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Taking the Human Body Seriously

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Keywords Body, Somatic Practices, Ethnography, Fieldwork.

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INTRODUCTION

In the introduction to a special issue of the *European Journal of Information Systems*, the editors observed that the "human body has been largely omitted from IS research" and called for new ways of engagement with the body (Avital et al., 2017, p. 245). Interestingly, in neighbouring disciplines, scholars have also been arguing for study of the human body in what is called the "somatic turn" in Anthropology (Monaghan, 2006, p. 225), Sociology (Farnell and Varela, 2008, p. 216) and Human-Computer Interaction (Loke and Schiphorst, 2018, p. 55). The somatic turn refers to a broad intellectual project that seeks to explore how somatic aspects, for example, the lived human body and corporeality, have an impact on the social world and practices, and cannot be regarded merely at a conceptual level. Previous studies have discussed somatic topics, such as new technologies and the emergence of "skills that only the body can learn and remember" (Zuboff, 1988, p. 23), "bodily capital to control technology" (Wajcman, 2004, p. 116), cyborg view of body and technology as "a coupling between organism and machine" (Haraway, 1991, p. 150), "shifting nature of body-machine boundaries" (Suchman, 2007, p. 263), and the significance of the body in digital work practices (Brynjolfsson and McAfee, 2014, pp. 27-9). One area that remains unexplained is the corporeal or somatic engagement with everyday practices.

Conceptualisations of the human body in IS research are primarily informed by the phenomenology of Merleau-Ponty via the interpretations developed in computer science, psychology and other fields (e.g., Mingers, 2001; Schultze, 2010; Yoo, 2010). Although many interpretations of Merleau-Ponty often appear under the umbrella term of *embodiment*, they do not always focus on the living body (e.g., embodied cognition is primarily about the embodiment of mind). Ziemke (2003, p. 1306 original emphasis) points out that studies of "em*bodi*ed cognition actually pay relatively little attention to the nature and the role of the body involved (if at all)". A significant recent development is the focus on feelings, experiences and affect. For example, Yoo (2010) builds on Dourish (2004) to offer a framework of experiential computing based on the notion of embodiment, but he also does not fully include the body. Why? Perhaps because the focus of Dourish (2004) is not the lived body; instead, he uses the term *embodiment* to capture

> "a sense of "phenomenological presence," the way that a variety of interactive phenomena arise from a direct and engaged participation in the world… However, in Merleau-Ponty's work, the idea of "embodiment" is used to draw particular attention to the role of the body" (Dourish, 2004, p. 115, original emphasis).

Dourish goes on to suggest that a critical theory perspective is more appropriate for the study of the living body. With little critical theory informing interpretations of the body in the IS literature, researchers of embodiment have thus far focused on the inner workings of the body (what one feels or thinks). Perhaps that is also why the human body in terms of corporeality and somatic aspects (position, orientation or sexuality) is missing in contemporary embodiment debates in IS research.

This study contributes to the somatic turn by presenting an empirical somatic understanding of engagement with contemporary IS-related work practices, and advances the understanding of the lived human body in IS research (e.g., Mingers, 2001; McGrath, 2006; Schultze, 2010; Casilli, 2010) by exploring the substantial role of the human body, its associated somatic practices, and its impact in social and IS organisations (see Gherardi, 2018; Moore, 2018; Rigg, 2018; Welsh, 2018). The overarching question is: how should qualitative researchers approach the lived human body in IS research? The standard approach is to use a conventional notion of embodiment and to see bodily practices as cognitive functions and processes. However, this is problematic for two reasons. First, the conventional view is inadequate for investigating somatic engagement with technology and practices (due to its focus on non-body aspects). Second, the recent somatic turn in contemporary ethnographic theory has further emphasised body-orientated interpretations. A somatic perspective redirects the scholarly gaze to diverse human bodies in diverse situations, and looks at how bodies shape practices. Somatic insights are also central to developing knowledge about IS, as a person bodily engages with a given technology, and the lived body determines how one interprets and uses a technology. In the same spirit, this work offers a critical understanding of somatic engagements, using empirical examples from contemporary everyday practices. The insights will help qualitative researchers (such as ethnographers and action researchers) to identify and critically examine the somatic aspects of their studies.

In what follows, I draw on the critical social theory as represented by Connerton (1989) and Todes (2001) to conceptualise somatic engagement and illustrate it using empirical evidence

from an in-depth ethnographic account of the technological practices of software professionals in an IS organisation. I begin by discussing the related research, followed by the somatic perspective taken in this article. I provide a detailed overview of key somatic concepts and terms, and the relevant literature. After this groundwork, I develop a conceptual framework to make sense of somatic engagement. I then provide empirical evidence from my ethnographic fieldwork. The article concludes with a discussion and implications of somatic engagement for IS research.

BACKGROUND AND RELATED RESEARCH

In this section, I highlight theoretical advancements in the debates surrounding the body in IS research which either develop a new understanding of the body or extend or integrate previous works (see Appendix 1). I used hermeneutic readings (Boell and Cecez-Kecmanovic, 2010) of selected articles – where the direct or indirect focus was the human body – published between 1997 and 2017, and primarily focused on IS outlets. I identified key sources by searching in three academic databases: Scopus, ABI/INFORM, and ISI Web of Science. I first gathered all body-related text using the query "body OR emotion* OR experien*" and then further refined it using the query "human body OR lived body OR physical body OR physiological body OR bodily OR embod* OR somatic OR corporeal* OR affect*" in order to find the literature with a sharper focus. I then scrutinised each article and developed the insights that follow.

Human Body and Embodiment

I use prevalent perspectives as a starting point to problematise bodily or somatic engagement with technology. By *bodily*, I mean focus on the lived corporeality of the human body: what a body does, rather than what a person thinks or perceives. While the literature on lived corporeality is growing, the body is still often used as a means to an end, and rarely as an end in its own right. Some examples include the physical use of mobile devices (Mazmanian et al., 2013), IT use patterns (Stein et al., 2015), behavioural signals (Christopoulos et al., 2017), affect and technology acceptance (Beaudry and Pinsonneault, 2010), digitally enhanced consciousness (Bødker, 2017) and digitally mediated affective awareness (Prasopoulou, 2017). These studies contribute valuable insights into technological tasks and cognitive processes, but do not discuss the active corporeality of the lived body. Instead, bodily interaction with technology is primarily

discussed to convey "the lived experience in a way that highlights the human body's simultaneous *passivity*" (Prasopoulou, 2017, p. 294 emphasised).

The human body is often conceptualised as a person's capacity for action, as suggested by Merleau-Ponty (2012, pp. 254, 411) and has been discussed by Mingers (2001), Nonaka and von Krogh (2009), and Yoo (2010). The complex somatic modes of engagement are often written off under the broader notion of embodiment. Therefore, it should not be a surprise to find out that current research on embodiment remains somewhat preoccupied with mind–body problems (see Schear, 2013). The body and bodily engagements are perceived either as a set of mental activities (Johnson, 2013) or as physiological structures under the control of the mind (Heaphy and Dutton, 2008, p. 138). I find this problematic because the lived body, detached from its situated context – the everyday world of experience – risks being pushed into the background in theory and practice (see Merleau-Ponty, 2012, p. 292).

To understand and fully appreciate the role of the human body in research, we need to understand the general notion of embodiment which is often used to study body-related aspects. Embodiment primarily concerns *the human body* and how it relates to human practices (Dijkstra and Post, 2015; Gieser, 2014; Glenberg, 2010). Embodiment has been extensively used in the IS literature (e.g., Mingers, 2001; Schultze, 2010), but a precise definition is not available, which adds an extra layer of confusion. Although Merleau-Ponty's phenomenology is central to the study of embodiment, the term has been used in diverse ways. For instance, embodiment may mean the effect of the physical body on mental processes and vice versa (Glenberg, 2010). Embodiment is also discussed as the notion of the extended mind (Ihde, 2002), which suggests that cognition is in neither the mind nor the body, but extends outward to the world. This view was adopted by Mingers (2001) in the idea of embodied cognition. Others, such as Dourish (2004), developed a technological interpretation in which embodiment is seen as being "embedded in the world, and the ways in which their reality depends on being embedded" (p. 18). This position, along with embodied cognition, has dominated the IS literature and is seen as the embodiment of technology (see Table 1).

Table 1 Views of Embodiment

Focus	Application

embodiment of technology	becoming of an artefact	the use and appropriation of information and personal computing devices
embodiment of mind	overcoming the body's limitations	the questions concerning cognition, experience and identity

Embodiment of mind concerns issues around overcoming of the body, bodily abilities and digitally mediated experiences. The extended mind view of embodiment is discussed in several configurations, such as the embodiment of time (Ikemiya and Rosner, 2013), of space (Devlieger and Strickfaden, 2012), of gender (Fotaki, 2011), of media (Dijkstra and Post, 2015; Kiverstein, 2012) and digital embodiment (Casilli, 2010). This view is still somewhat prevalent in contemporary IS theory. Ramiller (2016, p. 24) says that recent materiality debates are about "a fundamental embodiment of mind", which attempts to go "beyond the confines of the physical body" (p. 26). Similarly, cyborgs are considered examples of extended embodiment. Schultze and Mason (2012) describe cyborgs as embodied users whose "bodily senses [are] extended across time and space" (p. 307). Digital embodiment conceptualisations are often bound to the extended mind hypothesis (Ihde, 2002; Schultze, 2014). Another line of inquiry deals with "technologies' physical embodiment" (Ramiller, 2016) or the creation of artefacts and the ways they become what they are, and how they configure social situations (Broadbent, 2017).

