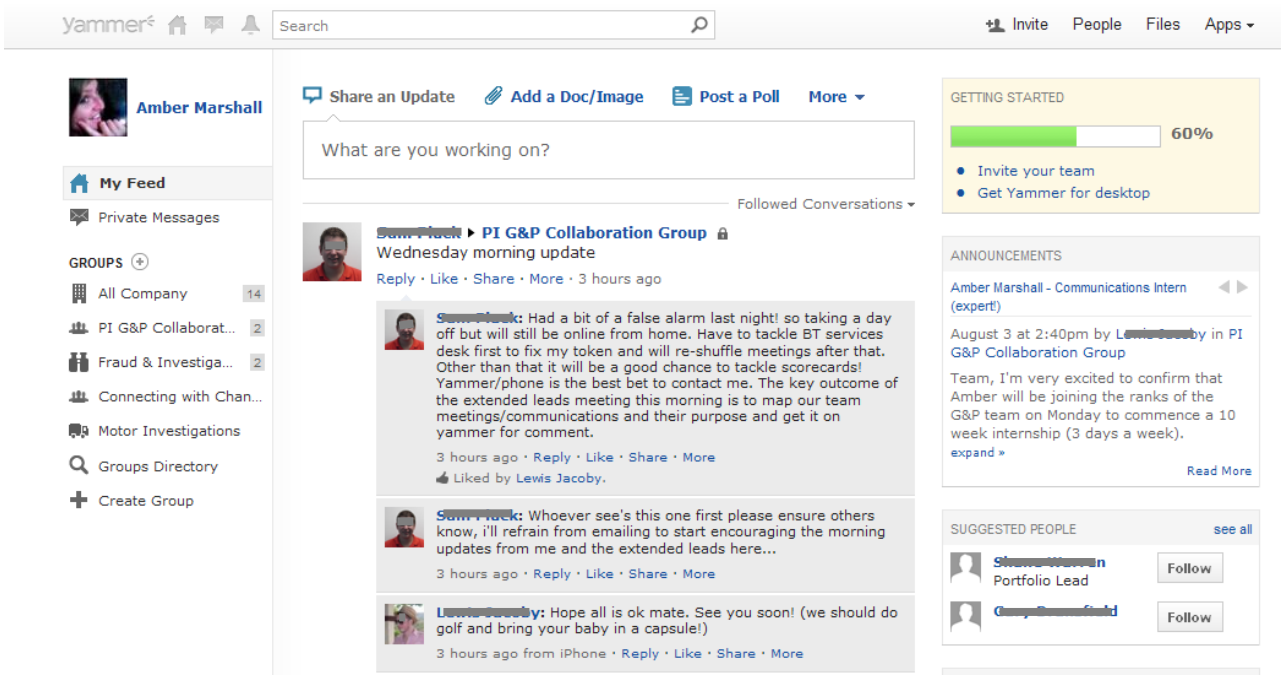


Figure 7: Yammer interface.

Yammer in Finsure Group

Finsure Group is one of Yammer Inc.'s longest-held clients in Australia. Yammer appeared in the organisation in 2009 when IT staff started playing around with the free version. Since then, uptake has been sporadic. Pockets within the organisation have embraced Yammer while others barely know of its existence. Speaking about the time of my internship, about half of all Finsure staff have Yammer accounts, but many are not active. Yammer's standing as a corporate tool is contentious and non-uniform across the organisation. While leaders and employees in some business areas advocate and use Yammer productively to get work done, others think Yammer is a time-waster, and that as a social network like Facebook it should not be used for work purposes. Unlike the standard corporate tools (email, instant messaging, SharePoint, video conferencing) Yammer is an unofficial communication channel; while employees are expected to use the standard tools, Yammer is optional. Having said that, the G&P team is one such pocket within the organisation in which Yammer thrives.

Yammer in the G&P team

The G&P team officially adopted Yammer in February 2012 at the suggestion of the team leader who created a group called G&P Collaboration group. He starts a thread in this group each morning called Morning Update in which he posts his own status for the day (e.g. meetings, key

issues, absentees, etc.) and encourages staff to follow suit (See Figure 7). Apart from this, the team leader empowers his employees to use Yammer in ways they see fit rather than mandating uses. Members of the G&P team create new groups, join existing groups, follow other users in the wider network, and participate in the All Company feed. The communications function in particular provides encouragement and support for the rest of the G&P team to log on to Yammer and engage with the platform. Indeed, some G&P communications staff actively promote Yammer more broadly as a corporate communications tool; they use Yammer to share information and solve problems in various groups and in the All Company feed. They also identify and share Yammer success stories with their team, department, division and the broader organisation, and have created "cheat sheets" for new Yammer users. As such the G&P team, in particular the communications function, are known throughout Finsure Group as strong advocates of Yammer and as somewhat experts in how to navigate the platform. They are also a key liaison point for Yammer Inc.[19]

When the G&P team use Yammer to carry out key activities they usually do so within the G&P Collaboration group. As the group's name suggests, this is a place where all members of the G&P team in all locations collaborate on various projects and tasks (at the time of data collection, G&P Collaboration group was one of the most active groups in the entire Finsure Yammer network). More generally, the G&P team use the broader Yammer network to: share and promote information, initiatives and events; discuss issues and clarify points; ask and answer questions; praise others for good work; give/seek opinions; and progress professional agendas. Importantly, while some G&P staff see productive uses and benefits of the tool (e.g. crowdsourcing answers to questions and networking with people across the organisation), others see Yammer as a toy and a distraction. Indeed, most G&P staff do not necessarily *need* Yammer to carry out their key activities; the specific tasks associated with maintaining and improving claims processes is mostly carried out on other platforms, such as SharePoint and email.

[19] During my internship I liaised directly with Yammer Inc. on several occasions to deepen my investigation.

6.2 Episodic and immanent sensemaking

Having described the organisational and technological setting, I introduce empirical data in the form of three accounts that exemplify how G&P practitioners carry out their key activities using Yammer. The three key activities and the corresponding accounts are listed in Table 6 along with information about the Yammer groups from which they are drawn.

Ref	Key activity	Account	Yammer Group	No. of group members	Group status
1a	Coordinating projects	Coordinating projects	BAM project	8	Public
1b	Sharing knowledge	PPG survey results	G&P Collaboration	38	Private
1c	Engaging stakeholders	Comms Framework	Hub & Spoke Communications	15	Public

Table 6: Summary of G&P practitioners' key activities and exemplar accounts from empirical data.

Now I provide a background to and summary of each exemplar account. As per the theoretical framework, I articulate the higher order intelligibility towards which people act as they carry out the activity at hand and identify how the technology underpins the activities. Annotated transcripts of Yammer threads, which document each account, accompany my descriptions. Within these transcripts I identify specific instances of sensemaking (both immanent and episodic), [20] which are colour coded in the threads. The doings and acts that comprise this sensemaking are italicised in the annotations.

6.2.1 Account 1a: Coordinating projects – BAM project

The first account exemplifies the key activity of coordinating projects and takes place in a Yammer group called BAM project. As described in the fieldsite background, the BAM project was a pilot to implement BAM software to work in conjunction with ClaimsCenter (the central claims processing platform) in relation to the glass-only motor claims process. Of the eight members of the BAM project Yammer group, there were five key contributors: two co-located experts from the process function in the G&P team who led the project; two university student interns (working both onsite and offsite) who documented the development requirements in cards; and an IT developer

[20] I do not identify all of the instances of sensemaking that appear in the accounts. Instead, I choose examples of both immanent and episodic sensemaking in each account.

(from the IT division) who liaised with the leaders/students and implemented the necessary changes in ClaimsCenter.

In the account, participants are discussing the requirements for the next development card. Aaron (a student) is in charge of defining the requirements of the card and works with Zane (IT developer) to implement the requirements in ClaimsCenter. The account sees Aaron seeking advice from Mason (a project leader). Through this pilot project, the practitioners are acting towards the higher order intelligibility of increasing efficiency of claims processing across the division. As seen in the thread, a number of virtual technologies underpin the participants' activities, including Confluence (to document the project requirements in cards) and JIRA (to track the progress of development of those cards). However, Yammer is the principal technology is use. In particular, as the participants are geographically separated, the group feature of Yammer enables the project members to carry out activities in a central, virtual location. Further, they choose to set the group to 'public' so that stakeholders outside the immediate team can see the content. I now provide an overview of the account before identifying specific instances of sensemaking in the thread.

The account begins with Aaron seeking clarification about the requirements for the BAM-61 card (regarding the "close claim" activity) on behalf of Zane (IT developer). Aaron includes a hyperlink in his initial post to the BAM-61 card in JIRA that shows where Zane is up to in implementing the changes to ClaimsCentre. In his next comment, Mason is evidently confused because BAM-61 actually refers to open claims, not closed claims. Aaron quickly realises that he has mixed up the BAM-61 and BAM-62 cards, provides the correct hyperlink to JIRA, and restates his question about how long closed claims should remain in the pipeline view in ClaimsCenter. Mason replies by posting a hyperlink to the BAM-62 card in Confluence (where all the requirements for each card are documented). Mason cuts and pastes a section from the Confluence card into his comment and goes on to explain that there is a problem with the Confluence documentation that is causing the confusion. Aaron then clarifies his understanding of what Mason has just said by bullet-pointing what he thinks needs to be done. Still not satisfied that Aaron understands, Mason attempts to re-explain the requirements, but Aaron is still confused. Mason then uploads a document to the thread which contains a detailed process map of the close claim activity. Aaron reads the map and finally understands, realising that what Zane has developed in ClaimsCenter is correct after all.

Below is a transcript of the Yammer thread from which this account is drawn. The acts and doings of sensemaking are annotated in the left and right columns, respectively. They comprise

instances of episodic and immanent sensemaking, which are coloured coded to differentiate them from one another. Each individual post in the thread is numbered for referencing purposes. Also, the annotations are directly aligned with the specific part of the post to which I refer (some posts include more than one doing/act). Finally, some posts in the thread may appear to be out of order. This often occurs in Yammer when people try to chat about two or more topics in the one thread.

Acts of episodic sensemaking	Yammer thread	Doings of immanent sensemaking
Aaron *presents* the group with a problem that Zane is unsure of the 'BAM-61' requirements (interruption to sensemaking)	1  Aaron: Other important question raised by Zane in regard to BAM-61 (which is close claim activity) Zane would like to know form you as SMEs; for how long you want to show the closed claims in the pipeline view? http://jira.int.corp.xyz/jira/browse/BAM-61 September 17 at 10.17am · Like · Reply · Share · More	
	2  Aaron: Hi @Mason I found it a litter bit confusing to mention the (BamBam Definitions) again and again So, I've put a note at the top of the page to explain that; please take a look and let me know if it is easier for the reader or not http://confluence.int.corp.xyz/confluence /display/GUIDEWIRE/ September 17 at 11.14am · Like · Reply · Share · More	Aaron *greeting* Mason Arron *stating* changes he has made to Confluence
	3  Mason in reply to Aaron: nice idea Aaron - could I suggest changing the definition references to the bold italic – ie it doesn't get confused with headings? September 17 at 11.34am · Like · Reply · Share · More	Mason *endorsing* the changes in Confluence and *requesting* more changes
Mason *questions* which card Aaron is referring to (initial act towards resolving interruption)	4  Mason in reply to Aaron: @Aaron card 61 refers to open claims not closed claims. can you please check this? September 17 at 11.37am · Like · Reply · Share · More Liked by Aaron	
Aaron *realises* his mistakes and *corrects* himself re: BAM-61, it is BAM-62 (further act towards resolving interruption)	5  Aaron: Well do. Sorry, my question in regard to BAM-62 http:jira.int.corp.xyz/jira/browse/BAM-62 September 17 at 11.41am · Like · Reply · Share · More	Aaron *agreeing* to make changes, i.e., "well (will) do"
	6  Aaron: Zane would like to know form you as SMEs; for how long you want to show the closed claims in the pipeline view? September 17 at 11.43am · Like · Reply · Share · More	

Mason *explains* how closed claims should be treated

7 

Mason: as currently documented here..

http://confluence.int.corp.xyz/confluence /display/GUIDEWIRE/

.. the process instance should be counted in the close claim activity if the most recent milestone event is – System service status changed to "Paid Complete". The process instance should continue to be included in this activity until any other milestone event occurs.

I've just realised that there is an issue with the doco as the first line of the pipeline section of this page expand >>

September 17 at 12.25pm · Like · Reply · Share · More
Liked by Aaron

Aaron *summarises* his understanding of Mason's instructions

8 

Aaron: I thought of it and correct me if I'm wrong:

- We always need BAM to scan for open claims and reopened ones and to show them in their proper location on the dashboard

- If a claim is closed for more than a (time period). Then don't show it

- Show all claims that have been closed for less than (time period)

Where the (time period) is the amount of time that SMEs needs to identify

September 17 at 1.42pm · Like · Reply · Share · More

Mason *identifies* that Aaron is confused and *clarifies* his original explanation (new interruption)

9 

Mason in reply to Aaron: Aaron..Claims which have been closed in claimscenter should not appear in the pipeline unless they are reopened (tbc discussion above).

By contrast some open claims will sit in the 'Close Claim' process activity in the pipeline view. This means we are performing the 'Close Claim' activity not that the claim is closed..

September 17 at 2.37pm · Like · Reply · Share · More

Aaron *questions* Mason's clarification (act towards resolving interruption)

10 

Aaron: I guess I'm still confused

I'm not sure what you mean by this statement "This means we are performing the 'Close Claim' activity not that the claim is close.."

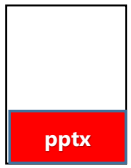
What is/are the Close Claim activity or activities?

September 17 at 2.47pm · Like · Reply · Share · More

Mason *expands* his explanation of BAM-62 (further act towards resolving interruption)

11 

Mason: No worries Aaron. Check ;Close Claim' activity in the attached diagram. The activity comprises (1) perform appropriate checks to ensure that it is appropriate to close the claim and then (2) close the claim in claim center



Glass Only Claim Process – End to End with issues
Uploaded to Project BB > Files

September 17 at 2.56pm · Like · Reply · Share · More

Aaron *confirms* that he now understands fully (interruption is resolved for Aaron)

12 

Aaron: Okay, that's make more sense. So in this case we have no problem :)

I think the problems was only the misunderstanding between me, zane and you

Now everything is clearer

September 17 at 3.10pm · Like · Reply · Share · More

Mason *acknowledges* Aaron's confirmation (interruption is resolved for Mason)

13 

Mason: Good to hear :)

September 17 at 3.10pm · Like · Reply · Share · More

I now identify the instances of sensemaking in the above transcript. I begin with an instance of episodic sensemaking (and the acts that comprise it) as shown in the annotations on the left hand side. First there is confusion about which card (61 or 62) is being discussed. As per the yellow annotations, the specific acts of sensemaking by which this first interruption emerges are that Aaron *presents* the problem with BAM-61 (post 1) and Mason *questions* which card Aaron is referring to (post 4). The episode is resolved when Aaron *realises* his mistake and *corrects* himself re: BAM-62 (post 5). Second, there is confusion about the content of the card. A per the blue annotations, the specific acts of sensemaking by which this interruption emerges are that Mason *explains* how closed claims should be treated (post 7); Aaron *summarises* his understanding of Mason's explanation (post 8), and Mason *identifies* that Aaron has not fully understood the instruction (post 9). The interruption is resolved by the following acts of sensemaking: Mason *clarifies* his original explanation (post 9); Aaron *questions* Mason's clarification (post 10); Mason *expands* on his explanation of BAM-62 (post 11); Aaron *confirms* his understanding of the card requirements (post 12), and Mason *acknowledges* Aaron's confirmation (post 13).

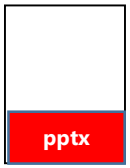
As stated previously, the happenings that occur in the thread that do not contribute to episodic sensemaking are, by definition, immanent sensemaking. An example of immanent sensemaking is the fluid interaction between Aaron and Mason towards the beginning of the thread. Here Aaron (who is responsible for documenting the project requirements in Confluence cards) tells Mason about some changes he has made to Confluence by providing a hyperlink to his work. Mason immediately understands the changes that have been made and endorses them by saying "nice idea". Mason also asks Aaron to make some further changes, to which Aaron responds "well (sic) do"; that is, "will do". The doings of this immanent sensemaking are identified by grey annotations in the right hand column. These include: Aaron *greeting* Mason and *stating* the changes he has made to Confluence (post 2), Mason *endorsing* the work and *requesting* more changes (post 3), and Aaron *agreeing* to make the changes (post 5).

There are some further doings of sensemaking in this account that are not explicitly visible in the thread. Namely, while acts/doings of sensemaking identified above seem to comprise the main activity, Mason and Aaron are subliminally undertaking further doings that contribute to immanent sensemaking. For example, simply *showing up* in the thread or silently *reading posts* are necessary for sensemaking to take place, yet these doings are not obvious in the thread.

6.2.2 Account 1b: Sharing knowledge – PPG survey results

As explained in the fieldsite background, a core component of the G&P team's key activity of sharing knowledge is managing the PPG (a central repository for all process documents in the claims division). To gain feedback on the PPG and inform potential improvements, G&P staff developed a survey for users of the PPG. A beta version of the PPG survey was administered in the recovery and settlement department. In the account below Caitlin (the governance team leader responsible for the PPG) shares the results of the survey with her team, which includes negative feedback. The intelligibility towards which Caitlin and her team act is to improve the effectiveness of the PPG and therefore bolster claim processing within the division. The team, through their sensemaking, is also trying to justify the shortcomings of the PPG and defend their reputation in the claims division. This account takes place in the G&P Collaboration group which, being a private group, serves as a safe forum for G&P staff to share stories, discuss issues, and update each other on projects. Sharing the results in the G&P Collaboration group enables team members who work from home or other offices to participate. Another technology that is implicated in this thread is Microsoft PowerPoint, which enables sensemakers to read the survey results on their desktop. I now provide an overview of the account before identifying specific instances of sensemaking in the thread.

Caitlin commences this thread by uploading a PowerPoint document containing the survey results; her aim is to make her team aware of how the PPG is perceived by the people who use it. The team proceeds to interpret the results and feedback. Tori leads the group's sensemaking efforts by making a broad statement that the results are "shocking". Noel provides more insight into the results by giving examples of how the PPG users' complaints play out when they call the Claims Centre Help Desk. Caitlin brokers the discussion by thanking Noel for his contribution and making suggestions as to what might be done to correct problems. Amanda, a floating change consultant within the claims division, provides yet another interpretation of the survey results by suggesting that people who use the PPG are also responsible for its content as PPG contributors (not just the G&P governance function). Caitlin "likes" this comment, further softening the impact the harsh feedback may have on the team. Raylene and Tanya also agree with Amanda's interpretation in subsequent comments.

Acts of episodic sensemaking		Yammer thread	Doings of immanent sensemaking
Caitlyn *shares* the results (interruption)	1	 Caitlin PI G&P Collaboration Group Hi all, Attached are the results of a survey that Rec Set did on the PPG, if you are interested in reading it. The responses are quite critical but there are some interesting ideas to come out of it.  PPG survey results Uploaded to G&P Collaboration > Files Like · Reply · Share · More · September 6 at 11.51am Liked by Luke	
			Luke *acknowledging* receipt of results
Tori *interprets* the results as "shocking" and *questions* if the survey will be carried out elsewhere (making sense of the results)	2	 Tori: shocking results but again nothing new about the culture. Do you know Caitlin if this survey will be carried out to other areas as well cause it would be really interesting to see if results varies, September 6 at 3.56pm · Like · Reply · Share · More	
Caitlin *answers* Tori's question (further act towards making sense)	3	 Caitlin in reply to Tori: I am finalising a strategy pack at the moment that focussed on the future direction and action items that we need to take with the PPG, and that is one of the things that we are looking into. I'll be sure to share it with all of G&P and the Spokes team shortly. September 6 at 4.59pm · Like · Reply · Share · More	
Noel *agrees* with and *elaborates* the group's interpretation of the results (further acts towards making sense)	4	 Noel: Very interesting Read – from my point of view on the HelpDesk we hear all the time about consultants who are not using the PPG, we do tyr and push back especially when we know the answer is there. September 7 at 8.46am · Like · Reply · Share · More Liked by Luke	Noel *reading* the documents
Caitlin *expands* on Noel's points	5	 Caitlin in reply to Noel: That's a good point Noel. The content is definitely there. The regular issues that I am hearing about is the inaccuracy of contact phone numbers / emails etc, and navigation/search functionality as they are having difficulty finding the content they are looking for. So it is something we are going to workshop and see if we can fix. September 7 at 2.54pm · Like · Reply · Share · More	

Luke *shares* his relevant experiences	6	 Luke: @Caitlin When I first started in the team last year whe did the PPG Benchmark survey which was meant to be redistributed over the next few months. Let's catch up to discuss. Is good to distribute the same survey to effectively track results/ trends. Is shame that we will not be able to send to Rec and Set now. September 10 at 8.41am · Like · Reply · Share · More	
Amanda *shares* her relevant experiences	7	 Amanda: The PPG often comes up as an issue teams raise in their RTB workshops. Mostly it is around the search function or not going directly to the area they are trying to find. I reinforce in the workshops when PPG is brought up, that it is owned by the departments , and if they find something inaccurate or difficult it is their responsibility to highlight and raise. I encourage ownership and responsibility for content and technology. I also encourage then to go back and revisit the PPG . Often the people complaining have not used the PPG in the last 12 months. The survey is a great idea and happy we are actioning feedback. September 10 at 9.23am · Like · Reply · Share · More Liked by Caitlin	Amanda *attending* the thread Caitlin *acknowledging* others
Raylene *agrees* with the current interpretation (beginning to get consensus and thus resolve interruption)	8	 Raylene in reply to Amanda: Great points Amanda – I also reinforce the ownership issue in the Contributor training, and using the Process and Content Feedback register in STRIVE. September 10 at 9.55am · Like · Reply · Share · More Liked by Caitlin	Caitlin *acknowledging* Raylene's comment
Tanya *suggests* that instructions to PPG Contributors should be clearer	9	 Tanya: Hmm, interesting… Can't say that I am surprised, because there still seems to be a lack of understanding in business teams that their Program & Change team CAN & SHOULD change the PPG if there is wrong info/ info missing/ info could be clearer, etc. The culture seems to favour creating cheat sheets & their own procedures unfortunately, rather than getting things fixed properly in the PPG. I am not sure whether this is maybe due to the fact that many P&C team expand >> September 17 at 3.23pm · Like · Reply · Share · More	Tanya *catching up* on issues one week later
Caitlin *affirms* suggested action (resolution)	10	 Caitlin in reply to Tanya: Bridging procedures sounds like a great approach, and I have been chatting to Ben Lane (who is the dedicated PPG change team person in RecSet) about their through of that one. I'll be popping into your team day on Friday to share our PPG Strategy Pack. September 17 at 3.48pm · Like · Reply · Share · More	

As per the yellow annotations in the left column, as soon as the first post is made there is an interruption that sends the group into collective, episodic sensemaking. Namely, Caitlin posts the results of the PPG survey which "shock" and thus interrupt the practitioners' sense of the quality of their work. The acts of sensemaking by which the G&P team negotiate and resolve this interruption are: Caitlin *shares* the results (post 1); Tori *interprets* the results as "shocking" and *questions* if the survey will be carried out elsewhere (post 2); Caitlin *answers* Tori's question (post 3); Noel *agrees* with and *elaborates* the group's interpretation of the results (post 4); Caitlin *expands* on Noel's points (post 5); Luke and Amanda *share* their relevant experiences (posts 6 & 7); Raylene *agrees* with the current interpretation (post 8); Tanya *suggests* that instructions to PPG contributors should be clearer (post 9); and Caitlin *affirms* the suggested action (post 10).

There is also evidence of immanent sensemaking in this account that seems to takes place concurrently with the episodic sensemaking. That is, there are doings of sensemaking that are taken for granted which contribute to the practitioners' sensemaking. For example, as per the grey annotations in the right column, Caitlin's first post is "liked" by Luke, which implicitly signifies him *acknowledging* receipt of the results without him having to make an explicit comment (post 1). Other implicit doings that contribute to the group's sensemaking include *reading* the documents (post 4), *attending* the thread (post 7), *acknowledging* others (posts 7 and 8), and *catching up* on issues (post 9).

6.2.3 Account 1c: Engaging stakeholders – Comms Framework

The third account, which occurs in the Hub & Spoke Communications Yammer group, exemplifies the key activity of engaging stakeholders. As per the hub and spoke model discussed in the fieldsite background, this model was set up by G&P (the hub) for change managers (the spokes) to communicate across the claims division. In the below the account, hub and spoke members are holding their quarterly meeting in Yammer for the first time (they usually meet face-to-face or via video conference). Called a YamJam, this meeting in Yammer involves participants coming together to have discussions via threads in (near to) real-time. In this YamJam, Luke (the communications lead in the hub) facilitates a four-point agenda – one thread for each agenda item. The account summarised below is one thread/agenda item from this Hub & Spokes Communications YamJam.

In the thread Luke is engaging his stakeholders in a new strategy (called the Comms Framework) for disseminating operational messages across the claims division. Luke's intent is to engage his stakeholders and gain buy in/feedback from the spokes who will eventually implement the strategy in their local areas. The ultimate intelligibility of this activity is to improve communication of important operational matters and thereby improve productivity in processing claims. As in Accounts 1a and 1b, the groups tool in Yammer underpins the participants' activities. In this account the group is public so that stakeholders have open access to the conversations. As seen in the thread below, other virtual tools are also used in the YamJam, most notably YammerFall – an application that displays all posts (regardless of which thread/group they are made in) in chronological order.

The account begins with Luke uploading a working version of the Comms Framework (a PowerPoint document) and inviting the audience to read through it. Amber (the researcher), trying to keep up with the structure of the YamJam, asks if they are now on agenda item three, and Tommy shares in Amber's confusion. Luke confirms there are now three active threads, one for each agenda item so far. Bruce makes a suggestion to use YammerFall to help participants keep up with the comments in the threads. Luke then returns the group's focus to the Comms Framework and draws similarities between it and another frameworks people are familiar with (i.e. STRIVE). Bruce and Tommy continue talking on a tangent about the confusion within the YamJam. Luke then asks the group a specific question about their thoughts on the "list/forms based approach". Luke is finally able to engage his audience and gains the feedback he wants. Tommy and Cathy offer their agreement with Luke's approach. Sharon seeks clarification about the scope of the framework and Luke clarifies, which is "liked" by Sharon. The account concludes with Tommy raising an issue about distribution lists (DLs), and Bruce (who works with Luke) assuring the group that the framework will address how operational communications will reach the correct audiences.

Acts of episodic sensemaking		Yammer thread	Doings of immanent sensemaking
Luke *shares* the Comms Framework	1	 **Luke** **Hub and Spoke Communications** The Communication Framework – Rough overview. Please have a look through the attached. This is a basic snapshot of what we're aiming for. Bruce and I will be booking in time with all spokes over the coming month to discuss this approach in more details pptx Comms framework - short Uploaded to Hub & Spokes Communications > Files Like · Reply · Share · More · September 12 at 11.36am Liked by Sharon	
Amber *questions* the agenda item (interruption to activity)	2	 **Amber**: So, we are on agenda item 3 now? September 12 at 11.37am· Like · Reply · Share · More Liked by Bruce	
Tommy *affirms* Amber's confusion	3	 **Tommy**: This old man is getting dizzy September 12 at 11.37am· Like · Reply · Share · More Liked by you and Luke	Tommy *stating* he is getting dizzy Amber & Luke *sympathising* with Tommy
	4	 **Amber**: Me too – Tommy. And I like to think I'm not that old! :) September 12 at 11.38am· Like · Reply · Share · More Liked by Bruce	
Luke *clarifies* the agenda item (act towards resolving confusion)	5	 **Luke**: 1, 2 and 3. lol. I think it's fine for people to move through at their own pace September 12 at 11.38am· Like · Reply · Share · More	
	6	 **Tommy**: Taking a pill… September 12 at 11.39am · Like · Reply · Share · More	Tommy *stating* he is taking a pill
Bruce *suggests* ways to keep track of the thread (further resolution to confusion)	7	 **Bruce**: Yeah, Yammerfall www.yammerfall.com is a great way to see all conversations in one view then pick the ones you want to reply to. If you miss anything suring the yam jam then reply after it :) September 12 at 11.39am· Like · Reply · Share · More Liked by you	

	8	 **Tommy**: Suring? September 12 at 11.40am· Like · Reply · Share · More	
Luke *explains* the Comms Framework (background to problem)	9	 **Luke**: As a very basic description, the framework we are building will actually have some similarities to STRIVE in that it will be based on submitting new requests and filling out 'forms'. This will mean we can get consistent content flow, templates, etc. September 12 at 11.41am· Like · Reply · Share · More	
	10	 **Annie in reply to Tommy**: *during September 12 at 11.41am· Like · Reply · Share · More	
	11	 **Tommy**: Darn, I thought t was a new word I could use September 12 at 11.41am· Like · Reply · Share · More	
Bruce *expands* on Luke's explanation	12	 **Bruce**: It also puts a focus on the content being the message not the channel being the message. September 12 at 11.42am· Like · Reply · Share · More Liked by you	
	13	 **Bruce in reply to Tommy**: How many pills did you Take? September 12 at 11.42am· Like · Reply · Share · More	Bruce *asking* Tommy how many pills he took
Luke *asks* people for feedback (articulation of problem/interruption)	14	 **Luke**: Anyone got any thoughts on the list/ forms based approach? September 12 at 11.43am· Like · Reply · Share · More	
Cathy *suggests* possible changes (act towards solving problem)	15	 **Cathy**: I think that the concept is really good. It would be great to move away from the traditional SharePoint look. Will probably be a challenge to work out what content is relevant to everyont? September 12 at 11.43am· Like · Reply · Share · More	
Luke *affirms* suggested change	16	 **Luke**: Great point Cathy. Content relevancy is certainly a pain pint for a lot of people. I think a good way to combat this is by keeping messages short, and getting to the point, at least that way people can quickly and easily gauge whether it is indeed relevant to them or not. September 12 at 11.45am· Like · Reply · Share · More	

Tommy *agrees* with suggested change	17	 **Tommy in reply to Luke**: It's a terrific approach. I guess the design and as Cathy says the relevance is the issue to get it right/ September 12 at 11.45am· Like · Reply · Share · More
Tommy *suggests* ways to progress the framework	18	 **Tommy in reply to Luke**: Maybe SP 2010 offers some ways to highlight relevance through use of color, etc? September 12 at 11.47am· Like · Reply · Share · More
Sharon *questions* an aspect of the Framework (further acts towards solving problem	19	 **Sharon**: So it will have EVERY communication to every part of PI, and you will have to go through what is relevant for your area? Is that right? Or have I misunderstood? cc: @Luke September 12 at 11.47am· Like · Reply · Share · More
Bruce *answers* questions/suggestions about Comms Framework	20	 **Bruce in reply to Tommy**: If you are receiving the communication then its relevant…. Well that's thay Id like to think anyway. The sender of the communication when completing the form will select which audience that need to target September 12 at 11.49am· Like · Reply · Share · More Liked by Luke
Luke *clarifies* Bruce's given answer	21	 **Luke**: This framework is just for operational comms within PI Claims. So not the strategic comms from Mark's area. but essentially anything operational that staff receive. The framework and the portals will be personalised and content distributed to targeted audience so definitely not a case of people having to sift through all comms. That would be painful! September 12 at 11.50am· Like · Reply · Share · More Liked by Sharon
Sharon *acknowledges* Bruce's answer		
Tommy *suggests* further challenges	22	 **Tommy in reply to Bruce**: That is a good rhing, the challenge is the DLs as always and people who multi skill September 12 at 11.51am· Like · Reply · Share · More Liked by Luke
Bruce *agrees* with stated challenges (resolution)	23	 **Bruce**: Yes, Luke and I will need to esnure things are in place so we can target audiences. September 12 at 11.53am· Like · Reply · Share · More

Again there is evidence of both episodic and immanent sensemaking in the thread. First, participants partake in episodic sensemaking about the YamJam itself. Namely, there is confusion about how the meeting format is translating to the virtual setting of Yammer. As highlighted in the yellow annotations in the left column, the acts of sensemaking by which the participants resolve their confusion about the meeting are: Luke *shares* the Comms Framework (post 1), Amber *questions* what agenda item they are up to (post 2); Tommy *affirms* Amber's confusion (post 3); Luke *clarifies* the agenda item (post 5); and Bruce *suggests* ways to keep track of the thread (post 7).

Second, as per the blue annotations on the left, participants engage in episodic sensemaking about the Comms Framework. The acts involved in making sense and resolving confusion are: Luke *explains* the Comms Framework (post 9); Bruce *expands* on Luke' explanation of the Comms Framework (post 12); Luke *asks* people for feedback (post 14); Cathy *suggests* possible challenges (post 15); Luke *affirms* suggested challenges (post 16); Tommy *agrees* with previous point (post 17) and *suggests* ways to progress the framework (post 18); Sharon *questions* an aspect of the framework (19); Bruce *answers* others' questions/suggestions about framework (post 20); Luke *clarifies* Bruce's given answer (post 21); Sharon *acknowledges* given answer (21); Tommy *suggests* further challenges (post 22); and Bruce *agrees* with stated challenges (post 23).

Third, in parallel with these instances of episodic sensemaking about the YamJam and Comms Framework, some participants are accomplishing immanent sensemaking through their aside conversations. For example, as per the grey annotations in the right column, Bruce and Tommy partake in light-hearted, fluid banter amongst themselves. The doings by which this is accomplished are: Tommy *stating* he's getting dizzy (post 3) and taking a pill for it (post 6), Amber and Luke *sympathising* with Tommy ("liking" his post) (post 3), and Bruce *asking* Tommy how many pills he took (post 13). This immanent, humorous interaction is interwoven throughout thread. While this instance of sensemaking is immanent for the direct participants (mainly Terry and Bruce), it may also contribute to episodic sensemaking. Namely, although no one comments in the thread that they found Terry and Bruce's banter distracting, I made a note in my fieldsnotes that "Bruce asked Terry how many pills he took. Felt like these funny little things get in the way of an already crowded discussion".

6.2.4 Summary of sensemaking in empirical accounts

Table 7 summarises the exemplar accounts of key activities, the instances of immanent and episodic sensemaking within them, and their constitutive doings/acts.

Account	Instance of sensemaking	Sensemaking type	Doings/acts of sensemaking
1a: Coordinating projects – BAM project	BAM-61/62 card and content	Episodic	States, questions, acknowledges, corrects, re states, explains, summarises, clarifies, expands, confirms
	Reporting on changes made to Confluence pages	Immanent	Stating, endorsing
1b: Sharing knowledge – PPG survey results	Interpretation of PPG survey results	Episodic	Shares, interprets, questions, answers, agrees, elaborates, expands, acknowledges, suggests, affirms
	Passive participation	Immanent	Acknowledging, attending, reading
1c: Engaging stakeholders – Comms Framework	Figuring out the YamJam format	Episodic	Questions, affirms, clarifies, suggests
	Evaluating the Comms Framework	Episodic	Explains, expands, asks, suggests, affirms, questions, clarifies, acknowledges, suggests, agrees
	Aside conversations	Immanent	Stating, asking

Table 7: Summary of immanent/episodic sensemaking and constitutive doings/acts in Yammer.

As alluded to in Chapter 5, I was further able to identify the specific features of Yammer that enable doings and acts of sensemaking to be carried out in the virtual setting. For example, the doings of stating and questioning are accomplished through the posting and commenting features of Yammer. Ten of the most common doings/acts (five of each) appear in Table 8; they are accompanied by their specific virtual sensemaking tools. Interrogation of these acts/doings and their corresponding virtual sensemaking tools involved making general observations about how acts and doings are carried out virtually and making initial notes about potential implications for sensemaking. For example, using the "like" tool to carry out the doing of agreeing means that the sensemaker does not have to say anything in order to enact sense; this could lead to a kind of passive participation.

Acts and doings of sensemaking	Virtual sensemaking tool	Preliminary observations	Implications for sensemaking
States (act)	Posts	Involves "showing up" as a profile pic and text	Presence and identity enacted differently in Yammer
Agrees (act)	Like button	Don't have to say anything in order to contribute	Passive participation in sensemaking
Shares (act)	Document sharing	Can upload content into threads that are too big for posts/comments	Can import information as required to help sensemakers in ways not possible in traditional setting
Expands (act)	Hyperlink	Sensemaking materials not restricted to what is on hand	Sensemaking takes place in multiple locations (both virtual and physical)
Discusses (act)	Groups	Sensemaking can be private, public or secret	Can target people without having to summon them
Reading (doing)	Threads	Involves auto-documentation of threads, i.e., can go back and read after the fact	Can make sense in retrospect be re-visiting threads
Attending (doing)	Profile pic	Participants embody text and pictures in showing up for sensemaking	Expression of identity is undermined because sensemakers are restricted to text/images
Answering (doing)	In reply to	Can answer directly to person who asked question	Helps suspend sense even when comments are make out of order
Expressing (doing)	Emoticons	Hard to express oneself through text only	Embodiment restricted in sensemaking
Greeting (doing)	@mention	Can direct comments to a particular person, even if they are not present	The concept of presence is questioned in sensemaking in the virtual setting

Table 8: Ten common doings/acts in Yammer and corresponding virtual sensemaking tools and observations.

