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Introduction

What is digital reality?

Digital Reality highlights bodily experiences in relation to digital technologies in everyday life. These bodily experiences include the sensations arising from writing and receiving instant messages (IM), tweeting, posting images to online social networks, watching television and listening to music via streaming services (such as Netflix and Spotify). To do so, *Digital Reality* explores our interplay with digital technologies to heighten our awareness, sensitivity and responsiveness to the bodily aspects of screen-based experiences.

For several years, my research interests focused on representations of transcending the physical body through immersion in virtual reality. During this time, I explored popular representations of virtual reality and the body in a series of Hollywood film and science fiction literature (Chan, 2014). *Digital Reality* expands on my previous studies concerning representation by focusing more on bodily experience. Furthermore, the aim in *Digital Reality* is to delve into new disciplinary areas such as performance and movement studies to examine our bodily relationships with technologies. Therefore, instead of writing about representations of transcending the body through immersion in virtual reality, *Digital Reality* indicates how our daily interactions in advanced technological societies are entwined with digital technologies (Farman, 2012; Lupton, 2015).

Digital Reality introduces readers to phenomenology as a way of investigating debates about the body and digital technologies. The book offers a series of examples based on common activities and experiences which highlight our relationship to digital technologies, especially in relation to the body and movement. The book also synthesizes debates about the relationships between sensory experience and technology across a range of disciplines including media and communication studies, cultural studies, philosophy, sociology and performance studies. In addition, the book raises a range of issues arising from our relationship to digital technologies such as surveillance, data mining, knowledge production, empowerment through self-tracking, immersion in virtual realities and talking to machines.

In *Digital Reality*, the body and digital technologies are regarded as phenomena that appear to the senses. Importantly, social and cultural conventions filter and shape our perception of phenomena such as smartphones, handsets, consoles, tablet computers and so forth (O'Neal Irwin, 2016; Idhe, 2012, 2009, 2003). Drawing on the work of designer Donald A Norman, *Digital Reality* indicates how the affordances of objects are also relevant to our interplay with digital technologies. Norman, who trained as a cognitive psychologist, shows how we form a mental model of an object based on its appearance, qualities and function. In *The Design of Everyday Things* (1988), Norman indicates how these mental models are formed through experience which creates expectations of what an object is used for and what we can do with it.

Information and communication scholar Rachel Plotnick (2012) has also produced an in-depth study on the development of the push button. Notably, Plotnick examines push buttons as significant social, historical and cultural objects which provide important insight into human machine relationships. Taking Plotnick's work into consideration, it is possible to contend that the buttons that we press on digital screens are not inconsequential. Instead, their design and usage can be connected to significant social, cultural and technological changes. Meanwhile, media and literature scholar Janet H Murray (2012) examines the ways in which digital artefacts mimic physical objects. For example, an e-book allows the reader to 'turn pages'. Similarly, icons on word-processing software programmes also mimic familiar objects, such as a paint bush for formatting functions, a clipboard for copying and pasting and binoculars or magnifying glasses for search functions. Through experience and repeated practice of engaging with digital devices and software applications, we gain a sense of how they work and what to do with them.

Journalist, editor and media scholar, Marianne van den Boomen also outlines the ways in which computers transpose digital code into something which is intelligible to the human user (such as the graphic user interface, for example). Van den Boomen discusses how computers provide a set of tools to produce, reproduce and circulate texts, images and sounds. Notably, van den Boomen draws our attention to the complexities involved in distinguishing between tools and products when using computers. On this point, van den Boomen states that 'at first sight, tools and products are clearly differentiated on the user interface. Products exist as mutable data objects (files); and tools exist as executable sets of commands (programs), or as interfacial signs (icons, buttons, menus)' (2009: 254). However, as van den Boomen points out, these objects, tools and signs

are 'nested into each other' (2009: 254). For as van den Boomen remarks, to interact with word-processing software we use menus, icons and buttons. To fill a digital object such as a box shape with colour, for example, requires pointing and pressing a mouse towards an icon of a tipped over paint can. Once we press the icon it performs an action – filling the digital object. Yet, when we use word-processing software, we do not see the algorithmic processes involved in performing these actions (at the level of computer coding). Furthermore, van den Boomen notes that icons seem to refer to places such as the location of files or a mailbox. Yet van den Boomen asks, where is the mail that appears to be in our inbox? Does the mail exist in a virtual state as a set of algorithmic instructions that can be activated and then actualized?