While previous studies have developed new understandings concerning the affect, the human body and the appropriation of IT, they have primarily followed the embodiment of mind perspective. Stein et al. (2015) studied emotions in terms of affective cues and IT stimulus, but excluded bodily practices from their design, perhaps because their research focused on external stimuli and patterns of use (p. 368). Beynon-Davies (2013) makes a persuasive case for using facial expressions to make sense of digital information. However, he similarly does not provide a framework to make sense of somatic expressions; instead, bodily expressions are merely seen as the outcome of mental activities (p. 343). Schultze (2010) explores digitally mediated embodiment, but the human body is treated as a "communication device[s]" (p. 436) or "an impression management device" (Schultze, 2014, p. 85). Prasopoulou (2017) uses a novel

approach to study how wearable devices affect the body and, in doing so, influence the user; but the study does not say how the body influences the use of technology.

Some recent works have attempted to bring the body back into embodiment: Christopoulos et al. (2017) developed a method to explain how somatic responses relate to learning and decision-making skills, while Bødker (2017) attempted to incorporate bodily aspects into the existing frameworks of embodiment. Bødker reminds us that, first and foremost, a researcher is a "sensuous 'scholar-with-a-body'" (p. 278). These studies attempt to redirect the scholarly gaze to the lived body, and remind scholars to pay attention to the corporeal self, which provides important data.

Embodiment has proved to be a fruitful notion in studying tasks and affect in IS research, but it only tells a one-sided story from a cognitive viewpoint. Connerton's (1989, p. 104) warning is still relevant today, that somatic "practices and behaviour are constantly being assimilated into a cognitive model". This is important because people tend to interpret practices based on their prior familiarity and assumptions (Markus and Rowe, 2018). Acker (2016, p. 451) suggests that "body differences provide clues to the appropriate assumptions, followed by appropriate behaviours. What is appropriate varies … in relation to the situation, the organisational culture and history, and the standpoints of the people judging appropriateness". Consequently, current understanding of the body in the IS literature is limited in two ways.

First, the lived corporeal body is still not fully acknowledged, while bodily mechanisms are taken for granted; thus, corporeality continues to be marginalised in theory (cf. Merleau-Ponty, 2012, p. 292). Although the body is considered to be an essential data source, there is no theoretical framework around the lived body. Somatic engagement and orientations are excluded. Studies often focus on certain isolated parts of the body (or cognitive processes), and do not conceptualise it as a whole. Consequently, studies related to the body in the IS literature are increasingly becoming *bodiless*, with little guidance on how to study and make sense of somatic engagement. Second, by excluding the lived body from studies of IS phenomena, the research risks becoming divorced from practice. Contemporary practices rely heavily on bodily engagement with different systems, devices and information technologies. While the engagement aspect might appear as *an obvious fact*, I want to critically confront those taken-for-granted assumptions concerning the human body.

A CRITICAL SOMATIC PERSPECTIVE

Soma refers to the lived body. It is central to any human inquiry because, through our bodies, we move, experience and engage with the surrounding world (Shusterman, 2012). In order to fully understand this fundamental concept, a critical position is required to investigate bodily or somatic practices (Bohman, 2008, p. 98). Like Doolin (1998, p. 303), in this article by critical I mean "questioning and deconstructing the taken for granted assumptions inherent in the status quo." To this end, I follow the guidance of Todes (2001) and Csordas (1993), who have integrated the work of body theorists and provided comprehensive critical interpretations of the body. By a critical somatic perspective, I mean "a consistent methodological [body-orientated] perspective that encourages reanalyses of existing data and suggests new questions for empirical research" (Csordas, 1990, p. 5). This concerns a critical reflective study of the body, including views about embodiment, in social and cultural contexts, which "can open up the space for creation of new ways of thinking and acting" (Rigg, 2018, p. 151). Important work has been done by feminist theorists (e.g., Acker, 1990, 2016; Schnabel and Breitwieser, 2015). I am sympathetic to other feminist ethnographic perspectives, such as gender and body performance in digital work (see Carrigan, 2018) and other theoretical positions, such as the somatic marker theory, which attempt to explain decision-making processes through bodily feelings and emotions – but these are out of the scope of this study. Similarly, the critical somatic view should not be confused with the field of *somatics* (related only to first-person perspective bodily movements), although there may be some common areas such as the social implications of kinaesthesia.

The social study of the human body can be undertaken from many different perspectives (see Blaikie et al., 2003 for a discussion). Dreyfus (1996) identifies three distinct body-orientated interpretations of the notion of embodiment in Merleau-Ponty's work (also see Selinger et al., 2007):

- the physical embodiment of a person (body shape, size and physique);
- body skill sets and situational responses (historically developed); and
- social skills and abilities of the body by virtue of being embedded in a socio-cultural situation.

These interpretations have been further developed to study gender and technology (Carrigan, 2018), bodily senses and organisations (Sandberg and Tsoukas, 2015; Van Maanen and Kunda, 1989), somatic power structures (Michel, 2011), somaesthetics (Gallagher, 2011; Shusterman, 2008), and somatic ethics (Rose, 2009).

Although traditionally the study of somatic phenomena featured in social studies of the body (e.g., rituals, dance), it is now increasingly accepted as a critical approach to studying the human body in computing disciplines, particularly those favouring ethnographic and design methods (Rajko et al., 2016; Hayes and Rajko, 2017). It is a way to understand somatic movements and examine the body from a first-person (such as walking, performing art, and so on), a third-person (a researcher studying the body), or an inter-corporeal perspective (mediated through more than one person, possibly involving others, things or places). Somatic practices can be external (directed outward such as regulating the body, or engaging in a certain practice), or internal (directed inward such as meditation and reflection). In a sense, somatic practice is a way to engage with the body and, in so doing, establishes the somatic authority of a person. In clarifying these concepts, bodily practices can be understood by engaging with their conceptual parts: somatic engagement and orientation, and somatic modes of inscription and incorporation.

Somatic Orientation and Engagement

One's orientation is always a bodily orientation (Merleau-Ponty, 2012, pp. 257-8). In everyday practices, one is always bodily *directed* toward something or someone (see Tilley, 1994, p. 15; 2008, p. 25 for a theoretical discussion). A person (user, researcher or participant) is, first and foremost, some*body* who has a body, a somatic frame of understanding and, through their body, they make sense of the world. In practical dealings with the phenomena (be they societal, organisational or information systems), a person's practical situation and orientation intimately relate to their bodily disposition. An appropriate somatic orientation is required in order to engage meaningfully with things, people and places (Merleau-Ponty, 2012, pp. 254-265). For instance, if we use a mobile device, we need specific bodily orientation including, but not limited to, postures, gestures, touch and movements to successfully and effectively use the device. Yet most of us do it effortlessly and unreflectively. This is because somatic orientations in practice create vantage points, a horizon from where one makes sense of the world – what Peacocke

(1992, p. 64) refers to as "positioned scenario". Everyone has their unique positionality or somatic frame and, therefore, a distinct view of the world.

Somatic orientation can be interpreted through two different but related ways using the body's positionality. First, for Merleau-Ponty (2012), there is a "symmetry of our body" that defines one's somatic orientation towards the concerned phenomena (p. 260). This symmetry has vertical and horizontal axes, permits us to make sense of 'up' and 'down', and allows 'forward', 'backward' or other directional bodily movements. From this perspective, body orientation is seen as a prerequisite to meaningful engagement with practice (Evans, 1985, pp. 384-385; Taylor, 1978, p. 154). Every practice is a bodily enterprise, involving specific somatic directionality toward the phenomena (Todes, 2001, pp. 3, 65; Pink, 2008, p. 100). Second, Todes (2001, p. 118) points out that the human body is not truly symmetrical because it has a "front-back asymmetry". This is a subtle but critical insight that makes a transition from the theory *of* the body to the body *in* practice. In everyday practice, it is easy to engage with what is in *front* of oneself; however, engaging with a phenomenon that lies *behind* or out of sight is rather ineffective. Of course, it is possible for us to get around the problem by using various types of technologies and devices (such as mirrors, cameras, wearables or prosthetics). Nonetheless, somatic orientations determine how one engages with practice and facilitate the development of complex skills. Somatic orientations contribute to meaning- and sense-making in everyday practices, and somatic responses configure the way one engages with digital technologies in physical (Zuboff, 1988, pp. 6, 423; Connerton, 1989, p. 74; Olsen, 2010, pp. 76-7) and virtual environments (e.g., Kilteni et al., 2012; Kilteni et al., 2015; Murray and Sixsmith, 1999).

Somatic orientations can also explain various ways of social interaction, because one is always bodily engaged with others in practice. Here, I shall briefly pause to make a crucial point: the notion of somatic engagement indicates the presence of a paradox. Following Todes (2001, p. 66), the paradox of somatic engagement is that one cannot be fully engaged and aware of one's somatic engagement simultaneously. A person cannot constantly think about their body while doing something with that body. This paradox is often presented in studies, but it is not always interpreted. For instance, Prasopoulou (2017) documents "somatic encounter between people and technology" using her experience of wearable technology (an activity tracker) on her body. When fully immersed, she says that she had to switch from immersed engagement to deliberate awareness in order to engage in a "mental activity", to pay attention to her otherwise immersed

situation (Ibid.). However, this switching is not trivial. When a somatic practice breakdown occurs (e.g., the failure to switch, the loss of engagement when switching), it needs to be carefully interpreted. As the paradox suggests, one must step out of somatic immersion in order to reflect on one's body and situation.