In carrying out this analysis, I further realised that some deeply immanent forms of sensemaking were only able to be identified by reversing my approach to analysing the doings/acts and their enabling tools. Namely, instead of identifying doings/acts and then matching them to tools, I searched for tools that seemed to be overlooked (or were altogether invisible in Yammer) and then identified ways in which they suspended sensemaking. These more subliminal, taken-for-granted tools include: indentation of comments to initial post, @mentions, profile with picture, Caps, emoticons, groups, auto-documentation, search, editing post in retrospect, concurrent threads, and private chat. Indeed, these tools emerged as providing a baseline sense from which actors draw to accomplish all their activities (discussed further later on).

6.3 Dimensions of sensemaking in virtual settings

As described in Chapter 5, the data in Tables 7 and 8 were interrogated to arrive at the five dimensions of sensemaking in virtual settings: matter, presence, place, time and appropriation. These dimensions are now discussed in Stage 3 of the presentation of findings. Namely, within each dimension I consider how sensemaking may be enabled (made possible/easier) and constrained (made more difficult/impossible) because it takes place virtually in Yammer instead of in traditional settings.

6.3.1 Matter

In each of the accounts "what" sensemaking is about (the "stuff" or "matter" of sensemaking) is represented by some kind of text, more specifically, a digital text. For example in Account 1a: Coordinating projects – BAM project, the "thing" Aaron and Mason are discussing is the Close Motor Claims card, which is represented by various digital texts such as posts, comments, and hyperlinks to JIRA and Confluence. In this way, the BAM development card is a kind of moving target because the digital text that represents the card is always changing. As another example, in Account 1c: Engaging stakeholders – Comms Framework participants are sharing and interpreting a PowerPoint document (a type of digital text) which they download to their individual desktops. While the PowerPoint document cannot be touched or moved like a physical document, the digital text can be interacted with in various ways. For example, sensemakers may edit and share the document (often unbeknownst to others) by saving, re-naming and emailing the document to another colleague. Though digital texts are intangible in a physical sense, they are multiple, malleable, replicable, sharable, and often untraceable.

In Yammer, sensemakers have the freedom to create, modify and share the materials (matter) that are involved in key activities, which *enables* sensemaking. On the other hand, textual materials *constrain* sensemaking because they may only be created/used within the parameters of Yammer. For example, only common file types (e.g. .docx, .xlsx .jpg, etc.) may be uploaded to and downloaded from Yammer and the threads are arranged in a fixed, uniform way. Having said that, while the restrictions of the platform constrain the form the initial material may take, there is much variability as to what may become of the digital material once it is shared.

In order to make collective sense of these slippery, digital texts sensemakers seem to rely on existing knowledge and shared local histories. For example participants in Account 1b: Sharing knowledge – PPG survey results, were involved in devising/administering the survey and already shared many of the views that were expressed in the thread (e.g. that other PPG contributors should also take responsibly for the quality of the PPG). As such, sensemakers enact pre-existing interpretations of the feedback. Sensemakers also rely on broader institutional knowledge to help them negotiate digital texts. Namely, as per corporate values and policies, they know which things are and are not appropriate to modify, copy or share. As one interviewee said:

> I've seen many instances of posts where … you'll see the comments left over where someone's deleted a post saying "I don't really find this appropriate"… people would be testing levels of, you know, culturally what's acceptable and what's not … I'd say it would probably be essentially based on … what are the Finsure company values?

Further, using real names/roles and profile pictures in one's Yammer profile make sensemakers accountable for their behaviour in Yammer. Also, sensemakers (deliberately or unconsciously) set up groups that mimic the institutional structure, perhaps reminding them of their missions, projects, and obligations. Such institutional frameworks *enable* sensemaking by guiding sensemakers towards shared interpretations of digital matter.

6.3.2 Presence

The question of "who" the sensemakers are in each account is evidenced by the names and profile pictures that appear next to each participant's post or comment. Further, the words in the posts/comments provide information about who sensemakers are. In this way, sensemakers show up in Yammer through words and images (digital texts) rather than flesh and speech (bodies). Such textual embodiment enables and/or constrains sensemaking in two main ways. First, sensemakers are confined to the symbols on a keyboard that may only be arranged within the prescribed structures of Yammer (i.e. groups, threads, feeds, etc.). In the absence of bodies, gestures, facial expressions and voice, sensemakers may struggle to express themselves, in particular their emotions. Despite this, sensemakers find various ways to express feelings, mood and sentiment. For example, there is a sense of tension in Account 1b: Sharing knowledge – PPG survey results, as the participants are interpreting the feedback. Tanya uses capital letters to state her strong view that other stakeholders "CAN & SHOULD change the PPG". And Caitlin uses the "like" feature to acknowledge team members' sentiments. More generally, sensemakers often also use emoticons,

(i.e., :) or :(or variations of them) to express simple emotions. They also use exclamation marks to show excitement/frustration and @mention people to share enthusiasm with others. This *enables* emotions to be part of sensemaking in the virtual setting.

Second, because sensemakers and their bodies are reduced to two-dimensional (2D) texts on a screen, expressing any depth of personality is difficult, which *constrains* sensemaking. In virtual settings more generally, this can pose enormous challenges for strangers who are trying to get to know each other online, and there is a risk that some participants may fake their identity. In the institutional context, however, people use their real names and photos (and accurate information in personal profiles), which *enables* sensemaking. As well, colleagues who know each other in person extrapolate their understanding of each other's identity on to Yammer. As such, enacting and interpreting identity in Yammer is made easier because people generally stay true to their institutional identity. This extends beyond names and photos to behaviours in Yammer. For example in the Account 1b: Sharing knowledge – PPG survey results, Caitlin enacts her identity as a leader by guiding interpretation of the negative results as an opportunity rather than a threat, thereby keeping team morale up.

6.3.3 Place

In a broad sense, interviewees said they understand Yammer to be a place to "connect with people" and "keep an eye on others". More specifically, "where" these interactions (and thus sensemaking) takes place in Yammer (for the G&P team) is usually in a Yammer group.[21] These shared, web-based, virtual places *enable* sensemaking because participants can access Yammer (and therefore each other) from any device with an internet connection – at home, work or in between. For example in Account 1a: Coordinating projects – BAM project, Aaron participates from home and/or university while Mason is in the office. Further, the virtual place of the BAM project group allows sensemakers to import people and resources on demand. For example, in the broader thread (not shown in the selected excerpt), Mason and Aaron bring other people and resources into the Yammer group via the @mention tool and hyperlinks. As such, sensemaking is *enabled* by

[21] Practitioners also use All Company feed and My Feed in a more ad hoc fashion. Groups are preferred for continuous work on key activities.

participants' ability to simultaneously congregate in a shared virtual place *and* access additional resources and information from other places as required. Further, sensemakers may virtually congregate from any physical place as reflected in my fieldnote entry below.

> I checked Yammer on the way to work this morning (using the Yammer app on my smart phone) and saw that a colleague posted that they would be working at another site today – so when I came in (to the office) I knew I could have her desk.

Yammer groups can be set to a particular status (public, private or secret), allowing sensemakers to choose the best kind of place for particular activities. For example Account 1b: Sharing knowledge – PPG survey, primarily took place in the G&P Collaboration group which is private (only invited members can see and contribute to threads). The privacy of the group *enables* sensemakers to be honest when interpreting results and to express emotions where possible. On the other hand, the G&P Collaboration group is not entirely secure from external stakeholders; even though the group is private, comments are documented in black and white and may be copied, shared or printed. As such, sensemakers may withhold certain information or opinions, which may *constrain* sensemaking. Finally, in this case a few members of the broader claims division were invited to join the private G&P Collaboration group. This broadens the pool of expertise and experience of contributors, which may *enable* better sensemaking outcomes (e.g. in Account 1b: Sharing knowledge – PPG survey results, Amanda – the floating change consultant – shares stories from other areas in the claims division, which help provide a more nuanced interpretation of the results).

6.3.4 Time

In Yammer most interaction takes place asynchronously. That is, posts and comments are made over hours, days and weeks, and there may be large lapses in time between one post/comment and the next. In some instances, such as the YamJam in Account 1c: Engaging stakeholders – Comms framework, interaction may be semi-synchronous (i.e. participants attempt to converse in near-to-real-time). However, often sensemakers cannot type fast enough to keep up with the conversation. This is evidenced in my fieldnotes made during Account 1c: Engaging stakeholders – Comms framework: "For YamJams you need to prepare – just like a meeting – but write it in small chucks ready to post separately". Some contributors to the YamJam also reported to have experienced lag in the system; that is, there was a discrepancy between the time they typed words and those words appearing on the screen, which *constrains* sensemaking.

A further, related temporal feature of Yammer is auto-documentation of activities. How this auto-documentation enables and constrains sensemaking is discussed below. First, auto-documentation means that all Yammer activities are recorded and stored – every post and comment, every like and @mention, and every uploaded file or picture. Further, each comment is automatically time stamped and listed in the order in which it is posted. Comments are also indented from the initial post, which is how different threads are decipherable from each other. Such devices *enable* sensemaking because they give order to activities in Yammer and allow for turn-taking between participants. For example in Account 1a: Coordinating projects – BAM project, Aaron and Mason discuss BAM-62 in a fairly ordered manner and make comments in quick succession (13 comments in 5 hours).

Second, auto-documentation *enables* sensemaking because people can join a conversation at any time. Unlike in traditional settings where participants must arrive at a certain time, Yammer allows sensemakers to contribute when they are ready. For example in Account 1b: Sharing knowledge – PPG survey, Tanya (who works part-time from home) joins the conversation seven days after Caitlin's initial post. Further, sensemakers are able to alter their posts in retrospect. It is not possible to tell in the selected accounts if retrospective changes were made to threads. However, there have been cases where people have posted a statement and then retracted it later, leaving behind only the comments that had been made in response to the initial post. For example, an interviewee reported that a Finsure Group employee made a cheeky comment in Yammer about the chief executive officer's (CEO) salary increase and quickly came under pressure from peers to delete it.

Third, auto-documentation also *constrains* sensemaking. While the chronological ordering of posts makes sense, it is also a source of disorder. Namely, comments are captured in the order in which they are posted rather than in the order of conversation. For example in Account 1c: Engaging stakeholders – Comms Framework, when Bruce asks Tommy how many pills he took, the very next comment is made by Luke asking an unrelated question. Further, unlike in traditional settings where verbal comments are ephemeral, written posts remain in view to all participants. This means sensemakers must scroll backward and forward between comments in a thread, or between threads in a group, to try to keep up. Sensemakers can also be confused by concurrent threads/agenda items, as evidenced in the first few comments made by Tommy and Amber in the YamJam (e.g. "I'm getting dizzy"). Also, the YamJam is documented back to front; because

Yammer always displays the most recent threads first, when a participant returns to the thread after the YamJam, the most recent agenda item appears first. As such, if a participant misses the meeting and goes back later to catch up, the threads are more complicated to understand than, say, typical meeting minutes.

Sensemakers attempt to negotiate these temporal oddities in various ways. Namely, the "in reply to" tool is used to indicate to whom the comment is addressed. For example in Account 1c: Engaging stakeholders – Comms Framework, Tommy "in reply to" Bruce disagrees with Bruce's comment that senders of communication should select who receives it. Also, Sharon uses the "like" feature when indicating she has read and understood Luke's comment (without having to further interrupt the flow of the thread with another out-of-order comment). Finally, throughout the course of the YamJam Bruce uses the YammerFall feature to read all comments as they were made, regardless of which thread they are posted in.

6.3.5 Appropriation

The skills required of sensemakers to appropriate the Yammer platform to carry out key activities (the "how") are akin to more general social media skills (e.g. the ability to post, comment, like, @mention, share, chat and search). These skills, exemplified in all of the accounts, are familiar to G&P practitioners from their personal social media use. In particular, having experience with Facebook (which has similar functionality and appearance to Yammer) helps some G&P practitioners to adjust quickly to the Yammer platform, which *enables* sensemaking. However there are a number of key differences between how sensemakers use Yammer and how they use Facebook. For example, to build a strong network on each platform requires a different approach. "Friending" people on Facebook is the key to growing one's network, whereas in Yammer (as least in Finsure Group) it is better to focus on joining and contributing to groups.[22] Despite these differences, Yammer and Facebook look almost identical. As such when Yammer, for whatever reason, does not perform in the same way as Facebook, G&P practitioners become confused, which *constrains* sensemaking. As one interviewee said:

[22] Since 2012, groups have become a more prominent feature of Facebook.

> Yammer's a social media – and then you look at it and just associate it with something that you know … I use Facebook and I use Twitter and it's kind of a combination of both and it really confused me. I didn't know how, I didn't understand what it was doing and how it worked.

All in all, Yammer is a relatively easy technology to use in comparison to others, which *enables* sensemaking. As one interview said of his earlier attempts to train his colleagues in Yammer:

> You don't need training for Facebook, you don't need training for iPhones. User, user testing, or usability experts and things like that, they do things which mean products can be released with no training … And that's exactly what Yammer is aiming to be and (they) are pretty good at it. Pretty good. Um, so me going "alright, I'm going to train everyone in how to use Yammer" is highly flawed and very naïve.

Having said that, some G&P practitioners struggle with some technical aspects of the platform, which *constrains* sensemaking. For example, some sensemakers are overwhelmed by the sheer amount of information on Yammer, especially in conjunction with other communication tools. As one interviewee said:

> I struggle with using it in the day to day work, um, because of the way it's structured, and I can't always find what I was looking for (sic). The other problem that I have with it is it's another inflow of information, so it's just another thing that I need to watch on a daily basis.

Many sensemakers are able to overcome this information overload by sifting and scrolling though information rather than reading threads word for word. As one interviewee said: "That's social media – you just scroll on … You don't sit there and read everyone's post … You just keep going and keep going and keep going. Oh, there's something!"

Table 9 summarises the findings for Fieldsite 1 by outlining how sensemaking is enabled and constrained in Yammer along the five dimensions of sensemaking. It also prefaces the next section by listing the unique features of sensemaking in each dimension and summarising how sensemaking is altered owing to the virtual setting.

Dimension of sensemaking	**How sensemaking is *enabled* and *constrained* in dimension**	**Unique feature of sensemaking**	**How unique feature *alters* sensemaking**
Matter – the "things" that are implicated in sensemaking	Sensemakers create the textual materials involved in activities, which *enables* them have more control over sensemaking. Textual materials *enable* sensemaking because they can be modified to suit the activity, but can they only be created within the structures of Yammer, which *constrains* sensemaking. The institutional cues *enable* sensemaking.	Textuality – everything and everyone is a digital text	Textuality causes sensemakers to carry out an extra step, which presupposes the activity at hand, to disentangle the textual elements into categories of people, things and places.
Presence – "who" sensemakers are	Having text for bodies *constrains* sensemakers in their self-expression (identity, emotions, etc.). Limited emotional expression is *enabled* by use of emoticons. Sensemaking is *enabled* by use of real names and pictures, and enactment of professional roles.	Degrees of presence – sensemakers control their level of presence through deliberate action	Degrees of presence *alter* sensemaking because sensemakers have more control over presence and participation. However, immediacy of responses to stimuli is compromised, i.e., there is a 'gap' between sensemakers' thoughts/emotions and expression of them.
Place – "where" sensemaking takes place	Shared virtual places *enable* sensemaking over distance from anywhere, and *enable* resources to be brought in on demand. Being able to choose a group's status *enables* sensemakers to create places suitable for the activities at hand. Publicness of Yammer groups (even private ones) may *constrain* sensemakers in their honesty.	Locational variability – sensemaking takes place in many physical/virtual places, often concurrently	Locational variability *alters* sensemaking because sensemakers must process a large amount of data in multiple formats. Virtual places *alter* sensemaking because they shape people and things in ways not evident in traditional settings. Unlike in traditional settings, sensemakers must constantly switch between goals/projects.
Time – "when" sensemaking takes place	Auto-documentation (which provides for asynchronous and semi-synchronous interaction) *enables* sensemakers to partake in the activity in their own time. Auto-documentation is a source of both order and disorder, which *enables* and *constrains* sensemaking, respectively. Sensemakers may overcome constraints using features of Yammer (e.g. in reply to and YammerFall).	Temporal disorder – sensemaking is characterised by both order and disorder	Temporal disorder *alters* sensemaking because sensemakers can return to the activity at any time, i.e., the past can be revisited in ways not possible in traditional settings. However, if one can't remember searchable details of the thread, it is very hard to go back.

Appropriation – "how" sensemakers use the technology to accomplish activities	Yammer is like other social media (Facebook and Twitter) which *enables* sensemaking. However, sensemaking is *constrained* when Yammer does not behave like Facebook. Yammer's relatively simple interface *enables* sensemaking, yet some sensemakers are *constrained* by being overwhelmed by information.	User resilience – sensemakers develop resilience through overcoming "chicken and egg" process.	User resilience *alters* sensemaking because sensemakers are better able to overcome adversity.

Table 9: Summary of findings for Fieldsite 1 – Yammer.

6.4 Unique features of sensemaking in Yammer

Having described how sensemaking is enabled and constrained by Yammer, the unique features of sensemaking in this virtual setting are now identified (Stage 4 of the presentation of findings). These unique features, again described along the dimensions of sensemaking, illuminate how sensemaking is altogether altered by the virtual setting. In this stage of presenting the findings, the theoretical framework is consulted along with broader theory. Namely, they guide my interpretation of how sensemaking takes place in Yammer and how it differs from our more traditional understanding of sensemaking. Here I also use broader data (fieldnotes and interviews) to inform interpretations and conclusions.

6.4.1 Textuality

The "matter" dimension shows that sensemaking in Yammer is entirely mediated by digital texts. In Yammer everything and everyone (including artefacts, bodies and emotions) are made of the same digital cloth of words, symbols and pictures. We may call this aspect of sensemaking "textuality", which is unique to the virtual setting of Yammer. Textuality alters sensemaking because unlike in traditional settings, it may be difficult to isolate one digital text from another. For example, when the text in a post simultaneously represents the thing about which sense is being made *and* the sensemaker themselves, both the artefact and the body are the same digital text. In such a case sensemakers must carry out an extra step, which presupposes the activity at hand, to disentangle the textual elements into categories of people, things and places (a distinction that is far more obvious in traditional settings). For example in Account 1a: Coordinating projects – BAM project, the text in a single post simultaneously represents the sensemakers (e.g. Mason and Aaron),

the multiple foci of sensemaking (e.g. the BAM-62 development card), and the places in which the activity is carried out (e.g. JIRA and Confluence).

6.4.2 Degrees of presence

The "presence" dimension shows that in the virtual setting of Yammer, sensemakers are both enabled and constrained in their attempts to textually express their identities and emotions. Further, this textual embodiment impacts sensemakers' capacity to be visible to others. To explain, in the traditional sense we know someone is present because we can see them in front of us, but this is not the case in Yammer. Indeed, it is possible for sensemakers to be there in Yammer without being seen. For example, by just showing up and reading the thread but not contributing to it, sensemakers remain invisible to others (i.e. lurking). For example in Account 1a: Coordinating projects – BAM project, it is likely that Zane (IT developer), who has a vested interest in the outcome of this interaction, is passively reading the thread. Also, interview data suggests that other BAM project members likely read this thread (mostly in retrospect) but did not make any comments.

Here the concept of presence in the virtual setting may be problematised. That is, being present for sensemaking is not just a matter of being there or not; it is also a matter of being visible or not. As such, presence (of sensemakers in the virtual setting) has two dimensions: being there and being visible. Considering both the "being there" and "being visible" dimensions of presence gives rise to various "degrees of presence". Table 10 shows the degrees of presence made possible by textual embodiment of sensemakers in Yammer. Each type of presence is explained using examples from Account 1c: Engaging stakeholders – Comms Framework.

	Visible	Invisible
There	**Active presence** (posting, commenting, liking) Actively present sensemakers are those who are visibly active in the thread. There is no limit on the number of posts one can make in the thread and therefore how "present" they can be. Sensemakers may also express presence by using the "like" tool. For example Luke, who begins the thread and makes the most comments and likes, is arguably the most present. Others are arguably less present, for example, Cathy remains invisible for most of the thread, making only one comment. As such, there are further degrees of presence within active presence.	**Lurking** (viewing but not contributing) Lurkers are participants who are there reading the thread but are not contributing, thereby remaining invisible to others. There are 15 members of the Hub & Spoke Communications group, all of whom were invited to the YamJam; of these, only six people contribute to the Comms Framework thread and thereby make themselves visible to the group. It is likely that other meeting invitees are lurking in this thread.
Not there	**Passive presence** (Logged in but not paying attention) Passively present sensemakers are those who are visible to others but are not there or at all engaged in the thread. For example, it is possible that some YamJam invitees log in to Yammer at the time of the meeting and are visible to others in the Online Now feature, but they are not actually paying attention to the thread. This could be a deliberate action to make others think they have turned up to the meeting even though they are disinterested. Alternatively, other passively present sensemakers may have logged on to Yammer at some point prior to the YamJam, thus appearing in the others' Online Now lists, but may actually be caught up doing something else.[23]	**Non-presence** (Logged out of Yammer) This quadrant represents sensemakers who are not present at the YamJam. Namely, they are not logged in to Yammer at all.

Table 10: Degrees of presence in Yammer.

Such degrees of presence are unique to sensemaking in the virtual setting and *alter* traditional sensemaking in various ways. On one hand, sensemakers are able to take more control over their level of presence and participation in sensemaking than in traditional settings. In other words, in Yammer sensemakers may elect to be there, not there, or somewhere in between. On the

[23] The "online now" feature lists people in the user's network (who they have "followed") who are logged in to Yammer at the present time. It does not, however, show which group or thread in Yammer the followed person is viewing. In the case of the YamJam, some participants scanned their online now list to see who of the regular quarterly meeting participants had shown up; that is, it was likely that if a followed person was online at the time of the YamJam they were also viewing the YamJam thread, though this cannot be guaranteed.

other hand, textual embodiment undermines sensemakers' ability to react in a timely way to stimuli in Yammer in synchronous interactions. That is, the need to type words on a keyboard means sensemakers must make a deliberate choice to be present. As such, there is a resulting gap between the sensemaker's thought or emotion and expression of that thought or emotion.

6.4.3 Locational variability

The "place" dimension shows that sensemaking in Yammer takes place in many virtual and physical places. For example in Account 1c: Engaging stakeholders – Comms Framework, Bruce occupies the physical place of his desk (which he shares with Luke and Amber (researcher) who sit next to him) and the virtual place of Yammer. At the same time, Bruce is also concurrently in the virtual places of the YamJam and YammerFall (an auxiliary application that appears in a different window to the main Yammer thread and displays every comment made in the group in chronological order). During the YamJam, Bruce toggles between the virtual places of YammerFall (to read comments), the Yammer thread (to make comments), and verbal conversation with his colleagues in his immediate physical place. Traditionally sensemaking is assumed to take place in a single setting (e.g. meeting room), yet this is not the case in Yammer. Indeed, sensemaking in all three accounts takes place in various virtual and physical, individual and shared, places – often concurrently.

The following excerpt from an interview with Bruce reveals how he copes with activities being carried out in multiple places.

BRUCE:	But it is confusing, but not to the point where you're going like this "oh, what did Tommy say, oh sh*t, oh". I actually use the YammerFall.
INTERVIEWER:	Right, so how does YammerFall help you to keep track?
BRUCE:	Oh, well it just centralised it in chronological order.
INTERVIEWER:	The posts that were, all the posts in chronological order as opposed to ordered by the threads?
BRUCE:	As in, all the posts in chronological order – this is in chronological order (points at Yammer transcript) but it's only one thread.
INTERVIEWER:	Yep.
BRUCE:	There's about five, five or six threads going on.

INTERVIEWER: Is that confusing in itself?

BRUCE: No, not at all. ‘Cause you can get the gist of what they’re talking about in their message.

INTERVIEWER: So you don’t need to be in the thread to make sense of what’s going?

BRUCE: Sometimes I jump back into it to see what they were talking about … you just pair it all up.

This demonstrates that sensemaking is *altered* in the virtual setting because people must filter larger amounts of textual information in multiple places, and in multiple formats, at the same time. Sensemakers move fluidly between places in novel ways, such as toggling between windows and scrolling through threads, which is made possible by sensemakers’ ability to quickly switch between projects and goals. Further, virtual places literally shape the people and things (texts) that occupy them (more so than physical, traditional settings); that is, the text is presented differently in the Yammer group than in YammerFall, and so Bruce must compare and corroborate various sources of information in different formats.

6.4.4 Temporal disorder

The “time” dimension reveals that sensemaking in Yammer is temporally governed by the chronological documentation of threads. Despite this order, interactions may become disordered when, for example, two strains of conversation take place in a single thread. Further, because auto-documentation allows sensemakers to re-engage in the thread at any time, the process of sensemaking may be drawn out over an extended period of time. This means that the pace of activities are variable in the virtual setting, from the near-to-real-time of the YamJam in Account 1c to the long conversation about the PPG survey results in Account 1b. Such variable pace *alters* sensemaking. Namely, unlike in traditional settings, sensemakers may effectively pause sensemaking while they think about the problem, find additional resources, or tend to other activities. This is evident in Account 1a: Coordinating projects – BAM project when Aaron is conferrin*g* with the Zane (IT developer) and other resources before returning to the Yammer thread.

Temporal disorder *alters* and gives new meaning to the traditional concept of retrospective sensemaking; that is, sensemakers do not just look back on their action from the present moment, they actually return to a point in time in the past that has been captured by the Yammer thread. In other words, sensemakers do not just bracket and then look back on certain aspects of reality, they

may “go back in time” to re-read and respond to comments in the Yammer thread. However, it is difficult to return to and re-engage with threads if you do not remember the group/thread in which comments were made. As reflected in my fieldnote entry, sensemakers need to be able to use Yammer’s search tool (which is fallible) to find the desired thread to participate in it retrospectively: “It’s actually very hard to go back in time on Yammer, except if you know exactly what you are looking for, i.e., a name or topic”.

6.4.5 User resilience

The “appropriation” dimension of sensemaking in virtual settings shows that although Yammer is a relatively simple platform, sensemakers are sometimes constrained because of information load and Yammer not behaving like Facebook. Indeed, evidence shows that more important than a technical capacity for Yammer is a favourable attitude towards social media in general and, further, towards using Yammer in the organisational context. For example, some sensemakers believe a valid purpose of Yammer is to share information freely across distance, organisational hierarchy, structure and processes. As one interviewee said:

> I believe it does make you feel more connected to the organisation because you’re in contact with the people that you wouldn’t normally be in contact with (which means) a transparent working environment, the ability to share knowledge.

Others are deterred by behaviours they see on Yammer that they think should not be carried out at work, such as making trivial posts or posting personal photos. Others still, in the absence of coherent corporate direction on what Yammer is and how to use it, do not see a purpose for the platform at all; these sensemakers struggle with Yammer. As I observed in my fieldnotes: “Yammer does not have an intended use (in Finsure). It can be used for many things, but it has no central purpose therefore people don’t understand it”. On the other hand, sensemakers that successfully engage with Yammer are those who “have the inclination/motivation to start something”.

Throughout the interviews a theme emerged regarding sensemakers’ experiences of moving from being a sceptic of, to a believer in, Yammer. That is, the Yammer-user relationship is often a kind of “chicken and egg” stand off – sensemakers do not use Yammer unless they think they understand it, but Yammer may not be understood until one commits to using the platform. To break this deadlock, sensemakers often make a number of attempts to use Yammer before they experience a moment of realisation. As one interviewee said, “I understand the benefits of it but only because I’ve witnessed them”. Indeed, even the most fervent advocates of Yammer tried to use

the platform several times before they "got it". This was reflected in my own experience of Yammer. I thought that Yammer would just "come to me" in the course of working alongside other people. But I soon realised I had to put in a concerted effort to connect with certain people (opinion leaders, Yammer champions, etc.) before Yammer became useful and workable for me, as reflected in my fieldnote entry: "Now that I'm dedicating time to immersing myself in Yammer – I'm starting to get it – but if I was doing a (G&P) job as well, not sure I would uptake it as easily/quickly." Evidence suggests, therefore, that only after surmounting initial confusion, scepticism or resistance can Yammer be used to effectively carry out activities.

Indeed, sensemakers develop a kind of resilience in incorporating Yammer into their key activities. Such resilience *alters* their sensemaking. Namely, it equips sensemakers to take interruptions "in their stride". To explain, the uninitiated may experience breakdowns in sense constantly, be they technical issues with the platform or the social behaviours of other users. On the other hand, more experienced, resilient sensemakers treat such interruptions as "part and parcel" of social media generally and Yammer specifically. This resilience goes further than just scrolling past irrelevant content. Resilience is also about having a kind of faith in other users to serve the Yammer community. For example, resilient users of Yammer choose to interpret lurking (watching without contributing) as a legitimate way to participate in sensemaking instead of a type of spying or laziness. Further, effective sensemaking in Yammer requires a faith in the platform to be valuable (without any steadfast guarantees). Unlike other communication tools used by G&P team members, Yammer's outputs cannot be predicted on the basis of inputs. Yet it is this unpredictability that makes it so powerful, as suggested in the interview quote below.

> There's no requirements … there's no expectations. If you ask a question on Yammer, there's no expectation that you'll get answered … So that's the whole thing, that's the difference, and that's the unknown, and people hate that. It's so different. You write an email to someone and damn well you expect to get a response ... On Yammer, give it a go! Pull it off! Yay, got a response! And I got the answer. Awesome!

In sum, resilient sensemakers in virtual settings are better equipped to deal with interruptions and setbacks, be they technical or social. Indeed, resilient sensemakers take more risks and "cast their net" further in pursuit of carrying out activities. This *alters* sensemaking because sensemakers do not just make do with what is at hand in order to make sense (as they may in traditional settings); they actively seek out more information, use more tools, engage more people, and employ new skills that were not conceived of in traditional settings.

6.5 Chapter summary

In this chapter I have presented the results for Fieldsite 1 – Yammer. I have shown how sensemaking is enabled, constrained and altered by virtue of it taking place in Yammer (as opposed to in more traditional settings). My four-stage presentation of findings has culminated in five unique features of sensemaking that are specific to the virtual setting of Yammer. First, sensemaking in Yammer is characterised by textuality, which forces sensemakers to disentangle textual representations of people, things and processes in ways that are not demanded by traditional settings. Second, that sensemakers may control their level of presence in Yammer gives them more control over their participation than is possible in traditional settings. Third, that sensemaking takes place in various physical and virtual locations (as opposed to just one location in traditional settings) means that sensemakers must negotiate large amounts of information in various formats. Fourth, because time is distorted in Yammer (i.e. sensemaking is both ordered and disordered), sensemakers may participate in retrospective sensemaking in a qualitatively different way than in traditional settings (e.g. by going back in time). Finally, the resilience required of sensemakers as they accomplish activities in Yammer helps them to overcome obstacles to activities. These unique features of sensemaking will be revisited in Chapter 9. For now, I turn to the findings for Fieldsite 2 (telepresence) which will be presented in much the same way as Chapter 6.

Chapter 7 FIELDSITE 2 FINDINGS - TELEPRESENCE

In chapter 6 I presented the findings for Fieldsite 1 (Yammer). Now I present the findings for Fieldsite 2 (telepresence) following much the same structure, in four stages: (1) I provide a contextual background to the fieldsite, including identifying practitioners' key activities and the technologies that underpin them; (2) I present accounts of key activities as they are carried out virtually by practitioners and I identify instances of immanent and episodic sensemaking (along with the specific doings/acts of sensemaking that constitute them and their enabling sensemaking tools); (3) I return to the five dimensions of sensemaking in virtual settings (matter, presence, place, time and appropriation) and explore how sensemaking is both enabled and constrained by the virtual setting of telepresence; and (4) I describe how sensemaking is altogether altered by telepresence, and thereby articulate five unique features of sensemaking in telepresence. As we will see, these unique features of sensemaking are different to those arrived at in Fieldsite 1; they are extrapolation, performance, virtual culture, compression of time, and unity with technology.

7.1 Contextual background

Vitec is a global leader in technology design, manufacturing and sales. It is an S&P 500 listed company with customers in North America, South America, Asia Pacific, Africa, the Middle East and Europe. Vitec provides networking solutions for individuals, small to medium enterprise, and global multinational companies. These technologies enable customers to access data and each other across time, space and different kinds of computer systems. Indeed, 85% of all internet traffic travels across Vitec's systems, which include hardware such as routers and servers, software such a web-video and security software, and endpoints such as phones and telepresence rooms. Vitec designs, develops and manufactures all of its products internally, and then sells these products directly to customers.

At the leadership level, Vitec is managed by a series of boards and councils. At the operational level, Vitec has a matrix organisational structure – business units (products/services) on one axis (e.g. collaboration, security, data management) and functions (e.g. sales, development, marketing) on the other axis. I (the researcher) was embedded in a team of employees working in the collaboration business unit within a sales function; that is, collaboration sales. Collaboration products (the technologies the research participants sell to customers) include video, cloud computing, and mobile technologies. These are packaged together by collaboration sales

practitioners (CSPs) to provide solutions to customers' problems. Such problems usually relate to inefficiencies with internal communication and knowledge sharing. For example, to replace or complement radio communications in a mining company, Vitec may recommend video-enabled portable devices deployed to remote sites in conjunction with a cloud-based document storage solution.

7.1.1 Collaboration sales practitioners (CPSs)

The participant group is comprised of CSPs in Australia and New Zealand (ANZ), which is a sub-set of the broader Asia Pacific region. Geographically, research participants (and the researcher) are based in Brisbane, Australia. Other research participants are based in Sydney and Melbourne. Collaboration sales teams include regional sales managers, account managers, collaborations specialists, and system engineers. Such teams work directly with customers to identify, propose and sell collaboration solutions comprised of video-based technologies. While Vitec's collaboration products are developed and manufactured in-house, CSPs work closely with local certified Vitec partners (e.g. large telecommunications firms) who are employed directly by customers to install and maintain Vitec systems. Figure 8 summarises the CSPs' position within the broader Vitec organisation. Because Vitec is an enormous, global organisation with over 70,000 employees, it is not possible to include the entire organisational chart. Instead, the Collaborations Sales – ANZ section only is provided, which shows where CSPs fit in relation to their superiors and each other. The shaded boxes indicate how many of the research participants occupy each role. These 10 key participants, whose roles are described below, service a variety of specialist industries including healthcare, finance, primary resources and education.

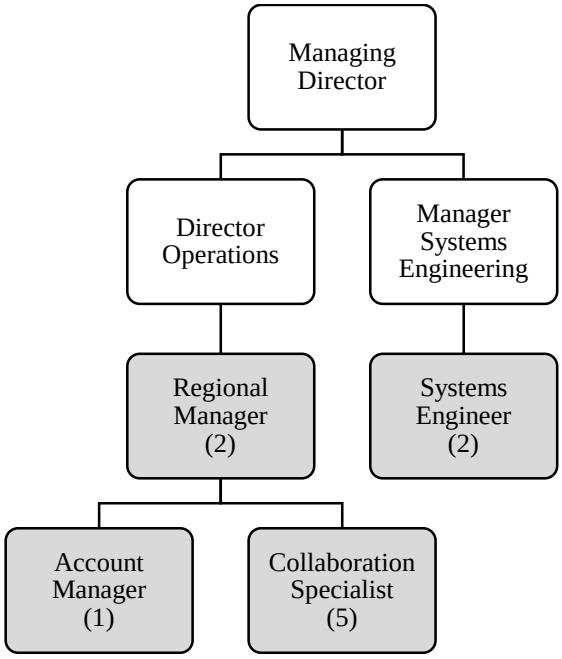


Figure 8: Hierarchy of Vitec Collaboration Sales Practitioners – ANZ.

Regional managers preside over collaboration sales and forecasting within each region (e.g. the state of Queensland) across various industries. They oversee teams of sales and technical personnel (usually with expertise in a particular industry) that are assembled to meet the needs of each customer. Account managers build and "own" relationships with specific customers, and host various meetings throughout the sales lifecycle with a focus on identifying problems/opportunities and consequent solutions involving Vitec's collaboration technology. Collaboration specialists are responsible for selling a package of specific technologies (hardware and software) to customers that fulfils the proposed solution. They also broker relationships between suppliers and customers. Finally, systems engineers work with IT personnel on the customer side to ensure the proposed solution can be successfully implemented. Collaboration specialists and systems engineers may meet independently with their counterparts within the customer's organisation to keep the project moving in between account manager-led meetings.

Key activities of CSPs

The key activities of CSPs are focused on customers and sales. CSPs' job, first and foremost, is to meet sales targets every week, month, quarter and year. As such, CSPs spend most of their time in meetings with customers. They also attend regular meetings with superiors or mentors

within their function (i.e. sales or technical roles). The tasks of CSPs also include report writing, preparation of sales presentations, attendance at higher level meetings, and some internal training. Despite these internal commitments, CSPs are very externally focused, and as such their key activities revolve around the lifecycle of the customer relationship. These key activities, which I arrived at iteratively throughout data collection and analysis, are: establishing relationships, devising solutions, selling products, and being available. Each is described below with examples.