According to van den Boomen, the 'concealment of software and hardware processes cannot be seen as coincidental "non-representing": it is a necessary and deliberate act against representation' (2009: 256). At the level of icons on word-processing software, we see a stable world featuring icons of clipboards, paint cans, erasers and binoculars. Yet these icons also refer to actions: paint cans fill digital objects with colour and clipboards allow the user to cut and paste text. Similarly, the eraser icon enables the user to delete text and binoculars helps the user search a document to find particular words or phrases. Drawing on the semiotic model of Charles Sanders Peirce, van den Boomen proposes that icons are a sort of virtual object which arises from the interplay of computer processes, the graphical user interface and the human user.

In her discussion of graphical user interfaces, Marianne van den Boomen notes that 'metaphorical signs condense two references by transferring and incorporating qualities from one object of reference to another' (2009: 259). Furthermore, van den Boomen explores the conceptual approach to metaphor (such as the work of Lakoff and Johnson, 2003) which focuses on the transference of ideas or notions from one thing to another. However, van den Boomen asserts that this approach tends to overlook how 'sign and tool gets glued together' (2009: 262). Therefore, van den Boomen's work shows (2009, 2018) that we need some way of understanding the transference of meaning between ontological domains such as code, icons, graphical user interface and display screens.

Notably, we have a bodily experience of phenomena such as smartphones, keypads and keyboards. Writer and poet, Diane Ackerman (2014) draws attention to how our interplay with digital technologies impacts upon our bodies. Ackerman claims myopia (near sightedness) is increasing due to our usage of digital devices and screen interfaces. Ackerman adds that there is 'a generation

of people who can't see the forest for the trees. This malady, known as "urban eyes", stems from spending too much time indoors, crouched over small screens' (Ackerman, 2014: 192). However, *Digital Reality* also considers how our active bodily interplay with digital technologies goes beyond staring at screens with our 'urban eyes'. Mary Chayko (2017) acknowledges that sitting immobilized in front of digital devices and screens has a negative impact upon our health. But she also discusses how digital devices can be used on the move. For instance, she comments on how digital devices are attached to treadmills at gyms. Moreover, it is equally important to consider the physicality engendered by virtual reality gaming and augmented reality applications such as *Zombies Run*! (Naomi Alderman and Rebecca Levene, 2012) and *Pokémon Go* (Niantic, 2016).

Phenomenology as a theory and research practice offers a detailed and nuanced approach to our bodily experience of digital technologies. In *Digital Reality*, phenomenology provides a way of evoking the sensory aspects of everyday practices such as typing a text message, using a smartphone to chat to a friend while on the move, or sitting in a cafe and scrolling through our social media feed. Yet, *Digital Reality* is not just about studying how digitally mediated content generates meaning. Instead *Digital Reality* focuses on how meaning arises through sensory experience such as 'seeing, hearing, touching, being touched and being-in-touch with the world' (Van Manen, 2016: 18). Using insights from phenomenology, I seek to explore our connection with digital technologies (devices and software), how they appear to us and our sensory encounters with them. In this regard, the discussion attempts to build on the work of Anne Cranny-Francis (2011) who examines what touching means to human subjects and how interfaces can make the materiality of our interaction with devices appear seamless. Additionally, the discussion draws on the work of David Parisi and Jason Archer (2017) and recognizes the importance of their call to develop haptic media studies. However, although reference is made to touch throughout *Digital Reality*, the discussion does not focus exclusively on a particular form of sensory experience.