One way to address the somatic engagement paradox is to acknowledge the historical nature of somatic skills, which influences somatic orientations and engagement. Somatic skills are developed gradually and become instilled in the body as one engages with technologies (as well as things and places). When engaged in practice, according to Todes (2001), the body plays a triple role. First, it acts as a repository of (embodied) skills. Second, it provides an immersive and rather intuitive recall mechanism. When we use a familiar device, such as a phone, our particular body-set engages with it, without any cognitive effort, facilitated by somatic familiarity (Dreyfus, 2014, pp. 97-99). As somatic skills persist in the body they begin to act as the background of our practices: we no longer pay attention to them. Through somatic engagement, both the body and associated practices change: sensuous skills improve or depreciate. It is crucial to pay special attention to bodily engagement (the way one does things in the world) and orientations (the ways one is in the world) (see Yakhlef and Essén, 2013, pp. 884ff for an empirical discussion). Third, the body contains a history of engagements and orientations. This history also shapes and reconstitutes the body and, in so doing, influences already acquired skills, and aids the acquisition of new skills.

Modes of Somatic Engagement

The discussion on somatic orientation and engagement leads to the question: how does the body apprehend technology and adjust to it? Connerton (1989, pp. 72ff) provides a tentative solution, which is anchored in critical performativity. He suggests that, as one bodily engages with practices, the acquired knowledge is ingrained using two distinct modes of somatic engagement: *inscription* and *incorporation* – the "somatic modes of attention" (cf. Csordas, 1993, p. 135). Table 2 summarises the modes and provides some examples.

Table 2. Somatic Modes

Refers to	Example

Inscription	Persistence and retrieval of information *external* to the lived body. The information is often of a fixed nature and persists outside the body as audio, video, images, text or any external media (or as any combination of these).	Sparrow et al. (2011, p. 776) demonstrate that "the Internet has become a primary form of external or transactive memory, where information is stored collectively outside ourselves". Wegner and Ward (2013) show that people are increasingly using the Google search engine as an external body-set.
Incorporation	Persistence and retrieval of information *internal* to the lived body. The information is often of holistic nature and persists in the body as gestures, mannerisms, movements, redolence, expressions or any other sensuous aspects (or as any combination of these).	Edenius and Yakhlef (2007) explain how people in complex organisational spaces incorporate somatic aspects, such as body responses, physical movement, as well as bodily participation and improvisation in practice. Anteby and Molnar (2012) show how the development of organisational knowledge structures hinges on incorporating the somatic practices of remembering and forgetting.

Inscribing practices relate to the persistence of the concerned phenomena. They are primarily intentional, though not necessarily. As these practices entail some form of *inscription*, they often involve something other than the body, for instance equipment, with which the inscription is performed and from where one recalls the inscribed information. Inscription is performed through the body and, in doing so, the body shapes the performance (Hayles, 1999). In such practices, the body and equipment tend to become one. A basic example of inscription is the practice of typing or writing (as opposed to 'learning' the activity). The practice of writing both persists and allows us to recall the information. Therefore, inscription has "an irreducible bodily component" (Connerton, 1989, p. 76) that includes certain bodily engagement and orientation (such as posture, grip and movement). Inscribing practices can also be understood as the human embodiment of shared language, feelings and senses that motivate actions (Stoller, 2010, p. 59;

Shilling, 2012, p. 21). Other inscribing practices include, but are not limited to, the transfer of visual, textual or any other sensuous form of information into another medium external to the lived body (for an empirical account of wearable body trackers, see Prasopoulou, 2017). More complex examples of inscription can be found in the studies of somaesthetic and include body modification, tattoos, piercing, self-inscription and the use of another body (MacKendrick, 1998; Shusterman, 2012).

Incorporating practices relate to orientated actions and how they are encoded in the body as somatic memory, often through repetition or exposure. Incorporating practices are those where one performs social or cultural conventions (such as a handshake or a dialect) and can be unintentional or intentional (Olsen, 2010, p. 122). An example of incorporating practice is learning to type (as opposed to the practice of typing); another is learning different somatic gestures (such as swiping, zooming or moving) to interact with touch-based interfaces (Serino et al., 2016) and touchless immersed environments (Lv et al., 2015). Other examples of incorporating practices include learning etiquettes, expressions, movement styles and vestibular signals. Incorporating practices may lead to the formation of new somatic orientations (new ways of understanding) and a person's distinct somatic individuality (Shilling, p. 157).

Incorporated somatic content contains essential social and cultural references from the surrounding environment; hence incorporating practices serve as "mnemonics of the body" (Connerton, 1989, p. 74). In this way, the environment in which one is embedded and performing certain practices (the context of the somatic engagement) also influences the development of somatic practices. The body is always located in a place. Everyday places serve as the somatic field of practice, which comprises rich spatial details (such as ambience, locale, familiarity and navigation). The structure of the place shapes the lived body and contributes to the sense of embodied place (for related examples and a useful discussion, see Basso, 1996). Performing similar practices in similar or dissimilar places may result in different incorporated somatic practices.

Given the above, all somatic practices comprise some degree of somatic inscription and incorporation. They are not mutually exclusive; there is always an interlacing of the two modes (Stoller, 2010). It is not possible to understand inscription without incorporation: "many practices of inscription contain an element of incorporation, and it may indeed be that no type of

inscription is at all conceivable without such an irreducible incorporating aspect" (Connerton, 1989, p. 76). In sum, I aim to give a twofold theoretical insight concerning the corporeality of practices. First, incorporation involves the persistence of certain actions in the body that help build somatic practices. Second, inscription involves a modulating of the practice and, consequently, an opportunity to update or correct somatic practices with the repeated and effective use of technologies. There are always discrepancies in what people say they do and what they actually do. This might be more complex because of the influence of the corporeality of the lived body on people's practice and their engagement with systems and devices (Michel, 2011, p. 332). Somatic engagement and orientations can provide essential clues for a more in-depth analysis of complex engagement with the concerned phenomena.

METHOD

This work stems from an ethnography of everyday practices (Katz and Csordas, 2003). The fieldwork was part of my doctoral research and centred on the taken-for-granted immersion of software engineering professionals in IS phenomena. Ethnography belongs to the field of anthropology, and is characterised by observing the concerned phenomena (field practices, participants, things and places) by immersing oneself in the lives of, and going through the same routines as the participants (Mattarelli et al., 2013; Tedlock, 1991; Clifford, 1988). Ethnographic methods are considered most appropriate when studying shared patterns (such as everyday practices, beliefs and norms) of a particular group (Creswell, 2007; Hammersley and Atkinson, 2007). In this study, ethnography is used to explore everyday practices as somatic practices. Ethnographic approaches are particularly helpful in collecting somatic data, allowing the ethnographer to study participants' bodily engagement while immersed in performing practices in the field. By bodily immersing themselves in the field, ethnographers may gain access to the participants' life worlds, which otherwise remain inaccessible to detached observers, and are able to report data from an intimate perspective. Immersion in practice also forces an ethnographer to reflect on their own body, and how their own somatic orientation affects the fieldwork.

A somatic approach to ethnography is taken here; it is considered a "critical methodology" as it departs from classical detached observation techniques, and puts the human body at the centre of inquiry (Pink, 2015, p. 8). From a methodological standpoint, this work follows somatic traditions within ethnography, which invite researchers to pay attention to the lived corporeality

(Csordas, 1993, 1990; Pink, 2012, 2015). This position rejects the body as given, and critically confronts somatic aspects in order to reveal that subtle bodily movements and orientations are critical sources of information. For instance, when engaging with participants in the field, an ethnographer must be aware that "a peculiar body posture used when subjects relate given narratives is not accidental or arbitrary but is rooted in the multi-faceted historical experience of a people" (Katz and Csordas, 2003, p. 276). In my data collection and analysis, I have approached IS work practices as a somatic concept of interest in order to highlight the modes of somatic engagement. This was only possible because of the ideas developed from using the appropriate research instrument – the lived body.

Body as Research Instrument

The principal research instrument in ethnography is *the researcher* (Monaghan, 2006; Williams and Milton, 2015, p. 18; Chughtai and Myers, 2017; Madden, 2017, p. 19). Ethnographers use their bodies to explore and interact with the field. The body has a direct bearing on how one approaches the ethnographic field (research site). Somatic orientations (bodily positions of the research and the participants) and somatic engagement (bodily performance of the researchers and the participants towards the field and each other) correspond most closely to what one finds in the field. In this study, I used the body – my own body – as my primary research instrument to learn about participants' somatic practices. Although I developed and presented the insights as a somatic narrative in the field, they were developed by triangulating my own somatic perspective with the participants' perspectives, as is the case with ethnographic writing at large (Katz, 2018; Van Maanen and Kunda, 1989). I was bodily immersed in the field, and my body went through the same routines as those of my participants, which helped me to delve deeper into their somatic practices. I also tried to be reflective, in a somatic sense, about what I was doing and how I was performing the tasks. While digital work such as software and programming tasks are generally considered purely technical, they are complex somatic enterprises. Previous studies have argued that the body is crucial not just in terms of ergonomics (orientation toward the machines), but also for a sense of belonging (orientation toward the others), bringing in gender and identity issues, which all affect digital work (Heaphy and Dutton, 2008; Ganster and Rosen, 2013). Hence I take the methodological stance that researchers must take heed of participants' somatic orientation (including body language), which is available for inquiry only after becoming

critically aware of one's own position in the field. As I worked in the software industry for over ten years, my previous somatic history helped me to understand participants' practices (how to physically position oneself in the work environment) and establish authenticity and, following Clifford (1983), "ethnographic authority" in the development of a somatic narrative.