Establishing relationships

Where establishing relationships is concerned, CSPs are responsible for pursuing new leads and arranging initial meetings with potential customers. CSPs are often assigned to customers within industries they are experts in. This is important because Vitec does not just sell products, it solves problems for customers. CSPs establish relationships with customers by sitting down with them and talking generally about markets, issues facing the relevant sector, opportunities and threats to their organisation, and possible ways to take their company forward. CSPs also devise and deliver sales presentations to demonstrate products, run use-case scenarios, and share success stories with new customers. An example of establishing relationships is a follows. An existing Vitec customer, an oil exploration firm, suggested to their Vitec account manager that one of their machinery service providers might benefit from Vitec technologies. As such the account manager, who specialises in the mining sector, asked for an email introduction to the chief information officer (CIO) of the machinery firm, followed up with a phone call, and then arranged to fly to Perth for an in-person meeting.

Devising solutions

Once the initial relationship is established, CSPs work with the customer (and each other) to flesh out the details of the problem/opportunity along with a comprehensive solution. When devising solutions, the CSP team members meet several times with various stakeholders within the customer's firm, including CEOs, CIOs, IT staff, and end users. CSPs also spend time on the customer premises to understand the business and how it might be improved with collaboration technologies. Often the problem and solution revolve around improving communication over distance, which leads to increased productivity. CSPs also meet as a team to discuss options and bring in other experts from within Vitec, such as product specialists who have intimate knowledge of the technology. An example of devising solutions is as follows. A CSP team in the medical

sector devised a collaboration technology solution for a hospital emergency room. In doing so, CSPs observed the hospital staff and patients "in action", learning what the current communication systems were between employees in different parts of the hospital. They proposed that video, in conjunction with new processes, might replace handheld phones to improve the accuracy of information being exchanged.

Selling products

Once a solution has been devised in conjunction with the customer, CSPs provide a breakdown of the collaboration hardware and software that will be required to bring the solution to fruition. At this stage, Vitec's system engineers have more detailed conversations with IT staff on the customer side to ascertain what existing infrastructure they have and how it might be integrated with the new technology. Collaboration specialists are ultimately responsible for breaking down the requirements and selling pieces of technology to the customer in packages. Although Vitec manufactures and sells all its own hardware directly to the customer, installation and ongoing service is provided by Vitec's approved service providers. As such, collaboration specialists also broker relationships between their customers and service providers to ensure a good fit and see that the solution is carried out as planned. An example of selling products is as follows. A CSP dedicated to the education sector worked with a university to improve the efficiency and effectiveness of communication between the leaders of the organisation (Chancellor, Vice Chancellors and senior administration staff). The agreed solution was to install a personal telepresence device on each leader's desk so they could have instant video calls at any time. The collaboration specialist then figured out how many units were required and what extra infrastructure was needed to make the technology operational, which was packaged into a contract.

Being available

Being available spans across all CSP's key activities no matter what the stage of the customer relationship; account managers, collaboration specialists, system engineers and regional managers (to a lesser extent) remain available to answer questions, trouble shoot problems, or discuss projects. Being available principally means keeping lines of communication open by providing customers (and colleagues) various means of getting in touch no matter where the CSP is working from (e.g. by personal telepresence at home or on a smart phone when travelling). These interactions are usually "off the cuff", casual and foster more interpersonal relationships between

colleagues, partners and customers. An example of being available is as follows. A collaboration specialist, close to closing a deal with a Brisbane-based customer, was in Melbourne for a conference. During a conference session the collaboration specialist received an email on his smart phone from the IT manager of the customer firm; she had seen the proposed contract and wanted to clarify some details. The collaboration specialist attended to the email immediately. Namely, he instant messaged a systems engineers in Brisbane and asked him to phone the customer and meet up with her.

Virtual tools used to carry out key activities

Vitec, the company, is run largely on its own systems. For example, Vitec supplies all its own hardware products such as servers and routers. Collaboration technologies are deployed company-wide. Desktop video phones, WebMeet[24] (video software), and WebMeet Social[25] (an enterprise social network similar to Yammer) enable every Vitec employee to connect across time, distance, business units and areas of expertise. Vitec staff also use ChitChat[26] (presence and instant messaging technology) to see colleagues' statuses (available, away, busy) at any given time. ChitChat is a downloadable software that can also be used by Vitec's partners to send IMs and/or make video calls. As well CSPs have access to every telepresence and video product offered by Vitec; these include immersive telepresence, multipurpose telepresence, personal telepresence, and WebMeet. Explained in more detail later, these video technologies are used by CSPs throughout the sales lifecycle with customers, partners and colleagues. Owing to their access and familiarity with such technologies, CSPs report that video is the "normal" mode of connecting with people, even more than the regular telephone/mobile.

Furthermore, Vitec's unified communications manager (UCM) is a technology that integrates all CSPs' personal devices. This means that CSPs can be contacted on a single phone number but may answer on any device (video or otherwise) they choose. UCM also enables CSPs to move between endpoints *during* interactions. For example, if a conversation begins on the phone in the car, CSPs can transfer the call to personal telepresence or WebMeet when they return to the

[24] This is a pseudonym of the actual product name.
[25] This is a pseudonym of the actual product name.
[26] This is a pseudonym of the actual product name.

office. Desktop phones (sometimes with video), mobile phones and email also play a large role in CSPs' interactions with customers, partners, suppliers and colleagues. They also use other common organisational technologies in the course of their work. For example, CSPs work independently on sales presentations or write reports using Microsoft Office, or arrange meetings using Microsoft Outlook. Further, Vitec staff have virtual desktops which allow them to access all required files, software and people from anywhere on any device (e.g. laptops, tablets and smart phones).

It is important to note that despite their huge reliance on technology, CSPs said technology cannot replace the in-person coffee or round-table meeting. Indeed, technology is used to enhance productivity in between such meetings, not replace them. Some CSPs said that the amount of travel to visit customers is not necessarily reduced by video, but one does get more done in between visits. As one interviewee said:

> The realities are that in my experience … it (video) doesn't reduce travel … It's still important for people to meet face-to-face and, you know, have a coffee, have a glass of wine. You can't remove that. But what happens in between is an escalation of that relationship … So if I'm meeting you again in three months we probably double or triple or quadruple what we normally would have done by leveraging other technology.

7.1.2 Telepresence

While CSPs use many, varied and integrated technologies to carry out key activities, this research focuses on how telepresence specifically is implicated in practice. Telepresence is a high end video-conferencing system that provides users with "face-to-face" virtual meeting experiences. The Vitec telepresence systems have a number of endpoints, namely immersive, multipurpose and personal, which allow users to experience telepresence in different ways (see Figure 9).[27] Immersive telepresence rooms enable users to conduct meetings with customers/colleagues over distance as if they were in the same room. This is achieved by employing identical meeting room architecture in each location, along with high end audio and visual connections. Multipurpose telepresence systems are used to turn ordinary meeting rooms into telepresence (video conferencing) rooms. Such systems are more versatile but less immersive; that is, the face-to-face experience is somewhat compromised because the visual and audio effects are less sophisticated.

[27] These images were sourced from the corporate website of the organisation that "Vitec" represents. To maintain anonymity, the reference is not provided.

Personal telepresence is a single user, home or office-based desktop system designed for users to gain quick access to colleagues/customers via video. Finally, Vitec also has a downloadable and web-based video software called WebMeet. Though WebMeet is not the express focus of the research, during data collection it became evident that CSPs use WebMeet in conjunction with telepresence all the time. Thus, WebMeet cannot be excluded from analysis.

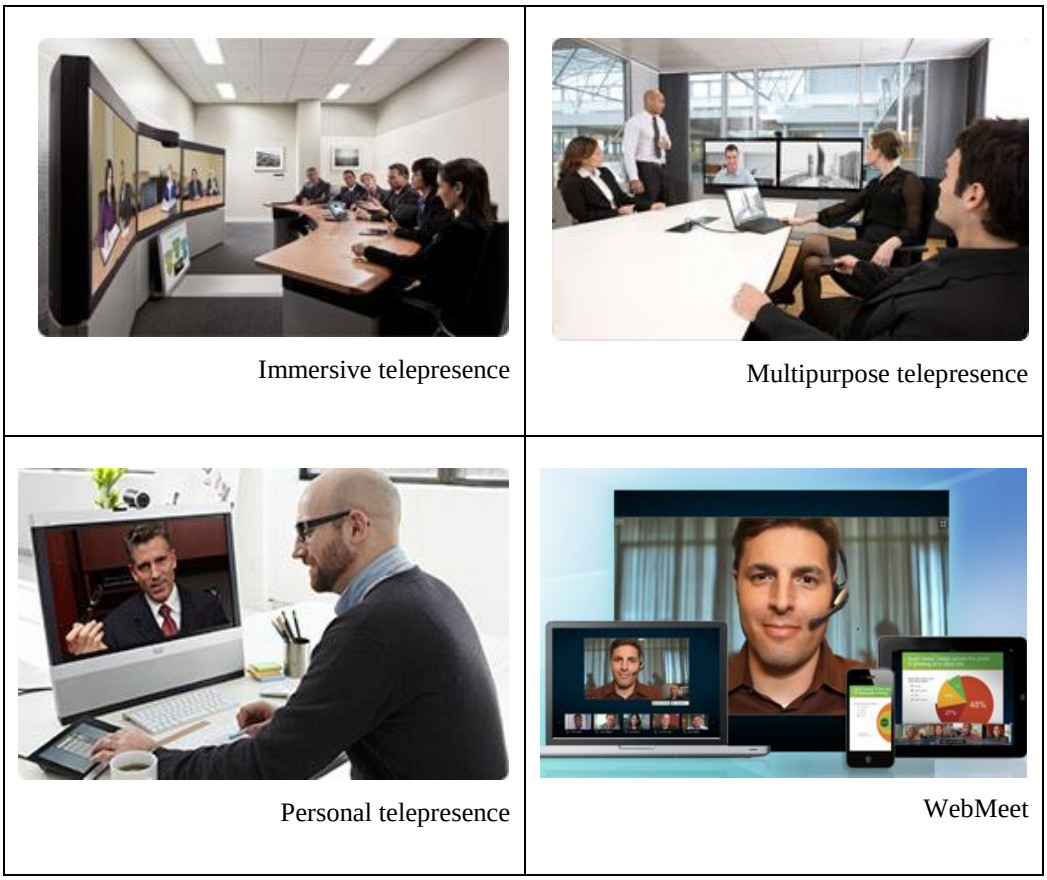


Figure 9: Telepresence endpoints.

Telepresence and CSPs

Having introduced telepresence technologies generally, I now outline how they are employed specifically by CSPs in practice. Because CSPs are in the unique position of using telepresence to sell that same technology to customers they are experts in, and evangelists of, telepresence/video technologies. Indeed, telepresence is not just a way to get work done; it is the source of CSPs' livelihoods. CSPs employ telepresence and video technologies throughout the sales lifecycle. The configuration of telepresence endpoints is chosen based on the need at the time and the type of technology their counterpart has access to; CSPs will devise the best configuration to

give the best video experience possible. There are literally hundreds of possible configurations of video call depending on the number of participants and the technology they have access to. Some common configurations are summarised below (see Table 11).

Configuration	Type of meeting
Immersive telepresence to immersive telepresence	Important meetings between two (or more) parties
Multipurpose telepresence or personal telepresence to various video endpoints	Planned meetings between CSPs and several parties
WebMeet or personal telepresence to various video endpoints	Ad hoc calls between CSPs and customers/colleagues

Table 11: Telepresence configurations.

Immersive telepresence, the most sophisticated telepresence experience, is usually reserved for important, high level meetings where it is desirable for participants to be able to see and hear each other as clearly as possible. This configuration is also sometimes used for product demonstrations. Second, multipurpose rooms are usually booked by CSPs in conjunction with various other endpoints for meetings with several parties at once (customers, partners, suppliers and colleagues). Finally, CSPs usually use WebMeet to make or receive video calls "on the go" (e.g. travelling between the home and office or on an overseas trip). WebMeet may also be used to join immersive, multipurpose or personal telepresence meetings. In all configurations, participants may join the conversation using any endpoint available to them. As one interviewee said: "Some people will just be sitting at their PC at their desk, other people will be on their iPad using ChitChat and then other ones will be into a (telepresence) room, so it's fine. Any way we want to do it, it works."

7.2 Episodic and immanent sensemaking

Having provided a background to the fieldsite, empirical data is introduced in the form of three accounts that exemplify how CSPs carry out key activities using telepresence (and video). Three of the four key activities and their exemplar accounts are listed in Table 12, along with information about the telepresence/video configurations and participants involved. The first key activity, establishing relationships, has been omitted because it does not (usually) involve telepresence.

Ref	Activity	Account	Configuration	Participants
2a	Devising a solution	Choosing between products	Personal telepresence to multipurpose telepresence and WebMeet	Collaboration specialist (1) Product specialist (1) Customer (1)
2b	Selling products	Closing a deal	Immersive telepresence to immersive telepresence	Account manager (1) Systems engineer (1) Collaboration specialists (2) Members of customer team (5)
2c	Being available	Teleworking from overseas	WebMeet to WebMeet	Regional manager (1) Systems engineer (1) Customer (1) Family members (2)

Table 12: Summary of CSPs' key activities and exemplar accounts from empirical data.

Now a background to and a summary of each account is provided, including details of the intelligibility towards people act and the technology that underpins the activities. Photos of the activity in progress are provided along with annotated narrative accounts of the activity. Owing to the sensitivity of customer information, it was not possible to record (many) telepresence sales meetings as they unfolded. As such, the accounts presented are fictional reconstructions of observations made in the field (along with information collected during interviews). These accounts are informed by my own reactions to various types of meetings and the interviews. Furthermore, interviewees gave specific examples of how they carried out their everyday activities using telepresence/video. In all photos accompanying these accounts, identifying information has been greyed out.

7.2.1 Account 2a: Devising solutions – comparing products

The first account exemplifies the key activity of devising solutions as it takes place in the virtual setting of telepresence. Alan, a collaboration specialist operating from home in Brisbane, has been working with his team to devise a collaboration solution for a mining company, OzCo. Alan has asked OzCo's CIO, Dick, to go into Vitec's Perth office and connect to the meeting via a multipurpose room. During the meeting Alan invites a Norway-based product specialist, Gary, to the meeting who joins via WebMeet from his desktop. The photos in Figures 10 and 11 show the three participants (and the researcher/observer) on the telepresence call. The telepresence system ensures that the person who is talking (Alan) takes precedence on screen. The rest of the participants appear on an "active presence" strip at the bottom of the screen (see Figure 10). The

researcher (bottom right hand image in Figures 10 and 11) is remotely observing the meeting from a multipurpose telepresence room in Brisbane. As shown in Figure 11, when the PowerPoint slide is introduced into the meeting it dominates the screen and the participants are significantly reduced in size.

In this account each participant is acting towards their own sense of the meeting. For example, Alan is acting towards his sense of wanting to sell products, and Dick is acting towards the sense of trying to get the best solution for his company. All three participants share a mutual, more specific goal of attempting to solve internal communication problems at OzCo with a video-based solution. In doing so, they are choosing between three options: multipurpose telepresence, video phones, and personal telepresence. As reflected in Figures 10 and 11, the configuration that facilitates this exchange is personal telepresence to multipurpose telepresence, and later in the account, Gary joins using WebMeet. All participants have a slightly different experience of the meeting; that is, on their own screen their own image (self-view) is always minimised (as I am in Figures 10 and 11 which are taken from my perspective).

As seen in Figure 10, Alan has set up his home personal telepresence system strategically. The camera nicely frames his head and torso. He has also arranged items in the background such as Vitec hardware (phones) and a leather couch, to convey a neat and professional image. He also uses self-view to keep an eye on how he looks throughout the call (e.g. posture and facial expressions). Gary, on the other hand, has his desktop camera focused on his forehead, which Alan refers to as "turbo head" (bottom left of Figure 10). Dick, who joins the conversation from a multipurpose telepresence room in Perth, does not know how to use the remote control to set the camera. As such, Dick's camera remains in the position he found it which captures a largely empty meeting room, reducing him to a faraway object on Alan and Gary's screens (middle picture in Figure 10).

Figure 10: Account 2a: Devising solutions – comparing products (#1)
Large screen: Alan (collaboration specialist)
Small screens/active presence strip (from left to right): Gary (product specialist), Dick (OzCo CEO)
Bottom right screen: Amber (researcher/observer)

Figure 11: Account 2a: Devising solutions – comparing products (#2)
Large screen: PowerPoint shared by Gary
Top screen: Alan appears in large window, other participants in small windows/active presence
Bottom right screen: Amber (researcher/observer)

Now follows an annotated narrative of the account as it unfolds. Similar to Chapter 6, within these narratives I identify specific instances of immanent and episodic sensemaking which are colour coded. As well, the specific doings and acts that comprise immanent and episodic sensemaking (respectively) are italicised in the annotations. Each instance of sensemaking is discussed separately at the conclusion of the account. Throughout I refer to the specific lines in the narrative in which the doings and acts of sensemaking appear.

Acts of episodic sensemaking	Narrative account	Doings of immanent sensemaking
	The account begins when, at 4pm Brisbane time, Alan uses his personal telepresence unit to dial the multipurpose room he has booked for Dick in Perth where it is 1pm. Dick sees the incoming call on the screen and answers using the remote control that was on the desk when he entered the room. Alan comments that Dick is looking well and asks about the weather in Perth. Dick says it's been a big week and he's looking forward to a sunny weekend of boating. Following pleasantries Alan confirms that, as per previous conversations, at this stage OzCo is looking for a solution to replace current teleconferencing systems, which are unreliable and ineffective. But exactly which technology will be used is still undecided. Alan suggests that there are two roads they could take – replacing the room-based teleconferencing with a multipurpose system or giving each individual a video phone or personal telepresence system on their desk (so they don't have to move into a shared room in order to make video calls).	Alan *contacting* Dick. Dick *answering* the call. Alan *complimenting* Dick. Dick *responding* to Alan. Alan *summarising* conversations to date. Alan *suggesting* options.
Dick *asks* Alan a difficult questions. (interruption) Alan *points* to the item in question. (clarify understanding of problem)	Dick asks some quite technical questions about how a particular model of video phone (one of which is sitting behind Alan) might integrate with other non-Vitec technology. Alan points to the black phone (on the far left in Figure 10) to confirm which model Dick is referring to. Realising he does not have enough expertise in that area, Alan tries to contact a video phone product specialist; he has a particular colleague in mind (Gary in Norway). Alan calculates in his head what time it is in Norway – about 9am the same day. He thinks Gary should be at work by now. Alan sends Gary an instant message via ChitChat asking if he has time for a chat. Gary indicates that he has a few minutes free, and	
Alan *invites* Gary to join.		

Gary *joins* the meeting. Alan *introduces* Gary to Dick.	27 28 29 30 31 32 33 34 36	so Alan calls Gary using his personal telepresence system. Gary answers the call at his office desk using WebMeet and is connected to the telepresence meeting. Alan introduces Dick to Gary and then summaries the recent discussion. Gary has a PowerPoint slide showing the features of the multipurpose systems in comparison to personal telepresence and video phones, which he shares with his colleagues by plugging his laptop into his personal telepresence system, which enables screen-sharing (see Figure 11). The trio read through the slide and discuss the options.	
Gary *shares* the PowerPoint			
The trio *discuss* options. (resolution)	37 38 39 40 41 42 43 44 45 46 47 48 49	As time is running out, and sensing that a resolution is close, Alan asks how the others feel about the options. Dick and Gary agree that it would be best if Gary talked directly with OzCo's IT manager to iron out details, but at this stage they think desktop video phones would be sufficient rather than multipurpose or personal telepresence. Alan offers to arrange a video meeting in the next few days, which he does on the spot. Alan's Outlook account dominates the screen, replacing Gary's PowerPoint slide, and he composes an invitation. Gary and Dick can see the words Alan is typing and Alan seeks their input about a suitable day and time. When the email invitation is complete, Alan thanks Gary and Dick for their time. The trio chat for a further two minutes before Alan terminates the call using his personal telepresence touch screen.	Alan *asking* how the chat is going. Dick/Gary *responding* to Alan. Alan *offering* to make an appt. Alan, Dick, and Gary *collaborating* on the email invite. Alan *thanking* his counterparts. The trio *chatting* and Alan c*losing* the meeting.

Immanent sensemaking features heavily in this account. Namely, the exchange between sensemakers is fluid and natural for most of the conversation, as evidenced by the friendly banter between participants. For example, as per the grey annotations in the right hand column the conversation begins with free-flowing chat including the following doings of sensemaking: Alan *contacting* (line 1) Dick; Dick *answering* the call (line 4); Alan *complimenting* Dick (line 5); Dick *responding* to Alan (line 6); Alan *summarising* conversations to date (line 8); and Alan *suggesting* options (line 12).

At this point an interruption occurs and episodic sensemaking ensues. As per the yellow annotations in the left column, the acts of sensemaking that comprise this sensemaking episode are as follows. Dick *asks* Alan some difficult, technical questions that he is unable to answer offhand (line 17). Then Alan *points* to the item in question to clarify Dick's question (line 19). This interruption is resolved by Alan who *invites* Gary (a video phone product specialist) to join the meeting (line 25). Gary *joins* the meeting (line 28); Alan *introduces* Gary to Dick (line 29); Gary *shares* the PowerPoint (line 32); and the trio *discuss* options (line 36).

The account concludes by reverting back to immanent sensemaking as per the second bank of grey annotations in the right column. This includes the doings of Alan *asking* how the conversation is going (line 37); Dick/Gary *responding* to Alan (line 38); Alan *offering* to make an appointment (line 42); Alan, Dick and Gary *collaborating* on the email invite (line 43); Alan *thanking* his counterparts (line 47); the trio *chatting* in general (line 48); and Alan *closing* the meeting (line 48).

7.2.2 Account 2b: Selling products – closing a deal

The second account exemplifies the key activity of selling products as it takes place in the virtual setting of telepresence. In this account Tony, a Vitec account manager servicing customers in the education sector, is hosting a meeting with a team from State University (SU). SU already has 10 multipurpose telepresence units across five campuses, and an immersive telepresence room at their principal campus in Landsborough. It is the last day of the financial year and this meeting is being held to finalise a deal on twenty new personal telepresence units for the Vice Chancellors and senior administrators of SU as part of a solution to improve communication across the University. The Vitec team is working towards their sense of wanting to close the deal so that their commissions are included in the current financial year. On the other hand, the SU team act towards

their sense of wanting to spend their budget before the end of financial year but also get the best deal from Vitec. All parties share the mutual goal of wanting to proceed with installation of the technology so as to improve SU's internal communications.

This is a smooth meeting involving participants who are well versed in using the telepresence technology. This activity involves the most sophisticated configuration of endpoints available (immersive to immersive telepresence), which creates a sense of being in the same room together physically. As shown in Figure 12, Vitec's Tony (account manager), along with Monty (systems engineer), and Boris and Charlie (collaboration specialists) attend the meeting from the immersive telepresence room in Brisbane. The SU team of Larry (team leader), Ben (IT manager), and three IT officers (Craig, Joshua and Levi) attend the meeting via SU's immersive telepresence room in Landsborough (Figure 13). In both rooms the lighting, audio, seating and cameras are pre-set and fixed; all the participants need to do is sit down in time for the meeting to commence. Each participant has a personal microphone positioned in front of them on the table. The photos in Figures 12 and 13 are taken from inside Vitec's immersive room, just behind the head of the researcher/observer. As shown, there are four Vitec staff (in the foreground) talking with five SU staff (on the screens).

Figure 12: Account 2b: Selling products – closing a deal (#1)
SU staff (on screen) from left to right: Larry (team leader), Ben (IT manager), Craig (IT officer)
Vitec staff (in foreground) from left to right: Amber (researcher, blonde hair), Tony (account manager), Monty (systems engineer), Boris (collaboration specialist), Charlie (collaboration specialist).

Figure 13: Account 2b: Selling products – closing a deal (#2)
SU staff (on screen) from left to right: Joshua (IT officer), Levi (IT officer), Larry (team leader), Ben (IT manager), Craig (IT officer)
In foreground: Amber (researcher, blonde hair)

Now follows the narrative account as it unfolds. Again, alongside the narrative I annotate the specific doings and acts that constitute immanent and episodic sensemaking, respectively. Each instance of immanent and episodic sensemaking is discussed separately at the conclusion of the narrative.

Acts of episodic sensemaking	Narrative account	Doings of immanent sensemaking
	The account begins at 12noon when the immersive telepresence systems at Vitec and SU are automatically connected; there is no need for either party to dial or answer the call. This occurs because Tony booked the 30 minute meeting from 12noon to 12:30pm in advance. The Vitec team throw on jackets and ties just before entering room and see SU staff arriving. The bosses (Tony and Larry) take the centre seats at their respective tables and the others sit around them. When Tony can see all are present, he welcomes everyone by looking directly into the camera, thereby effectively looking each participant in the eye. Tony asks Larry, the SU team leader, to lead off with questions about the contract. Larry, who has a paper copy of the contract in front of him, asks several questions about warranty on the new hardware, which Tony answers. Then SU's IT manager, Ben, asks if the new technology will be able to be integrated with all SU's existing telepresence units and that Vitec see to it that this will be carried out by the installation partner. Tony nods and looks to Monty (systems engineer) for confirmation.	Participants *arriving* at the meeting. Participants *dressing* in ties and jackets. Tony *noticing* all are present and *welcoming* everyone. Tony *inviting* Larry to speak. Larry *asking* about the warranty. Tony *answering* Larry. Ben *asking* about integration. Tony *seeking* confirmation from Monty.
Monty and Ben *discuss* technical details. Tony *notices* particiants' attention is waning (minor interrution) Tony *interrupts* the discssuon and *suggests* they move on. Larry *approves* the suggestion.	Monty and Ben go on to discuss a few technical issues about integration which seems to go over the heads of the other participants who begin to "turn off" a little; they fidget and check their phones. At this point, Tony notices that Larry's attention is waning. With 10 minutes to go in the scheduled meeting, Tony leans forward and interrupts Monty and Ben, suggesting they continue their discussion later, provided Larry is content that any details can be ironed out. Larry nods with approval.	

Larry *excuses* himself and his team for a moment (interruption) Larry and team *discuss* decision SU members *return* to the meeting (resolution)	Tony invites Boris (Vitec collaboration specialist) to answer any questions about the pricing. Larry asks if the 5% discount they discussed for signing before the end of finical year still applies, and Boris says it does. Boris then suggests that the contract be signed, as the conversation has not incurred any changes to the agreement. Larry then asks the Vitec team to excuse them for a moment and tells everyone on his team to mute their microphones. Larry spends a minute privately discussing his decision with his team; Vitec staff can see but not hear them. The SU team members unmute their microphones as Larry pulls a pen from his shirt pocket and signs the contract in front of all parties. Larry says he will scan and email the signed contract after the meeting. Tony says, “Thank you. I’ll be sure to shake your hand when next we meet”. With five minutes to spare, all participants leave their respective rooms. The immersive telepresence session automatically closes at 12:30pm as scheduled.	Tony *inviting L*arry to speak. Larry *asking* about the discount Boris *answering* Larry and *suggesting* the contract be signed. Larry *signing* the contract. Tony *thanking* Larry and.

While most sensemaking in this account is immanent, minor interruptions do occur that initiate instances of episodic sensemaking. As per the grey annotations in the right column, sensemaking begins in an immanent fashion (through doings of sensemaking) with all participants *arriving* at and connecting to the meeting via various devices (line 1).This immanent sensemaking also involves the Vitec team *dressing* in jackets and ties (line 5); Tony *noticing* all are present (line 8); Tony *welcoming* everyone (line 9); Tony *inviting* Larry to speak (line 10); Larry *asking* a question about the warranty on hardware (line 11); Tony *answering* Larry's question (line 13); Ben *asking* about integration (line 14); and Tony *seeking* confirmation from Monty (line 16).

In the middle of the meeting a minor interruption occurs by way of the loss of concentration of a key stakeholder, Larry. As per the yellow annotations in the left column, episodic sensemaking (comprised of acts of sensemaking) ensues when, as and Monty and Ben *discuss* technical details (line 18), Tony *notices* participants' attention is waning (line 21). To resolve this issue and get back on track with the activity of closing the deal, Tony proceeds with further acts of sensemaking. Namely, Tony *interrupts* the discussion (line 23) and *suggests* they move on (line 24). Larry then *approves* the suggestion at which time the interruption is resolved (line 25).

As per the blue annotations in both the left and right columns, the account concludes with further immanent sensemaking with a very minor interruption (sensemaking episode). This sensemaking includes the doings of Tony *inviting L*arry to speak (line 26), Larry *asking* about the discount (line 27), and Boris *answering* Larry and *suggesting* that the contract be signed (line 29). There is a minor interruption (and consequent acts of sensemaking) when Larry *excuses* himself and his team for a moment (line 31) and they *discuss* their decision while Vitec staff wait (line 33). The SU members then *return* to the meeting by unmuting themselves (line 34). The account concludes immanently with the doings of Larry *signing* the contract (line 35) and Tony *thanking* Larry (line 37).

7.2.3 Account 2c: Being available – teleworking from overseas

The third account exemplifies the key activity of being available as it takes place in the virtual setting of telepresence. Adam is a regional manager who is responsible for sales in the medical sector in ANZ. Adam is on one of his regular trips to Vitec's Asia Pacific headquarters in Kuala Lumpur. He travels 30 weeks of the year, leaving his wife and daughter at home in Brisbane. Vitec's video technologies, in particular WebMeet on his smart phone and laptop, enable Adam to

stay connected with his colleagues, suppliers, customers and family while he's away. After the flight from Brisbane, there are still a couple of working hours left in the day back in Australia. As Adam need not go into the Kuala Lumpur (KL) office until the next day, he decides to take a cab to his hotel and work from his room.

In this account of the activity of being available, sensemakers act towards various intelligibilities. Adam is acting towards his sense of responsibility to continue to support his customers even while he is in transit. Other sensemakers act towards quite different goals. For example, Adam's customers are acting towards their sense of wanting to progress their own projects, while Adam's daughter and wife want to say goodnight to their dad/husband. The interactions between sensemakers in this account take place through a number of different endpoints (e.g. ChitChat and email) but mostly through WebMeet. For example, Adam transitions from WebMeet on his smart phone to WebMeet on his laptop; other participants use WebMeet on computer and tablet. Figure 14 represents Adam working in the hotel room.

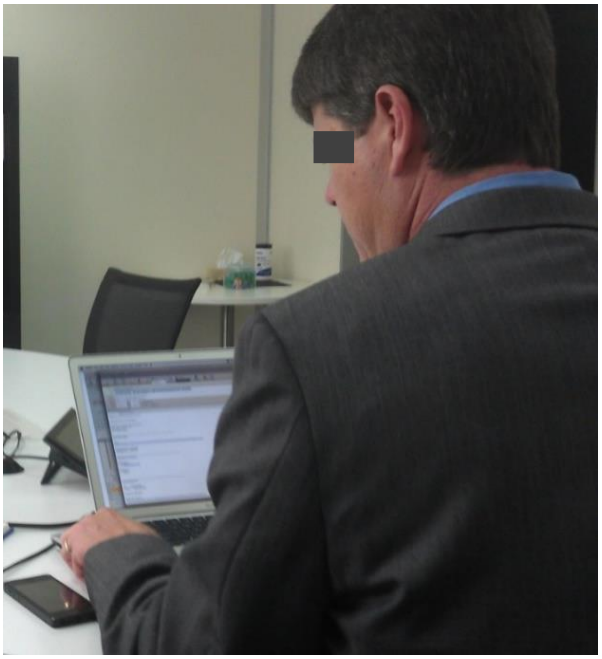


Figure 14: Account 2c: Being available – teleworking from overseas
Adam works from his hotel room using multiple devices (laptop, smart phone) and Vitec platforms (WebMeet, ChitChat, email).

Now follows the narrative account as it unfolds. As with the above two accounts, the instances of immanent and episodic sensemaking are colour coded in the annotations, and the doings and acts that comprise these instances of sensemaking are italicised.

Acts of episodic sensemaking	Narrative account	Doings of immanent sensemaking
	1 On the way from the airport to a KL hotel, Adam checks his 2 emails on his smart phone. He finds various requests for his 3 attention, which he mentally arranges in order of priority. The 4 most urgent message is from a collaboration specialist back in 5 Brisbane, John, to call him about a brand new customer, 6 MediAsia, a large pharmaceutical company. John's email says 7 that MediAsia are keen to talk to Adam about Vitec's past 8 experience with the medical industry in Asia. Adam immediately 9 calls John via WebMeet on his smart phone. John answers from 10 WebMeet on his desktop. Ten minutes into their discussion 11 Adam arrives at the hotel room, boots up his laptop, and opens 12 WebMeet; he puts down his phone and continues the 13 conversation via WebMeet on his laptop.	Adam *checking* his email. Adam *prioritising* requests. Adam *contacting* John. John *receiving* the call. Adam *transferring* the call Adam and John *discussing* the new customer.
Adam *receives* request from Stewart (interruption). Adam *acknowledges* the message from Stewart. Adam *terminates* the call with John. Adam *contacts* Stewart. Stewart *explains* the problem.	14 During the WebMeet call, Adam receives an instant message on 15 ChitChat from a different customer, Stewart from PharmaHealth 16 – he needs to speak with Adam urgently. Adam acknowledges 17 the message via ChitChat (instant message) and says he will be 18 available to talk in two minutes. Adam cuts the discussion with 19 John short and says he will contact MediAsia directly tomorrow 20 morning to follow up. He then video calls Stewart from 21 PharmaHealth and asks what the problem is. Stewart is unhappy 22 following an incident earlier in the day regarding a botched 23 installation of Vitec software that caused system outages at 24 PharmaHealth Australia wide. Stewart is visibly distressed; he is	
Adam *understands* the problem and *states* he will help.	25 red in the face and talking quickly. Adam does his best to listen to 26 the problem and keep Stewart calm. Adam says he will call the	

Stewart *argees* with Adam's idea
Adam *contacts* Mark and Mark *receives* the call.
Adam instructs Mark and *terminates* the call.

system engineer dedicated to PharmaHealth's account, Mark, immediately and ask him to go their head office and check over the installation first hand. Stewart says he looks forward to seeing Mark first thing in the morning. Adam then uses WebMeet to phone Mark who is on his way home. Mark answers using his smart phone – voice only. Adam gives Mark instructions to visit PharmaHealth in the morning, thanks him, and terminates the call.

It's now late in the day and Adam decides to stop working, having dealt with the most urgent queries. As he pours himself a drink from the minibar, he receives a WebMeet call from his wife Mia and daughter Sophie. Mia and Sophie place the call using a free web-based version of WebMeet on a tablet and Adam answers the call using his laptop. Sophie is excited see her dad and, as always, asks him what the hotel is like. Adam picks up his laptop and points the camera around the room and then out the window so Sophie can see the city lights. As it's nearly bedtime, Adam asks Sophie if she would like him to read her a bedtime story that he packed in his suitcase. Sophie listens to and watches her dad as he reads aloud and turns the pages so she can see the pictures. Afterwards Mia asks Sophie to go to bed and has a quick chat with her husband. The account concludes when Mia terminates the call on her tablet touch screen.

Sophie/Mia *contacting* Adam.
Adam *receiving* the call.

Sophie *asking* to see the room.
Adam *showing* Sophie the room.

Adam *reading* Sophie a book.

Adam *chatting* to Mia.
Mia *concluding* the call.

As per the grey annotations in the right column, the account begins with immanent sensemaking whereby Adam checks his messages on the go. In doing so, he seamlessly switches between technological platforms as necessary. In order of occurrence the doings involved in this immanent sensemaking are: Adam *checking* his email (line 1); Adam *prioritising* requests (line 3); Adam *contacting* John (line 8); John *receiving* Adam's call (line 9); Adam *transferring* from smart phone to laptop (line 11); and Adam and John *discussing* the new customer (line 12).

Adam's immanent sensemaking interaction with John is interrupted by an urgent message from Stewart, an unhappy customer. As per the yellow annotations in the left column, episodic sensemaking ensues with Adam trying to calm Stewart down and resolve the problem. This sensemaking episode is comprised of the following acts of sensemaking: Adam *receives* the request from Stewart (line 14); Adam *acknowledges* the request (line 16); Adam *terminates* the call with John (line 18); Adam *contacts* Stewart (line 20); Stewart *explains* the problem (21); Adam *understands* Stewart's message (line 25) and *states* he will help (line 26); and Stewart *agrees* with Adam's idea to resolve the problem (line 29). The resolution of the interruption is complete when Adam *contacts* Mark (the systems engineer) (line 30), Mark *receives* the call (line 31), Adam *instructs* Mark (line 32); and Adam *terminates* the call (line 33).