Research Site

The fieldwork was conducted at a large IT organisation in New Zealand, called Agiley (all names in this article are pseudonyms). Like any ethnography, this work does not purport to be archetypal, and the case of Agiley provides only a partial representation. The site was selected for the interesting differences between participants' perspectives, exhibited in the analysis. Agiley is one of the largest digital service organisations in New Zealand. As of 2015, it comprised approximately 300 employees and five strategic business units, within which were many project teams, including software development and consultants. The core digital work was done by the software development teams and infrastructure teams, which were responsible for 157 active projects. I gained sustained access to Agiley after a series of negotiations that led to an invitation to join as a part-time engineer in the capacity of an external researcher. I was placed in DevGroup, within the leading software development department, and worked on an enterprise information system called KnowSys.

My historical understanding of the field helped me to interpret somatic cues and orientation, all of which were significant. The employees in DevGroup were found to be bodily immersed in everyday technologies, bodily engagement with others and equipment playing a central role in their practices, many of which were Agile induced (cf. Cockburn and Highsmith, 2001). As in many digital organisations, the software engineers formed a tightly knit group of professionals with distinct bodily actions towards organisational and information system practices (Spraggon and Bodolica, 2017).

Fieldwork

I did not go into the field to find or explore bodily practices; on the contrary, my purpose was simply to examine the nature of engagement with everyday practices. The insights gradually developed during the course of the fieldwork. I conducted intensive fieldwork for 18 consecutive months, spanning 2013 and 2014. During that time, I worked three times a week as a temporary

software engineer, which allowed me to collect data from different sources (see Table 3). Given the slow and gradual nature of the fieldwork, it was possible to report observations from an intimate point of view, and to document minute details on a daily basis. I generated field notes using the *deep hanging out* strategy (Geertz, 1998), an established ethnographic method of casual, bodily and prolonged immersion. I took daily observation notes, mostly digitally, with some handwritten. These daily field notes ranged from half a single-spaced page to three pages, depending on the work and day. Such variation is standard, with ethnographers often finding themselves doing everyday tasks in order to become familiar with field practices (Van Maanen, 2011). Although the everyday tasks in this study were trivial in an ethnographic sense, they were primarily complex programming and software design related tasks. I use the term *everyday* tasks in a critical sense, because they were part of the everyday lives of the software engineers.

Table 3 Details of Data Collection

Data sources	**No. of evidence**	**Somatic traces**
Interviews	Software engineers: 7 Senior managers: 3	Reflections and confessions regarding somatic practices, such as working with information systems artefacts
Observations	Field notes: daily	Body movement (working on digital solutions; project meetings; interacting with digital tools), body position and orientation (toward machines and others), gestures, posture, touch, feel, proximity (places, things and technologies), propinquity (intercorporeality and working together)
Audio and visual data	Photographs: 60 Videos: 4 Audio snippets: 3	Similar to observations, with a focus on visualising body movement, body position and orientation including gestures and posture (mostly informal and candid)

For researchers studying issues surrounding the body, it is important to know how one's body is located in the field. The practice of fieldwork involves physically leaving a familiar place and entering another place. Following Clifford (1997), I approached the idea of fieldwork as a somatic practice: an ethnographer learning about the field using her body and seeing how the human body is positioned in the field. Immersion in the IT project work also enabled me to become bodily closer to the participants (e.g., physically working together on a task, which is standard work practice in Agile teams). I also attended project meetings on a regular basis, and had the opportunity to observe engagements up close. As a working member of the DevGroup, I had access to a number of other data sources: the organisational IT infrastructure, project documentation and various digital artefacts. I paid hermeneutic attention to participants' engagement with the digital systems, was part of project communications, and kept logs of emails and digital communications. I also took photographic evidence, audio recordings and videos where permissible.

Moreover, I conducted ten ethnographic interviews with members of the DevGroup. The respondents were selected using ethnographic sampling, with a particular focus on somatic propinquity (closeness to the research instrument) and familiarity with the task and project work. The interviews lasted one to two hours and were digitally recorded (except one). During interviews, I also took observational notes, which were later used in the analysis. As the interviews were conducted after gaining full acceptance in the field, the interviewees were candid, honest and open to dialogue. The interviews used open questions relating to engagement with digital technologies and everyday practice. The respondents often used body related examples to illustrate their answers. This prompted me to analyse the data using a somatic lens and to complement the interview data with observations. As the observations were first-hand accounts of what people were actually doing, the narratives were accompanied by field notes, and only the interviews used for triangulation. During the 18 months, I collected a massive amount of data. Some of the findings are published elsewhere (references suppressed); in this article, only data relevant to somatic engagement are used.

Data Analysis

I took the methodological position that an ethnography of somatic practices is first and foremost an ethnography (although with a focus on the body); hence the data should be treated accordingly. This position is consistent with contemporary ethnographic approaches to the study of the body. Pink (2015, p. 8) points out that doing somatic ethnographic inquiry "does not privilege any one type of data or research method. Rather, it is open to multiple ways of knowing and to the exploration of and reflection on new routes to knowledge." Pink (2015) goes on to suggest that ethnographic analysis of body-related data should go beyond structured analysis (such as coding), and instead develop narratives from the field based on ethnographers' own lived experiences. In the same spirit, and to develop interesting narratives, I performed the analysis in three stages.

First, the analysis began while I was still in the field. This involved meticulously reading and re-reading my observation notes and transcripts in order to identify critical issues. At this stage, the notion of bodily practices was highlighted as an important concept, but the focus was on the broader notion of everyday practices (how people engage with technologies, where they engage, and how to interpret the logic of engagement). Second, in order to examine the field data anew for somatic concepts, a critical hermeneutic approach was taken, as suggested by Stoller (2010). A critical hermeneutics approach means the methodological use of critical theory in hermeneutic interpretations (Kögler, 2006). Prior studies of inscription and inscribing somatic practices uphold critical hermeneutics as the appropriate method of analysis for data of a somatic nature (Edenius and Yakhlef, 2007). Given the somatic orientation of this work, I grounded my interpretations in two description-based narratives to highlight body positionality and inscription versus incorporation. At this stage, the analysis involved careful re-reading of the evidence and looking for somatic traces in the observation notes with regards to a person's body position (including gesture and posture), body propinquity (including coming together in a meeting and discussing complex IT tasks), and somatic cues (including bodily responses when one is deeply immersed in a practice). It was clear that participants valued their bodily interactions, which must be interpreted carefully. As the participants consistently referred to their somatic orientation and somatic engagement, I invoked the somatic framework developed in this work to examine the evidence for somatic conflicts (first narrative) and to highlight distinctions between

different modes (second narrative). Third, I adhered to the principles provided by Klein and Myers (1999), particularly invoking the fundamental principles of hermeneutic circle and contextualisation. This facilitated development of the interpretation (by going back and forth between the data and the interpretation) of interview excerpts, observation notes concerning somatic traces in the data sources (as above), including video vignettes of bodies at work, and candid comments concerning the body in practice.

The ethnographic interviews were analysed using an interpretive method inspired by Myers and Newman (2007) in order to extract the somatic details. I initially used some elements from grounded theory methods, in particular constant comparative data analysis techniques, to highlight key concepts and emerging themes. From these analyses, I highlighted the somatic modes of engagement and interpreted these in light of the field notes. This also involved reviewing the annotated interview transcripts to identify somatic gestures (where applicable) and explications of the gestures, as I observed, and as reported by the interviewees. In one such instance, one of the participants, Aisling (a software engineer) reflected on the importance of physical observation and acquisition of skills. I made the following observation during the interview:

> "It is not just the *use* she is referring to here, but the physical observation ... On another occasion, she told me that how she had learned [a database tool] by observing [a senior team member]. By observing, she meant, quite literally, lean over and observe because they were sitting next to each other … The problem, she said, is that even though others were using that [particular] tool, no one told her how to use it. As a result, she had to bodily engage with the others to acquire new skills. But, it is clear that she did it unreflectively." – *Observation note, annotated during the interview.*

The body is rarely discussed in the context of IS organisational work practices (such as Agile development or knowledge management). Agiley presented many insights into bodily practices. Here, only a single aspect is unpacked – the recurring software developer stand-up meetings – to shed light on the somatic engagement with the IS and organisational phenomena. The meetings followed the SCRUM format, the concept of SCRUM itself being a bodily metaphor. The term SCRUM is used in rugby where it refers to a bodily formation where players come close, pack together, and attempt to gain the control of the ball SCRUM is seen as a bedrock of team

performance in IS organisations, with instances of transition between inscribing (inactive body) and incorporating (active body) towards a common end. DevGroup was a tight-knit group of developers, analysts, technical support and quality assurance engineers and managers. The team often presented demos, orientated towards and engaged with devices, and overall worked very closely, in a somatic sense. The following account is presented from a first-person perspective, as suggested by Clifford (1988), in order to provide a narrative of the bodily practices in the field from the vantage point of the body of the ethnographer.

ETHNOGRAPHIC ANALYSIS

A Conflict Between Body Orientation and Engagement

Like many other IS organisations, software development stand-up meetings were the norm at Agiley . These were primarily for knowledge transfer about KnowSys, and were held at least twice a week. Senior managers (Aileen and Aidan) often managed the meetings, frequented by software engineers and support staff (Aisling, Aideen, Alby, Alroy, Alan and Adam). Although by definition a stand-up meeting requires participants to be bodily standing up and in proximity, this was rarely the case here, and, as I shall reveal in this section, the otherwise trivial body orientations in a meeting contributed to technological issues in their project work (for related empirical discussions, see Stray et al., 2013; Mansfield et al., 2018).

Despite their best efforts and the application of Agile methods, senior management always struggled to have a firm grasp on project progress, and encountered delays in the knowledge transfer process. On many occasions, I noticed that one problem was their understanding of technical knowledge as a mere mental phenomenon. This was disclosed by observing their two distinct IS management strategies: first, a sustained insistence on the documentation (or codification of the embodied knowledge) of KnowSys' crucial technical processes (such as software interfaces and database structures); and second, their conviction that software developers had tacit sophisticated knowledge of KnowSys, and that such knowledge could be extracted through documentation. A key team member, Aisling, who was about to leave, was asked to transfer her knowledge. This transfer primarily involved face-to-face training and screen recording of KnowSys with her detailed commentary. I shall return to the tacit transfer part later.

First, some early signs of somatic conflict were spotted in the structure and style of the knowledge transfer meetings – this excerpt from the field notes on the first meeting sets the scene:

> "I just attended my first [Agile] daily stand up meeting; it was labelled as *scrum,* but it was far from it. Unlike a SCRUM, the meeting was chaotic and haphazard when it comes to the flow of information as well as a physical presence. We constantly had to move from one place to another. While the meeting was going on, the "IT guys," as the team referred to the admin department, were also moving PCs for the annual review. There was on-going traffic of people. After some time, everyone managed to come together, and Aileen led the SCRUM; though, among all this [bodily] movement, it was not obvious who the leader was – everybody constantly kept moving in all directions." – *An excerpt from the field notes.*

It might be tempting to conclude from a surface reading that such haphazard meetings are the norm in IS organisations. However, a critical close reading suggests that a meeting is much more than a social or professional gathering of people, and more than a communication strategy. It is a directed and bodily-orientated complex practice (Heaphy and Dutton, 2008, pp. 152ff), which requires careful propinquity or orientation towards others and technologies (such as eye contact, the direction in face-to-face or virtual environments, and posture). A deeper symptomatic reading discloses that such everyday bodily orientations in social groups can help to highlight the somatic aspects embedded in everyday practices. As Shilling (2012, p. 86ff) points out, many everyday bodily orientations transmit messages between people; messages such as eye contact, gestures and vestibular cues that need to be decoded in order to understand the role of the body and are "potent conveyors of meaning and memory" (Stoller, 2010, p. 59). As my body (the ethnographic instrument) was also embedded in the situation, it became possible for me to see clearly that the team members were primarily in the inscribing mode. They were neither truly engaged, nor particularly orientated in their bodily practices, but made sense of and grasped the situation as best they could by recalling and invoking Agile rules.

Over time, I became keenly aware of the somatic significance of the field practices. I also came across another related issue. The management failed to grasp the changes in the somatic field or body space in their practices. The significance of orientation was prominent in the next meeting

when KnowSys was approaching a significant milestone – an upcoming software release. In the meeting, I observed:

> "The standup was, quite literally, everyone standing right next to the main [presentation] screen; so close that I could not even see what was on the screen, only hands merging into the screen. It was loud, and they were as closer to the screen and each other physically as they could be. I also had to come closer to see what was going on." – *An excerpt from the field notes.*

In this ethnographic episode, the DevGroup came bodily close together to work on the vital milestone, but remained somatically disengaged in practice. I observed that there were, of course, subtle somatic practices that were more than mere bodily movements: some tried to move close to the screen in order to discuss their work; some touched the screen to show how good their programming strategies were. However, what exactly was being communicated? It was unclear. For a detached observer, this might be an instance of reporting a close meeting; but for me, it was also about my *work* in the fieldwork. I was part of the team, and some aspects of the meeting were related to my assigned tasks. I was not detached from, but bodily attached to my work situation. I should have known what was going on, but I could not make sense of it. Thus, when I asked Aidan and Aileen about "what I missed", they too were unsure about what had happened during the meeting. The confusion was partly related to bodily orientation and how it influenced the knowledge channels within the team. Consider the following event from a different stand-up meeting:

> "Although, it is a daily *standup* … [this Agile] meeting, as previously, remains abrupt and scattered: also, this time, everybody is *sitting* down, *away* from each other, and mostly doing their own thing; this arrangement continues while each person gave an update. [Only] Alby's focus is *toward* the speaker. Aideen, after giving an update, moved around, went out, then came back, and stood next to the door. Alroy gives a brief update and then leaves while the meeting was still on. Alan, after giving an update, *turned back* to his [workstation] and put on the headphones." – *An excerpt from the field notes.*

It is now possible to see the problems related to somatic propinquity in terms of bodily disorientation and a loss of body perspective within DevGroup – a loss that shows how bodily disorientation could adversely affect meeting effectiveness. As the project deadline approached,

there were still outstanding problems. Consequently, the knowledge transfer part of KnowSys was delayed. Aisling still had issues to resolve before her departure. Yet the management paid little attention to the issues and insisted that, in Aidan's words, "we shall be sticking with the plan". Of course, their plan was to extract (bodily) knowledge through documentation (bodiless knowledge).

Software engineers are human bodies working on and living in complex environments. IS development and implementation strategies are woven with somatic threads. However, there were many loose threads in the tapestry of DevGroup. I asked Aidan about the outstanding issues, but he seemed confident and dismissed the afore-mentioned somatic disorientation as a "calm time" in the project work. His point was that people were busy with their tasks, so need not be fully immersed in the meetings. Could this be true? On the contrary, I observed that, in that *calm*, there were clear signs of a storm brewing, which became apparent in the following observation, made during the software demo of the new functionality of KnowSys:

> "The demo, from the beginning, was dominated by various software bugs related issues. It went so chaotic that Aidan had to [occasionally] shout and stop the on-going conversations as well as the people from moving around. "One person at a time!" He repeated this call a couple of times, but in vain. The demo at one stage turned into such a loud chatter, coming from all the *directions*, so it became inaudible, and it was not clear *who was talking to who and which voice came from where*. Aidan, on occasion, had to speak louder than usual, frequently shouting out to get *a sense of orientation amidst the chaos that was unfolding.* He appeared helpless and lost, asking people to stay focused: "Aideen! … Adam! … Please!", he shouted." – *An excerpt from the field notes.*

Aidan's dilemma was far from a leadership crisis; nor was it a matter of technical and system understanding of the project – Aidan was an expert software professional. A hermeneutic reading of his situation reveals two important things: first, the management of IS projects is not just a matter of managing people, technologies and processes, but also the orientated situation created by the human bodies in a nexus of technologies and processes (see Wasserman and Frenkel, 2011, p. 505 for an empirical discussion on body movements and spatiality of organisations). This is what can be best described as a *somatic web* of everyday practices. Second, in order to develop somatic understanding, a *positioned scenario* in the somatic web is required during

knowledge work. However, Aidan's approach to the meeting was not necessarily wrong. For instance, one reason behind his approach was to take control of somatic activity by creating everyday spaces of engagement, through casual meetings, which were meaningful and familiar to individual members of staff: he wanted to extend the somatic web into everyday places. On the surface, this appeared to be an excellent idea. Both everyday spatiality and somatic space are inextricably connected, and they are critical in the management of IS infrastructures, as well as complex practices in organisational settings (Michel, 2011, pp. 336-340; Poore, 2011). Aidan was also sympathetic to the idea that staff should neither be strictly managed, nor restricted to specific physical spaces or rigid routines, but that management needed to engage with them. However, the various symptoms that were observed and reported here suggest this was not working, so what had happened

There are two plausible explanations concerning bodily disorientation and disengagement in the somatic field of DevGroup. First, after talking to Aidan and Aileen, and reflecting on the hermeneutic concepts, it became clear that the management was not aware of the significance of the bodily aspect of practices; they simply saw the skills as mental or material phenomena. While they acknowledged some differences in the contemporary practices of staff, the differences were conceptualised as cognitive differences and not as bodily practices. This is problematic because the younger staff were generally more bodily immersed in their everyday practices; in some cases, such as Alby and Alan, they had also been expert programmers before joining Agiley, and had their own ways of doing things (an indication of somatic incorporation). As the management ignored the everyday historicity of their lived bodies, their bodily engagement with the knowledge work at DevGroup was simply seen as a matter of the binary division of explicit and tacit knowledge regarding documentation and training, respectively. Any somatic competence that could have been used to gain practical knowledge was lost in disorientation and disengagement problems.

When it comes to somatic understanding, according to Rouse (2005) "we are both vulnerable to and dependent upon our surroundings. Only by [bodily] orienting ourselves toward and within the world can we find ourselves and stave off (for the moment) our vulnerability to circumstance" (p. 44). This was true in the case of DevGroup. Many issues that could have been resolved by grasping bodily orientations were left open. However, bodily orientations and engagement may only be one part of the story. There may also be conflicting interpretations of

the somatic mode of engagement. This can result in unanticipated somatic practice and, in so doing, produce an unintended outcome of a technological strategy (see Pallud and Monod, 2010, p. 569 for related empirical examples).