As per the second bank of grey annotations in the right column, the account concludes with an immanent sensemaking exchange between Adam and his family which involves the following doings: Sophie and Mia *contacting* Adam (line 38); Adam *receiving* call (line 39); Sophie *asking* to see the room (line 41); Adam *showing* Sophie the room (line 42); Adam *reading* Sophie a book (line 45); Adam *chatting* to Mia (line 47); and Mia *concluding* the call (line 48).

7.2.4 Summary of sensemaking in empirical accounts

Table 13 summarises the exemplar accounts of key activities, the instances of immanent and episodic sensemaking within them, and their constitutive doings/acts.

Account	Instance of sensemaking	Sensemaking type	Doings/acts of sensemaking
2a: Devising solutions – Comparing products	Friendly conversation to open the meeting	Immanent	contacting, answering, complementing, responding, summarising, suggesting, sharing, discussing
	Tough technical questions	Episodic	asks, invites, joins, introduces, points, discusses
	Wrapping up the meeting	Immanent	asking, responding, offering, collaborating, thanking, chatting, closing
2b: Selling products – Closing a deal	Commencing the meeting	Immanent	connecting, dressing, entering, noticing, welcoming, inviting, asking, answering, seeking, discussing
	Waning attention	Episodic	notices, interrupts, suggests, approves
2c: Being available – Teleworking from overseas	Checking messages	Immanent	checking, prioritising, contacting, receiving, transferring, discussing
	Unhappy customer	Episodic	receives, acknowledges, terminates, contacts, explains, understands, states, agrees, reassures, contacts, instructs, concludes
	Family call	Immanent	contacting, receiving, asking, reading, chatting, concluding

Table 13: Summary of immanent/episodic sensemaking and constitutive doings/acts in telepresence.

As was the case in Chapter 6, 10 of the most common acts/doings (five of each) and their corresponding virtual sensemaking tools appear in Table 14. Again, general observations are made about these tools' potential implications for sensemaking. For example, the doing of discussing is enabled by the specific tools of voice and video, which provide sensemakers with vocal and physical cues about when it is their turn to speak. Telepresence also automatically privileges the image of the person who is speaking by displaying them in the largest window on the screen. Another tool that enables sensemaking in telepresence is WebMeet's mechanism of adjusting the interface to the device in use (PC, laptop, tablet). These more subliminal, taken-for-granted tools seem to give sensemakers a baseline sense from which to operate as they carry out activities.

Doings/acts of sensemaking	**Virtual sensemaking tool**	**Observations**	**Implications for sensemaking**
Joins (meeting) (act)	- Remote control (multipurpose telepresence) or on-screen button (WebMeet)	- Combination of physical and digital tools involved - Can join from anywhere on any device	- Blending of physical and virtual matter - Integrated virtual systems enable sensemaking
Welcomes (act)	- Looking directly into camera (immersive telepresence)	- Has the effect of looking each individual in the eye	- Possible to address all sensemakers simultaneously, which is not possible in traditional settings
Contacts (act)	- ChitChat used in parallel with telepresence/video	- Can import expertise on the spot	- Transcend time and space
Explains (act)	- Voice and video	- Intonation and facial hands gestures relied on	- Somewhat replicates sensemaking in traditional settings
Discusses (act)	- Turn-taking via voice and video	- There is a slight delay on the audio	- Interaction does not flow 100% naturally
Suggesting (doing)	- Video	- May point to a physical object (e.g. paper contract)	- Shared objects do not equate to shared place (here, there, between?) - Shared experiences (i.e. seeing the same things) enable sensemaking
Joking/laughing (doing)	- Audio - Visual cues via video	- Aside jokes are heard by everyone (unless mute button in use) - Others' physical environment can transcend space	- Personal relationships formed in virtual setting - One can express emotion freely (unlike other virtual settings e.g. Yammer)
Interjecting (doing)	- Video/audio	- Lean forward closer to camera or move hands before start talking - Appear larger on the screen of other participants	- Sensemaking can be difficult because of slight delay - Slight gestures not as easily picked up in virtual setting
Excusing (oneself)	- Mute button	- May be rude to have an aside conversation in traditional setting, but not in virtual setting	- Cultural expectations are different in virtual setting
Closing (meeting) (doing)	- Standing up and leaving physical room - Remote control buttons/touchscreen	- No handshake - Substitute handshake with other gestures	- Sensemakers adapt traditional practices to virtual setting

Table 14: Ten common acts/doings in telepresence and corresponding virtual sensemaking tools and observations.

7.3 Dimensions of sensemaking in virtual settings

As described in Chapter 5, the observations made in Tables 13 and 14 were interrogated to arrive at the five dimensions of sensemaking in virtual settings. These dimensions are discussed below in Stage 3 of the presentation of findings.

7.3.1 Matter

The question of "what" people make sense of in telepresence can be answered by looking at how things are represented in the virtual setting of telepresence. For example in Account 2a: Devising solutions – comparing products, the video phone, which is represented by the physical phone in the background of Alan's office, is one "thing" that is the focus of sensemaking. Being able to see physical materials in telepresence *enables* sensemakers to be clear on exactly what they are talking about which reduces confusion. For example, perhaps Gary (the product specialist in Norway) has a different model of video phone in mind before Alan points to it. Digital bodies, a kind of matter, are also implicated in sensemaking in telepresence. For example in Account 2b: Selling products – closing a deal, Tony does a quick head count of people on the screen and in the room with him before starting the meeting. Tony may not necessarily pick out individual people – he just knows there are as many bodies present as he invited to the meeting.

Physical matter (as represented digitally on video) may also be used to contribute to the emotiveness and engagement of participants in the activity and thus *enable* sensemaking. For example in Account 2b: Selling products – closing a deal, Larry physically signs a contract in front of the Vitec staff which gives weight to the agreement between the two organisations. As another example in Account 2a: Devising solutions – comparing products, the physical materials in Alan's office play a large role in how the customer, Dick, makes sense of the situation. Namely, Dick knows he is in a professional meeting based on the décor in Alan's office. In this way, involving tangible, physical materials (albeit mediated by video) in sensemaking grounds the activity in something "tangible" and shared amongst participants, which *enables* sensemaking.

Using physical materials/matter in telepresence also *constrains* sensemaking because the technology stops short of allowing people to actually hold and inspect things (e.g. read a book) or bodies (e.g. shake hands) through video. This is evident in an anecdote told by an interviewee who was working from home after a skiing accident.

> I've sort of got a photo wall behind me where I've got the kids and the wife and the rest of it. And one of the photos was just off angle a little bit and everyone I got on the video call was like, "I know you've got a broken leg, but you need to get up and fix the photo behind you that's driving us mental!"

As an example from the empirical accounts, in Account 2a: Devising a solution - comparing products, Dick cannot not reach out and touch the video phone handset. If Alan or Gary could physically point out features of the video phone to Dick and get him to operate it, perhaps questions would be answered more quickly.

However, sensemakers find ways to overcome such constraints. For example in Account 2b: Selling products – closing a deal, Larry signing the physical contract is a symbolic gesture that only works because of the relationship Vitec and SU have built up over time. Further, Tony (Vitec account manager) is able to close the deal without physically shaking on it, as is customary in more traditional settings. As one interviewee put it, "I think … a nod through a video screen is now an accepted version of the handshake". Indeed, evidence suggests that sensemakers overcome the lack of physical contact with materials and bodies by capitalising on existing relationships, trust and familiarity.

Finally, the matter that is implicated in sensemaking in telepresence may be physical and/or virtual depending on one's vantage point. For example in Account 2c: Being available – teleworking from overseas, the book Adam reads to his daughter is physical to him but to Sophie it is virtual – she cannot reach out and touch the book, yet Adam is able to physically turn pages. Also, some matter involved in sensemaking may be altogether virtual. For example in Account 2a: Devising solutions – comparing products, Gary's PowerPoint slide – a virtual material – is shared. Despite differing vantage points, shared virtual materials *enable* sensemaking because the focus of the activity is front and centre for each participant.

7.3.2 Presence

The question of "who" sensemakers are and how they show up for activities in telepresence may appear to be similar to traditional settings; that is, sensemakers walk into a physical meeting room, sit down and start talking (particularly in the immersive to immersive configuration). Indeed, sensemakers are able to see and hear each other clearly despite being on opposite sides of the world. This suspended reality, enabled by extremely high quality visual and audio technology, creates a

sense of co-presence that *enables* sensemaking. As one interviewee put it, "I'm hearing you, you are right here; I'm seeing you like half a metre away". This sense of co-presence is most evident in Account 2b: Selling products – closing a deal, where participants in two different immersive telepresence rooms experience the meeting as if they are sitting across from each other at a single boardroom table. Each participant is in perfect proportion, the backgrounds in each room are identical, and voice can be heard from the specific direction of the speaker. In such environments participants can project and ascertain subtle body language and slight intonation in voice. For example, Tony pays close attention to Larry's body language throughout the meeting – when Tony notices Larry's attention is waning, Tony makes an effort to keep the meeting moving.

There are, however, slight but significant differences between co-presence in traditional settings and co-presence in the virtual setting of telepresence. Namely, bodily senses that we use to carry out activities in more traditional settings are rendered useless in telepresence, most notably the sense of touch (along with taste and smell). In this way, sensemaking in telepresence is *constrained*. As another example, in telepresence one cannot see the whole body of the other participant(s). This can be to the advantage of sensemakers if they are caught in their pyjamas when working from home. As one interviewee said, "I have to admit, there are numerous times I've rushed into the bathroom, brushed my hair and put on a work shirt, and sat down with tracksuit pants on to do a video call". In such a case, the sensemaker is *constrained* to the use of only the top half of their body, which means they cannot move freely around the room as one might in a more traditional meeting.

Through this virtual version of co-presence, telepresence *enables* sensemakers to be emotionally present. That is, because sensemakers see and hear each other clearly in telepresence, emotions are easily expressed and perceived. For example, in Account 2c: Being available – teleworking from overseas, Adam feels his customer's anger about the supplier's work and, on the other hand, his daughter's delight in listening to a story. This ability to express and perceive emotions in telepresence enables sensemakers to build and maintain relationships over distance. Not only does video subsidise existing in-person relationships (as in Account 2c where Adam continues his relationships with his wife and child), but relationships can be fostered on video and then carried offline into physical interactions, which *enables* sensemaking. For example, several interviewees said that having built relationships with colleagues over telepresence/video, when they meet in person it can take a few minutes to realise they have not met in the flesh. One interviewee reported:

> It absolutely can happen and it does happen. And it's very interesting to go to these conferences together because you know you instantly know a room full of people that you've not actually met … I walked up to him (a colleague) and started chatting to him like I'd gone out and had drinks with him 100 times.

7.3.3 Place

Regarding the question of "where" sensemaking takes place in telepresence, sensemakers may partake in key activties wherever they have access to a telepresence (or video) endpoint and an internet connection. As stated previously, as well as having access to immersive, multipurpose and personal telepresence systems at the office, many CSPs have a personal telepresence system in their home office. They also have WebMeet on their peronsal laptops, tablets and smart phones. Further, most of these systems are integrated via UCM, enabling CSPs' transiton from one device and place to another during a video call. Such sophistiacted architeure *enables* sensemakers to move freely between geograpohical places in between and during activities. As one CSP put it, "Video plays a big part in what I do day to day because you never know where I'm going to be."

The mobility of sensemakers in the virtual setting of telepresence is exemplified in Account 2c: Being available – teleworking from overseas. First, Adam is geographically very distant from all the people he communicates with during the account – his colleagues, customers and family – yet he is able to interact with them where he is on the device of his choice. Second, Adam is able to transition between devices as his circumstances change. Namely, he starts his conversation with John via WebMeet on his smart phone in the cab then transitions to his laptop when he arrives at the hotel room. In essence, video renders Adam's georgrpahical location almost inconsequential. Indeed, CSPs are ever-mobile, almost never tied to any specific geographic location or device. As one CSP put it, "Just call me, I'll determine the space".

Such mobility also creates *constraints* for sensemakers. Namely, when CSPs connect via portable devices, the quality of the interaction is significantly reduced than if they were in a multipurpose or immersive telepresence room. Indeed, there is always a trade-off to be made between mobility and quality. CSPs are constantly making decisions about how they will interact with customers, partners, suppliers and colleagues, and their decisions can have enormous impacts on their key activities. For example in Account 2b: Selling products – closing a deal, if Tony

misjudges Larry's comfortableness with doing serious business over telepresence, the deal may not eventuate.

7.3.4 Time

Unlike other virtual settings such as Yammer, sensemaking in telepresence takes place in conventional clock time (i.e. real-time). As such, sensemaking is *enabled* by an imposed linear order of interaction that people are used to; that is, sensemakers expect that events will takes place in chronological order over a finite period of time. Sensemaking in telepresence is not, however, exactly temporally the same as in traditional settings. Namely the natural, linear, orderly interaction may be ever so slightly interrupted by a barely noticeable but apparent delay in the audio. This *constrains* sensemaking because it can be difficult to achieve flowing conversation. Observational and interview data reveal that sensemakers develop means to overcome such a delay. First, CSPs become accustomed to structured turn-taking; they wait until one person has finished speaking before they ask a question instead of interjecting. Second, if a CSP wishes to interject mid-sentence, they give a physical signal before they speak. For example in Account 2b: Selling products – closing a deal, Tony leans forward before interrupting Monty and Ben's technical discussion. Such simple techniques improve the smoothness of interaction, and therefore sensemaking, in telepresence. Indeed, I developed my own means of overcoming the delay in audio during interviewees via telepresence; that is, gesturing with my hands before starting to speak so I could interject and clarify an interviewee's statement.

Also from a temporal perspective, sensemakers have enormous freedom to choose *when* sensemaking takes place in telepresence. Namely, CSPs need not be restricted to business hours; they can summon people (colleagues, customers, family) and things (documents, videos) whenever they need them. As one interviewee said:

> I'll actually get more done. So if you think about in a meeting, I can sit at home 7 o'clock in the morning until 9 o'clock at night and do back-to-back meetings an hour long all day. I might have a 10 minute window, I can go and grab some soup out of the cupboard, heat that up, and I can keep going through, but I don't then have to walk from one meeting to another.

As such, telepresence *enables* sensemaking because CSPs have freedom to order their activties in ways that maximise use of time.

Being able to manage their time also enables CSPs to stay close to family. One interviewee said, "Whenever I feel anxious or nervous or any of that sort of stuff when I'm travelling, the family is just a video call away, which is good. I like it." Further, interviewees said that telepresnce and video means they need not be absent fathers and husbands.[28]

> They're (wife and child) along for the ride and that's an important part for them understanding what it is I do because I can actually bring them into my world … They see me and understand what I do while I'm away … There's a real sense of, "yeah I'm with you and I know what you're doing" … I'm actually still very much part of where they are.

On the other hand, the freedom to interact at any time can *constrain* sensemaking. Namely, CSPs are almost always contactable even when it does not suit them. As one interviewee put it, "You're a lot more available when you're not". Further temporal aspects of teleprence also *constrain* sensemaking. Namely, time zones are fixed and therefore restrict sensemaking in ways that geography does not. For example in Account 2a: Devising solutions – comparing products, Alan must check the local times of his colleagues in Perth and Norway before making the call.

7.3.5 Appropriation

The dimension of appropriation highlights "how" sensemakers skilfully carry out activities through negotiating telepresence on its own and in conjunction with other technologies. For example in Account 2a: Devising solutions – comparing products, Alan manipulates his camera and office setup to provide his counterparts with the best telepresence experience possible, which *enables* sensemaking. As another example in Account 2c: Being available – teleworking from overseas, Adam uses ChitChat in tandem with WebMeet to see who is available to help him solve the problem at hand. In some cases, however, some aspects of telepresence may be out of the control of the sensemaker and may *constrain* sensemaking. For example in Account 2a: Devising solutions – comparing products, PowerPoint takes up such a large proportion of the screen that it is difficult to see the participants involved in the discussion. As such visual cues are compromised, which may *constrain* sensemaking. Indeed, in response to this I (the researcher) observed in my

[28] The participants were all male.

fieldnotes, “I don’t like screen sharing on telepresence – it just ruins the experience!” As another example in Account 2a, after the reply email has been written the sensemakers discuss another topic, yet the email is still most prominent on screen. This means that the topic of sensemaking is mismatched with the item at the centre of visual attention.

In general, telepresence is a very reliable, stable and intuitve technology. Observational data suggest that once the video call is in progress, sensemakers quickly begin to take it for granted; that is, it becomes inivisble to them. Further, CSPs’ experience of video is that is just “appears” when and where they need it. As one interviewee put it, “It’s the nature of pervasive video, it just happens”. However, there are occasions when video and/or voice is disrupted or drops out altogether. Such an occurrence can come as quite a shock to sensemakers who are deeply engrossed in the conversation, effectively having forgotten they were on a video call. This reminds us that “when technology is involved you hand over some control and faith to the platform”, as one interviewee said. This further evidences how sensemaking is both *enabled* and *constrained* in the appropriation of technology.

Finally, telepresence has a number of built-in features that *enable* sensemaking in ways that are unfamiliar to us in traditional settings. For example in Account 2a: Devising solutions – comparing products, the person who is talking appears largest on the screen. And in Account 2b: Selling products – closing a deal, participant’s voices can be heard from the direction in which their image in seen on the screen. Furthermore, sensemakers skilfully use video and voice in novel ways to achieve their ends. For example, also in Account 2b, Tony capitalises on the camera’s built-in feature in order to look everyone in the eye simultaneously.

Table 15 summarises the findings for Fieldsite 2 by outlining how sensemaking is enabled and constrained in telepresence along the five dimensions of sensemaking. It also prefaces the next section by listing the unique features of sensemaking (within each dimension) and summarising how sensemaking is altered owing to the virtual setting.

Dimension of sensemaking	**How sensemaking is *enabled* and *constrained* in dimension**	**Unique feature of sensemaking**	**How unique feature *alters* sensemaking**
Matter – the "things" that are implicated in sensemaking	Physical materials *enable* sensemakers to focus on one thing and to enhance emotiveness in interaction. Virtual materials *enable* sensemaking by providing a focus. Physical materials may *constrain* sensemaking because they cannot be held or inspected together by all parties – other senses compromised.	Extrapolation – Cameras limit sensemakers to one viewpoint and they must extrapolate the rest.	Extrapolation *alters* sensemaking because sensemakers must imagine more than in traditional settings. Extrapolation *alters* sensemaking because balance of power is misaligned.
Presence – "who" sensemakers are	High quality audio and video enables co-presence, which *enables* sensemakers to feel emotionally present, and build relationships via telepresence. Sensemaking is *constrained* because true co-presence is compromised by lack of whole body.	Performance – sensemakers must perform contrived behaviours in telepresence.	Performance of contrived behaviours *alters* sensemaking because they demand a greater level of concentration and skill.
Place – "where" sensemaking takes place	Telepresence gives unprecedented mobility to sensemakers, which *enables* sensemaking to take place almost anywhere. Mobility can *constrain* sensemaking because sensemakers may trade-off off quality of the video and audio.	Virtual culture – sensemakers substitute a common virtual place with a common virtual culture.	A virtual culture of telepresence, characterised by unique norms and etiquette, *alters* sensemaking because sensemakers must learn this above and beyond organisational culture.
Time – "when" sensemaking takes place	Sensemaking is *enabled* by real-time interaction that people are used to, but time zones are a *constraint*. Natural, linear order can be interrupted by slight delays, which *constrain* sensemaking, though sensemakers find ways to overcome this. Telepresence *enables* sensemakers to connect at any time, but this may be *constraining* because they cannot "switch off".	Compression of time – owing to mobility of telepresence, sensemakers compress work time, home time, and time in between.	Compression of time is unique to sensemaking the virtual setting and *alters* sensemaking because incidents of sensemaking are less finite in telepresence than in traditional settings.
Appropriation – "how" sensemakers use the technology to accomplish activities	Skillful manipulation of features of telepresence, and other technologies, *enable* sensemaking. Some automated features that are out of the control of sensemakers may *constrain* sensemaking. High reliability of telepresence *enables* sensemaking. However, when the technology does fail, sensemaking is highly *constrained* or is compromised entirely.	Unity with technology – activities in telepresence are most successful when the technology becomes second nature to sensemakers.	Unity with technology *alters* sensemaking because such tight technology-user relationships may not be not required in traditional settings.

Table 15: Summary of findings for Fieldsite 2 – Telepresence.

7.4 Unique features of sensemaking in telepresence

Having described how sensemaking is enabled and constrained by telepresence, the unique features of sensemaking in telepresence are now identified. These unique features, again described along the five dimensions of sensemaking in virtual settings, illuminate how sensemaking is altogether altered by virtue of it taking place in telepresence.

7.4.1 Extrapolation

The "matter" dimension shows that physical objects can be used to enhance sensemaking in the virtual setting. However unlike in traditional settings, these things (when viewed through the video) can only be seen from a single perspective. That is, having the camera focused on one person or thing means sensemakers cannot see what or who else is there. For example in Account 2c: Being available – teleworking from overseas, Sophie sees the city lights out of the hotel room window from a single angle, which gives her a very limited idea of what it is really like to be in Kuala Lumpur. As such, Sophie must extrapolate what else is going on, which may or may not be accurate. This necessity to extrapolate *alters* sensemaking because sensemakers must imagine more than they need to in traditional settings.

That sensemakers must extrapolate meaning in telepresence can be abused by users. Namely, sensemakers may deliberately hide information from their counterpart to encourage them to extrapolate meaning in certain ways (or to not extrapolate at all). For example, in a one-to-one personal telepresence meeting, a third person may be sitting next to one of the participants listening in unbeknownst to the participant at the other end of the call. As such, the "even playing field" of telepresence (which is especially salient in immersive to immersive telepresence) may be compromised, as one party may gain a degree of control over the meeting. In this way, the disempowered participant may interpret the interaction in a way that has been orchestrated by the empowered party. Such manipulation (using one's camera to include/exclude contextual information) may *alter* sensemaking because a layer of power may be added to interactions that may not exist in traditional settings.

7.4.2 Performance

The "presence" dimension shows that sensemakers can freely express and perceive meaning, emotion and mood through body language, but may be constrained by their inability to use all senses and the whole body. Observational data suggest that to overcome some of these limitations, sensemakers acquire contrived behaviours that bolster their presence in telepresence and thus *alter* sensemaking. This is evident in Account 2a: Devising solutions – closing a deal, where Alan manipulates his presence in ways that he believes will lubricate relationships. First, prior to the meeting, Alan arranges his environment (furniture, lighting, etc.) to reflect a relaxed but professional setting, thereby providing the context for serious work. Second, Alan arranges his personal telepresence camera and microphone to capture his torso, head and voice so that he can be clearly seen and heard by other sensemakers. As well, Alan ensures that strategic items behind him are captured by the camera, for example the phones he points to during the conversation. Third, during video calls Alan uses the self-view feature of telepresence to adjust his facial expressions and posture throughout the meeting, thereby ensuring his intended expressions are what his counterparts see.

Such constant physical monitoring and adjusting of one's physicality (body and back ground) is a kind of performance which is unique to sensemaking in the virtual setting of telepresence. Interviewees said that these performances can be exhausting, perhaps more so than in a traditional meeting. As one interviewee put it, "Because you're just dialled up one or two notches, it does tend to take it out of you a little bit more". Such performance *alters* sensemaking because more is demanded of the sensemaker than in traditional settings; that is, "showing up" is not merely a matter of being there, but of skilfully controlling and monitoring one's behaviour and technology throughout the activity. Of course, not all participants equally master this performance. Namely, sensemakers must be technically competent to be able to manipulate the technology to accommodate their desired presence. As one interviewee said, "The technology itself is not 100% fool proof. You still need people to know to push the right button and do the right things before the technology becomes useful". An example of relative incompetence in performing presence is in Account 2a: Devising a solution – comparing products. Both Dick and Gary neglect to modify the position of their camera; they therefore appear too close and too far away, retrospectively. Their inability and/or laziness compromises the telepresence experience. Thus sensemaking is *altered*

because body language cannot be conveyed or read as effectively by others, and the lack of correct proportions can be distracting.

7.4.3 Virtual culture

The "place" dimension of sensemaking shows that sensemakers in telepresence are able to transcend place. That is, bodies and things can be shared between geographic locations in ways that are simply not possible in traditional settings. As such, the question of exactly where sensemaking takes place in telepresence is ambiguous – is it here, there, or somewhere in between? As one interviewee based in Melbourne remarked to me (the interviewer) in Brisbane:

> Because the way you are presented to me is from this LCD screen, you are physically in Melbourne. Your voice comes out from a headset here, so I'm literally having a physical conversation right here in this room … But from your perspective that's quite the opposite. Your video comes out of the LCD screen in Brisbane and the sound waves are created in that Brisbane room as well.

In traditional settings, sensemakers share a place – a common context or culture – from which to draw meaning. But in the virtual setting of telepresence, such a shared place may not exist. Namely, sensemakers manage to conjure a common sense of being together despite not having a single, shared, physical place to carry out activities. Instead, sensemakers find alternate ways to make sense together, which *alters* sensemaking. Namely, sensemakers develop norms and etiquette that are unique to the virtual stetting and which give sense to interaction in telepresence. For example in Account 2b: Selling products – closing a deal, the two team leaders take the centre seats at their respective tables, reflecting hierarchy in the teams. This is quite different to a traditional setting where the bosses would sit at the head, not in the middle, of the table. As another example, whispering amongst one's own colleagues in a meeting may be considered rude in traditional settings. However, it is quite acceptable for Larry to mute his audio and have a private conversation with his SU team in plain view of the Vitec staff.

Likewise, traditionally acceptable behaviours may be unacceptable in telepresence. For example, interviewees reported that telepresence meetings invariably start on time. Unlike in-person meetings where participants may chat for a few minutes while they wait for late-comers, there is an expectation that for a telepresence meeting everyone should be on time and ready to work (this ethic may be underpinned by the fact that participants should be able to join the meeting from practically anywhere). This etiquette limits the instances of non-sense where participants may be left

wondering what has held up their colleagues. Indeed, such virtual norms are crucial to giving order and sense to activities in telepresence. In this way, a shared virtual culture stands in for a shared place from which to draw meaning. Finally, this virtual culture is not explicitly taught to CSPs; they pick it up by copying the behaviours of others and through experience in using telepresence. For example, if someone forgets to mute their microphone and exposes the group to loud background noise, the group quickly embarrasses the person so that they remember to mute themselves next time.

7.4.4 Compression of time

The "time" dimension shows that sensemakers in telepresence have the ability to connect anywhere at any time. As such, sensemakers may have interactions with geographically dispersed people immediately and in quick succession in ways not possible in traditional settings. For example in Account 2c: Being available – teleworking from overseas, the days and weeks Adam would have had to spend flying to various locations is compressed into a few hours. This compression of time is further aided by sensemakers' ability to move seamlessly from one video device to another without having to stop the activity (e.g. Adam moves from his phone to laptop without "missing a beat"). Further, though traditionally people compartmentalise time at work and time at home, CSPs often willingly and actively compress work time, home time, and the time in-between. As one interviewee put it:

> This whole work-life balance has been the buzz for a number of years now. We actually heard one of our business leaders refer to it as more work-life blending … so and that resonates, because that's what it is – it's not about "I have to do this", or "I have to do this". It's about it all coming together and just managing the time to do whatever you need to do.

This compression of time *alters* sensemaking. Namely, incidents of sensemaking are less finite in telepresence than in traditional settings. That is, activities run into or overlap each other more readily in telepresence than in traditional settings. As such, the idea of activities and sensemaking being time-bound (and place-bound) – as is often the case in traditional settings – does not hold true for the virtual setting of telepresence.

7.4.5 Unity with technology

The "appropriation" dimension shows that telepresence is only useful when skilful sensemakers use the technology in certain ways. As shown in the accounts, telepresence has functions that aid sensemaking *and* sensemakers are competent agents of the technology. This symbiotic relationship between the users and the technology is evidenced in CSPs' passion for the technology and willingness to incorporate it into every aspect of their lives because it enables them to work and live better. Further, the special skills required to operate and maximise the effectiveness of telepresence become second nature to CSPs over time. That is, when human and technology are in harmony, the technology dissappears into the background. In other words, activities are carried out almost seamlessly when sensemakers are unified with the technology, and this *alters* sensemaking.

Namely, unlike in traditional settings where technology may be seen as auxiliary to the activity at hand (e.g. the PowerPoint presentation aids the round table meeting), in telepresence the activity cannot take place *but* for the presence of the technology. This has great implictions for sensemaking because if the sensemaker and the technology are not intune, activities may be severly or permantaly impeded. In other words, unlike in traditional settings, sensemakers must be skilled in and committed to (i.e. unifed with) the technolgy at hand in order for activities to be successful. Depending on the level of unity with technology, at best, telepresence becomes second nature to sensemakers – they just carry out activities through telepresence without thinking about it; at worst, sensemaking may be clunky or breakdown altogether because the technology gets in the way of accomplishing activities.

7.5 Chapter summary

In this chapter I have shown how sensemaking is enabled, constrained and altered by virtue of it taking place in telepresence (as opposed to more traditional settings). The critical findings are the five unique features of sensemaking that are specific to the virtual setting. First, sensemaking in telepresence is characterised by extrapolation whereby sensemakers must imagine what else is going on outside the view of the camera in ways that are not demanded by traditional settings. Second, sensemaking in telepresence involves performance of contrived behaviours (that are not seen in traditional settings), which demands a greater level of concentration and skill. Third, in lieu of a shared physical space, sensemakers in telepresence conjure a shared virtual culture

characterised by unique norms and etiquette. Fourth, compression of time (work, home, in-between) means instances of sensemaking are less finite in telepresence than in traditional settings. Fifth and finally, for sensemaking to be successful in telepresence, sensemakers must be unified with the enabling technology in ways not demanded by traditional settings. These findings will be consulted again in Chapter 9. Now I turn to the findings for the third and final fieldsite.

Chapter 8 FIELDSITE 3 FINDINGS – SECOND LIFE

In Chapter 8 I present the results for Fieldsite 3 (SL), following much the same structure as Chapters 6 and 7. Namely, I present (1) a contextual background; (2) exemplar accounts of the key activities as they are carried out virtually, including instances of both immanent/episodic sensemaking and the virtual sensemaking tools that enable them; (3) how sensemaking is both enabled and constrained by the virtual setting of SL within the five dimensions of sensemaking in virtual settings; and (4) how sensemaking is altogether altered by the virtual setting and, moreover, five unique features of sensemaking in SL. As we will see, these unique features of sensemaking are different to those arrived at in Fieldsites 1 and 2; they include malleability, dual embodiment, belonging, temporal multiplicity and experimentation.

8.1 Contextual background

Departing slightly from the structure of the contextual background in Chapter 6 and 7, I begin with a description of the technological setting and then move on to how the SL educators' community members organise through key activities. This is because the practitioners in his fieldsite are entirely immersed in the virtual setting; that is, there is (often) no broader organisational setting.

8.1.1 Second Life (SL)

SL is an online virtual world developed by Linden Labs. Launched in 2003, SL is one of the most popular serious virtual worlds and has attracted attention from many businesses, institutions, groups and individuals. The official Second Life website (2014) is brief in its description of the platform, stating "Second Life is a 3D world where everyone you see is a real person and every place you visit is built by people just like you". Indeed, SL is a vast world that means different things to different people. One industry website (How Stuff Works, 2014) summarises the platform as follows. Herein an important distinction is made between SL and 3D virtual games.

> At its most basic level, Second Life is … an online world in which residents create virtual representations of themselves, called avatars, and interact with other avatars, places or objects. Second Life isn't just a fancy chat room – residents can do much more than communicate with one another. For one thing, they can contribute to the world around them, creating buildings, objects or even animations … In many ways, Second Life is similar to Massively Multiplayer Online Role Playing Games (MMORPGs). Like an MMORPG, users represent themselves with a customizable,

> three-dimensional figure that acts like a computer-generated puppet. Users navigate through an online world, encountering strange landscapes and new people. Unlike MMORPGs, residents in Second Life aren't in a game, though there are games inside Second Life's virtual environment. They inhabit a virtual world free of pre-determined goals or tasks, just like the real world.

SL has parallels with "real life" (RL), defined here as 'non-virtual' or 'physical' life, including being able to own property, buy and sell products, and earn money. Indeed, SL has its own stand-alone economy based on Linden dollars which may be traded in-world for goods and services and exchanged for US currency. In this way, some residents earn money in SL which they spend in the actual world. Further, SL is home to a number of online businesses (e.g. avatar fashion outlets) and many offline businesses have a presence in SL. Between 2006 and 2009, large global companies such as Dell and IBM purchased land and built virtual shopfronts in SL. While interest from big business has since waned, educators remain a large and active community in SL (Webber, 2013). Primary, secondary and tertiary education institutions (such as the University of Washington (USA), the University of Warwick (UK), and the University of Western Australia) use SL for education purposes, including building campuses in-world and holding classes in virtual laboratories. As well, a number of in-world groups host education-related seminars, meetings, conferences and social events. Some of these groups have other online and offline presences, such as physical associations, Facebook groups, Google Hang Outs, and listservs. This research is focused on how educators' community members carry out their activities in SL.

To access SL, users must download a free software program (SL viewer) to their desktop; they also require persistent high bandwidth and a good graphics card. Before entering SL, users must acquire an avatar. In designing their avatar users make choices about their avatar's name, sex, body shape, height, hair, eye colour, clothing, shoes, accessories and more (there are also a range of default avatars). Avatars can walk, run, fly, sit, stand and touch through keyboard commands and in-world menus. Each avatar has an inventory of possessions that they buy or acquire in-world, such as Linden dollars, wardrobe items, toys, furniture, decorations, animation scripts, land titles and music. Users navigate the virtual world by using the SL map, by searching for particular locations, or by teleporting to known addresses (via hyperlink to a landmark). Users "see" the immediate environment using a view tool that enables them to zoom in/out and pan in any direction. Users communicate with each other via various means, including by voice, instant chat (either public or private), and notifications. Users share information about themselves and find out about others

through personal profiles and by joining interest groups. The world of SL consists of synthetic sky, land, water, trees, houses, etc., much of which is able to be created or modified using various building tools (3D objects may be endowed with textures, sounds, animations, scripts and permissions). Finally, SL has its own time zone which is the same as Pacific Standard Time (PST).[29] All these features, functions and tools will be explained in more detail as they relate to particular findings. For readers who are unfamiliar with SL functionality, a more detailed account is in Appendix B.

8.1.2 SL educators' community

The SL educators' community consists of teachers, researchers, students, administrators and technologists who belong to education interest groups.[30] These groups are managed by volunteers who coordinate activities in SL such as meetings, seminars and conferences. These groups, which sometimes have parent organisations in RL, are well-established in SL having been in existence for between five and 10 years. Though the aims and missions of these groups vary slightly, they informally work together in SL (and other platforms) towards their shared goal of bringing 3D virtual worlds into education at all levels. They also exist to support one another in their education practice in RL and SL. As one group's mission states, "[we] will grow, at least initially, through personal learning networks, seeking out and welcoming representatives from all virtual worlds towards building a community of like-minded educators who learn from and teach one another".

While SL educators' community members see great potential for virtual words to expand and improve education, their enthusiasm is seldom shared by out-of-world colleagues within schools and universities. SL educators experience various sources of resistance in their RL institutions, such as that teachers are too busy to learn the complex technology, and that virtual worlds are not considered appropriate or secure enough environments for students. As well, there seems to be a trend in education more generally towards mobile learning; this is incongruent with learning in virtual worlds that demand high bandwidth and powerful graphics capacities that mobile

[29] During data collection, I (the researcher) was mostly based in the USA which made attending events and conducting interviews in SL much easier than from Australia which is 16 hours ahead.

[30] Group names used in this thesis are pseudonyms.

devices cannot cope with. At the time of data collection, the SL educators' community also had a tenuous relationship with Linden Labs who, in recent years, had abolished and then re-introduced a 50% discount on land sold to educational institutions. In the interim, many educators lost their land and the infrastructure they had built on it, such as virtual classrooms. Despite these setbacks, the educators' community shares a passion for and belief in virtual worlds and their enthusiasm, experience and expertise is substantial.

I (the researcher) became part of the SL educators' community over a period of approximately six months, which included three months of intensive participation/observation. In July 2013 I attended a three day, in-world conference on the topic of education in virtual worlds.[31] From September to November 2013 I integrated myself into the SL educators' community by joining groups, attending events, and talking to people in the network. As an educator myself, I was able to genuinely contribute to and participate as an insider. During this period I attended weekly meetings and tours of "sims" – places where members had built, for example, a museum or replica of an historical place in RL (e.g. Anne Frank's house). I also attended and/or presented at three conferences in SL. Community members (including me) also met and collaborated on other virtual platforms such Facebook, Google Plus and Skype. It is important to note that members of the SL educators' community were often also members of groups and conferences in other virtual worlds, for example Open Sim, Unity, Kitely, Cloud Party (now retired), and Vibe. However, these are out of the scope of this research.

Most educators' community members use pseudonyms instead of their RL given name(s). However, there is little attempt by educators' community members to conceal their RL identity. On the contrary, because they are in SL to progress RL careers, projects and agendas, members are very transparent about their lives in the physical world, in particular their working lives. They often use their SL profiles to divulge which institutions they work for (universities, schools, government, non-profit, etc.) and the roles they hold within them (students, teachers, lecturers, technologists, etc.). In many cases, however, avatars bear little resemblance to their owners' physical bodies.

[31] I also attended this same conference in 2012 in the very early stages of my research.

Indeed, some members experiment with non-human avatars (such as animals or robots), having a body of the opposite sex, and dressing in extravagant costumes. Dressing up is especially common for themed events such as medieval balls held by the History Association of Second Life (HASL). Following the lead of my peers, I adopted a pseudonym for my avatar (Sadie Juan Eighty) but was totally transparent about my RL name, role as a PhD student at the University of Queensland, and my intentions for being in SL. As well, I experimented with my appearance, creating a tanned, dark-haired avatar when physically I am fair and blonde.

Key activities of SL educators' community members

The key activities of the educators' community in SL are networking with colleagues, participating in seminars and meetings, and playing with friends. Each activity, which was arrived at iteratively throughout data collection and analysis, is described below using empirical examples directly from my experiences in SL. Interviews and observations of other participants were used to inform my interpretation of events. Detailed examples of the key activities are provided in Appendices B to E, including details of SL functionality that will be referenced in the findings. In each example activity in the appendices, two pictures are provided – one showing the raw activity as it is carried out, and one showing the broader view of the SL viewer, including various controls and windows that enable users to carry out activities.

Networking

Networking is carried out on an ad hoc basis between individuals in the SL educators' community. People network in SL to make friends and support each other in their individual and shared goals, and to build both professional and personal relationships with each other. Members participate in networking in a number of ways including "pinging" people when they arrive online; that is, sending them an IM to flag their attention. Community members also participate in "backchannel" discussions during formal meetings/seminars; that is, they chat using text in "nearby chat" during spoken presentations. Members also meet up in social spaces (such as a bar, library or public lawn) and chat to each other via voice. Members often carry conversations onto other online platforms, such as other virtual worlds, email, Skype, Google Docs, Google Circles and Facebook. They also occasionally meet face-to-face, for example, at industry conferences. The activity of networking is characterised by camaraderie, friendship, positivity and acceptance. In my experience, community members are unanimously welcoming and non-judgemental, regardless of

one's age, gender, appearance, vocation, or length of time in SL (avatar age). An example of networking is when I was invited by a librarian, Brenda, to sit, drink and chat in the bar she owned (see Appendix C).

Participating

The SL educators' community revolves around participating in the weekly meetings and seminars held by the various educators' groups. In-world conferences also take place on an annual basis. Members of the community are involved in these events in various ways including organising, hosting, presenting, promoting, attending and providing technical support. Members participate in these events in order to share knowledge (academic and practical) and learn about others' experiences and projects. They also share expertise and resources with each other about various education-related technologies, from MOOCs to gamification. Members generally schedule these gatherings into their weekly calendars and are committed and punctual in their attendance. Meetings, conferences and seminars usually take place in purpose-built rooms or arenas which are owned by the host education group. These rooms often include tables and chairs or large banks of seating with a big screen for PowerPoint presentations, depending on the number of attendees and purpose of the gathering. An example of participating is my attendance at weekly Educators in Virtual Worlds (EVW) group meetings in SL (see Appendix D).

Playing

Playing in the educators' community in SL is about having a good time and being creative by building or doings things that are not work-related. Through playing, members develop closer, more personal connections with each other. A popular way to play in SL is to dance together. For example, social events at conferences often involve a musician providing entertainment while avatars dance individually or in couples on a dance floor. Members often dress up their avatars in costume to suit the theme of the party, creating further enjoyment. Such events also allow users to showcase their technical skills in being able to build objects and write animation scripts (e.g. dance moves) for their avatar(s). Playing usually takes place in purpose-built public venues, such as an arena or club. One of the more sophisticated playing activities is making "machinima"; that is, making a movie in SL by filming avatars acting or dancing. While this activity may seem frivolous, playing is an important part of the educators' community practice. As one interviewee said:

> I think that's part of community-building, doing fun things together. That's one reason I have friendships and professional relationships with the people in these groups because we're not just sitting around talking about serious things, we're having fun together.

An example of playing is when I attended the closing party at a conference (See Appendix E).

8.2 Episodic and immanent sensemaking

Having provided a background to the fieldsite, empirical data is now introduced in the form of three accounts that exemplify how educators' community members carry out key activities in SL. The three key activities and their exemplar accounts are listed in Table 16, along with information about the locations of the activities and participants involved. These accounts are derived from events in which I was explicitly involved and, as such, are told from my own perspective. In reconstructing these accounts, I referenced voice recordings (captured using desktop video software) and text chat (both nearby group chat and private IM) that accompanied the action. I also recorded my experience of each account in detail (both during and after each activity) in my fieldnotes and asked interviewees about their experience of these particular activities. As in Chapters 6 and 7, I now provide a background to and a summary of each account, including details of the intelligibility towards which people act and the broad technology that underpins sensemaking. For each account, two screen shots are provided – one with and one without the SL viewer. In all screenshots identifying information is greyed out.

Ref	Activity	Account	Location in SL	Participants
3a	Networking	Campfire catch-up	SLEF Campfire	Sadie (researcher) Kory, Spin and Brenda (participants) Others SLEF members (participants)
3b	Participating	Conference presentation	VWC Amphitheatre	Sadie (researcher) Bange (attendee) Various conference delegates (attendees)
3c	Playing	Making machinima	HASL Sandbox	Sadie (researcher) Angel (machinima director) Bookie (cast member) Various HASL members (cast)

Table 16: Summary of exemplary accounts of key activities.

8.2.1 Account 3a: Networking – campfire catch-up

In this account I (Sadie) am attending an informal weekly catch-up hosted by one of the educators' groups – Second Life educators' forum (SLEF). This group's general mission is to explore all things related to education in virtual environments. To carry out this aim SLEF undertakes various initiatives in SL including an in-world speaker series, tours of educational facilities in SL, social events, and weekly catch-ups where members drop in to chat. As shown in Figure 15, I am attending a catch-up event at the SLEF campfire. There are deckchairs arranged in a circle around the campfire and attendees can sit wherever they like. The surrounding environment is open with birds flying in the sky, and the atmosphere is relaxed and casual. Sadie is in the foreground. This is my (Sadie's) first time at this campfire catch-up. Here I am acting towards the sense of wanting to make a good impression and maybe even recruit some interviewees. My counterparts are acting towards other senses, such as gathering momentum for their current projects or catching up socially with friends. The specific technological features of SL that facilitate this camp fire catch-up include (but are not limited to) avatars and associated options for appearance (e.g. clothes, gestures), teleporting to get to the meeting, static and animated objects to provide scenery and furniture, and voice chat, nearby chat, and IM to converse.

Figure 15: Account 3a: Networking – campfire catch-up (#1)

As shown in Figure 16 (taken from a different view to Figure 15 and including the SL viewer), there are six attendees including Sadie. The conversations window on the left lists all the avatars that are present for the meeting (Spin, Kory, Jess, Blue and Mimi), all of whom are regulars at these catch-ups. Kory, the leader of SLEF and host of this meeting, is talking – this is indicated by the green signal above his head and next to his name in the conversations window. The conversations window also shows text chat (both nearby chat and IM) happening at the same time as the voice conversation. In nearby chat, any avatar that is geographically close to the meeting will see the text chat in their conversations window. They (the avatar's owner) will also be able to hear the voices of users whose avatars are close to theirs. In IM, users invite each other to chat in private (their being able to chat is not dependent on geographical proximity). IMs may be sent to groups as well as individuals. New messages are indicated by a flashing orange bar (as seen in the conversations window in Figure 16). Users toggle between nearby chat and IM by clicking on the flashing bars.

Figure 16: Account 3a: Networking – campfire catch-up (#2)

Now follows the narrative account of the networking activity as it unfolds. Similar to Chapters 6 and 7, within these accounts I identify specific instances of immanent and episodic sensemaking which are colour coded, and doings/acts are italicised. Each instance of immanent and episodic sensemaking is discussed separately at the conclusion of the account. This is repeated in Accounts 3b and 3c.

Acts of episodic sensemaking	Narrative account	Doings of immanent sensemaking
	When Sadie (I) arrives at the meeting she is both excited and nervous. She tentatively says "hello" in the nearby chat and quickly takes a seat by right clicking a deck chair and selecting "sit" from the menu; her sitting posture is determined by the script embedded in the chair. Sadie is greeted in text and in voice by the attendees. Even though she is new, they are very welcoming. Kory comments on Sadie's Australian accent which stands out amongst the others who are all American.	Participants *arriving* at campfire Sadie *greeting* others Sadie (and others) *sitting* on the deckchairs Participants *welcoming* Sadie Kory *commenting* on my Sadie's accent
Brenda *arrives* amidst the meeting (interruption) Brenda *greets* everyone and *apologises* for being late Brenda *shares* the survey Sadie *investigates* the survey Participants *discuss* the survey (resolution)	After a few minutes of chit chat an avatar (Brenda) arrives, appearing amid a cloud of dust (this happens each time an avatar teleports to a new place). Brenda, interrupting the conversation, greets everyone and apologises to Kory for being late. She also tells the group that she has recruited Sadie into the group. Brenda then goes on to share that another colleague, Dina, is looking for people to complete a survey for her own research project; Brenda posts a hyperlink to the survey in the nearby chat. Sadie clicks the link to have a look at the survey and the attendees discuss their intention to do it. Sadie responds by saying she is glad they feel open to participating in research as she is trying to recruit interviewees of her own.	
	Brenda takes a seat and everyone continues to give updates about projects they are working on. Jess is promoting an up-coming Scary Machinima Festival where one minute scary movies filmed in Second Life will be shown. As the group discusses the schedule for the festival in voice and in nearby chat, Spin sends Sadie a friend request, which she accepts. Spin and Sadie strike up a conversation in IM in parallel to the nearby chat. Sadie gives Spin more details of her research, and also	Participants *updating* each other about projects Spin *inviting* Sadie to be friends Sadie *accepting* Spin's request

26	looks at Spin's SL profile to get an idea of who he is. While Spin and	
27	Sadie are chatting, Sadie receives friend requests from other attendees	Sadie and Spin *chatting*
28	and continues to monitor the nearby chat. As the discussion draws to a	Sadie *monitoring* the nearby chat
29	close Sadie feels she has broken into the group; she has done some	
30	successful networking, including recruiting Spin for an interview and	Sadie *recruiting* Spin for an interview
31	has been invited to participate in future gatherings. The account	
32	concludes when my (the researcher's) laptop is running out of battery,	Sadie *excusing* herself from the meeting
33	so I excuse myself and log out of SL so as not to make a sudden exit.	

As per the grey annotation in the right column, this account begins with immanent sensemaking whereby participants arrive at and settle into the meeting. The doings that comprise this immanent sensemaking include participants *arriving* at the campfire (line 1), Sadie *greeting* others (line 2), participants *sitting* on the deckchairs (line 3), others *welcoming* Sadie (line 6), and Kory *commenting* on Sadie's accent (line 7).

Then an interruption occurs by way of Brenda arriving late to the meeting and landing in the middle of the campfire. As per the yellow annotations in the left column, the ensuing sensemaking episode is comprised of the following acts of sensemaking: Brenda *arrives* amidst the meeting (line 8), *greets* everyone (line 10), and *apologises* for being late (line 11). Brenda then goes on to *share* the survey (line 14) despite it not being aligned with the current line of conversation. Sadie (and others) then *investigates* the survey by clicking on the hyperlink provided by Brenda in nearby chat (line 15). The participants *discuss* the survey (line 16) for a short while before returning to the conversation that was underway before the interruption.

As per the second bank of grey annotations in the right column, the remainder of the account sees sensemakers participating in free-flowing conversation (mostly between Sadie and Spin) that constitutes immanent sensemaking. The doings of sensemaking involved here are: participants *updating* each other about projects (line 19), Spin *inviting* Sadie to be friends (line 23), Sadie *accepting* Spin's request (line 24), Sadie and Spin *chatting* about research (line 27), Sadie *monitoring* the nearby chat (line 28), Sadie *recruiting* Spin for an interview (line 30), and Sadie *excusing* herself from the meeting (line 32).

8.2.2 Account 3b: Participating – conference presentation

In this account, Sadie (the reseracher) is presenting at a confernce in SL called the Virtual Worlds Consortium (VWC). This consortium in an annual event where educators, researchers and students come together for a variety of events including opening and closing plenary sessions, lectures, workshops, poster presentations, and social functions. I had been invited by the conference organisers to present some preliminary findings of my research. As shown in Figure 17, the auditorium in which this seminar is presented is a stone amphitheatre. In the background billboards bear advertisements of sponsors of the conference. There is also a teleport board; participants can click on the conference venue they wish to teleport to without having to walk or fly there.

In giving this presentation I am acting towards the sense of making a good impression on my peers and getting feedback on my research. It is also my opportunity to give something back in

return for the supprt and time I received from SL educators to collect my data. In preparation for this seminar, I engaged a number of technological tools. For example, I bought a new suit for Sadie at the SL marketplace and chose an animation from my SL inventory that would make her mouth move and her body/hands move slightly as I spoke. I also created 15 slides to complement my 30 minute talk. I created them in PowerPoint and transferred them into an in-world slidedeck (provided by the conference organisers). Prior to the seminar I also receieved a presenter's lanyard; wearing the lanyard automatically populates Sadie's inventory with presenters' items (e.g. notecards containing the conference schedule). The lanyard also provides Sadie with permissions to access places that ordinary attendees cannot go (e.g. conference head office). Now follows the annotated narrative transcript of the account as it unfolds.

Figure 17: Account 3b: Participating – conference presentation (#1).

Acts of episodic sensemaking	Narrative account	Doings of immanent sensemaking
Sadie *arrives* at the venue Sadie *mutes* the music Sadie *produces* her slidedeck The slidedeck *confuses* Sadie Sadie *asks* for help Bange *instructs* Sadie Sadie *manoeuvres* the slidedeck The darkness of the venue *confuses* Sadie and Sadie *states* her confusion Bange *suggests* checking sun settings Sadie *adjusts* the sun settings	Sadie arrives at the venue 10 minutes before the scheduled start time of 2pm Second Life Time (SLT). There is ambient music playing in the background of this venue which I mute by hitting the pause button on the in-world radio. I arrived early to set up my (Sadie's) slidedeck, which I do by dragging and dropping it from Sadie's inventory into the seminar space. The slidedeck, however, is facing away from the audience and I do not know how to turn the board around. I seek help from the gathering audience by posting in nearby chat. Bange, an audience member, gives me instructions on how to access the "object" menu and move the slidedeck object. As shown in Figure 18, the object menu is accompanied by colourful tools that overlay the slidedeck which I, with difficulty, click and drag to move it around. As also shown in Figure 18, the venue is dark as if it is night time. Sadie (I) comments in nearby chat, "It's very dark in here!" Other participants, mostly in the USA, are in day time and they see the arena as being light (SL day and night settings are linked to local PC settings). Bange suggests that Sadie check her sun settings. I then realise that, because my local time in Australia is 5am, the sun in SL is automatically set to night. I then adjust my in-world suns settings to give light to the scene.	
	At 2pm SLT I can see avatars have taken their seats. Before I start the seminar, I set my view tool so I can monitor Sadie while I talk. As shown in Figure 17, I (Sadie) begin my presentation in voice, welcoming everyone and thanking them for coming. Sadie asks if everyone can hear her and, if they can, to put a "Y" for Yes in the nearby chat. Several attendees indicate they hear. Sadie clicks the "forward" button on her slidedeck to show the first slide. Sadie	Sadie *noticing* the audience is ready Sadie *welcoming* people Sadie *asking* if people can hear her Audience *answering* Sadie Sadie *operating* the slidedeck

	29	shares an anecdote with the audience about her first experience in	Sadie *sharing* an anecdote
	30	Second Life when, at this conference the previous year, she had	
	31	accidentally become naked while trying to change outfits. The	
	32	audience laugh and share in her embarrassment by posting	The audience *laughing* at the story
	33	comments in nearby chat. Having "broken the ice" Sadie (I)	
	34	continues with her presentation, explaining her research question	Sadie *explaining* her research
	35	and data collection methods in SL.	
Sadie *notices* the audience's attention is waning Sadie *re-engages* her audience by asking them to use cameras.	36	During the presentation attendees also talk amongst themselves in	
	37	nearby chat about things other than my topic. At this point, Sadie	
	38	re-engages her audience by asking them to pan their cameras to	
	39	look at the avatar next to them. Sadie also pans her camera and	
	40	notices an avatar with a pot plant-shaped body and large floral hat	
Sadie *asks* people what they can see and they *respond* in chat. Sadie *addresses* individuals in the group	41	whom she recognises as Daisy (known for her interest in building	
	42	gardens in SL). Sadie asks people who or what they can see, and	
	43	they respond in nearby chat. Sadie attempts to address and	
	44	incorporate the audience's comments and questions as she goes	
	45	along; that is, when a text comment is made Sadie stops her	
	46	prepared speech, reads the text aloud, and comments on it in voice.	
Sadie *concludes* the seminar	47	At the end of the seminar, the audience thanks and applauds Sadie	
	48	using text and gestures. As the audience members start to move off	
	49	to other sessions, Sadie takes her slidedeck with her (i.e. puts it	
	50	back in her inventory) and moves into the seating bank.	

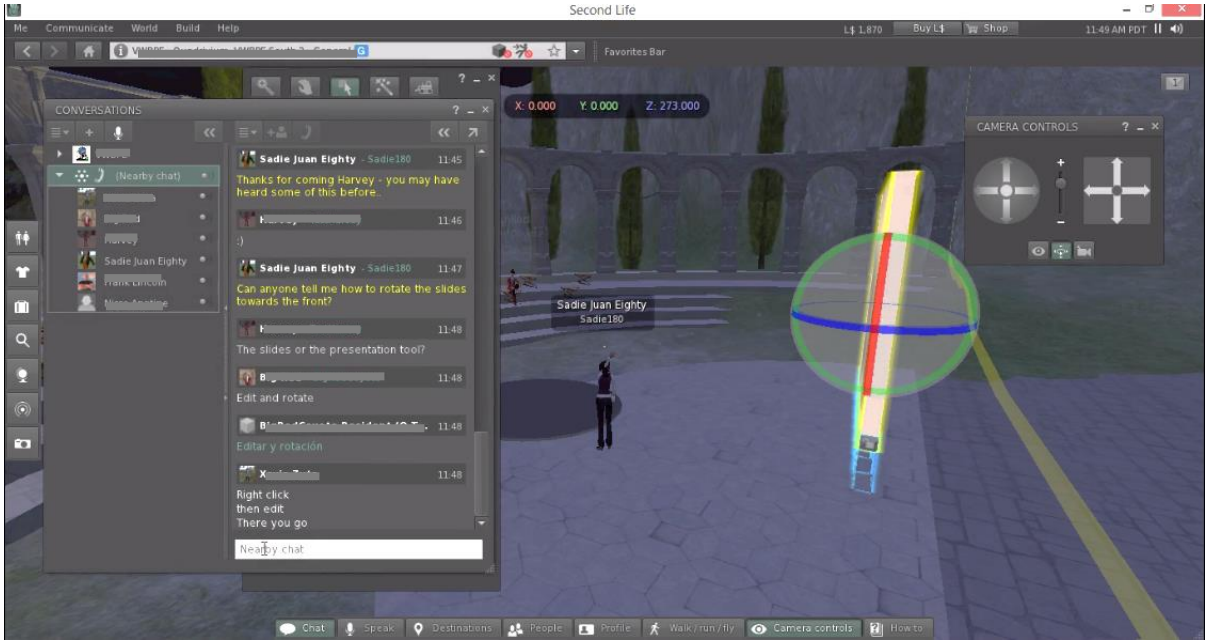


Figure 18: Account 3b: Participating – conference presentation (#2).

As soon as the account begins I experience a sensemaking episode. I am confronted by a strange place and must figure out what is going on in this space and how to set up for my presentation. As per the yellow annotations in the left column, the acts of sensemaking that comprise this episode are as follows: Sadie *arrives* at the venue (line 1), *mutes* the music (line 3), and *produces* her slidedeck by dragging and dropping it from her inventory (line 5). However, the slidedeck *confuses* Sadie (me) because it is facing backwards (line 7). Sadie *asks* for help from the audience (line 8) and Bange *instructs* her in how to use the object tool (line 9). Sadie *manoeuvres* the slidedeck to face frontwards (line 13). Just as the episode is being resolved, another interruption occurs whereby the darkness of the venue *confuses* Sadie (me) (line 15). Sadie *states* her confusion (line 15) and again Bange helps when he *suggests* checking sun settings (line 18). Sadie (I) *adjusts* the sun settings (line 20); finally the setup is complete and the sensemaking episode is resolved.

The account then proceeds immanently as Sadie carries out her presentation. As per the grey annotations in the right column, the doings of sensemaking involved include: Sadie *noticing* the audience is ready (line 22) and *welcoming* attendees (line 25); Sadie *asking* if people can hear her (line 26) and the audience *answering* her (line 27); Sadie *operating* the slidedeck (line 28) and *sharing* an anecdote (line 29); and the audience *laughing* at the story (line 32) and Sadie *explaining* her research (line 34).

Then another small interruption occurs for Sadie and another sensemaking episode ensues, as per the blue annotations in the left column. Namely, Sadie *notices* the audience's attention is waning (line 36). She *re-engages* her audience by asking them to participate by using their cameras (line 38). Sadie *asks* attendees what they can see (line 42) and audience members *respond* in nearby chat (line 43). Sadie *addresses* individuals in the group (line 44) and, having regained their attention and resolved the minor interruption, she moves on with and *concludes* the presentation (line 47).

8.2.3 Account 3c: Playing – making machinima

In this account, members of the educators' community gather to make a machinima to enter into the Scary Machinima Festival. Angel, the director, has chosen Michael Jackson's "Thriller" theme for the video and has recruited his friends from the HASL group to be the cast. HASL often hosts dress-up parties and is therefore a logical group from which to seek participants for this project. Angel has asked participants to meet at the HASL sandbox, for which he provided a landmark hyperlink in a group IM. Being a "Thriller" theme, the cast has been asked to dress in ghoul; they show up as a dragon, zombie, witch, ogre, skeleton and more. These costumes, mostly bought at the SL marketplace, are worn by avatars to replace their "normal" body and outfit. Some costumes come complete with accessories, gestures and/or animations (e.g. the dragon has an evil laugh and can breathe fire). Sadie (I) does not have a suitable costume in her inventory. As such, Angel suggests that she play the role of innocent victim.

Here all participants are acting towards the intelligibility of having some fun. Angel, more specifically, intends to enter the "Thriller" video into a machinima competition and is thus acting towards this sense of getting the best result. I am just trying to keep up and negotiate the various technological features involved in making machinima. These include but are not limited to: costumes and animations for avatars; pose balls and scripts for dancing; flying to get to the set of the machinima; and voice and text chat for instruction and feedback. Angel also makes use of a desktop video recorder (a device I used to capture my conference presentation in Account 3b). Figures 19 and 20 depict the scene and are referenced in the following annotated narrative accounts.

Figure 19: Account 3c: Playing – making machinima (#1).

Figure 20: Account 3c: Playing – making machinima (#2).

Acts of episodic sensemaking	Narrative account	Doings of immanent sensemaking
	Angel asks everyone to fly up 4,000m to the warehouse he has built in the skybox. Angel offers a teleport to anyone who prefers it. In this scene, Angel wants to film Sadie alone doing a strutting walk towards the back of the room and then turning to face the front.	Cast members *flying* and *teleporting* to their destination
Angel *shows* Sadie the pose ball Angel *instructs* Sadie to get on Sadie *follows* the instruction but *sits* on Angel; Sadie *apologises* Sadie *corrects* herself to sit on the pose ball Angel *records* the action	In Figure 19, Angel is showing Sadie her pose ball (white ball in the image) which he has created specifically for the victim character. When Sadie is instructed to "get on", I right click the ball and select "sit". Unfortunately, I misplace my cursor and accidently sit on Angel. Sadie (I) is embarrassed and apologises profusely in voice. Once Sadie manages to sit on the pose ball, her avatar is overridden by a "strutting" script – as long as she remains seated on the pose ball, the animation override will control all her movements. Angel films Sadie using a desktop recorder which captures the action from the angle he has set his in-world camera.	
Angel *asks* the cast to join Sadie Angel *replaces* the pose balls and *instructs* cast members to sit. Cast members *sit* on pose balls. The animations fail which *confuses* the cast Angel *instructs* cast members to sit and stand a few times.	Angel then asks the rest of the cast to join Sadie in the centre of the warehouse. He removes the pose ball Sadie was sitting on and "reses" some new pose balls. He instructs everyone, including Sadie, to sit on the new pose balls, which are embedded with an animation override that mimics the dance moves of Michael Jackson's "Thriller". There are some technical difficulties with getting the animation to override some avatars, which makes everyone confused. Angel troubleshoots by asking people to stand and then sit back on the pose ball. When giving directions, Angel uses voice. To minimise clutter in the audio participants only speak in voice if the director speaks to them directly, otherwise they use nearby text chat. Eventually, all the avatars begin to dance in unison.	

Bookie *notices* he is out of sync Angel *explains* why	The cast comment in nearby chat how great it looks and how much fun they are having. Angel films the dancing from various angles. At one point, Bookie (the zombie avatar) notices he is out of sync with the other avatars and asks why. Angel explains that it looks different on everyone's computer screens depending on their internet bandwidth; that is, this is a "heavy" scene that can create lag for some users. The account concludes when Angel is satisfied he has all the footage he needs to edit into a single video with the music backing. He says in voice "That's a wrap!"	Cast members *chatting* Angel *recording* the action

As per the yellow annotations in the left column, the account is no sooner underway when Sadie experiences an interruption. Episodic sensemaking ensues comprised of the following acts of sensemaking: Angel *shows* Sadie the pose ball (line 5) and *instructs* her to "get on" (line 7). Sadie *follows* the instruction but accidently *sits* on Angel (line 8), causing her to become flustered and embarrassed. Trying to resolve the interruption, Sadie *apologises* (line 9) and then *corrects* herself to sit on the pose ball (line 10). With the animation override now functioning the interruption is resolved and Angel *records* the action (line 13).

Following this, as per the blue annotations in the left column, another sensemaking episode takes place. Namely, the rest of the cast is invited to sit on pose balls and more breakdowns occur. The acts of sensemaking involved are as follows. Angel *asks* the rest of the cast to join Sadie (line 15) and *replaces* the pose balls (line 16). He then *instructs* cast members to sit on them (line 17). However, the animations fail to override avatars when they *sit* on the pose balls (line 18), which *confuses* the cast members (line 20) and interrupts the filming. Angel *instructs* cast members to get off and try again (line 22). After a few rounds of sitting and standing, all the avatars are moving. But just as filming recommences, Bookie *notices* his avatar is out of sync (line 29), which constitutes another minor interruption. Angel somewhat resolves the breakdown when he *explains* why this occurs (line 30).

Despite the clunky nature of this account, there is evidence of immanent sensemaking which helps to suspend activities during the filming of the machinima. This immanent sensemaking, as per the grey annotations in the right column, is mostly evidenced by participants who take their skill in operating technical features of SL for granted when carrying out routine action. Here doings of sensemaking include: cast members *flying* and *teleporting* to their destination (lines 1 & 2), cast members *chatting* amongst themselves (lines 27), Angel *recording* the action using his desktop (line 28), and cast members *dressing* up in costumes prior to arrival.

8.2.4 Summary of sensemaking in empirical accounts

Table 17 summarises the exemplar accounts of key activities, the instances of immanent and episodic sensemaking within them, and their constitutive doings/acts. As explained previously, I identified the specific virtual sensemaking tools that enable doings/acts to be carried out in SL. Ten of the most common acts/doings (five of each) appear in Table 18 alongside their corresponding virtual sensemaking tools.

Account	**Instance of sensemaking**	**Sensemaking type**	**Doings/acts of sensemaking**
3a: Networking – campfire catch-up	Commencing the meeting	Immanent	arriving, sitting, greeting, welcoming, chatting
	Brenda arriving late to the catch-up	Episodic	arrives, apologises, greets, shares, investigates, discusses
	Parallel networking between Sadie and Spin	Immanent	updating, inviting, accepting, chatting, monitoring, recruiting, excusing
3b: Participating – conference presentation	Preparing to talk	Episodic	arrives, produces, confuses, asks, instructs, maneuverers, states, suggests, adjusts
	Delivering the presentation	Immanent	noticing, introducing, operating, laughing, explaining,
	Re-engaging distracted audience members	Episodic	chats, notices, asks, responds, re-engages, addresses
3c: Playing – making machinima	Sadie sitting on pose ball	Episodic	shows, instructs, follows, records
	Directing participants to dance in unison	Episodic	replaces, instructs, confuses, sits, stands, notices, explains
	Participating in machinima	Immanent	chatting, recording, flying, teleporting, dressing

Table 17: Summary of immanent/episodic sensemaking and constitutive doings/acts in SL.

As discussed in Chapter 5, interrogation of these accounts involved making general observations and notes about potential implications for sensemaking (see Table 18). For example, when a participant "travels" to a meeting in SL they fly or teleport to their destination, and thus are not constrained by physical laws of gravity. A number of further virtual sensemaking tools help

suspend immanent sensemaking in SL. These include but are not limited to: the in-world radio; the general layout of the world complete with ground, sky and horizon; and the sun rising/falling with the time of day set on the user's desktop.

Doing/act	**Virtual sensemaking tool**	**Observations**	**Implications for sensemaking**
Arrives (act)	teleport	Users do not need to have geographical awareness to get where they are going	Easy to get around, but can become disoriented
Instructs (act)	Concurrent voice and text chat	Use voice to instruct and text to reply	This is a virtual kind of turn-taking to give order to sensemaking
Sits/stands (act)	Avatar, navigation tools (e.g. keyboard arrows, right click/drop down menu)	Keyboard/mouse navigation tools are quite clunky Sitting position of avatar determined by scripts	Give control of avatar body to digital objects
Adjusts (act)	Camera control/view too	Users only have one perspective at any time (no peripherals) Camera tool quite clucky, not easy to glance around	Hard to feel a sense of the broader context when it's out of view (e.g. when presenting)
Notices (act)	Avatar gestures, costumes, text chat	Can express emotions/sentiments through avatars in a limited capacity Voice is very expressive when used	Users employ multiple senses in gauging others' feelings Still more restricted than traditional settings
Chatting (doing)	Voice, IM, nearby chat	Voice makes people seem tangible and is supplemented by text/visual cues Avatar gestures are automated so users don't perceive much from them	Users need to multitask in order to keep up Intonation in voice and text more telling than physical cues
Monitoring (doing)	Toggle between windows	Users employ keyboard or mouse to move between conversations	Gap between typing (through hardware) and expressing (in software)
Operating (doing)	PowerPoint slidedeck	Familiarity with PowerPoint helps, but the slidedeck tool is complicated and hard to use	Level of technical proficiency enables and constrains sensemaking greatly in SL
Laughing (doing)	Voice, text chat	When people laugh, they feel co-present with others	Voice humanises the androgynous avatars
Dressing (doing)	SL Marketplace	Users express identity, creativity, technical prowess in how their avatar looks	Shows commitment to the activity and enriches sensemaking

Table 18: Ten common doings/acts in Second Life and corresponding virtual sensemaking tools and observations.

8.3 Dimensions of sensemaking in virtual settings

As described previously, Tables 17 and 18 were interrogated to arrive at the five dimensions of sensemaking in virtual settings, which are discussed in the Stage 3 of the presentation of findings below.

8.3.1 Matter

The question of "what" people make sense of in SL may be answered by looking at the materials that are implicated in, or are the focus of, the activities in the accounts. For example, in Account 3a: Networking – campfire catch-up, the SLEF campfire is a virtual object (matter) around which sensemaking takes place – it sets a casual and relaxed tone for the activity. As the conversation progresses, other materials become the focus of the networking activity, like the survey Brenda shares with the group. As further examples, in Account 3b: Participating – conference presentation, the main objects involved in sensemaking initially are the amphitheatre seats and stage before attention is turned to Sadie's slidedeck. And in Account 3c: Playing – making machinima, costumes and pose balls are the foci of the activity. Also, avatars themselves may be the material focus of sensemaking; for example, Angel uses his body as a kind of cursor to point Sadie to her pose ball.

Much of the material matter in the accounts, such as chairs, billboards and the slidedeck, are familiar to sensemakers from RL and this *enables* sensemaking. However, many virtual objects have special features that are unique to the virtual setting; namely, they may be embedded with digital information. For example in Account 3b: Participating – conference presentation, the lanyard around Sadie's neck does more than just identify her as a conference speaker – it holds useful items in her inventory (e.g. notecards). The ability to embed information in objects *enables* sensemaking in various ways. Namely, unlike in traditional settings, objects in SL need not be taken at face value; they are rich with details relevant to the activity at hand and may provide instruction on how to use the object.

Unlike in traditional settings, virtual matter in SL can be readily modified, copied, moved or transferred by the user (depending on object permissions set by the creator). For example, in Account 3b: Participating – conference presentation, Sadie modifies the slidedeck by replacing the default instruction slides with slides of her own. Further, these virtual objects can be imported ("resed") or removed at any time; it does not matter how large an item is, it can be materialised at the click of a button. For example, Sadie reses her slidedeck when she needs it then removes it after

the seminar. Having said that, items can be "heavy" in terms of lag in the system. As one interviewee said about building a classroom, "I didn't realise that a 1,024 texture is 10 times the size of a smaller one, and so I have lag." In such a case, the SL system can struggle to load properly and thus *constrain* sensemaking.

Sensemakers use the view tool to see the materials (objects and avatars) around them. For example in Account 2b: Participating – conference presentation, Sadie asks her attendees to pan their cameras to see who is sitting next to them. As such, unlike in traditional settings, SL *enables* sensemakers to gain multiple perspectives on the objects around them while sitting in the same physical place. In SL, sensemakers can also zoom in on things that are beyond "normal" sight range. Also, zooming in on avatars enhances the volume of their voice, so one can effectively "lean in" more closely. One of the *constraining* factors of the view tool is that the sensemaker can only see from one angle at a time, which can cause them to miss things that are not in direct view. For example, also in Account 2b, I have the camera pointed at Sadie to monitor her behaviours but this compromises my ability to see the audience. Also, the view tool is quite clunky and difficult to adjust quickly. As such, if the focus of the activity changes quickly, sensemaking is *constrained* because it can take too long to re-focus the camera. That is, if something happens out of view, even if the sensemaker hears it, they cannot whip their head around quickly to catch the action as in traditional settings.

Matter in SL has material value. That is, items can be bought or sold for Linden dollars, which can be exchanged for US dollars. While materials in SL can be expensive, it is comparatively much cheaper to buy/own things in SL than RL. For example in Account 3b: Participating – conference presentation, physical lanyards for the hundreds of conference attendees would be much more expensive than creating one virtual lanyard and replicating it. In this way, because digital materials are cheap, sensemakers have access to more "stuff" (matter) than in traditional settings.[32] The more land, textures, animations, clothes etc. one has access to, the richer the experience in SL, which *enables* sensemaking. Further, sensemakers can express themselves beyond traditional means through, for example, extravagant clothing and accessories. Also, sensemakers become more invested in the SL experience when they spend hard-earned money on virtual materials. As one interviewee said:

[32] Interviewees reported having up to 100,000 items in their inventories and some are self-confessed "freebie" addicts.

> It was also overcoming the idea that I'm actually to pay for this stuff … It's one thing to do this and not have to pay anything for the software and not have to pay for, you know, any of these things. But then suddenly you start saying, I'm going to pay for these clothing items, even though it was dollar here, or a few dollars there. That was a leap.

Textual matter is also involved in activities in SL. That is, text may be at the centre of sensemaking or supplement other material foci. For example in Account 3a: Networking – campfire catch-up, sensemakers interact using nearby chat, IMs, friend requests and notifications. Having various textual and other foci (such as objects and voices) in one activity can be challenging and *constraining* for the sensemaker. That is, looking at various objects, reading different texts, and listening to voices at the same time can be overwhelming. For example, also in Account 3a, when I (Sadie) click on the survey link, my attention is drawn away from SL to a web browser, which momentarily causes me to miss out on what is being said in voice/text chat. Further, some sensemakers may use the nearby chat as a backchannel to talk about things unrelated to the activity at hand. Having to decipher what is relevant to a conversation thread (and what is not) adds to the sensemaker's workload and thus may *constrain* sensemaking.

Despite these challenges, sensemakers learn quickly how to negotiate the various digital material foci of the activity at hand; perhaps sensemakers owe this to previous experience with virtual technologies that, for example, lead us to have countless web browser windows open at once. As one interviewee said:

> I mean, it's going at your own speed and really focusing on really like multitasking. So listening to what he's saying, to doing what you're doing, listening to the chat. I mean, we're all over the place.