The Distinction Between Inscription and Incorporation

Let us return to knowledge transfer and software demos; let us also recall that the primary participants were the younger staff. The latter point is significant because (unlike the senior management of DevGroup) they grew up with technologies, many of which the management struggled with, such as mobile programming and collaboration frameworks, but which were simply part of their lives. Olick and Robbins (1998, pp. 113ff) state that everyday engagement with new technology is gradually incorporated into bodily practice in every epoch. The application of somatic knowledge is automatic, and one rarely pays attention to it. The body is part of one's practice - a fact that is often overlooked. Of course, not all new generation professionals are expert programmers or even tech-savvy, but in the case of DevGroup, some of the participants had prior expertise in computer programming. Their knowledge was incorporated in their lived bodies. When I asked about working on specific complex tasks, most were able to engage with KnowSys practically, but had difficulties engaging at a theoretical level. On one occasion, a software demo turned into a meshwork of bodily gestures, cues and pointing to the content in the system. I documented this ethnographic episode in a field note:

> "In this demo, the whole meeting was dominated by various physical interactions with the screen rather than describing what is happening in the software, on the screen i.e., what is the task or functionality. This point-to-screen resembled their answers to my many [earlier] technical questions, which I asked many members in the last few days. Their answer was always in the same bodily form: they simply pointed to the screen and showed how one software component is linked to another, such as saying *this does that*, and so forth. As a programmer, I know what they are saying but this is a matter of intuitively talking with them at their level; the problem is that do [the management] know? They wanted [the developers] to write what they know in clear instructions and not pointing to the screen." – *An excerpt from the field notes.*

A likely explanation of this bodily engagement is that some staff members saw their KnowSys knowledge as an everyday thing, rather than a strategic resource for Agiley. Like many software

professionals, they had a somatic affinity towards their programming task. Indeed, from the observations, it became clear that they saw the work practice, team meetings and projects as everyday somatic enterprises. They were already familiar with particular software frameworks, and did not require any formal training; in a sense, some of their technological skills were already incorporated into their bodily practices. While the participants were ordinarily absorbed in their practices, it was difficult to grasp the nature of their immersed somatic engagement. A moment of malfunction revealed the immersed bodily nature of their engagement:

> "All of a sudden a software bug stopped the KnowSys code to compile, and the software demo broke down. In this [software] breakdown scenario, they [three developers] moved very close to the screen and started to *lean in* to the KnowSys code as if they wanted to *inspect* the code *physically*. This was a rather peculiar practice that I have also previously observed in some other software houses; the code remains the same no matter how close you get to it or observe from a distance … There was a lot of touching the screen, acknowledging visual cues, and overall a *play* of bodily gestures but very little actual discussion. After a brief silence, the code was fixed and as KnowSys was shown again on the screen, Aidan seemed happy too; the noise returned and everything went back to *normal*. Is there an order in the chaos? A method to their madness?" – *An excerpt from the field notes.*

The breakdown reveals what lay beneath the otherwise somatic chaos that was visible in the previous meetings: what can be described as almost superstitious bodily rituals. This bodily practice is also pervasive in the everyday world as somatic or "affective affordances" (Van Vugt et al., 2006). In other words, the affordance of a thing affects both somatic engagement and the intention to use it (p. 877). Everyday examples include pressing a doorbell harder, as if it will make it louder, or swiping forcefully on a touch screen, even though the device in question will work the same, however hard or gentle the touch. Such bodily engagements are more than psychological responses, but are also subtle instances of inscription that facilitate modulating and refining an already incorporated bodily practice (Connerton, 1989). This subtle strategic insight, nonetheless, escaped senior management as they ignored the fact that IT knowledge workers are bodily immersed in their everyday practices, which facilitates the incorporation of such practices. In other words, Agiley's managers failed to acknowledge that there might be differences between prior inscriptions (such as somatic familiarity with certain technologies) and practices emerging

from bodily incorporation of historical engagement with technologies (such as the everyday use of technologies while growing up).

The management's story of somatic practices became apparent when, in an attempt to modernise the office, the office walls were turned into a whiteboard. It was a genuine benign effort to engage the engineers and other staff. Indeed, most of the engineers welcomed the change and interpreted it as a useful somatic affordance. Soon, the walls were full of meeting agendas, the KnowSys project plan, architecture and other technical diagrams. It arguably gave the engineers bodily orientation and a sense of calm in their engagement with work practices; in a sense, their somatic space expanded significantly. It is also important to clarify here that lived space and somatic space are often intimately entwined in practice as a holistic whole (Wasserman and Frenkel, 2011); hence, here the white board is an empirical example of somatic web located in a place. For the participants, the new wall was also something to play with – an everyday thing and not a strategic structure (see Kolb and Kolb, 2010 for another example). As a result, the walls soon became a meshwork of technical ideas and internet memes, jokes and other playful content. Aidan and Aileen saw this as an unintended negative outcome of the introduced change, but their concerns faced resistance from the engineers – for them, the wall was a nexus of their bodily expression, work and play.

Consequently, the managers proposed that only one part of the wall could be the 'social wall', used for sharing fun things, or in Aidan's words, "the jokes". However, within a week there was no room left on the work side of the wall, so Aidan wiped everything off the social side and wrote a few technical notes. When the engineers found out, they were frustrated and expressed their concern by writing "this isn't very social" on the wall and, soon afterwards, the wall with any bodily orientations and engagement faded. Whatever somatic significance the wall had had was lost. The participants went silent, turned their backs, and kept their somatic engagement to a minimum, becoming almost invisible to the others.

Analysis of the evidence suggests that, in addition to technologies, many everyday things provide a somatic compass, through which one can relate to one's bodily orientations in practice and learn about the surrounding world (Yakhlef, 2010). The wall had a dual role of somatic affordance and physical anchor, providing stability in the transition from inscription to the incorporation of old and new practices. For example, I often found the engineers working on

KnowSys on their computers while facing the wall; it was a repository of knowledge. Many incorporation practices involve an element of the inscription (Connerton, 1989); similarly, the wall may have served this purpose in the long run. The very engagement with things can also result in inscription of bodily practices (Olsen, 2010, p. 120). However, rather than adapting to or learning from the contemporary practices incorporated in the bodily practices of software professionals, senior managers relied on conventional inscription methods (documentation, training, etc.). Senior IT management lost the opportunity for a refined inscriptive strategy that might have been beneficial for somatic engagement with IS and organisational phenomena, particularly for the project they were undertaking.

DISCUSSION

This study offers two distinct contributions to the literature: a qualitative understanding of the structure of somatic practices, opening up a path for sensuous scholarship; and the extension of human embodiment research to include the nuances of somatic engagements and orientations. These contributions are particularly useful for less experienced qualitative researchers, but should also appeal to seasoned practitioners and veteran researchers.

The Structure of Everyday Somatic Practices

The first contribution is of a theoretical nature. In particular, this work brings the IS ethnography closer to debates about the somatic turn in contemporary ethnographic scholarship (Pink, 2015; Madden, 2017). The narratives reveal that a somatic perspective is critical for IS research, because one develops somatic understanding, including skills and competence embedded in a somatic manner, through bodily engagement (first narrative), and somatic competence contributes to the somatic historical understanding of things (second narrative). Findings suggest that the structure of bodily practices can be stated in a cyclical manner (Figure 1): our bodily practices are historical as they contain somatic competences that rely on our somatic engagements and orientations, which are in turn shaped by prior familiar somatic experiences or history. Findings have also shown that our bodies do not just create our somatic history, but also create the spatiotemporal world where things make sense by virtue of bodily presence and movement in the world (Todes, 2001, p. 49). As one acquires new competencies, existing skills and knowledge feed back into the practice world, and become part of one's somatic history ;

these historical somatic competences lead to better judgement in future engagements (see Dreyfus, 2014; also Rouse, 2005, p. 45). Hence, somatic competences are gradually developed through the shifting modes of the lived body in various situations.