Further, multiple material foci can help users to corroborate meaning, which *enables* sensemaking. For example in Account 3b: Participating – conference presentation, Sadie's visual aids (slides) give meaning to what she is saying in voice. I (Sadie) also get immediate feedback from the audience by using nearby chat in conjunction with voice (e.g. I ask attendees to confirm that they understand me by typing a "Y" for yes in the chat).

Finally, it is not just in-world matter that impacts sensemaking. Hardware such as computers, servers, routers and firewalls underpin and control access to the entire world of SL. As such, physical materials (hardware) *enable* and *constrain* sensemaking in various ways. For example, a good graphics card and high bandwidth internet enable sensemaking by providing a stable platform for SL software to run. On the other hand, a broken speaker or flat laptop battery

can debilitate sensemakers to the point that they cannot participate at all (as happened to Sadie in Account 3a: Networking campfire catch-up).

8.3.2 Presence

People "show up" in SL through avatars. In the educators' community, a few members model their avatar on their RL physical bodies (i.e. shape, skin colours, height, eye colours, etc.). As one interviewee said, "My avatar is a younger, skinnier, taller, prettier version of me … I think this avatar inspires me to be more fit and lose weight … She looks almost identical to me". Indeed, I was able to meet one of my participants in RL and I recognised her immediately from having met her avatar in SL. However most educators' avatars do not resemble their owners' RL bodies, yet they are recognisable as human bodies. In this way, human-like avatars that resemble a believable version of somebody *enable* sensemaking because they are familiar from traditional settings.

When participants embody avatars that do not look like them, they still consider the avatar to be a version of them (created for a specific purpose). For example, I do not look like my avatar, but Sadie's appearance is appropriate to my purpose for being in SL; that is, Sadie appears as a young lady (a student) dressed in smart casual clothes. More specifically, in Account 3b: Participating – conference presentation, Sadie is dressed in a collared shirt, slacks and waist coat for the seminar. Likewise, one interviewee described the purpose behind his avatar's appearance as follows.

> The reason I'm short is I don't want to – well, for quite a while I was making videos and I didn't have any resources to make them other than to ask, essentially become a street walker and go around asking people to be in my videos … I did not want to seem threatening or dominating to anybody. I'm going to ask males, and I figure some males … would respond better to a shorter male than they will to a, I mean in terms of doing a favour or doing something nice for them (sic).

Further, SL educators consider their avatar to be a part of who they are. Indeed, educators' community members tend to blend their avatar's identities with their RL identities.[33] For example, some participants' SL names are similar to their RL names. Further, a number of interviewees

[33] While most educators' community members are transparent with their RL identities/names, there are occasions when participants go into SL incognito using an alternative avatar or "alt". To explain, users who have lots of friends can be overwhelmed by notifications and private messages when they enter SL. To avoid being bombarded, they log in with an alternative avatar under another SL account so they can, for example, do some uninterrupted building. Their intention is not to deceive anyone about their identity, just to have some quiet time in SL.

referred to their avatar as their "alter ego" and said they are often called by their SL name in RL. As one interviewee said, "I just see it (my avatar) as an extension of myself in the virtual world, a way to do presentations or participate in teacher activities".

Some sensemakers choose to express themselves through their avatar in unconventional ways. For example I saw a dolphin and giraffe in SL which, though puzzling to me, made sense for the avatars' owners. Even though strange-looking avatars can be confusing and *constrain* sensemaking, creativity with avatars can *enable* sensemaking. For example in Account 3b: Participating – conference presentation, I (Sadie) recognise Daisy because of her elaborate pot plant avatar. Similarly, one interviewee said she creates/dresses her avatar to reflect what she is doing: "Like, if I'm building I'll be my worker bee avatar, where she's a bee and she has a construction helmet". In this way, avatars can develop personal brands and trademark appearances in SL, which become recognisable to others and thus enhance sensemaking. Further, the more time one spends in SL, what is considered to be "normal" or "strange" shifts; what was once constraining to sensemakers can come to enable them to understand new aspects of others' identities.

In SL sensemakers are able to endow their avatars with physical gestures and animations, which *enable* sensemaking. Avatars usually interact with one another by moving towards or away from each other or sitting beside one another (which is controlled by the owners using keyboard commands). Scripted gestures and animation overrides may also be used to give avatars expressions. For example in Account 3b: Participating – conference presentation, I use a stock animation so that Sadie moves when I speak in voice. Attendees of Sadie's seminar also express themselves through gestures, for example "applauding" sees the avatars clap, text appears in nearby chat, and a cheering sound effect is heard. However, it is difficult for sensemakers to command their avatars to make subtle expressions, such as looking another avatar in the eye, which *constrains* sensemaking. For example, also in Account 3b, Bange gives instructions to Sadie in text rather than physically demonstrating how to move the slidedeck (as he might have in a more traditional setting). Sensemaking is further *constrained* because animations and gestures are pre-programmed by the creator of the script. As such, expressions may not be made "in the moment". For example in Account 3a: Networking – campfire catch-up, Sadie's posture is determined by the script embedded in the chair she sits on; and therefore Sadie (I) cannot convey if she is interested, tired, relaxed or otherwise.

Speaking in voice helps sensemakers overcome some of the constraints of avatars' limited bodily expressions. Voice, which is the actual voice of the sensemaker, gives immediacy to

presence of avatars – one has a strong sense that there is an actual person behind the avatar. Further, voice provides extra information about the sensemaker. For example in Account 3a: Networking – campfire catch-up, Sadie's (my) accent informs the group she is from Australia. As well, voices have intonation and other subtleties (such as laughing, coughing, etc.) that *enable* sensemakers to express and perceive emotions. Voice can, however, be insufficient to convey meaning. For example, humour is sometimes difficult to interpret without facial expressions to accompany the voice. For example in one interview I conducted in SL, there were a number of awkward silences when the interviewee was waiting for me (the interviewer) to laugh, but I did not pick up on the joke.

Text is another important aspect of presence in SL. Namely when users log on to SL, their name appears in others' conversations window and also above their own avatar's head (depending on user settings). For example in Account 3: Playing – making machinima, when all avatars are in costume the names above avatars' heads are essential to figure out who is who. Also the "online now" feature enables sensemakers to see when their friends log on to SL. Sensemakers also use text profiles to document their friends, groups and hobbies in SL and in RL. These textual forms of presence (which reflect aspects of identity) help sensemakers get to know each other and thus *enable* sensemaking. For example in Account 3a: Networking – campfire catch-up, Sadie (I) reads Spin's profile to more gain insight into his character and interests.

8.3.3 Place

Activities are carried out in various, user-created places within the virtual world of SL. Sensemakers in SL can have a tremendous amount of control over their environment, far more than in traditional settings. For example, the VWC owns land in SL on which they build new conference facilities each year and for which they set the structure, layout and permissions. In the year Sadie (I) presented (Account 3b: Participating – conference presentation) the conference organisers chose a Roman theme with stone arenas, which *enabled* sensemaking. As one interviewee said, "I think we get some social cues and information from the venue, the venue and those in proximity". The conference organisers also set background music to give familiarity to the place; in this instance café music is playing in the conference welcome lounge, which *enables* sensemaking. As another example, the campfire in Account 3a: Networking – campfire catch-up is particularly familiar and engaging, as described by one interviewee below.

> I think in the campfire … there's something always soothing and disarming about a campfire – a fire of any kind – people always find comfort in that – real or virtual. So I think that kind of disarms people or let them talk freely or … For me I think it brings that, a campfire is usually a warm, friendly place and I think even historically (it's a) meeting place. And the fire is a key element to that and I think it's a powerful symbol.

However too much familiarity in a virtual place can *constrain* sensemaking because sensemakers become bored. That is, people come to SL to do and see things that they cannot in RL – so if the place is not novel, it becomes uninteresting. Indeed, users are free to create any setting they wish (within the bounds of the platform), yet many educators' community members persist in creating places that are similar or identical to RL places. For example, one interviewee describes the approach taken by many universities in SL.

> I think a lot of colleges did that. They build their university to look exactly like their college and it's kind of like, well, what is the point? You can be completely creative but there's also a psychological thing where if something is so foreign then it's just really weird – so I think there's a balance.

Sensemakers know where they are and how to get to places in SL via a number of navigation tools, the most common being teleporting. To teleport from one place to another, sensemakers must acquire a hyperlink to an SL landmark. For example in Account 3c: Playing – making machinima, the cast navigate to the warehouse in the skybox via a hyperlink in a group IM. By clicking this link, avatars are whisked from their current place and dropped at the destination place, which is accompanied by a "whoosh" sound and white sparkly dust (clear visual indicators that an avatar is departing or arriving at a place). As such, teleporting *enables* sensemakers to get to places they want to go instantaneously. Teleporting can, however, *constrain* sensemaking. First, teleporting (both leaving and arriving) can be quite abrupt and thus interrupt sensemaking. For example in Account 3a: Networking – campfire catch-up, Brenda teleports to the campfire mid-conversation and interrupts the meeting. Second, teleporting can be quite disorienting; because the sensemaker does not know the path they took to get to a place, they have no concept of where they are in relation to other places. For example in Account 3b: Participating – conference presentation, I knew how to teleport to the amphitheatre, but I had a limited sense of where the welcome lounge or conference office were in relation to the amphitheatre.

Finally, as sensemakers carry out activities they visit various virtual places both within and outside SL. For example in Account 3a: Networking – campfire catch-up, I toggle between the survey in a web browser and the conversation at the campfire in SL. In this way, sensemakers move between various 2D and 3D virtual places. Further, though avatars carry out activities in many shared virtual places, the users themselves are in various physical places all over the world. During

my time in SL I met people who lived in the USA, Europe, UK, South America and Australia. This geographical distance, however, has little bearing on sensemaking in SL because no one really knows exactly where other users are logging in from. Therefore, sensemaking is *enabled* by SL's ability to help educators comprehensively overcome distance in ways not possible in traditional settings.

8.3.4 Time

That SL runs on PST evidences the US-centric nature of the platform – the creators (Lindens Labs) are based in San Francisco and many users, including educators' community members, are based in the USA. Running on PST thus *enables* sensemaking because it mimics time in sensemakers' physical contexts. For example RL seasons are often reflected in SL; that is, there are autumn trees in Fall and snow in Winter. Also RL day and night transfer to SL, making the place familiar and normal. However, sensemakers who are not in or around PST time zones face particular challenges that *constrain* sensemaking. For example in Account 3b: Participating – conference presentation, I had to get up at 5am local time in Australia to present a 2pm seminar in SL. Also, because the SL software reads the time on the user's computer and reflects the time of day in-world, I had to change my in-world sun settings.

Activities in SL are carried out mostly in clock time (real-time as per PST). That is, as in each of the accounts, sensemakers log on and interact in a specific place at a specific time, which is familiar and *enables* sensemaking to take place "naturally". Some interactions also take place semi-synchronously and asynchronously. For example IMs, friend requests and notecards can be sent and received in-world when the other party is offline, and profiles can be read at any time. Further, synchronous, semi-synchronous and asynchronous interactions can occur concurrently. For example in Account 3a: Networking – campfire catch-up, Sadie receives various messages and notifications, some of which I attend to immediately (synchronously, like the voice conversation) and I leave others for later (semi-synchronously or asynchronously, like friend requests). In this way, sensemaking is *enabled* because users can do (some) things in their own time when they are ready. On the other hand, sensemaking is *constrained* because users can be overwhelmed or distracted by many things happening at once.

Also from a temporal perspective, sensemakers in SL are able to document their second lives via a number of means. Namely, the chat transcripts from all one's conversations are automatically saved to the user's desktop. SL itself does not have a video or voice recording

function, though many users use desktop software to record things like seminars or machinima, as Angel did in Account 3c: Playing – making machinima. Sensemakers may also document their activities by using the snapshot tool which takes a photo of the current camera view and posts it to the user's profile. Also, SL automatically records each avatar's teleport history so that sensemakers can re-visit places. All these mechanisms enable sensemakers to, at least partially, document and then revisit activities. For example after Account 3a: Networking – campfire catch-up, I followed up on hyperlinks to websites and details of people to contact. It can be difficult, however, to piece together each aspect of the interaction because they are saved in different places and in different formats (e.g. text file, video file, etc.). In sum, the documentation of interaction in SL *enables* sensemaking because what is missed in real-time can be regained in retrospect, though it can be challenging to reconstruct interactions exactly as they played out, which *constrains* sensemaking.

8.3.5 Appropriation

Being able to carry out activities effectively in SL (the "how" of sensemaking) requires sensemakers to possess a variety of technical skills. These may be broken down into three categories: in-world mastery, building/coding, and cultural awareness. First, in-world mastery involves being able to use the SL tools (e.g. keyboard controls, menus, commands, camera, etc.) to get around and do things. Second, building/coding relates to the ability to create objects or inventory items such as clothes, objects, buildings, textures and animations. Third, gaining cultural awareness is about learning the norms and etiquette of SL as well as where to look for information and help. How sensemakers acquire these skills is explored below.

SL is not just another computer program; it is a whole other world. As such, at first everything can feel new and confusing; one does not know how to choose an avatar, where to buy clothes, how to put them on, how to talk to people, how to move around, where to get help, etc. Many new SL residents feel like a newborn or "newbie" – they literally need to learn to walk again. As one interviewee said:

> When I first started with SL, which was maybe a little over a year ago, it took me a long time to get used it. I was on such a steep learning curve – it was more like a learning cliff. It took me like three weeks before I could learn to even change my clothes.

Also, resources for newbies are often scarce because they have small inventories and do not know how to acquire new things or modify them to their purpose. For example in Account 3b: Participating – Conference presentation, I bought Sadie's outfit and wore it "as is" because I did not

know how to modify it. Newbies are further *constrained* in their sensemaking because the tools can be difficult to use (compared to other virtual settings). For example in Account 3c: Playing – making machinima, Sadie accidently sits on Angel when trying to sit on the pose ball, which is very embarrassing and indicates to others she is relatively new. While there are many highly useful tools that *enable* users to carry out activities in SL, their effectiveness is *constrained* by sensemakers' (in)ability to operate them.

SL users learn technical skills in various ways. Users may simply stumble around until they work things out as Sadie does in Account 3a: Networking – campfire catch-up, when she just shows up to the meeting. Many users take in-world tutorials. As one interviewee said:

> Momentum University has a really good tutorial that I heard about. So I went there and you just walk through it and you read the posters that they have up. Um, and sometimes you follow directions and different things. So you learn how to walk and how to fly and gradually how to "cam" around, and how to do things.

Sensemakers also acquire skills in SL by creating a strong network of users to watch in action or ask for help. These users may also provide instruction and inventory items when needed. For example in Account 3b: Participating – conference presentation, prior to her seminar Sadie was given her slidedeck by a conference official who also helped her to create her slides and load them into the slidedeck. Even though I can create PowerPoint slides easily, another level of expertise and guidance is required to make them functional in SL.

One of the most difficult skills to acquire in SL is building. Indeed, building was largely out of the scope of this research, owing to time constraints for data collection and the significant investment (time and money) I would have had to make to become a proficient builder. That said, building is an important part of the practice of some educators and must be mentioned. Operating the in-world building tools can be clunky. In Account 3b: Participating – conference presentation, I find performing the simple task of moving the slidedeck challenging. Even users who have been in SL since its inception say that total mastery of building SL is difficult. For example in Account 3c: Playing – making machinima, the director of the film is a long-term resident but he purchased, rather than created, the animation overrides for the "Thriller" dance. Also, most of the cast elected to buy costumes from the SL marketplace rather than make (build) them. Further, SL's building tools are limited. Advanced users create elaborate objects in a third-party software and upload them to SL; this requires programming skills which are beyond the average user. One interviewee said, "One of my degrees is in computer animation, and that was for building and textures and that whole process". Indeed, building in SL is a professional job; another interviewee said, "We won a $30,000

grant and $10,000 of that we put to paying a SL builder who does nothing but build stuff in SL, to build everything on the island". As such, not only does building require coding expertise, it costs money for the land and building materials, which *constrains* many users in their activities and sensemaking.

Sensemakers must also learn cultural norms to effectively carry out activities in SL. Indeed, many SL norms bear resemblance in traditional norms, but have slight differences or quirks. For example, it is good etiquette in SL to avoid talking over someone when they are speaking (as it is in traditional settings). However in SL it is perfectly acceptable to talk (via text) in nearby chat while someone is presenting. This occurs throughout Account 3c: Playing – making machinima, where the cast chat in the backchannel while Angel directs the film in voice. To carry out such etiquette, sensemakers mute their speaker to eliminate background noise and then type in nearby chat. As another example, "question and answer" is mostly carried out using text for the question and voice for the answer (as is the case in Sadie's seminar in Account 3b: Participating – conference presentation). Also, educators' community members are generally very helpful in guiding behaviours and giving tips. Indeed, I found almost everyone I met be very willing to help and share resources and information. As noted in my fieldnotes, "I never met a negative person, they're all there because they want to be there". Such a positive and supportive community *enables* sensemaking because etiquette and norms that underpin activities are passed freely between members.

Table 19 summarises how sensemaking is enabled and constrained in SL along the five dimensions of sensemaking. Following the structure of Chapters 6 and 7, I now explore how sensemaking is altered owing to the virtual setting and identify unique features of sensemaking in SL.

Dimension of sensemaking	**How sensemaking is *enabled* and *constrained* in dimension**	**Unique feature of sensemaking**	**How unique feature *alters* sensemaking**
Matter – the "things" that are implicated in sensemaking	Familiar objects *enable* sensemaking, as well as information being embedded in virtual objects. Virtual materials can be moulded to the activity, and therefore *enable* sensemaking. View tool *enables* sensemakers to view objects from different perspectives but changing views is clunky, therefore sensemaking is *constrained*. Cheap, unbreakable, and weightless materials *enable* creativity and sensemaking. Various textual materials confuse and *constrain* sensemakers but may also help corroborate meaning and therefore *enable* sensemaking. Hardware and software *enable* sensemaking when working and *constrain* when faulty.	Malleability – SL provides infinite possibilities for creating material objects and for modifying them.	Malleability of materials *alters* sensemaking because sensemakers are not bound by natural laws as in traditional settings and may adjust their bodies, things and environments to suit the activity at hand.
Presence – "who" sensemakers are	Human-like avatars represent realistic versions of people, which *enables* sensemaking, but strange looking avatars can *constrain* others' sensemaking. Being able to express personality in unconventional ways *enables* sensemaking. Avatar gestures and animations *enable* sensemaking, but the limitations of remote control can *constrain* sensemaking. Pre-programming of gestures/animations *constrains* sensemaking because expressions are contrived/not immediate. Voice gives immediacy to presence and *enables* sensemaking but can be insufficient for expressing complex sentiments and therefore *constrain* sensemaking. Textual presence *enables* sensemakers to get to know each other.	Dual embodiment – Being able to bring multiple, changeable selves to bear in SL constitutes a unique kind of virtual embodiment. Being able to see oneself (i.e. their avatar) highlights sensemakers' disembodiment from their physical bodies.	Dual embodiment *alters* sensemaking because sensemakers can mold their identity to the activity in ways not possible in traditional settings. Dual embodiment *alters* sensemaking because emotions that are strongly felt by the sensemakers are difficult to reflect through one's avatar.

Place – "where" sensemaking takes place	Familiar places *enable* sensemaking, but over-familiarity can be boring and *constrain* sensemaking. Teleporting *enables* sensemakers to go anywhere at any time instantaneously, but can be disorienting and therefore *constrain* sensemaking. Sensemakers overcome physical distance in SL which *enables* sensemaking.	Belonging – sensemakers do not just feel they share place(s) in SL, they feel they belong there in ways they do not in RL.	Belonging *alters* sensemaking because it breeds a "can do" attitude that helps sensemakers overcome adversities they may not have to surmount in RL.
Time – "when" sensemaking takes place	Conventional time (time zones, seasons, day/night) is reflected in SL and *enables* sensemaking, but those outside PST may be *constrained*. Documentation of some interaction in SL *enables* sensemakers to go back and relive activities. However, these can be difficult and to piece together, which *constrains* sensemaking.	Temporal multiplicity – the result of sensemakers interacting over various time zones and in various modes (synchronous, semi-synchronous and asynchronous).	Temporal multiplicity *alters* sensemaking because past, present and future are incorporated and experienced in novel ways in the virtual setting.
Appropriation – "how" sensemakers use the technology to accomplish activities	SL is a complex platform that *constrains* many sensemakers in their ability to carry out even the most basic activities. There are very many useful tools in SL that *enable* sensemaking but only if sensemakers are competent. Building/coding *enables/constrains* sensemaking depending on specialist education/skills. Sensemakers evolve networks to help them, which *enables* sensemaking. Supportive and positive culture *enables* sensemaking because norms and etiquette that underpin activities are easily picked up.	Experimentation – sensemaking in SL is characterised by intense exploration and risk-taking.	Experimentation *alters* sensemaking because users cannot take existing knowledge for granted. Sensemakers must be vulnerable and unassuming in unprecedented ways in order to leverage creative possibilities of SL.

Table 19: Summary of findings for Fieldsite 3 – Second Life.

8.4 Unique features of sensemaking in Second Life

In the previous section I described the five dimensions of sensemaking and how sensemaking is enabled and constrained by particular virtual sensemaking tools in SL. Now I articulate unique features of sensemaking in SL, again along the five dimensions of sensemaking, which illuminate how sensemaking is altered by the virtual setting.

8.4.1 Malleability

The "matter" dimension shows that in the 3D virtual world of SL sensemakers can build, buy or otherwise access almost infinite synthetic materials. Further, unlike in traditional settings, these materials are totally malleable (within the scope of permissions set on certain objects by their creators). These materials may be embedded with extra layers of information about the object or how to use it. Also unlike in traditional settings, sensemakers are rarely encumbered by size or weight of objects (although some intricate, "heavy" objects may incur lag). Being able to create, modify, copy, move and transfer materials of any shape, size and texture is unique to sensemaking in the virtual setting. As well, these virtual objects can be materialised as and when required. These malleable materials of infinite abundance *alter* sensemaking because sensemakers can create anything they need to carry out activities. For example in Account 3c: Playing – making machinima, all the matter that appears in the machinima (actors, costumes, set, props, etc.) is contrived by the director and cast. As such, in SL almost anything is possible, as one interviewee said:

> You can do a lot of things in virtual worlds that you just can't do in RL … and that's what excites me and what's coming up in virtual worlds, um, we've scratched the surface on what virtual worlds can do.

Further, many educators' community members create objects with capabilities that, if built on the physical world, would be practically impossible to replicate. For example, a RL dragon costume cannot breathe fire or growl. Such novelties *alter* sensemaking because unlike traditional settings, sensemakers are not bound by natural laws in order to carry out activities. For example, so that other, foreign avatars would not obstruct filming in Account 3c: Playing – making machinima, Angel created the warehouse 4,000m in up in the sky and asks the cast to fly there (obviously not an option in RL). As such, sensemakers adjust their malleable bodies, objects and environments to suit the activity, rather than adjust their activity to accommodate material constraints.

8.4.2 Dual embodiment

The "presence" dimension shows that sensemakers in SL have infinite choice in the selves they bring to bear in any activity. Further, the range of preferences available to each avatar, such as outfits, gestures and animation overrides, afford sensemakers means to express an identity specific to the activity at hand. Such embodiment of avatars – and the ability to switch between them – is unique to sensemaking in the virtual setting as summarised by one interviewee who said, "You can express yourself in so many different ways, and you can dynamically express yourself". This embodiment of avatars *alters* sensemaking. In traditional settings people may bring various identities to bear in particular situations (e.g. "team leader", "subordinate", "mentor"). However, in the virtual world avatars can be moulded to extremes not dreamt of in more traditional settings. This means that sensemakers in SL are not limited by flesh and bone – they may morph into any identity that is most suitable and helpful at the time. For example in Account 3c: Playing – making machinima, sensemakers bring unprecedented richness to the experience of making a "Thriller" video through their elaborate costumes and sense of fun they conjure amongst themselves as friends and colleagues.

On the other hand sensemakers in SL may feel, in a way, disembodied from their avatars. To explain, the view tool in SL enables sensemakers to see themselves in action in ways that are not possible in traditional settings (or other virtual settings). For example in Account 3b: Participation – conference presentation, I am able to see my avatar (Sadie) in action as I deliver my seminar. Such disconnection between sensemaker and avatar was made explicit by one 85 year old interviewee who said "In the virtual world, no matter where you are you know where the bathroom is". This disconnection between physical and virtual body, a "dual embodiment" of the physical and virtual body, *alters* sensemaking. This is because sensemakers physical bodily experiences (thought, emotions, moods, etc.) are not automatically reflected in the actions of their avatar. Similar to the point made in Fieldsite 1 (Yammer), there is a delay in how one's physical response may be translated to the virtual world through the avatar. Moreover in other situations, there may not be any gesture or animation available to express what the sensemaker is thinking or feeling. As such, outward reflections of inner thoughts/emotions may be, at worst, absent and, at best, delayed while the user makes conscious decisions about how to respond. In this way, dual embodiment *alters* sensemaking because the actions of the avatar and the emotions of the sensemaker may be disjointed or mismatched.

Despite this dual embodiment, sensemakers in SL may emotionally react to events quite strongly. For example in Account 3c: Playing – making machinima, I feel very embarrassed about sitting on Angel instead of the pose ball. Indeed, my fieldnotes indicate that I laugh out loud and become flushed in the face. While my laugh is heard in-world, my avatar's physical reaction is delayed while I figure out how to get off the pose ball. As such, dual embodiment does not seem to obstruct the felt impact of in-world happenings on the physical person who is experiencing them through the technology – the virtual world is real in its consequences for sensemakers.

8.4.3 Belonging

The "place" dimension shows that SL is another world, or a collection of other worlds, in which educators' community members carry out activities. Furthermore, sensemakers develop special connections to specific places in SL. For example I found the SLEF campfire, in Account 3a: Networking – campfire catch-up, to be a warm and welcoming place, as reflected in my fieldnotes.

> That was the most amazing group ever! So friendly – I actually recognised a few people … I got a buzz out of "being there" and participating – real observation/participation.

Further, some interviewees said they like the feeling of just being with other avatars in SL, even if they do not talk or interact. As one interviewee said, "It might be similar to, um, how people like to go see movies and then … share what they learned, what that experience meant to them". In this way, sensemakers can share experiences in virtual places that feel intimate and real, yet are beyond their immediate and varied physical places. Consequently, SL is a place where sensemakers feel they truly belong, where they can be vulnerable to others and feel accepted for who they are, perhaps even more so than in RL. As one interviewee said:

> So what I'm doing is, with SL it allows me to have a constant so that they will, the majority of them, will always be here and I have a place to go with people that I know their name and they know my name, and it's the familiarity.

This sense of belonging *alters* sensemaking. Namely, virtual places (to which users feel they belong) orient sensemakers towards the activity at hand. That is, in the educators' community in particular, sensemakers create specific places to carry out specific tasks towards specific goals, and these places command a genuine attachment from the users who occupy them. It could be said that such specific orientation of places to particular activities is uncommon in more traditional settings; traditional settings must be more adaptable to multiple activities and goals (e.g. a seminar room that is used for team meetings, training and brainstorming sessions for people in various organisational

departments). In sum, owing to the commitment of sensemakers who feel they truly belong to virtual places that are dedicated to their purposes, sensemaking in the virtual setting of SL is *altered*. Namely, activities and attentions of sensemakers may be better aligned with the context in which they are carried out; therefore sensemaking may be more streamlined than in traditional settings.

8.4.4 Temporal multiplicity

The "time" dimension shows that SL runs on a PST clock by which sensemakers organise themselves and events. In this way, SL is temporally conventional. Yet sensemaking in SL is also temporally unconventional; that is, it is characterised by a combination of synchronous, semi-synchronous and asynchronous activities. Further, documentation of (some) interaction allows sensemakers to go back in time to relive aspects of their activities. As well, the act of teleporting enables sensemakers to, in a way, compress time – it takes seconds instead of hours, days or months to become co-present with counterparts all around the globe. Finally, sensemakers occupy various local time zones when they interact in SL. As such sensemakers in SL, unlike traditional settings, experience time in multiple ways – ordered/disordered, synchronous/asynchronous, local time/SLT, etc., which may be called "temporal multiplicity". This temporal multiplicity *alters* sensemaking in various ways. Namely, unlike in traditional settings in which sensemaking always takes place in the present (albeit looking back retrospectively), sensemaking in SL takes place in various "times" (often concurrently). For example in Account 3a: Networking – Campfire catch-up, I (Sadie) experience Spin as his "present" self (his avatar, text chat, IM) and also as his "past" self when I read his profile. This co-occupation of our past and present selves, and interaction with others' past/present selves, *alters* sensemaking. Namely, unlike in traditional settings, sensemakers to do more than just "show up" at a time and place for activities; they move back and forward though time in order to live and relive activities.

Further to this, time spent in SL is quite detached from time spent in RL. Educators' community members spend enormous amounts of time in SL, up to 25 or 30 hour per week (equivalent to a part time job), and many interviewees said they wish they could spend more time in-world. Though activities in SL tend to complement user's working lives, time spent in SL is usually personal time. Further, it is difficult to blend SL and RL time because it is hard for users to share their in-world experiences with family or friends who do not have SL accounts. As one interview said, "My husband in very jealous of the time I spend in Second Life". This temporal detachment between RL and SL *alters* sensemaking because RL activities compete with and detract

from SL activities, and vice versa. Even though users' SL and RL identities and goals are blended, carrying out activities in SL means compromising aspects of one's RL. Having said that, in some instances users such as Brenda (a librarian) are able to justify and manage spending time in SL during work time.

8.4.5 Experimentation

The "appropriation" dimension shows that successful sensemaking in SL requires proficiency in (much of) the functionality of SL, which incurs a steep learning curve for sensemakers. Further, because SL is a novel world for accomplishing activities, new approaches must be adopted to understand and navigate it. Namely, at least in the beginning (many) sensemakers must assume the disposition of a newborn and be willing to take risks and fail on many occasions. In traditional settings sensemakers generally have a baseline understanding of how the world works, but this is not a given in SL. In almost every function, sensemakers need to learn by doing, not by applying existing understandings as they may be used to. The resulting intense exploration and reflection, referred to here as "experimentation", is unique to sensemaking in the virtual setting. This virtual experimentation is unfamiliar to sensemakers who expect traditional ways of learning to be sufficient to get by. As one interviewee said:

> I have people asking me, "So where's the instructional manual for SL?" And I'm like, "There isn't really one". They're like, "How do I play?" And I'm like, "It's an exploration. You go and you try it".

Such experimentation *alters* sensemaking because sensemakers must put aside existing assumptions and dive into the unknown with an open mind. As one interviewee put it, "You need to unlearn what you have learned". Indeed, I felt out of my comfort zone on many occasions throughout data collection. My experience of such vulnerability, which ultimately led to my head-first approach to SL, is exemplified in Account 3b: Participating – conference presentation, when I share an anecdote about my first day in SL. I noted in my fieldnotes:

> I'm getting a make-over. Feeling embarrassed and overwhelmed. When I (accidentally) got naked, I don't know who saw me, if anyone! … A feel like a fraud being a newbie and trying to do research. I feel I won't be taken seriously!

Indeed, there is no way to avoid this phase of vulnerability if one wishes to leverage the creative possibilities of SL.

8.5 Chapter summary

The presentation of findings has explored how sensemaking is enabled, constrained and altered by virtue of it taking place in the virtual setting. The critical findings for Fieldsite 3 are the five unique features of sensemaking in SL. First, sensemaking in SL involves highly malleable materials that sensemakers are able to create/summon at will in ways that are not possible in traditional, physical settings. Second, the dual embodiment experienced by sensemakers, owing to their simultaneous presence in both the virtual and physical world, is unique to sensemaking in SL. Third, sensemakers in SL express a strong sense of belonging to virtual places that, in some cases, exceed their attachment to places in traditional settings. Fourth, SL is far more temporally complicated than traditional settings; for example, sensemaking may take place synchronously, asynchronously or a combination of both. Fifth and finally, when appropriating technology in SL, sensemakers must adopt an experimental approach and actively challenges their ideas about the best ways to accomplish activities. These findings, and those from Chapters 6 and 7, will be revisited in the next chapter (Chapter 9) in which I conduct a cross-fieldsite comparison.

Chapter 9 PULLING IT TOGETHER – SENSEMAKING IN VIRTUAL SETTINGS

In Chapters 6, 7 and 8 I presented the findings for each of the fieldsites. These findings chapters culminated in the articulation of unique features of sensemaking as it takes place in Yammer, telepresence and SL. Now I pull these findings together by conducting a cross-case analysis. To do this, I first overlay the unique features of sensemaking on to the virtuality continuum (developed in Chapter 2). Then I assess if and how each feature of sensemaking is applicable across the fieldsites. By this approach I articulate which features of sensemaking endure across all fieldsites and levels of virtuality. I also discuss how sensemaking changes with the level of virtuality of the setting. I present this cross-case analysis under each of the five dimensions of sensemaking: matter, presence, place, time and appropriation. This includes acknowledgement of some anomalies encountered in using the virtuality continuum as an analytical tool and consequent proposal of an alternative matrix model to help overcome these issues. Based on this analysis, I conclude the chapter with a summary of how sensemaking takes place in virtual settings, thereby answering the research question.

9.1 Cross-fieldsite comparison

The first step of the cross-case analysis is to overlay the findings from each fieldsite onto the virtuality continuum (see Figure 27). This captures all the unique features of sensemaking that were identified in the fieldsites across all levels of virtuality (three features for each fieldsite, 15 in total). Figure 27 serves as summary of findings from which to further the analysis.

	Yammer (enterprise social network)	Telepresence (video collaboration technology)	Second Life (3D virtual world)
	Virtuality (approaching actuality)		
Sensemaking dimension	Unique sensemaking features		
Matter	Textuality	Extrapolation	Malleability
Presence	Degree of presence	Performance	Dual embodiment
Place	Locational variability	Virtual culture	Belonging
Time	Temporal distortion	Compression of time	Temporal multiplicity
Appropriation	User resilience	Unity with technology	Experimentation
	Low level virtuality	Mid level virtuality	High level virtuality

Figure 27: Summary of findings across fieldsites.

I now consider if and how each unique feature of sensemaking is/is not applicable to the two fieldsites other than that from which it was derived (e.g. Is the textuality feature uncovered in Yammer also a feature of sensemaking in telepresence or SL?). In doing so, I identify qualitative similarities and differences in how each feature of sensemaking manifests specifically within each fieldsite. These findings are summarised in Table 20 where the * symbol represents the fieldsite in which the feature was first identified. In the subsequent text I further explain the cross-case analysis, again under each of the five dimensions of sensemaking. I identify common features of sensemaking as it takes place across all the virtual settings and levels of virtuality. I also discuss ways in which sensemaking seems to change depending on the setting and its level of virtuality. Towards the end of the chapter I discuss some anomalies that arise in analysis which challenge some of the conclusions drawn; these anomalies highlight ways in which the two-dimensional, virtuality continuum does not capture the 'whole story' of how sensemaking takes place in virtual settings. As such, I propose an alternative, matrix model of virtuality that helps to draw out a more nuanced understanding of the phenomenon, particularly in relation to the critical concepts of materiality and embodiment. This cross-case analysis chapter results in a high level description of how sensemaking takes place in virtual settings; this both answers the research question and forms the basis of a succinct account of "virtual sensemaking" in Chapter 10.

Dimension of sensemaking	Unique feature of sensemaking	Applicability to Yammer	Applicability to Telepresence	Applicability to Second Life
Matter	Textuality	* Textual matter is heavily implicated in sensemaking.	Text in the form of supporting tools (e.g. ChitChat) are used in parallel to the main tools, video and audio, to make sense.	Text (e.g. chat, profiles, menus) is used in tandem with other tools such as voice and avatars to make sense.
	Extrapolation	Sensemakers may extrapolate what is happening beyond the Yammer thread in the physical contexts of their counterparts.	* Sensemakers imagine what is happening off camera, and this can be manipulated by their counterparts.	The completeness of the world of SL makes extrapolation into others' physical worlds (largely) unnecessary.
	Malleability	Although matter (text, images, etc.) is somewhat malleable (can be modified, copied, shared, etc.) the structures of Yammer (e.g. threads) are relatively fixed.	The matter implicated in sensemaking in telepresence (physical bodies, objects etc.) is fairly fixed, but the configurations/set ups for telepresence are malleable.	*Malleability of materials is prominent in SL where materials are completely synthetic.
Presence	Degrees of presence	* Textual embodiment means sensemakers are unable to be physically present. Therefore it is unknown to others if they are there or not.	Degrees of presence are less pronounced in telepresence because presence is enacted through the physical body via video, i.e. one is there or not.	Degrees of presence are prominent in SL because there are various means by which one can express their presence/non-presence.
	Performance	Performance of identity is constrained to use of text and pictures only.	* In telepresence sensemakers uses their own body (and physical/digital materials) to enact a particular identity.	Virtual performance is prevalent in SL by way of sensemakers enacting identities in ways not possible in RL.
	Dual embodiment	In Yammer, sensemakers see themselves on screen as text/images.	In telepresence, sensemakers have the option to monitor their physical bodies on screen using the self-view tool.	* In SL sensemakers see themselves on screen as an avatar, which is a completely different embodiment of their physical self.
Place	Locational variability	* Sensemakers occupy various physical and virtual places.	Sensemakers occupy various physical places and can see into others physical places.	Sensemakers occupy various physical places and an infinite number of shared and non-shared virtual places.
	Virtual culture	Physical, organisational culture seems to inform virtual culture.	* Virtual culture is a blend of organisational culture and norms developed specifically for the virtual setting of telepresence.	Sensemakers enact a virtual culture that is independent of their physical contexts.

	Belonging	Sensemakers do not seem to feel connected to the virtual setting of Yammer beyond their sense of belonging to the organisation.	Telepresence seems to propagate sensemakers' sense of belonging to the organisation through constant connection to colleagues.	* Sensemakers feel a strong sense of belonging to places they co-create together for specific purposes.
Time	Temporal disorder	* In Yammer activities may be disordered because threads may be contributed to in tandem with other threads and revisited at any time.	Activities are relatively ordered (occur in real-time) in telepresence in which interactions are mediated by video.	In SL activities are both ordered (in real-time avatar/voice interactions) and disordered (in textual interactions).
	Compression of time	Some activities may overlap and therefore compress time. Time may be extended or drawn out (instead of compressed) because of the largely asynchronous nature of interaction in Yammer.	* Compression of time (overlapping of activities and consequent blending of home-work life) is exacerbated by sensemakers' constant connection to each other via telepresence/video.	Time is both compressed (several in-world activities take place in parallel) and decompressed (some textual activities are drawn out over hours, days or weeks).
	Temporal multiplicity	Interaction in Yammer is sequential, slow and relatively straight forward.	Time zones impact the multiplicity of time in telepresence, though interaction is mostly synchronous.	* In SL, time is multiple in various ways including variable times zones and a mixture of synchronous and asynchronous interaction.
Appropriation	User resilience	* Successful sensemakers in Yammer tend to be optimistic and persistent in using social media to accomplish activities.	Successful sensemakers must be committed to, and proficient in, their use of telepresence (which is quite intuitive overall, with some quirks to be negotiated).	Successful sensemakers in SL "give themselves over" to the technology and persist in the face of challenges.
	Unity with technology	Sensemakers in Yammer may remain at "arm's length" from the technology in accomplishing activities.	* In telepresence sensemakers are more successful if they embrace and embody the technology in work and life.	In SL, sensemakers have no choice but to be immersed within the technology.
	Experimentation	In Yammer, sensemakers largely apply existing knowledge to get by in the virtual setting.	In telepresence, sensemakers must learn new skills and somewhat experiment with the technology to get the most out of it.	* In SL sensemakers must unlearn what they take for granted in traditional settings.

Table 20: Comparison of features of sensemaking cross virtual settings and levels of virtuality.

9.1.1 Matter

The dimension of matter describes "what" (the things, stuff, materials) is implicated in sensemaking in virtual settings. In virtual settings, the materials that are involved in sensemaking are mostly digital. As shown in the cross-fieldsite comparison, this digital matter is often comprised of text. As such, textuality plays a role in sensemaking in all virtual settings/levels of virtuality. While text is particularly prominent in Yammer and SL (within the thread and chat features), text is also an inescapable component of the sensemaking experience in telepresence, which relies on text-based control systems (e.g. remote control) and integrated text-based applications (e.g. document sharing and instant messaging via ChitChat). An implication is that text is a "moving target" that can, through accomplishment of activities, be easily modified and shared in all the virtual settings (e.g. Yammer posts can be retrospectively changed, documents can be edited while being shared via telepresence, and personal profiles and notecards can be modified at any time in SL). This means that multiple instances of sensemaking can be carried out in parallel. For example, in all fieldsites aside conversations take place in instant chat in parallel to the main activity.

The cross-fieldsite comparison further reveals that, even though textuality is a feature of sensemaking in all fieldsites, the level of textuality differs. In Yammer (low level virtuality) almost all matter is composed of text – people, things, emotions, etc. In telepresence and SL (mid to high end of the continuum) text is used to support rather than lead the accomplishment of activities (which occur mainly through voice, video and avatars). As such, sensemaking in less virtual (more textual) settings requires sensemakers to carve out the material foci of their sensemaking from text. On the other hand, in more virtual settings the material foci of sensemaking are more easily distinguishable because they appear as digital people and objects (rather than as text). To illustrate, in Yammer differentiating a person (as represented by text) from the object of sensemaking (as represented by text) is more difficult for the sensemaker than, say, distinguishing between digital objects (such as chairs and tables) and people (represented by avatars) in SL. Further, the most sophisticated digital materials in the most virtual settings may provide richer sensemaking experiences than some traditional settings. For example, in SL being able to embed objects with textual information (which is not possible/practicable in traditional settings) helps sensemakers to accomplish activities without the need for verbal instruction.

The findings in Table 20 also suggest that matter, as it is implicated in sensemaking, is more or less malleable depending on the virtual setting. Although matter is always somewhat malleable in virtual settings, in Yammer (the least virtual setting) it is much more fixed (e.g. standardised

threads). In telepresence (mid level virtuality) malleability of technological configurations is high, and sensemakers have much choice about the physical materials they use to accomplish activities. However, the physical materials themselves are fixed. Further, in SL (the most virtual setting) matter is entirely contrived (e.g. sky, land, buildings, people, objects). As such, I suggest that as the level of virtuality increases, people, things and other matter implicated in sensemaking become more elastic. That is, sensemakers' ability to create, move, modify, transfer and copy materials is heightened as virtuality increases. For example, while a change to textual matter in Yammer is confined to using characters on a keyboard, the options for changing digital bodies and objects in SL is limited only by imagination (and technical skill).

The findings show that in (some) virtual settings sensemakers extrapolate what is happening in others' physical contexts as they interact with those people virtually. This feature of extrapolating matter is more or less pronounced in sensemaking depending on the virtual setting. In Yammer and telepresence sensemakers must actively imagine what else is going on behind the posts/comments and camera respectively in order to carry out activities. Conversely, in SL (unlike in traditional or other virtual settings) if an object that is required to complete an activity is missing, sensemakers can simply "res" it as if from thin air. Indeed, SL is a standalone, "complete" world that does not necessarily require connections to the physical world for the activities undertaken within it in to make sense. As such, I suggest that as the level of virtuality increases, extrapolation behaviours decrease in sensemakers. That is, the more virtual the setting, the more free sensemakers are to fabricate (rather than imagine) everything they need to accomplish activities.

9.1.2 Presence

The dimension of presence describes "who" sensemakers are and how they show up for sensemaking in virtual settings. In all the fieldsites sensemakers have flexibility and control over their degrees of presence, whether it is by manipulating text (Yammer), changing camera settings (telepresence), or designing avatars (SL). This indicates that sensemakers across the settings (and levels of virtuality) may choose to be actively or passively present, or to lurk without making their presence known to others. There are, however, nuances in how presence may be exploited by sensemakers in different virtual settings. For example, it is much easier to lurk in Yammer (low level virtuality) than in telepresence (mid-level virtuality) in which a physical body indicates presence. To a lesser extent, lurking is also more difficult to achieve in SL (high level virtuality) than in Yammer because in SL the digital avatar may "go to sleep" if the user is away from their

computer for an extended period of time. These findings represent an anomaly in which sensemakers' degrees of presence cannot be predicted based on the level of virtuality of the setting.

The findings suggest that sensemakers' ability to express more nuanced features of their identity and emotions varies between virtual settings. In Yammer (low level virtuality) sensemakers tend to "set and forget" their profile pictures that represent them. These textual representations are far less expressive than video-meditated, physical bodies of sensemakers in telepresence (mid level virtuality). In SL (high level virtuality) sensemakers use a combination of physical and virtual bodily features to perform their identities (i.e. physical voices accompanied by digital bodies). While digital avatars are not able to be controlled with the precision of physical bodies, the options for expression are heightened in many ways. That is, synthetic bodies, clothing, animations, etc. allow sensemakers in SL to express themselves in ways not possible in traditional settings (or less virtual settings). As such, in a general sense, I suggest that the sensemaking feature of performance – that is, sensemakers' expressiveness through skilful enactment of technology – seems to become more pronounced as the level of virtuality increases.

Relatedly, where digital bodies are implicated in sensemaking in the fieldsites, the immediacy of a sensemaker feeling an emotion and expressing it may be compromised. This creates an obvious distinction between the user and their digital representation. For example, in Yammer (low level virtuality) there is a pronounced delay between feeling an emotion and expressing it in text because the sensemaker must type their contribution in the thread. On the other hand, immediacy in telepresence (mid level virtuality) is seldom compromised, notwithstanding minor delays in audio and video. And in SL (high level virtuality) immediacy is somewhat compromised; while voice is immediate, keyboard typing and commands are delayed. In SL in particular, despite the obvious disconnection of the human body from the digital one (the avatar), evidence shows that sensemakers have very strong emotional connections to their digital selves. As such the sensemaking feature of dual embodiment (being simultaneously connected to, and disconnected from, oneself) is highly prevalent in SL (and to a lesser extent in Yammer and telepresence), but does not seem to increase or decrease generally with the level of virtuality of the setting.

9.1.3 Place

The dimension of place describes "where" sensemaking happens in virtual settings. In this regard, locational variability (moving between various physical and virtual places) is part and parcel of sensemaking in all fieldsites and all levels of virtuality. The type/level of virtual setting does not

constrain the *physical* places from which sensemakers can participate in activities. However, the type and number of *virtual* places available to sensemakers varies amongst the virtual settings. Namely, in SL (high level virtual setting) endless virtual places may be created or visited in carrying out the activity at hand. In Yammer and telepresence (less virtual settings) hyperlinks to other virtual places may be used at any time. However, within Yammer and telepresence themselves, sensemakers are far more confined (for example, to specific Yammer groups or telepresence calls). In any case, sensemakers in all virtual settings must develop ways to fluidly transition between various physical and virtual locations. This means sensemakers in virtual settings must negotiate and filter large amounts of information in various formats that are determined by the place in which they are acting (i.e. the format of content is determined by the platform).

In all fieldsites there is a virtual culture (special norms and etiquette) that underpins sensemakers' ability to carry out activities. This virtual culture may be weak or strong, and is influenced to varying degrees by the traditional setting alongside which the virtual setting exists. In Yammer (low level virtuality) the physical organisational culture heavily influences virtual culture; that is, organisational culture (values, norms, etc.) is directly reflected in the virtual culture. In telepresence (mid level virtuality) sensemakers import their physical, organisational culture, but also describe a special culture that exists virtually (which may also influence the broader organisational culture). Generally, in these low to mid level virtual settings sensemakers tend to know each other online and offline and must show some consistency between their virtual and physical behaviours. In SL (high level virtuality) there is no (or very little) shared physical, organisational place. Therefore, sensemakers' relationships with each other often only exist in the virtual world, with no necessary connection to physical organisations. Therefore, the findings suggest that the more virtual the setting the weaker the influence of the physical, organisational culture. Instead, in highly virtual settings sensemakers enact a shared virtual culture from within the virtual setting.

Relatedly, the sensemaking feature of belonging is present across virtual settings, but to varying degrees. In Yammer (low level virtuality) sensemakers' sense of belonging to the virtual setting is born out of their loyalty to the broader organisation (not to the virtual setting per se). In telepresence (mid level virtuality) sensemakers experience a sense of belonging to the organisational context that straddles both physical and virtual realms. And in SL (high level virtuality) sensemakers immerse themselves in the virtual world, and disconnect from the outside world, to conjure a feeling of belonging; belonging in SL means being accepted and heard by

effectual strangers. As such, like virtual culture, instead of carrying one's sense of belonging to the place/group from the physical to the virtual context (as in Yammer, low level virtuality), in highly virtual settings belonging is established and fostered almost entirely in the virtual setting (as in SL). As such, the findings suggest that the sensemaking feature of belonging seems to increase with the level of virtuality of the setting.

9.1.4 Time

The dimension of time describes "when" sensemaking takes place in virtual settings. This is a particularly complex dimension as it seems few temporal features appear uniformly across virtual settings. I was, however, able to identify that time seems to get more complicated with the level of virtuality of the setting. That is, where the sensemaking feature of temporal multiplicity is concerned, SL (the most virtual setting) is far more temporally complicated and challenging than the other two fieldsites. Namely, SL combines synchronous and asynchronous interaction (as well as various time zones), whereas as Yammer is usually asynchronous, and telepresence is predominantly synchronous.

Temporal disorder refers to the notion that sensemaking in virtual settings may not take place in an ordered, linear fashion as we are used to in traditional settings. This feature occurs in all virtual settings but is least pronounced in telepresence (the mid level virtual setting on the continuum) where sensemaking mostly takes place in real-time through a video call. Conversely, in Yammer and SL (the least and most virtual settings, respectively) sensemaking is heavily disordered owing to concurrent interactions taking place (e.g. concurrent threads in Yammer or concurrent voice and text chat in SL). From these findings I could not draw any distinct pattern in how the sensemaking feature of temporal disorder changes with the level of virtuality.

Finally, in all the virtual settings sensemakers have the capacity to compress time (or decompress time) as they carry out activities. In Yammer (low level virtuality) threads take place concurrently and therefore time is compressed (although some threads go on for days or weeks, which decompresses time). In telepresence (mid level virtuality) activities do not just occur in parallel, they are actively blended together by sensemakers. Namely, owing to the high integration of telepresence with other technologies, and the consequent integration of home and work life, sensemakers make little distinction between accomplishment of one activity and the next. Therefore, time is compressed (and very rarely decompressed). And in SL (high level virtuality) various activities take place in parallel through the different modes of interaction (voice, avatars,

chat, etc.). In this way, sensemaking activities are not finite; they run into each other and overlap (are compressed), and also straddle work and home time. However, some activities are drawn out (decompressed) over many hours or days. For example, a private chat session could be left and picked up again upon the next login. Because the sensemaking feature of compression of time "spikes" in the middle of the virtuality continuum (i.e. it is most prevalent in telepresence where sensemakers constantly move between devices and activities), there does not seem to be a pattern in how compression of time changes with the level of virtuality.

9.1.5 Appropriation

The dimension of appropriation describes "how" sensemakers use technology in order to carry out sensemaking virtually. The findings show that in all fieldsites, sensemakers need to acquire resilience to overcome technical and social interruptions (albeit to varying degrees). The sensemaking feature of user resilience suggests that successful sensemakers go further than merely knowing/learning how to use technology to accomplish activities. For example, in Yammer resilient sensemakers choose to overlook frivolous use of the platform to engage in meaningful work and build professional relationships across the organisation; in telepresence resilient sensemakers find ways to overcome the slight delay in audio (e.g. moving hands); and in SL sensemakers persist in the steep learning curve to acquire specialised skills and make the most of in-world tools (especially in the case of building). As such, to an extent, it can be said that the sensemaking feature of user resilience increases with the level of virtuality of the setting. Put another way, quite intuitively, the more virtual the setting (i.e. the more sophisticated the activity and enabling technology), the greater the level of resilience required by sensemakers.

Taking this argument further, experimentation – a sensemaking feature which is most critical in the highly virtual setting of SL – requires a different mentality to the sheer tenacity that may characterise user resilience. Namely, in SL (and to a much lesser extent in Yammer and telepresence) sensemakers must learn how to carry out novel activities using sophisticated tools, which demands a level of commitment and creativity beyond user resilience. In highly virtual settings it is not enough to just learn the functionality of the technology and how to use it to carry out specific activities. Instead, sensemakers must be willing to act as a newborn, to *un*learn what they have taken for granted in traditional settings (and less virtual settings). Indeed, sensemakers in highly virtual settings must also allow the technology to shape the activity, rather than adjust the technology to achieve the desired activity. For example, a key finding in SL was that sensemakers

must find the balance between familiarity (doing what they know) and novelty (challenging the status quo) in creating and enacting the virtual world.

Finally, in all fieldsites the findings suggest that the more sensemakers achieve unity with technology, the smoother sensemaking becomes. That is, successful sensemakers embrace and embody the technology as an extension of themselves in order to carry out activities. This sensemaking feature, unity with technology, may be achieved to varying degrees depending on the setting. Namely, in the SL (high level virtuality) users almost *become* the technology (i.e. people evolve their RL identities through their avatars). In telepresence (mid level virtuality) sensemakers use technology to seamlessly blend their professional and personal lives. And in Yammer (low level virtuality) sensemakers embrace the technology but, owing to the textual nature of the setting and other factors, cannot fully immerse themselves in it. Therefore, the findings suggest that as virtuality increases, sensemakers' unity with technology also increases.

9.2 An alternative model for explaining findings

Several anomalies arise in the above analysis which challenge the relationships I have drawn between features of sensemaking and the level of virtuality of the setting. While the virtuality continuum has been effective for selecting fieldsites that represented a large range of virtual organisational settings for investigation, it has proven less effective as an analytical tool to draw out and explain how the qualitative differences between fieldsites impact the findings. In some ways, this is unsurprising given that five dimensions of sensemaking have been ascertained from empirical sites selected from a two-dimensional continuum. As we will see, a specific issue arises with regard to the linear relationship drawn between the two criteria for defining virtuality: 'activity type' and 'technological sophistication'. In light of this I propose an alternative, matrix model of virtuality as an analytical tool. This model helps to overcome some of the issues identified during analysis, and deepens our understanding of the complexity of sensemaking in virtual settings.

9.2.1 Anomalies in findings

I now present some of the anomalies encountered during analysis in each of the five dimensions of sensemaking in virtual settings. First, in the dimension of matter, inconsistencies arise in the relationship drawn between material features of sensemaking and the level of virtuality of the setting. Namely, sensemakers in Yammer (low level virtuality) have access to many more digital materials (that do not represent physical materials) than they do in telepresence. Yet, telepresence (mid level virtuality) is considered to be a more 'virtual' setting owing to its higher

level of technical sophistication and therefore affordance of more sophisticated virtual activities. In this case, the supposedly 'less virtual' technology enables the 'more virtual' activity (materially richer sensemaking) to occur, which runs counter to the logic of the virtuality continuum.

Second, in the presence dimension of sensemaking in virtual settings, I have argued that digital bodies enable sensemakers to choose if and how they show up for sensemaking (an assertion I stand by generally). However, given this assertion, it is not clear how/why/if telepresence (mid level virtuality) is 'more virtual' than Yammer (less virtual setting) in terms of malleability of identity. Namely, a sensemaker's identity in Yammer is much more malleable than in telepresence where they are confined to being represented by their physical bodies rather than text and images. Again, the supposedly 'less virtual' setting of Yammer enables the 'more virtual' sensemaking activities.

Third, in the dimension of place, I argued generally that as virtuality increases so too do the number and richness of other virtual places available to sensemakers (e.g. in SL endless virtual places may be created or visited, which is not the case in Yammer and telepresence). However, this finding does not account for the fact that sensemakers in Yammer (low level virtuality) move between different virtual places far more readily than in telepresence (mid level virtuality). For example, Yammer users constantly move between various windows and programs on their desktops, whereas telepresence users usually participate in one "place", i.e., sitting on a single video call. Further, the findings do not adequately capture the notion that telepresence (a supposedly more virtual setting than Yammer) does not offer sensemakers a third, shared, digital place that is independent of their physical settings (as Yammer does in the form of feeds and groups). Indeed, the virtuality continuum does not adequately account for these spatial dimensions of sensemaking as were born out in the analysis.

Fourth, features of sensemaking in the dimension of time were particularly difficult explain using the virtuality continuum; I could not identify any enduring relationship between the level of virtuality of the setting and the temporal features of sensemaking in virtual settings (temporal multiplicity, order/disorder and compression of time). For example, it was my (unexamined) assumption that the more virtual and "life-like" the setting, the more "normally" activities would be played out in real-time, which was not the case. Indeed, I did not directly consider temporal aspects at all when structuring the virtuality continuum as a tool for fieldsite selection or data analysis.

Fifth, in relation to the appropriation dimension, I have argued that (generally) as virtuality increases, sensemakers must appropriate technology in more novel ways. This finding holds true when comparing the least virtual setting (Yammer) to the most virtual setting (Second Life). However, this finding also insinuates that telepresence (mid level virtuality) requires more experimentation of sensemakers than does Yammer (low level virtuality), which is not always the case. For example, while telepresence may require more physical experimentation (in terms of body language, for instance), Yammer requires great experimentation with digital manifestations of presence and identity.

9.2.2 Alternative, matrix model of virtuality

The above discussion has reveal several anomalies in the findings which suggest that the original virtuality continuum on which this research was predicated is a less-than-ideal platform as an analytical tool. I now propose an alternative model of virtuality (see Figure 21) by which some of these issues may be rectified. In this alternative model, virtuality increases along the dimensions of 'types of activity' and 'sophistication of technology', as did the original continuum. Here, however, these two dimensions of virtuality increase along different planes (x-axis and y-axis) in slightly different ways.

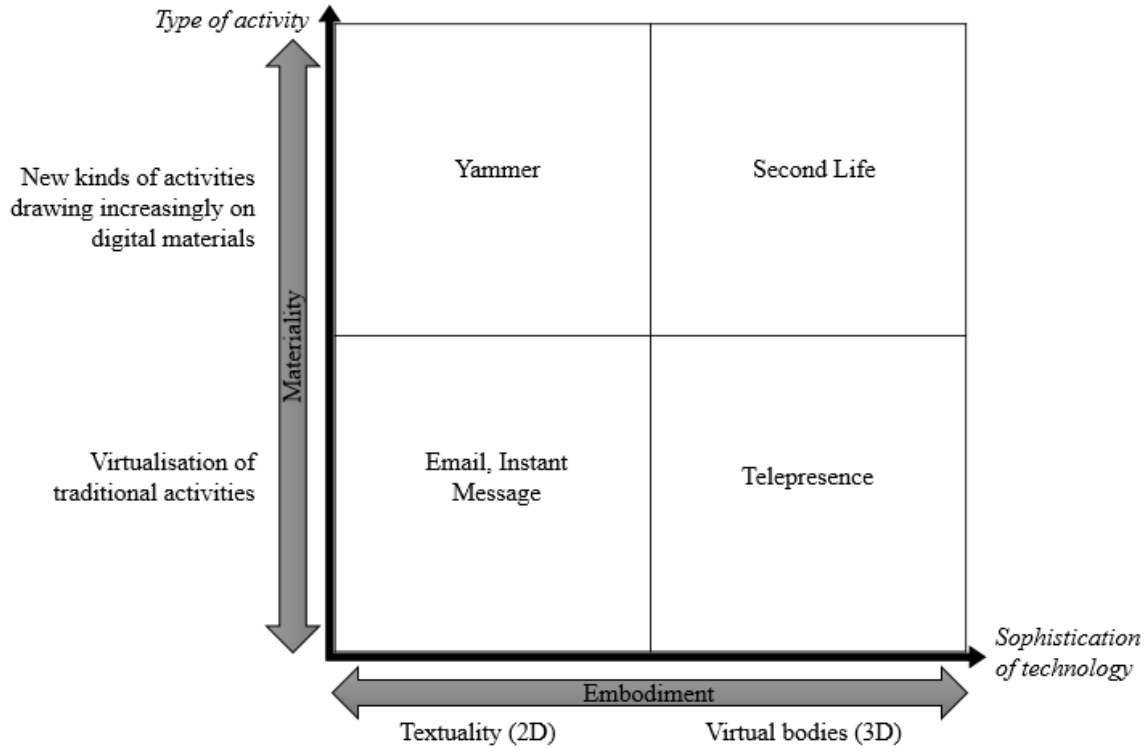


Figure 21: Matrix model of virtuality.

The y-axis is associated with the key concept of ‘materiality’. As virtuality increases on this axis, so too does the level of integration of digital materials in the activity at hand. Here the newer, more novel activities increasingly draw on various types of digital materials. For example, the now ‘more virtual’ setting of Yammer provides many more complex options for sensemakers to enact digital materials than do the ‘less virtual’ settings of email or IM. For example, Yammer enables sensemakers to collaborate in groups and co-author documents, whereas email and IM limit sensemakers to linear turn-taking in conversation. At the low end of the y-axis, ‘less virtual’ settings are more likely to virtualise traditional activities rather than enable innovative, new virtual activities.

The x-axis is associated with the key concept of ‘embodiment’. As virtuality increases on this axis, so too does the sophistication of the types of bodies – textual to 3D – made available to sensemakers by the underlying technology. For example, whereas the ‘more virtual’ settings of telepresence and SL afford sensemakers a 3D presence in their interactions with others, sensemakers’ textual representations in Yammer and email/IM remain 2D and thus ‘less virtual’.

Taken together, this matrix model of virtuality helps to overcome some of the analytical issues identified earlier. First, the issue that arose regarding the ‘less virtual’ technology of Yammer enabling ‘more virtual’ activities (involving many more digital materials than offered by telepresence) is resolved. Namely, Yammer’s sophistication in a material sense has been disentangled from telepresence’s sophistication in terms of 3D embodiment. Both Yammer and telepresence are technically sophisticated in different ways which lead to qualitatively different outcomes for sensemaking.

Second, another issue resolved by the new model is the uncertainty regarding how telepresence could be ‘more virtual’ than Yammer when, in terms of malleability of identity (i.e. range of choices for showing up for sensemaking) Yammer is superior. Namely, Yammer’s restriction of its users to 2D textual embodiment (which may be considered relatively unsophisticated technology) actually enables a ‘more virtual’ experience for sensemaking in terms of presence. The new model also provides for the finding that telepresence and SL provide a form of 3D embodiment and virtual co-presence not afforded by Yammer.

Third, the two-fold issues related to the place dimension of sensemaking are also rectified by the new model. Namely, the virtuality continuum could not account for (1) the finding that sensemakers in the ‘less virtual’ setting (Yammer) may move between different virtual places more

readily than a ‘more virtual’ setting (telepresence); and (2) the finding that some virtual settings provide a third, shared, digital place for sensemaking. These issues are resolved by disentangling the ‘type of activity’ from ‘level of sophistication’ in defining virtuality, and instead aligning them with ‘materiality’ and ‘embodiment’, respectively. By disentangling the material and embodied components virtuality, the model enables the novel activities that often take place in shared, digital places (which are afforded by access to malleable digital materials) to be recognised as such without sensemakers needing to have a sophisticated 3D digital presence. Furthermore, the new model reflects the capacity of sensemakers to create new material places in Yammer and SL which are not possible in telepresence.

Fourth, the temporal complexities that were identified using the virtuality continuum cannot be further explained within the new model. This may be testament to the highly complex and illusive nature of the time dimension of sensemaking. One idea is to add a z-axis to capture the temporal dimension of virtuality which may enable us to more clearly identify the role of time in sensemaking in various virtual settings. Indeed, this could be taken up in future research.

Fifth, the new model goes at least part way to rectifying ambiguity in the findings which suggest that the more virtual the setting, the higher the level of experimentation required by sensemakers (which is not always the case). Namely, the new model enables us to distinguish between experimentation with materials and experimentation with bodies. For example, in Yammer experimentation is high on the ‘materiality’ axis (i.e. sensemakers appropriate textual materials in novel ways) but low on the ‘embodiment’ axis (i.e. sensemakers are largely restricted to text and a profile picture). Further, in the ‘most virtual’ setting of SL experimentation across both dimensions (materiality and embodiment) is critical, i.e., creating avatars and building virtual structures. The new model also provides for the finding that sensemakers in telepresence and SL have far more scope to experiment with 3D bodily identity than textual settings.

In sum, by recasting the criteria for virtuality (type of activity and technological sophistication) along two separate axes (instead of on a single continuum), the new model helps to explain some anomalies in the findings. By aligning ‘type of activity’ with ‘materiality’ and ‘technological sophistication’ with ‘embodiment’, I am able to demonstrate SL’s superiority in terms of its virtualisation of both materials and the body through sensemaking, without neglecting the strengths of the other virtual settings. Namely, the new model allows me to disentangle Yammer’s sophistication in a material sense from telepresence’s sophistication in terms of 3D embodiment, which have implications for sensemaking as discussed. While the model falls short of

providing solutions to the temporal issues identified in the findings, it does give greater clarity to how sensemakers appropriate technology through sensemaking, in particular experimentation activities.

9.3 Chapter summary

I began this chapter by identifying the common features of sensemaking across all fieldsites. These features characterise sensemaking regardless of the level of virtual setting in which it takes place (albeit to varying degrees). These insights are summarised as follows. Digital materials are the stuff of sensemaking in virtual settings. These digital materials are often textual, but may also be still pictures, recorded or real-time video footage, or entirely computer-generated materials. Moreover, sensemakers' bodies are represented by digital materials, which enable them to select their degree of presence in the virtual setting. Sensemaking in virtual settings takes place across various physical and virtual locations. As sensemakers move between virtual places, they negotiate different forms of content and means of navigating the virtual setting. As sensemakers concurrently occupy virtual and physical places, they may transfer norms and etiquette from their local organisational context to the virtual setting, but a unique virtual culture may also emerge. In the virtual setting, sensemaking is temporally complex; it may be synchronous, asynchronous, or a combination of these. Finally, successful sensemakers develop a unique disposition characterised by resilience – a willingness to embrace technology and overcome challenges to accomplish activities virtually.

Within each dimension I identified how the above-mentioned enduring features changed depending on the level of virtuality of the setting. I also identified which features apply to some fieldsites but not others. These more nuanced insights are summarised as follows. In virtual settings, digital materials may be modified at any time, mostly extensively in highly virtual settings where materials are completely synthetic. Informed by this malleability of materials, sensemakers' capacity to perform their identities in creative ways generally increases with the level of virtuality of the setting. This can lead to a paradoxical sense of being simultaneously connected with, and disconnected from, one's body and the activity at hand. Relatedly, the more virtual the setting, the more free sensemakers are to create everything they need to accomplish sensemaking. As such, in highly virtual settings, sensemakers need not extrapolate what is happening alongside virtual activities (i.e. in the physical context) as they do in less virtual settings. Further, owing to the richness and completeness of highly virtual settings, sensemakers develop a sense of belonging that is not experienced (as intensely) in less virtual settings. The overall temporal complexity of

sensemaking seems to increase with virtuality, while the orderliness of sensemaking and compression/decompression of time is quite specific to particular virtual settings. Finally, as the level of virtuality increases, sensemakers must increasingly unlearn taken-for-granted knowledge and embrace new ways of being through active experimentation with and within the virtual setting.

It was noted that several anomalies in these findings could not be accounted for by using the virtuality continuum as an analytical tool for describing how sensemaking takes place in virtual settings. As such, I proposed an alternative, matrix model of virtuality that goes at least part-way to solving some of the above-identified issues. The new model by no means makes void the findings of the thesis, which are further abstracted in the next chapter. Instead, the new model gives further clarity to the dynamics of the features of sensemaking in virtual settings identified in this research. Opportunities to further develop this model will be taken up in Chapter 10.

In sum, I have provided a two-pronged answer to the research question: "How does sensemaking take place in virtual settings?" As summarised in the preceding paragraphs, I have described how sensemaking takes place across various virtual settings/levels of virtuality *and* how sensemaking differs depending on the level of virtuality of the setting (albeit with some inconsistencies). Upon these foundations, in Chapter 10 I articulate a practice-based theoretical account of "virtual sensemaking". This account focusses on the *general* features of virtual sensemaking; it does not capture *specific* nuances in how sensemaking features may intensify or diminish depending on the type of setting or its level of virtuality. As discussed in Chapter 5 (Methodology) I have made such generalisations in pursuit of presenting a somewhat unified, practicable account of virtual sensemaking that may be useful in future research.

Chapter 10 VIRTUAL SENSEMAKING

This thesis has sought to investigate how sensemaking, as the basis of all organising, takes place in virtual settings. This question was motivated by the observation that more and more of our everyday and organisational activities are now taking place virtually, from banking and shopping to socialising and telework. Indeed, the broader aim of this thesis has been to illuminate how our fundamental processes of organising are being transformed by the virtualisation of our world. I have argued that because sensemaking underlies all organising, an effective way to understand organising in the virtual age is to investigate how *sensemaking* takes place virtually. I have further argued that traditional conceptions of sensemaking are deficient in allowing scholars to see what is new, important and interesting about how we organise virtually. As such, an alternative practice-based conception of sensemaking was developed as a theoretical framework for this study. Conceptualised from a practice perspective, sensemaking is akin to accomplishment of activities (Schatzki, 1996) and includes the previously ignored yet critical concepts of materiality, embodiment, and ongoing accomplishment.

I investigated this practice-based conception of sensemaking in three different fieldsites which were characterised by varying levels of virtuality. These were Yammer (an enterprise social network), telepresence (a video-based collaboration platform), and SL (a 3D virtual world). In each fieldsite I identified how sensemaking is enabled, constrained and altered owing to activities being carried out virtually. I then made comparisons across the fieldsites to provide a two-pronged answer to the research question (which was explained in detail in Chapter 9). Now I abstract my findings further to articulate a unified, succinct practice-based theoretical account of *virtual sensemaking*. I then go on to make a comparison of this virtual sensemaking to traditional sensemaking. By this approach we refine our understanding of what is unique about virtual sensemaking. I conclude the chapter (and this thesis) by drawing out theoretical implications for sensemaking and organising more broadly. I also suggest ways that SP may be extended to accommodate virtual settings and thereby remain relevant in the modern age. Finally, I identify practical implications and limitations of the study along with opportunities for new research in the fields of sensemaking, organising and virtuality.

10.1 A practice-based theoretical account of virtual sensemaking

In Chapter 9 I summarised how sensemaking takes place in virtual settings; this included the unique features of sensemaking that endured across all virtual settings *and* those that changed with the level of virtuality of the setting. Now I further synthesise the findings to articulate a succinct account of virtual sensemaking. As reflected in Table 21, this account has five pillars that correspond to the five dimensions of sensemaking in virtual settings. From a practice perspective these pillars, spelled out below, highlight the most prominent and compelling aspects of virtual sensemaking. I do not provide explanations for my assertions or empirical examples, as these were covered in the findings chapters.

Dimension of sensemaking	Matter	Presence	Place	Time	Appropriation
Pillar of virtual sensemaking	Increasingly malleable, digital materials are the stuff of virtual sensemaking.	Digital bodies enable virtual sensemakers to choose their degrees of presence and to creatively perform identities.	Sensemakers occupy/create various physical and virtual places to which they belong, often concurrently.	Virtual sensemaking is often disordered, and temporal complexity increases with virtuality.	Resilient sensemakers must appropriate increasingly sophisticated technologies in increasingly novel ways.

Table 21: A practice-based theoretical account of virtual sensemaking.

First, digital materials (text, video, digital objects, etc.) are the stuff of virtual sensemaking. As virtuality increases, so too does the malleability of virtual materials. Second, digital bodies enable virtual sensemakers to choose if and how they show up for sensemaking. As virtuality increases, sensemakers' capacity to perform novel identities increases. Third, virtual sensemaking takes place in various physical locations that inform virtual culture to varying degrees. As virtuality increases, sensemaking occurs in an ever-expanding array of virtual places, and sensemakers are able to enact shared meaning (culture, belonging) specific to the virtual setting. Fourth, virtual sensemaking is often disordered (a combination of synchronous/asynchronous). As virtuality increases, virtual sensemaking becomes more temporally complex. Finally, virtual sensemakers are resilient. As virtuality increases, sensemakers must appropriate technology in more novel ways, such as experimentation and unlearning.

In the next section we further refine the above account of virtual sensemaking by comparing it to traditional sensemaking. Before moving on, however, we may acknowledge the shared

foundations of traditional and virtual sensemaking. Namely, as argued in the critique of sensemaking in Chapter 3, the findings confirmed that sensemaking in virtual settings takes place both episodically and immanently. It is not my assertion that episodic and immanent sensemaking are wholly different from one another, or that they differ between traditional and virtual settings. Rather, sensemaking should be considered a single phenomenon that is characterised by its episodic and immanent forms, which are interlinked and overlapping in practice.

10.2 Comparing virtual sensemaking to traditional sensemaking

Virtual and traditional sensemaking may be compared along the five dimensions of sensemaking (matter, presence, place, time and appropriation) which, through the course of this research, have enabled us to see more of what sensemaking entails beyond existing notions. As shown in Table 22, in each dimension I name the pillar that characterises virtual sensemaking (as per Table 21) and then postulate if and how that pillar may be applied in traditional settings. For example, Pillar 1 (in the dimension of matter) is that "increasingly malleable materials are the stuff of virtual sensemaking". In traditional settings matter is relatively more fixed, which has implications for how sensemaking is carried out; that is, while virtual sensemakers often create the materials they enact, traditional sensemakers often must make do with what is at hand. In text I draw out how the identified pillars of virtual sensemaking challenge traditional notions of sensemaking; these differences force us to question taken-for-granted assumptions about sensemaking and organising. By this approach, I further illuminate the value of the practice-based account of virtual sensemaking.