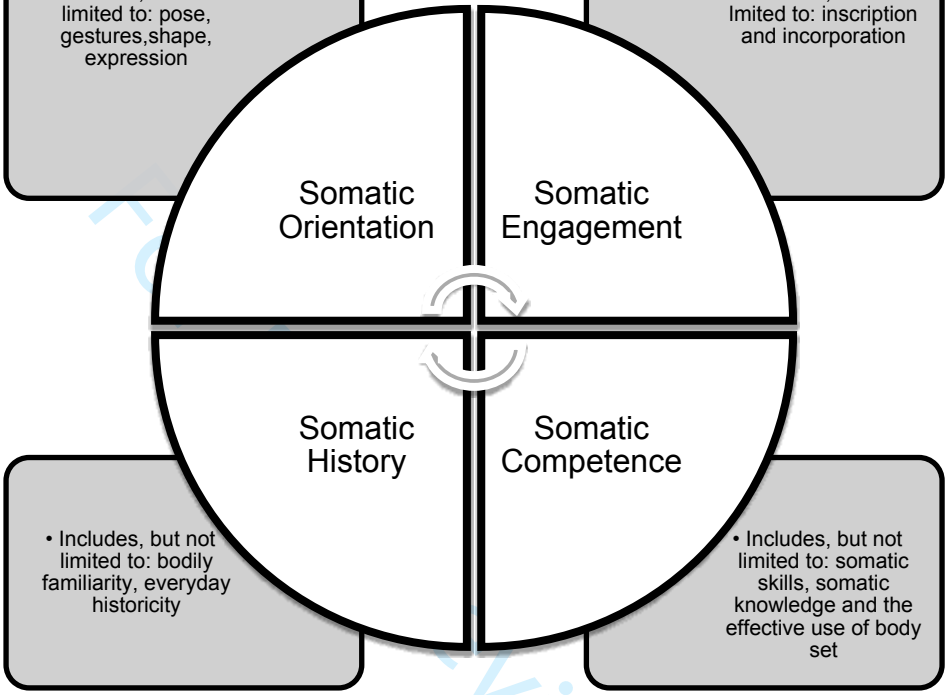

Figure 1. The Structure of Everyday Somatic Practices

Note. The arrows reflect the spatiotemporal flow

This work can also be used to bring IS practice research closer to the emerging field of sensuous studies by linking ordinary somatic practices with bodily senses (Stoller, 2010; Porcello et al., 2010). For Stoller (2010, pp. 41-2), a multi-perspective body-orientated approach is required for sensuous scholarship. This work further emphasises that "good ethnographers will [also] use their whole body as an organic recording device" (Madden, 2017, p. 19). As ethnographers' bodies are embedded in the field, one must reflect on one's own position when interpreting that of others. The somatic framework presented here can be used to interpret and understand the structure of bodily practices in bodily sensitive data collection, such as design studies, and in politically charged themes, such as the gender, skin colour and bodies of the marginal population (both in an organisational and societal context). Here, new somatic perspectives could be used to grasp the complexity of sense-making in engagement with technologies using conceptualisations of bodily needs. A practice world can be better understood as a somatic field. Experiential

aspects of technology can be interpreted as sensory experience in the somatic field. Findings have shown that the body has a history, and bodily practices help preserve the past. Moreover, somatic engagement with the world establishes a tangible connection with our histories; by paying attention to the lived human body, researchers can learn from the past to improve future research.

Extending Embodiment to Include Somatic Practices

The second contribution of the study is that it has extended the conventional understanding of embodiment. Using a somatic perspective, qualitative researchers can access subtle vestibular and visceral messages that otherwise remain inaccessible and are rarely examined in studies. Everyday practices are somatic practices. By taking this theoretical position, somatic lenses can help researchers to extend the notion of embodiment and bring it closer to the contemporary somatic turn in the study of social behaviour (Farnell and Varela, 2008). The lived body in IS theory can be further explored in a number of ways.

First, the findings suggest that the body contains certain somatic structures that are more than simply embodied (compared to the traditional embodiment perspectives) or tacit knowledge. As Collins (2010, p. 145) has argued, bodily knowledge is a particular form of "somatic tacit knowledge", which must be studied using somatic perspectives. Second, researchers studying technological practices might find it useful to further explore the inscribing and incorporating modes of somatic engagement to make sense of the effective use of technologies. A nuanced understanding of somatic engagement can be developed that might explain how social or organisational memory persists in the body. Third, findings suggest that human embodiment includes somatic traces, such as tone, body language, gestures and facial expressions which are significant in the context of somatic proximity and propinquity. Hence somatic information should be included or at least acknowledged in qualitative studies of human embodiment. In the same vein, researchers of human emotion and its implications on IS can use the somatic perspective to interpret complex somatic signals (Barsade and O'Neill, 2014, p. 567-8; Beynon-Davies, 2013). Fourth, researchers should not simplify somatic sophistication by reducing complex body engagement with IS phenomena in a research setting to detached bodiless concepts.

Despite it being central to the practice of ethnographic fieldwork, researchers rarely, if at all, acknowledge the body as the research instrument. By acknowledging and interpreting the ethnographic research instrument (i.e. the lived body), it is possible to go beyond the conventional view of knowledge and include everyday knowledge of the body in the management and study of IS work practices.

Reflections on Method

As pointed out earlier, this fieldwork was not done with the aim of collecting somatic information. Here I briefly reflect on my somatic positionality. To begin, I did the fieldwork in an organisation, and, in retrospect, I could have tried harder to better engage with the broader context of the fieldwork. My fieldwork was in a postcolonial spatial context (New Zealand), where indigenous and racial identities are a sensitive topic (e.g. Maori and Pacific Islanders); most of my participants belonged to different ethnic groups; some of the participants had strong gender and sexual identity. There were also some people with specific physical disabilities (not included in this study). All these contributed to somatic complexity in the field. Returning to the field with hindsight will be entering an entirely new world. What can researchers do to study somatic practices considering the sensitivities just noted?

I offer a way to learn about bodies in the field. In a sense, these methodological insights reflect on a particular question: if I were to re-conduct IS research on the body, how would I approach the somatic data in my fieldwork? For students of somatic practices, where should one look for somatic data, and what are the ways to know and explore somatic practices? Table 4 shows one of the many possible strategies for exploring somatic practices in critical ethnography and qualitative field research more generally. By contrast, the analytical frameworks of related methodologies such as ethnomethodology, sensory ethnography and action research are each data sensitive in their own way and should be used carefully.

Table 4 Ways of Knowing Somatic Practices

Somatic aspects	Type of data	Exploration strategies
Somatic orientation	Gestures; expression; posture; proximity and propinquity; positionality; physical	Primarily observation: pay attention to participants' language and use of

	characteristics including disabilities; gender and sexual orientation; body modification.	metaphors to describe their situations.
Somatic engagement	Inscription and incorporation related activities including learning and training; somatic awareness; somatic experience; body reactions such as touch, taste, smell and sound; affect and emotions; body movements.	Primarily observation: pay attention to how a person's body is engaged in practice, where the practice occurs, and how they make sense of their practices.
Somatic competence	Somatic skills; somatic knowledge; somatic memory; somatic context; somatic performance; somatic labour; somatic work; the use of body-set.	Observation and interviews: pay attention to somatic performance, how a person's body is used in a particular situation and, in so doing, reveal what a person knows (observation) and how they describe their competence (interviews).
Somatic history	Familiarity; somatic norms; body politic; gender and identity; everyday historicity; extrasomatic (something that exists outside the body but relates to it) such as social, cultural, political and historical aspects of the body, including language, ethnic	Primarily interviews: although some bodily aspects including symbols are readily visible (e.g., ethnic or racial), participants might not always be comfortable in talking about their somatic experiences. Hence, extreme care is required when

	and racial aspects; body symbols including tattoos.	collecting sensitive somatic information and prolonged immersion in the field is recommended to critically engage with other bodies in that field.

Ethnographic fieldwork cannot be explained in advance. Bodies and somatic practices cannot be known, let alone interpreted in advance. I, too, did not know my participants in advance. Hence these insights should not be seen as a canonical way to design and conduct fieldwork. Participants must not be seen as decontextualised bodies in the data collection and analysis; instead, it must be acknowledged that participants (and researchers) are vulnerable human beings with vulnerable bodies. For example, in gender, postcolonial and racial contexts, there are sensitive issues surrounding body politics and "somatic norms" (Hoetink, 1967, pp. 121ff). These somatic norms relate to the power structures underlying the social acceptance of specific ideal images or norms based on body characteristics (e.g., black identity, whiteness, etc.) and they must be carefully questioned and deconstructed (Puwar, 2001, p. 652). Each person's body is different and, therefore, the systematisation of data collection and analysis processes is discouraged (Pink, 2015). Qualitative researchers should use these insights to develop their own data collection strategies; other participatory and collaborative field methods, such as action research are also to be encouraged.

Organisational Implications

The case of Agiley shows that a critical understanding of bodily orientation is particularly relevant to contemporary organisations. A team of IS professionals is not a decontextualised collection of bodies. What seems to be a trivial activity (such as meetings) might be a complex somatic phenomenon. A sensuous and somatic understanding is inseparable from the human body, and must be included in the management of information systems and practitioners. Management cannot risk ignoring the body, nor should they reduce the body to a conceptual model.

At Agiley, a similar problem was present: the senior management had a specific way of thinking, perhaps best conceptualised as a representation of their mental models of engagement. Thus, conflict started to brew when new somatic practices were instilled. Rather than *incorporating* contemporary practices brought in by new staff the management was seen as *inscribing* prior organisational norms. A conflict between incorporation and inscription was apparent; this could also be seen as a problem of competing somatic norms within a social organisation. In many contemporary organisations, there is a recurring theme of problems relating to the integration of new workers, as they are seen as *different* compared to more experienced staff members (Koch et al., 2012; Smola and Sutton, 2002). This difference is generally understood as a difference in the level of technological immersion, where new workers are seen as more immersed in the IS phenomena in organisations and society; consequently, new IS work and collaboration models have emerged that were inconceivable a few years ago, such as Workplace by Facebook and Slack. While these technological solutions help organisations to better manage the processes, they do so by removing the somatic complexity from organisational processes. This bodiless understanding of embodied knowledge can create problems relating to knowledge transfer, as well as loss of a sense of belonging in an organisation.