Dimensions of sensemaking		Virtual sensemaking	Traditional sensemaking
Matter	Pillar	Increasingly malleable, digital materials are the stuff of virtual sensemaking.	Physical materials implicated in traditional sensemaking are mostly fixed (e.g. tables and chairs).
	Implication	Sensemakers import extra information and resources as required and may literally create that which they sense.	Sensemakers must often make use of what is at hand to accomplish activities.
Presence	Pillar	Digital bodies enable virtual sensemakers to choose their degrees of presence and to creatively perform identities.	Presence is a given – sensemakers are either "there" or "not there" and must express themselves physically.
	Implication	Sensemakers have unprecedented freedom in expression/performance of identity.	Face-to-face interaction/expression is thought to be "rich".
Place	Pillar	Sensemakers occupy/create various physical and virtual places to which they belong, often concurrently.	Sensemakers usually share one physical place.
	Implication	Sensemakers draw culture from various places (physical and virtual); they may extrapolate "what else" is going on in others' physical contexts or enact standalone virtual cultures.	Sensemakers usually have a single shared culture/context from which to draw meaning.
Time	Pillar	Virtual sensemaking is often disordered, and temporal complexity increases with virtuality.	Sensemaking (episodic) is linear and bound by clock time.
	Implication	Sensemakers may "jump" between past and present events.	Sensemaking is retrospective and confined to immediate past.
Appropriation	Pillar	Resilient sensemakers must appropriate increasingly sophisticated technologies in increasingly novel ways.	Sensemakers usually use familiar, physical tools.
	Implication	Sensemakers must acquire new technical skills and resilience, and be willing to experiment with technology and 'unlearn' taken-for-granted skills.	Sensemakers' means of interaction with tools are taken for granted.

Table 22: Comparing virtual sensemaking to traditional sensemaking.

10.2.1 Matter

Textuality (text representing matter in the virtual setting) is a universal feature of virtual sensemaking that distinguishes it from traditional sensemaking. Further, as the level of virtuality of the setting increases, so too does the sophistication of the digital materials (textual or otherwise) with which people make sense. A difference between traditional and virtual sensemaking is that in face-to-face settings sensemakers are often confined to immediate, physical resources, whereas virtual sensemakers can often import or create resources as required. Further, as the virtuality of the setting increases, sensemakers may more readily create and/or summon all the resources they require to carry out their activities. For example, connecting an extra person to a video call (telepresence) or "resing" another chair for an unexpected guest (SL) is more efficient and (arguably) simpler than looking for an extra physical chair in another meeting room. In this way, virtual settings may exceed physical settings in facilitating sensemaking. This is a counterintuitive finding because, in general, virtual settings are said to be inferior to face-to-face settings for the purposes of organising, an issue that will be picked up again shortly.

The digitisation of materials (that characterises virtual sensemaking) has an important implication for sensemaking theory. Namely enactment, a flagship feature of sensemaking, is the process of creating or making that which we sense (Weick, 1995). In other words, "in organizational life, people often produce part of the environment they face" by taking "undefined space, time, and action and draw(ing) lines, establishing categories, and coin(ing) labels that create new features of the environment that did not exist before" (Weick, 1995: 30-31, parentheses added). In traditional sensemaking this creation of reality is normally metaphorical; creation involves enacting meanings (cues) on which to act. But in virtual sensemaking creation of reality may be far more literal. For example, many virtual sensemakers do not just enact tacit resources such as temporal structures (e.g. start time or end time), they literally create material objects to carry out activities. This heightens sensemakers enactment capabilities in traditionally inconceivable ways (e.g. producing an object as if from thin air in SL). As such, we must expand our understanding of traditional notions of enactment to account for *literal* enactment. This may be somewhat achieved by breaking away from sensemaking's cognitive roots (i.e. sensemaking in the head) to take seriously material aspects of sensemaking. This was alluded to in my critique in Chapter 3, but the extent to which digital materials impact (virtual) sensemaking in this way is greater than first expected.

10.2.2 Presence

Presence (being there or not) in traditional sensemaking is taken as a given. However, the findings show that presence cannot be taken for granted in virtual sensemaking. Namely in virtual sensemaking, actors have choices about if and how they show up for activities. Further, virtual sensemakers have greater control over the form and shape of their presence as the level of virtuality of the setting increases. This has implications for traditional notions of sensemaking. As noted by Marshall and Sandberg (2011), sensemakers' ability to be "partially present" means that social aspects of sensemaking (how we interact with others, real or imagined (Weick, 1995)) may be called into question.[34] More specifically the authors suggest that when others (physical bodies) are unseen (as in text-based virtual settings), actors tend to endow the "other" with their own characteristics. That is, in the absence of definitive cues about others' identities, virtual sensemakers see themselves in others. As such, in virtual sensemaking "while there [is] indeed an assumed audience, that audience [is] a person conjured in the participants own image, which can hardly be described as a social process" (Marshall & Sandberg, 2011: 31).

The findings suggest, furthermore, that virtual sensemakers have means to express themselves in ways that supersede such means of traditional sensemakers. For example, virtual sensemakers may feel that by expressing themselves through digital bodies (e.g. avatars) they are truly "themselves", perhaps even more so than in RL. This finding has implications for traditional organising theory that dispenses of virtual interactions as inferior to "real" face-to-face settings. This sentiment is famously reflected in media richness theory (MRT) (Daft & Lengel, 1986); MRT suggests that face-to-face is the richest media and therefore the best means of resolving equivocality (many meanings). As reducing equivocality is a core problem of sensemaking (Weick, 1995) it stands to reason that traditional sensemaking theory is aligned with MRT in its view that virtual settings cannot match or exceed face-to-face settings for the purposes of accomplishing activities. Weick (1985) says that that technology undermines sensemaking, a sentiment which is echoed in other studies. Yet this may be refuted by my findings. Indeed, some virtual sensemakers explicitly state they prefer virtual settings over traditional ones for particular activities.

[34] Recall from Chapter 3 that sensemaking being "social" is one of Weick's seven properties of sensemaking.

10.2.3 Place

Traditional sensemaking usually takes place in a single, physical context that provides all sensemakers with similar information and resources from which they draw meaning. This, however, is not (often) the case in virtual sensemaking. Virtual sensemakers operate from various *physical* places (which they often occupy on their own) and, therefore, the culture of virtual settings seems to be somewhat informed by sensemakers' local contexts. Further, just as virtual sensemakers may refer to themselves to imagine others (a point made above), virtual sensemakers may refer to their own contexts to extrapolate what else is going on in others' physical contexts. This means that instead of drawing from a single, shared context for cues (as in traditional sensemaking), virtual sensemakers draw from several and sometimes competing contexts to enact culture. Virtual sensemakers also occupy various *virtual* places (which may be shared or unshared) whose culture may be propagated from within the virtual community itself. Relatedly, virtual sensemakers may experience a heightened sense of "realness" and belonging to this virtual place that may supersede their felt connection to traditional, physical places.

An implication of these findings is that questions may be asked about how a culture of organising can be enacted virtually. Weick (1995) does acknowledge that organisational culture may be constituted through sensemaking, for example, through storytelling. However an underlying assumption is that sensemakers share the context, and that this context provides a baseline sense from which to draw meaning (i.e. norms, etiquette, goals, purposes, etc.) (Marshall & Sandberg, 2011). I have shown that this is not (always) the case in virtual sensemaking. Virtual sensemakers do indeed have joint experiences and tell stories about them, but these stories are experienced separately in a physical sense. As such, how culture is enacted virtually from various physical locations is not explained by traditional theory. Scholars (see Hong & Vai, 2008) have made suggestions about how organisations can improve shared understanding (culture) amongst geographically-separated VT members. However, these suggestions often involve over-arching guidance and systems from a managerial level. Far less academic attention has been paid to circumstances where no over-arching structures exists, such as in (many) virtual settings. More investigation is required to understand how sensemakers establish and maintain a culture (entirely) virtually.

10.2.4 Time

In traditional settings linear clock time is a given; time moves along in a fixed, uniform manner and our sensemaking is carried out to its beat. Therefore, for all intents and purposes in traditional sensemaking, time is a constant. As such it is unsurprising that "time" has been an under-considered (taken-for-granted) factor in traditional sensemaking theory. In virtual sensemaking, however, time is anything but fixed and predictable. Depending on the setting, virtual sensemaking may be synchronous, asynchronous or a combination of both. As such, virtual sensemaking is often scrambled (non-linear); sensemakers toggle between various interactions and, in doing so, between past and present events. For example, auto-documentation enables sensemakers to "travel through time" to specific events of their choosing, rather than having to be present at the precise moment the event took place. Further and more specifically, virtual sensemaking episodes may take place in parallel or become entwined with each other and overlap. Though episodic sensemaking is indeed a key form of virtual sensemaking, the idea that these episodes are finite and linear (sometimes cyclic) (Sandberg & Tsoukas 2015), may be dismantled by the present evidence.[35] This is significant because episodes are another foundational concept of traditional sensemaking that is challenged by my account of virtual sensemaking.

The temporal complexity of virtual sensemaking also has implications for one of sensemaking's most fundamental features: retrospect. Retrospective sensemaking suggests that actors look back on their action from the present moment to make sense and decide on consequent actions (Weick, 1995). But virtual sensemakers are able to go further back in time than the immediate past and then come back to the present. As such, the concept of retrospective sensemaking must be expanded to include virtual sensemakers' capacity to jump between events in time. Furthermore, as alluded to in Chapter 3, we may consider (from a temporal perspective) other forms of sensemaking. For example, perhaps we can explain virtual sensemakers' preparations for activities (e.g. setting up camera in a particular position) as a type of "prospective sensemaking"

[35] Furthermore, we must expand our understanding of the triggers for episodic sensemaking. To explain, in both traditional and virtual sensemaking, ambiguous events cause interruptions that must be resolved. According to SP, these ambiguous events are either planned or unplanned, major or minor (Sandberg & Tsoukas, 2015). However, where virtual episodic sensemaking is concerned, we may make the further distinction between content-related (e.g. misunderstandings) or technology-related (e.g. technical glitch) triggers. Indeed, Marshall & Sandberg (2011) have previously made a similar distinction between interpersonal and technical sensemaking episodes.

whereby sensemakers pre-empt what they will see and do virtually. This suggestion is equally applicable to traditional sensemaking whereby, for example, a practitioner sets up physical chairs in a circular formation to facilitate focus group activities.

10.2.5 Appropriation

The physical tools implicated in traditional, organisational sensemaking are familiar objects that are often taken for granted. For example, traditional sensemakers do not need to think about what a boardroom table is or how to use it; they just take a seat and get on with the meeting. But virtual sensemakers must acquire specialised skills and a resilient disposition to negotiate the digital tools and carry out activities. For example, knowing how to sit at a virtual boardroom table surpasses the assumed knowledge of meeting-goers generally. Further, as these technologies become more and more sophisticated, virtual sensemakers must experiment with the technology and be prepared to unlearn what they have taken for granted in traditional settings (and in less virtual settings). In sum, successful virtual sensemakers do not only possess technical prowess; they hold an open disposition from which they embrace challenges to accomplishing activities.

The notions of experimentation and unlearning that have arisen as vital to virtual sensemaking (especially in highly virtual settings) have not been adequately addressed in existing literature. A trial-and-error approach to experimenting and learning is somewhat addressed in the form of the ecological process of enactment, selection and retention (Weick, 1979); that is, sensemaking is conceived of as a feedback loop. But my account of virtual sensemaking forces us to deepen our thinking about such notions. More specifically while sensemaking theory suggests that past experience and current context influence what traditional sensemakers enact (try out) in a particular situation, my findings suggest that virtual sensemakers do well to question and challenge – rather than accept and implement – existing knowledge and skills. As such, the concept of "unlearning", which has received some attention in OS (see Becker, 2010; Hedberg, 1981), may be included in future discussions of (traditional and virtual) sensemaking and organising.

Finally and relatedly, the account of virtual sensemaking shows that successful virtual sensemakers are those who become unified with technology (rather than use it as a tool at arm's length). Indeed, the findings indicate that the more sensemakers embrace and embody technology and the challenges it presents, the smoother accomplishment of activities becomes. Traditional notions of sensemaking (and organising more generally) do not adequately explain how virtual sensemakers may achieve such oneness with technology (that a person could be literally intertwined

with things/tools was inconceivable before the digital age). An emerging concept in OS and IS that may shed light on this is cyborgism (Schultze, 2014; Schultze & Mason, 2012). Cyborgs are "humans whose senses are extended through technology (Borer, 2002) and whose identities are entangled with and mutually constituted by technology (Introna, 2007; Nyberg, 2009)" (Schultze & Mason, 2012: 302). For example, we may explore the notion of sensemaker-as-cyborg to highlight how virtual sensemakers are inextricably "bound up" with technology as they organise in the modern world.

In sum, the above discussion has led us to extend and challenge existing notions of sensemaking and organising in several ways. First, the notion of enactment (creation of reality) needs to be expanded to include virtual sensemakers' increased capacity to literally create what they need in order to organise (rather than rely on what it at hand). Second, that virtual sensemakers may (in some ways) be able to express themselves more authentically (than in traditional settings) urges us to question the popular notion that face-to-face settings are generally superior for organising. Third, the findings revealed that traditional theories of organising do not account for how culture may be enacted by virtual sensemakers. Fourth, the non-linear nature of virtual sensemaking causes us to problematise the notion of retrospective sensemaking and to consider other temporal notions of sensemaking, such as prospective sensemaking. Finally, our understanding of organising needs to be extended to include virtual sensemakers' unconventional methods of appropriating technology, such as unlearning and experimentation.

10.3 Contributions to SP

Having challenged some general notions of sensemaking and organising, I now spell out the contributions of this thesis to SP in OS. The principle contribution is the practice-based theoretical account of virtual sensemaking. Indeed, explicating sensemaking in the virtual context – without imposing traditional sensemaking assumptions – has not been accomplished before. Moreover in my comparison of this virtual sensemaking with traditional sensemaking, I have shown that the five dimensions of sensemaking in virtual settings (which emerged from this research) are equally applicable to traditional settings – they shed light on aspects of sensemaking that have received little attention to date from scholars of SP. For example, we often assume that sensemaking takes place in a single place and time, therefore, these dimensions have been under-theorised. However, it is their very taken-for-grantedness that makes such dimensions integral to sensemaking and therefore worthy of greater attention in future research.

This leads me to propose that a unified model of sensemaking, which merges the old (traditional) and new (virtual) notions of sensemaking, be the focus of future research. This unified model could build on the findings of this thesis *and* the findings of the (few) existing OS studies on sensemaking in virtual settings (reviewed in Chapter 3). As alluded to above, the new model could include the five dimensions of sensemaking: matter, presence, place, time and appropriation. Indeed, the matrix model of virtuality (introduced in Chapter 9) could also be incorporated to help give clarity to at least two of these dimensions, namely matter (materiality) and presence (embodiment). By introducing the five dimensions to the unified sensemaking model, work such as Myers' (2007) investigation of virtual sensemakers' increased commitment to public activities could be revisited, in this instance within the "place" dimension of sensemaking. More broadly, including the five-dimensional framework in a unified model of sensemaking would help to progress SP beyond the fairly one-dimensional, cognitive approach that has dominated research to date. Such a model should also take in traditional, physical settings (as was the case in the original virtuality continuum in Figure 1 in Chapter 2) so as to account for both traditional and virtual sensemaking, thereby reflecting "real life" in the modern age.

As a further contribution to SP, the findings suggest that sensemaking does not wholly take place in *either* traditional or virtual settings, but in both. For example, in all the empirical sites in this research, participants were almost never wholly carrying out activities (making sense) physically or virtually – they occupied and enacted a multitude of settings characterised by the presence of more or fewer technologies. As such, modern sensemaking is characterised by a constant "diving in and out" of traditional and virtual materials, bodies, places, times and technologies. The unified model of sensemaking could further take in not just physical and virtual settings, but all the grey areas in between. As technology becomes ever-more integrated in organisational activities, these grey areas will demand more and more of our attention. Yet they will become ever-more elusive if we do not have appropriate frameworks (such as a unified model of sensemaking) by which to investigate them.

A final contribution to SP is the practice-based conception of sensemaking in virtual settings (the study's theoretical framework). Developed in Chapter 4, this framework was predicated on the notion that sensemaking takes place on the basis of practice. It was through this novel theoretical framework that I was able include the previously neglected yet critical concepts of materiality, embodiment and ongoing accomplishment in my study of virtual sensemaking. The notions of materiality and embodiment evidently informed the first two dimensions of sensemaking in virtual

settings (matter and presence), which yielded some of the most important findings of the thesis *and* informed the alternative matrix model of virtuality. As well, by incorporating the notion of ongoing accomplishment into my conception of sensemaking, I proposed and executed a means to identify and analyse immanent sensemaking as it takes place virtually. There is no compelling example of this in existing literature; scholars of SP have traditionally focused on sensemaking episodes only. Having means by which to spot immanent forms of virtual sensemaking (such as by identifying the doings of sensemaking) enables us to include data that would otherwise have been ignored. As such, we may go back to existing studies (in both traditional and virtual settings) and incorporate immanent sensemaking in the analysis to enrich the findings.

10.4 Implications for organising

This thesis is predicated on the notion that sensemaking underlies all organising. Now, by foregrounding organising instead of sensemaking, I use my findings to shed light on how organising more generally takes place in virtual settings. By this I go at least part way to fulfilling the general aim of this research as stated in Chapter 1; that is, to reveal how we organise in the modern virtual world. In making the proceeding claims I use the quintessential "meeting", a hallmark of traditional organising, to illustrate my points. In a traditional meeting people who are invited (via spoken or written invitation) arrive at a pre-determined time and place, usually in a meeting room endowed with typical artefacts such as chairs and tables. The attendees take their seats and the chairperson, who sits of the head of the table, leads the group in discussion of a set agenda. Attendees take turns in speaking as they discuss each agenda item. The meeting concludes after, say, one hour and the attendees return to their work spaces.

On the other hand, a virtual meeting is a categorically different organising experience. When we prepare for a virtual meeting, we are not limited to the colour of our dress or tie to make the desired impression; we can tailor our digital presence to the audience at hand in several ways. Furthermore, we need not collate physical documents for distribution at the meeting; we may email them to attendees to be viewed on personal devices. When we attend the meeting, we need not physically go anywhere; we may log in from home, work or somewhere in between. During the meeting, we need not make do with the information and documentation we brought with us because we can share them electronically at will. If we forget to invite someone or need another opinion, more people may be invited to the meeting "on the fly". And at the meeting's conclusion, or even during the proceedings, we may go on with other tasks. Of course, some traditional meeting conventions are retained in virtual meetings (such as agendas and turn-taking) which may bring

familiarly and structure to organising. But beyond these tacit aspects, from a traditional standpoint the modern meeting is an unrecognisable form of organising.

Indeed, new means of organising afforded by virtual technologies challenge the very notion and relevance of a traditional meeting to modern work. Specifically, many facets of a traditional meeting are pre-determined and fixed – the place, the time, the people, the resources and the tools. But in a virtual meeting these places, times, people, resources and tools are fluid. As such, provided we are competent in using the technology (and as digital natives, we increasingly are) we may in many ways feel more empowered to organise on our own terms. That is, we may modify the technology to suit the "meeting" or other activity, rather than allow the activity to be shaped by the technology. Put differently, virtual technologies give us unprecedented freedom to prioritise the objectives of our organising, and to mould the technology to those objectives (rather than be concerned with technological limitations or remain entrenched in traditional ways of doing things). Indeed, modern organising is characterised by empowerment of actors to access, enact and create specific technological contexts as and when they become relevant to achieving organisational ends. This marks a fundamental shift in our idea of what constitutes organising.

10.5 Practical implications

The findings of this thesis have a range of implications for practitioners, including managers, users and designers of technologies in the work place; four implications are discussed below.

First, the specific findings about sensemaking in the individual settings of Yammer, telepresence and SL may be applied to other virtual settings within their technology clusters. Though social media and other technologies continue to rapidly evolve, some of their functionality remains constant, such as the text-based nature of interaction. As such, for example, the sensemaking feature of textuality identified in Yammer (and its consequences) may be equally applicable in other social media platforms (e.g. Facebook, Twitter, LinkedIn, Google Plus) along with newer platforms such as Slack (which enables users to connect and manage all their social media tools in one application). Where video-based collaboration is concerned telepresence and its rivals, such as Vidyo and Polycom, continue to evolve. Yet the fundamental functionality of audio and video remains, and thus produces some consistent implications for sensemaking. For example, absolute real-time interaction (no delay ever) is impossible to achieve and, as such, giving physical indictors before one speaks may remain a helpful sensemaking device for years to come. Where 3D

virtual worlds are concerned, the sensemaking feature of malleability of digital materials may be equally applicable to other virtual worlds such as Kitely and OpenSim, as well as newer technologies. For example Linden Labs is working on a next generation virtual world, Project Sansar, which will incorporate virtual reality (VR). This this will impact virtual sensemaking in novel ways, but core functionality (such embodiment of avatars) will remain. Thus, challenges associated with dual embodiment (of the physical and virtual body) will also remain.

Second, designers, developers and consultants may refer specifically to the account of virtual sensemaking to inform what they focus on when designing and implementing new platforms. For example, developers of a new virtual collaboration platform may improve the accuracy with which the "presence" status of users is reflected by the interface (to account for degrees of presence). As another example, developers of virtual technologies that are approaching actuality (i.e. virtual worlds, VR, etc.) may consider how they may strike the balance between providing users with enough familiarity to orient themselves, and enough novelty to keep the experience interesting and challenging.

Third, the findings may inform the approach of managers working with or within VTs and VOs. For example, knowing that the most effective sensemakers are those who embrace and embody technology, managers may be more inclined to relinquish control of virtual platforms and free workers to "dive in" and experiment with new ways of organising. Indeed in my experience, middle and senior managers often struggle to trust their staff not to abuse the freedoms afforded by virtual technologies. Yet the findings here suggest that the risk of thwarting workers' capacity to innovate in virtual settings may outweigh the risk of misuse of technology. As technologies become more sophisticated, accessible and adaptable, workers will require ever more freedom to "play" with technology in order to evolve their practice. Further, knowledge workers now expect such freedoms and, as such, if companies want to draw the best candidates they must comply with such demands.

Finally, the research more broadly challenges the way we think about and approach virtual technologies for the purpose of organising. I began this thesis by stating that I would not buy into the utopian versus dystopian debate about the fate of humankind in the virtual age. Yet the findings of my research urge us to ask ourselves, "What can we now do better because of virtual technologies?" or "What can we do now that we could not do before?" For example, contrary to popular sentiment, some virtual settings may be more effective for carrying out particular activities than physical, face-to-face settings. Indeed, other research has found that virtual settings are

superior to face-to-face settings for the purposes of group decision making because the process is more democratic (Hague & Loader 1999) (e.g. in virtual settings the opinions of big personalities, which might dominate face-to-face interactions, are given equal weighting to those of softly spoken participants). Furthermore, instead of merely replicating our traditional activities in the virtual setting (e.g. taking the traditional meeting online to have a virtual meeting), we may invent new means of organising that harness the novel affordances of virtual platforms. Indeed, as mentioned previously, we may approach technology as something to be moulded to the objectives of our activities. As such, the findings of this research may help practitioners to make better use of technology to carry out their practice and to consider new possibilities for virtual forms of organising.

10.6 Limitations and opportunities for future research

A key limitation of this research is that of the multitude of virtual settings available to be studied, only three were selected. Indeed, at the beginning of this project I suspected that by the time the thesis was complete, the technologies I chose to investigate could be outdated and/or superseded. Having said that, the inclusion of three virtual settings of varying sophistication was a conscious effort to curb some limitations imposed by a small number of fieldsites. Namely, I assumed that if I identified features of virtual sensemaking that endured across all three settings, then I could reasonably extrapolate those findings to take in other virtual settings. Herein lies an opportunity to continue the work of this thesis by growing the virtuality continuum and/or the matrix model of virtuality by adding more sophisticated virtual settings as they become available. Technologies on the horizon that promise to be game-changers include VR and augmented reality (AR). For example Oculus Rift, to be released in 2016, is a VR headset system that completely immerses the user inside a 3D virtual world. And HoloLens is a holographic computer built into a headset that enables users to see, hear and interact with holograms within a 3D environment. Further, architects already use AR (real-time, computer-generated content that overlies physical images) to demonstrate their virtual designs in the physical world; they hold their device (installed with AR software) up to their architecture sites and the new design is overlaid on the physical building instantaneously. By investigating how sensemaking takes place with and within these emerging technological settings, and combining this with existing knowledge, we may move closer to a unified understanding of modern sensemaking and organising.

Finally, this research opens up opportunities to not just better understand how we organise virtually, but to re-conceptualise the theoretical, empirical and analytical landscape altogether. The

findings have shown that organising in the modern virtual world is not linear or place-specific, nor does it require a physical presence or real-time participation. Indeed, virtual organising is a complex, multi-dimensional *blending* of the physical and virtual. More specifically, the findings show that more and more, organising straddles the artificial divide we have constructed between the physical and the virtual. For example, it is already the case that the quintessential "meeting" straddle the realms of the physical and virtual through use of physical tools (tables, chairs, whiteboards), hardware (smart boards, microphones, monitors), and software (video-conferencing, screen-sharing). Through this blended arrangement of bodies and materials, participants meet in both the physical and virtual worlds concurrently. As such, we may redefine organisational activities in light on the new blended landscape.

More generally, emerging technologies such as wearable technologies or tech-enabled clothing (e.g. Google glasses, Fitbits, and iWatches) signify unprecedented blending of physical and virtual settings in everyday life. Here we may ask ourselves, "Where does the person stop and the technology begin?" As another example, the recently coined term "internet of things" (IoT) describes a network of physical things embedded with electronics and software that enable objects to collect and exchange data over the internet. "Simply put this is the concept of basically connecting any device with an on and off switch to the Internet (and/or to each other) … including, cell phones, coffee makers, washing machines, headphones, lamps, wearable devices" (Morgan, 2014). Indeed, IoT is the very definition of blending the physical with the virtual. As such, in future we may conceptualise sensemaking and organising as a *blending* of the physical/natural and virtual/synthetic. This blending is born out in practice; as people carry out their practical activities they implicate, and are implicated in, blended realities. Unlike much previous research that largely focuses on technology and its capabilities for virtualising various activities, a blended approach could focus on how virtuality is *enacted* by practitioners through organising. As such, we may modernise our understandings of the phenomena of sensemaking, organising and virtuality, and how they relate to each other.

10.7 Concluding remarks

In this thesis I set out to uncover how we organise in our modern virtual world. Through a journey of zooming in on micro-processes of acts and doings of sensemaking, to zooming out to their broader implications for organising, my research makes several important contributions. Foremost, I have articulated a practice-based theoretical account of virtual sensemaking through which I suggest that modern organising takes place with and within a blended landscape. As virtual

technologies become ubiquitous in our organising, we must let go of moot distinctions between the physical and digital, real and unreal, actual and virtual. Materials, bodies, places, time and tools (in whatever form we encounter them – physical, virtual or blended) are not fixed hurdles to negotiate when we carry out activities; they are fluid and mouldable dimensions of our sensemaking and organising. Only by acknowledging and embracing both the novel affordances of technology and our power to enact them in the ways that we wish, will we realise our organisational potential in the virtual age.

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Appendices

APPENDIX A: Example interview questions

Vitec (Fieldsite 2) introductory points and interview questions about telepresence:

Introduction

- I am conducting research on sensemaking in virtual settings; that is, how we literally make sense of things online as opposed in offline.
- Looking at a variety of the technologies: Yammer, telepresence, Second Life.
- A premise of the research is that understanding/sensemaking is based in practice; that is, what we do determines how we make sense.
- Therefore, I will be asking you to talk about telepresence in the context of your work – what you actually do.

Your job

- What is your job about?
- How does it fit into the overall organisation of Vitec?
- What kind of activities are involved in carrying out your job?
- How do you perform those activities?
- Who else is involved and how are they involved?

Your uses for telepresence

- In your everyday practice, what do you use telepresence for?
- How do you use telepresence for carrying out your job?
- What are the most common tasks?
- Do you use different endpoints/devices for different tasks? (e.g. Immersive, multipurpose room-based, mobile devices, desktop, etc.)
- Has your job changed because of telepresence? How?
- What did you do before telepresence?

Your experience of telepresence

- What is it like to interact with colleagues/clients using telepresence?
- How does it differ to your offline interactions?
- How did you feel? And what did you think about?
- What are you focused on/distracted by?
- When you are on telepresence, are you doing anything else at the same time?
- Do you use telepresence in conjunction with other technologies? What and how?

Your deeper experience of telepresence

- Are there things about the technology that surprise, frustrate, amuse or confuse you? How do you cope with these things?
- How do you experience time and space in telepresence?
- Impact of time zones, importance of real-time conversations, etc.?
- Where does the conversation take place?
- Do you get a sense of the context of the conversation?
- How is the tone set?
- What are the key aspects of telepresence etiquette? How did you come to know these things?

Meaning of telepresence

- What does telepresence mean to you?
- What would happen if telepresence disappeared?

APPENDIX B: Functionality of SL

The Second Life Community wiki (a rich and trusted source of user generated and reviewed information about SL) lists these basic skills and the main tools in the SL viewer software. Figure 22 and Table 23 provide a brief description of each skill/tool.

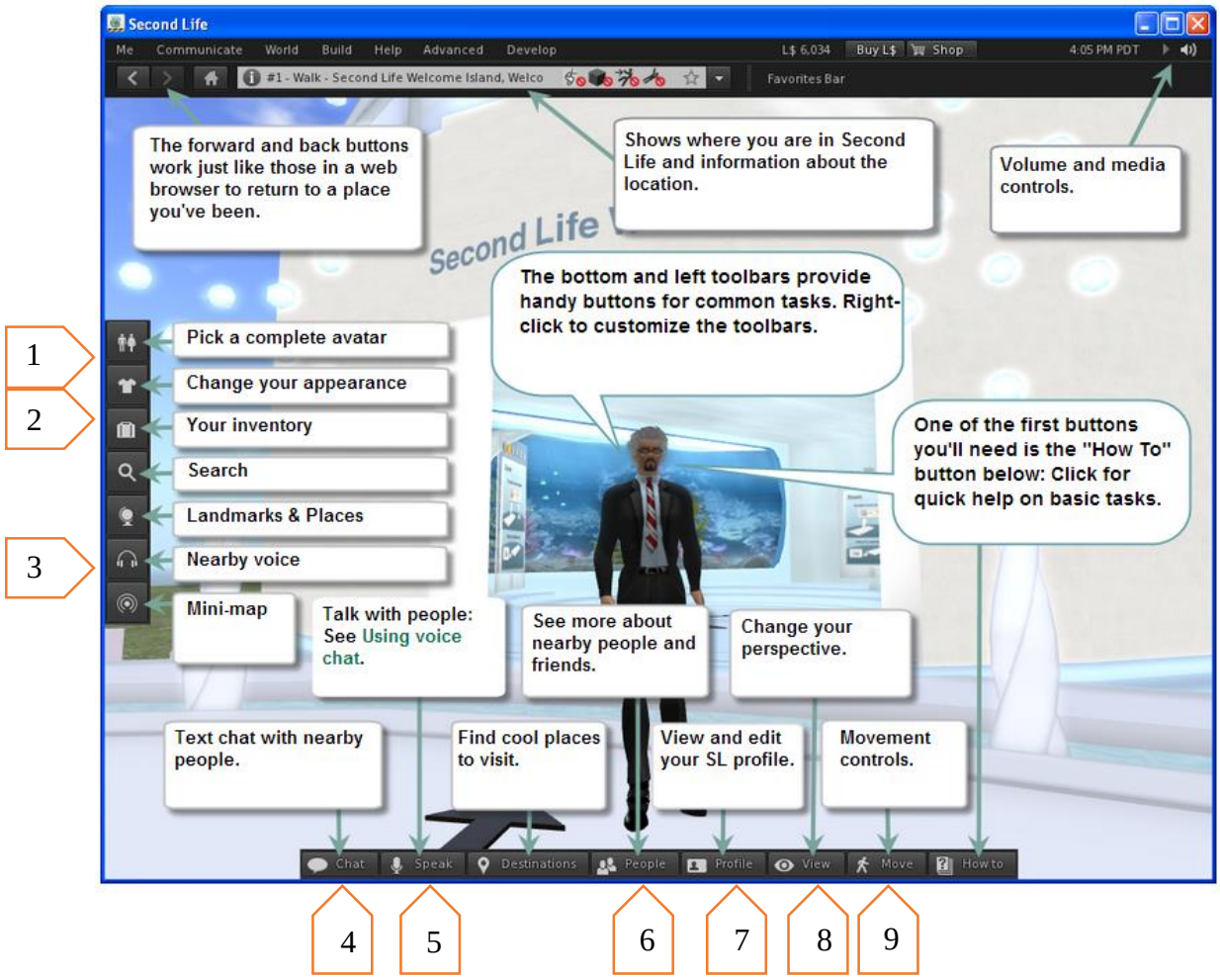

Figure 22: Basic skills and the main buttons/tools in the SL viewer software (Second Life English Knowledge Base, 2014).

Ref	Feature	Description
1	Avatar appearance	Users choose a complete avatar or create their own - name, body, hair, eyes, skin, dress, height, voice filters, accessories, etc.
2	Inventory	A virtual “closet” with all a user’s possessions - Linden dollars, land, furniture, clothes, animations, notecards, etc.
3	Navigation	Users search for person/place and/or go them via teleport, maps, hyperlinks, etc.
4	Text chat	Various modes of text chat include nearby chat, private IM, notifications, group IMs, etc.
5	Voice	Users speak into desktop microphone to give their avatar a voice.
6	People	Users “friend” each other and then appear in each other’s friend list, online now status and nearby map. Users also join groups.
7	Profile	Users create a personal profile consisting of information/pics from RL and SL at user’s discretion.
8	View	View tool enables users to see the world from different perspectives (e.g. from behind their avatar looking out or in front of the avatar looking at themselves), can zoom in/out/pan in all directions.
9	Move	Avatars move around by walking, running, flying, touching, sitting, standing, building, etc.

Table 23: Summary of features of SL platform.

APPENDIX C: Example of "networking" in SL

As shown in Figure 23, Brenda and Sadie (the researcher) are sitting in comfortable armchairs, sipping drinks, and chatting using IM. They are able to sit in the chairs by right-clicking them with a cursor and selecting "sit" from the dropdown menu. The décor, built by Brenda, is relaxed and conducive to getting to know each other. Figure 24 shows some of the features of SL that enable this activity to take place. First, the avatars' names are displayed above their heads to help with identification. Second, the address field at the top of the SL window gives the precise landmark where Brenda's bar is located in SL. Third, the conversations window enables Sadie and Brenda to communicate via text. Fourth, some objects have labels attached to them; for example, the keg says "touch for a glass of something". Finally, some objects are embedded with instructions; for example, once the keg is touched a menu appears with options including beer, juice and champagne.

Figure 23: Networking – Brenda and Sadie drinking and chatting in a pub.

Figure 24: Networking – Sadie helping herself to a drink using controls embedded in objects.

APPENDIX D: Example of "participating" in SL

Weekly meetings usually include a specific agenda or guest speaker to present and lead a discussion. As shown in Figure 25, I (Sadie) am attending an Educators in Virtual Worlds (EVW) meeting. I am sitting with my back to the screen with my colleague around the rest of the table. This particular meeting is taking place in text only (no voice/audio) so that people who do not have audio enabled can still participate (e.g. they do not have high enough bandwidth or they are at their RL jobs). The attendees are sitting in the seats provided by the hosts, and more seats appear as more avatars show up to the meeting. Figure 26 in particular shows some of the features of SL that enable this activity to take place. First, attendee names are displayed above their heads (can be turned off in "preferences"). Second, attendees are chatting amongst themselves in the "nearby chat" in the conversations window. Third, the "camera controls" enable participants to view the meeting from any angle they choose and to zoom in and out on people or objects of interest. Finally, when a participant contributes to text chat, their avatar automatically moves its hands as if typing on a keyboard (e.g. man sitting on Sadie's right in Figure 26).

Figure 25: Participating – Sadie joins nine colleagues at an EVW meeting.

Figure 26: Participating – activity shown in SL software window; participants chat in text, not voice.

APPENDIX E: Example of "playing" in SL

As shown in Figure 27, various avatars (conference attendees) are on the lavish outdoor dance floor. I (Sadie) am in centre screen with avatars dancing around me. Music is playing in the background and participants are "yelling" comments in the nearby chat (using CAPS in their text). Users command their avatars to dance either by selecting a "dance script" from their inventory or clicking a button provided by the venue owner. Figure 28 shows Sadie approaching a "pose ball" with the words "Click me to dance" above it. When I (Sadie) click this ball, a menu appears with dance options including "country" and "Saturday night". Once I make a selection, Sadie (the avatar) dances as per the animation script. I may stop the script at any time by clicking the "stand" button at the bottom of the screen in Figure 28.

Figure 27: Playing – conference delegates dancing and celebrating at the closing event.

Figure 28: Playing – Sadie selecting a dance animation.