The somatic perspective can help practitioners to improve IS related organisational practices by acknowledging them as somatic practices. As managers continue to struggle with the intricacies surrounding the embodied knowledge of projects, the notion of somatic tacit knowledge in organisational practices can help to develop solutions that are more meaningful to people (Yakhlef, 2010; Wolkowitz, 2006). The managerial issues often have two interrelated underlying problems. First, in IS organisations, traditionally embodied knowledge and skills are often seen as a strictly cognitive matter. Second, bodily practices are synonymised with the general notion of embodiment (again, in a general cognitive sense). Legacy views on intricate organisational practices advocating "all learning takes place inside individual human heads" (Simon, 1991, p. 125) and that "experience is stored in the head[s]" (Tsang, 1997, p. 83) are still prevalent today (e.g., Garicano and Wu, 2013). This rejection of the significance of the human body in organisational work shows that the status quo is problematic, the understanding of embodied knowledge is incomplete, and more effort must be made in this area.

By contrast, this work has shown that organisational practices are somatic. The human body must be taken seriously both in research and in practice. Embodiment also needs to be seen as

the human embodiment (or how lived human bodies are implicated) in complex organisational fields. Thus, the practitioner's dilemma is as follows: it is often assumed that human embodiment must have underlying abstract isolatable concepts, that these concepts have a mental basis, and that it is possible to grasp them objectively in order to improve the current understanding of embodiment. This dilemma can be addressed by reconsidering the lived human body in IS management practices. Using the structure of somatic practices, managers and employees can better understand the nature of organisational work. It might be possible to make sense (by acknowledging somatic history) of complex issues (in light of somatic competences) and develop somatic strategies (using incorporation and inscription) which are not detached from practice, but are attached to people's bodily practices (appropriate somatic orientation). Future studies of organisational knowledge management could extend somatic concepts to revise and refine organising and management strategies, and, in so doing, may develop more innovative and intuitive solutions that are closer to human practices and bodies.

Limitations and Future Research

The limitations of this study are the limitations of how seriously we take the body. First of all, the analysis primarily focused on somatic engagement within a particular social group, i.e. IT professionals. Second, both the researcher and the researched were able-bodied individuals. Third, the gender and sexuality of participants were not unorthodox. Although the study took a critical perspective, this was bound by the somatic situation of the researched (heterosexual, able-bodied), and also determined to what degree the researcher was able to interpret somatic orientation and engagement with technology. It is true that a longer study (exploring the changing nature of body and somatic practices) and a more in-depth account (to examine other somatic practices, such as those of queer, disabled or any other form of vulnerable bodies in order to reveal distinctions in somatic engagements) might have been appropriate to obtain fuller details (for a related study, see – references suppressed). However, this was not feasible for two methodological reasons. First, the study was conducted as part of my doctoral research, and I had to leave the field after two years to complete my thesis. Second, it was not my original intention to examine changes in practice, but rather to uncover the logic of everyday practice. I believe that, despite its limitations, the work could be of value to other researchers working in the same context. As Geertz (1973, p. 26) notes, the ethnographic findings seek "not to generalize across

cases but to generalize within them". It would be possible for other qualitative researchers to apply the insights in similar situations, but in different contexts.

This work might be extended in a number of ways to address the current limitations. First, in this study, I only focused on somatic orientation and engagement in an organisational setting. This means that other aspects of the body (e.g. physiological, psychological, sociological) were not included and future work here is needed. A report commissioned by *The Lancet* on the bodily and social wellbeing of young people and the use of technologies found that "the evidence of the effectiveness of new communication technologies in promoting *engagement* remains limited" (Patton et al., 2016, p. 42 emphasis added). The report acknowledged the significance of the body perspective in studying IS phenomena in everyday practice, and asked the researchers to explore it from people's everyday perspectives (also Bell et al., 2015 make a similar call). One possible direction is to use the somatic lens along with the somatic concept of *need*, as discussed by Todes (2001), to design and develop solutions that facilitate wellbeing (Fry, 1992).

Second, this work has suggested that somatic practice is also particularly relevant to the critical question of impaired engagement with IS phenomena, such as the accessibility of technologies. This path needs immediate exploration, as fully-abled bodies are taken for granted in any study involving human participants. Rarely are somatic disabilities (any kind of physical disability) or somatic differences (gender issues, sexual orientation, etc.) acknowledged in data collection, and somatic narratives are needed. Any somatic difference in the field also influences the fieldwork (and the fieldworker) and can determine data collection and findings. In their study on web accessibility and how disabled people engage with the digital technologies, Adam and Kreps (2006, p. 204) found that the non-somatic understanding of the human body often "mask[s] the question of embodiment and the lived experience of disability" in theory and practice. Disabled people have different values and bodily orientations in the world. Elsewhere, I have examined the issues surrounding human values and engagement in digital practices (references suppressed). Somatic orientation is critical for developing a plausible understanding of one's engagement with technologies. An impaired engagement can be fully immersive, but such immersion cannot be captured through detached conceptual understanding (Merleau-Ponty, 2012, p. 78ff). Future work could find the somatic perspective useful when examining engagement with technology from disabled people's perspectives.

Third, as new research on wearable technology has begun to emerge, findings from this study suggest revisiting the idiosyncratic view of human embodiment (Bødker, 2017; Prasopoulou, 2017). When one uses wearable technology (such as a fitness tracker), the body–device interaction is often more than a superficial experience. Such somatic engagements produce a massive amount of everyday data. Bygrave (2010, pp. 1, 6) says that the ubiquity of technology has led to the emergence of a new understanding of the "body as data" and "body as informational construct": one's body is not just seen as something that produces data, but is *becoming* data. This is a problematic but critical area that remains unexplored territory for IS researchers. New empirical and theoretical debates are required to include the body in policy- and decision-making practices.

Finally, I used a specific strand of critical theory that is deeply rooted in critical hermeneutics and phenomenology. Further research into somatic practices could explore the political and cultural aspects of the body, such as socio-cultural (re)production (Wacquant, 2006), the concepts of body capital and physical capital (Shilling, 2012), and the nuances of the reproduction of gender mediated power structures in the context of technology use and management (Oreglia and Srinivasan, 2016; Carrigan, 2018). The mechanism of reproduction of power structures relates to the exclusion or inclusion of certain (bodily) knowledge. Indeed, the IS field itself has several challenges here – gendered knowledge and western ethnocentric knowledge, among others – which are closely linked to the concept of body and embodied performance. The IS field is silent on somatic issues; this silence must be broken. One way forward is to engage with technoscientific and feminist technoscience studies, where body issues have been explored in social and political contexts. IS phenomena are now part of everyday life in most of the developed world, but are also central to the lives of those in developing world contexts. The IS field could benefit from deeper engagement with feminist and other marginal perspectives on the human body (such as indigenous population, postcolonial contexts, racial and non-western perspectives).

CONCLUSION

Although people engage with systems and technologies through their bodies, the focus of research is generally on the non-body aspects to improve the performance of a task or the business processes of an organisation. Researchers lack the tools to understand bodily

engagement. I have provided an empirical account of somatic practices in an organisational setting and developed a theoretical framework to explore and explain how somatic modes of engagement matter in everyday practice. I believe that my work has uncovered a new perspective, and offers a way to include somatic sources in the study of information systems. I hope that this line of research will help to bring scholarship one step closer to deciphering real-world engagement.

APPENDIX

Table A1. Key Conceptualisations of Human Body in the IS Literature

Examples	Type	Methods	Conceptualisation	Focus	Findings
Mingers (2001)	Conceptual	Phenomenology	as symbol	Embodied cognition, behaviour, perception	Builds on Merleau-Ponty (2012) to suggests the "inextricable involvement of the body in perception, cognition and language" (Mingers, 2001, p. 125).
McGrath (2006)	Empirical	Critical Theory	as the ethical subject	Affection, emotionality, morality	Builds on Foucault (1985, 1986) to reject the claim that "human experience can be understood from a position of emotional detachment" and suggest that information systems phenomena must be studied from a critical affective perspective (McGrath, 2006, p. 300).
Yoo (2010)	Conceptual	Issues and Opinion	as capacity for action	Embodiment relationship, digitally mediated	Integrates Mingers (2001) and Dourish (2004) to suggests a framework of experiential computing which "rests on the possibility of complete or partial mediation of the four dimension of lived human

				embodied experiences	experience by digital technology: space, time, actors, and artifacts" (Yoo, 2010, pp. 218-9).
Pallud and Monod (2010)	Empirical	Field Study, Mixed Methods	as experiencing being	User experience, historicity	Following Mingers (2001), they use Heidegger (2008) and Merleau-Ponty (2012) in a study of museum technologies to suggest that everyday technologies enhance one's embodied experience (Pallud and Monod, 2010, p. 575).
Beynon-Davies (2013)	Conceptual	Nonstandard Case	as emotional subject	Gestures, facial expressions	Integrates McGrath (2006) and Mingers (2001) to suggest that feelings, affection, gestures, and sensuous information is integral to develop a fuller understanding of the notion of information in the IS research.
Schultze (2014)	Empirical	Interviews, Photo Diary	as experiencing subject	Virtual bodies, digital self, embodied identities	Extends Mingers (2001) to suggest that the physically embodied self and the digital self are one and the same (Schultze, 2014, p. 94).

Bødker (2017)	Empirical	Meditation	as experiencing subject	Experiential computing, embodiment, affection	Extends Yoo (2010) to suggest that physical activities and sensuous feelings are essential to understand the information systems phenomena.
Prasopoulou (2017)	Empirical	Memoir	as experiencing agent; as flesh	Experiential computing, wearable technologies	Extends Yoo (2010) to suggest the centrality of the human body to and include the aesthetic dimension in the existing experiential computing frameworks.

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