Throughout *Digital Reality*, I also recognize the importance of postphenomenological discussions about the limitations of historical phenomenological approaches. Indeed, postphenomenological scholars such as Don Idhe (1993, 2003, 2009, 2012) and Stacey O'Neal Irwin (2016) remind us that the work of Husserl and Heidegger was written prior to the development of digital technologies such as the internet, online social networks and smartphones. Furthermore, Idhe (2009) suggests that Heidegger tends to offer an ontological

and epistemological overview of technology rather than focusing on particular case studies which highlight the sociocultural impact of technology. O'Neal Irwin (2016) also remarks that postphenomenology draws upon and extends the work of phenomenological philosophers such as Merleau-Ponty and Heidegger and philosophers from the pragmatic tradition such as William James, John Dewey and Richard Rorty. In addition, O'Neal Irwin states that 'both phenomenology and pragmatism move away from dystopian ideas about technologies to identify the non-neutrality of technology that encompasses both positive and negative effects' (2016: 30). Therefore, postphenomenology focuses on the practicalities of our lives, our choices, actions and experiences. Similarly, in *Digital Reality* I recognize the importance of the sociocultural and economic conditions in which digital technologies are produced, circulated and experienced. For these material conditions also shape and limit our experiences of digital technologies (Malafouris and Idhe, 2018). Yet *Digital Reality* does not offer an advanced philosophical inquiry into phenomenology and postphenomenology. Instead, my aim in *Digital Reality* is to make phenomenology accessible to a broad readership, by showing how this approach illuminates our sensory experience of digital technologies, using topical and relevant examples.

Digital Reality refers to various aspects of experience such as the body, space, time and materiality (Van Manen, 2016). Exploring digital technologies and relationships raises questions such as how bodies are connected online. And what sorts of sensory experiences arise as we chat using videotelephony? In addition, what happens as we touch and press keys on a keyboard? How does typing on a keyboard differ from forming letters of the alphabet using a pen or pencil? While focusing on spatiality involves asking questions about the ways in which virtual reality systems are considered as simulated environments or worlds. Moreover, to what extent can virtual reality be considered as a container like space into which we are immersed (Lakoff and Johnson, 2003)? Spatial and temporal concepts are also central to the study of quantifying bodily movements (the number of steps we take) and calorie intake through digital self-tracking devices. Digital devices such as smartphones or tablet computers are also material objects we clutch or hold close to our bodies throughout daily life.

The growth of digital technologies in the twenty-first century, such as internet-enabled smartphones and online social media platforms, enables almost instantaneous access to information and provides a glut of mediated content. Digital technologies also appear to shrink time and space. While our bodies are rooted in a particular space (location) and time, we can vastly extend our

communicative reach using digital technologies. We can press a few buttons on a keypad to type an email which can be sent thousands of miles in a few seconds. Swiping our fingers or thumb across a screen, we can open software applications such as Instagram and Twitter which provide access to millions of images of bodies which are annotated through digital hashtags such as #cardio, #FitLife and #bodypositive. An array of goods can also be purchased online from the comfort of an armchair and delivered to our doors within days, sometimes even within a few hours. Students can access online lecture recordings, reading lists or upload their assignments via virtual learning environments, at any time. Using wireless internet connections, employees can also work in cafes or access work files while sitting at their kitchen table.

Digital technologies provide quick, easy access to the information that is now central to our daily life such as weather and transport reports, schedules and appointments. Indeed, it seems that digital technologies are becoming a social necessity. For instance, in the UK, to access Universal Credit applicants must create an online account. Some local authorities in the UK also insist that citizens have an email address to register for rental properties online. Parents or guardians pay for their children's school meals or school trips via online systems such as Parent Pay.[1] Meanwhile, the Chinese Social Credit System (SCS) aims to provide a single numerical rating for all citizens based on a massive data compilation about their activities (Botsman, 2017). Writing in the *New York Post*, Steven Mosher (2019) outlines the dystopian aspects of the Chinese SCS, whereby algorithms will determine which citizens are deemed untrustworthy through monitoring their activities (such as their spending history, credit rating or even religious practices). Mosher's report indicates that individuals with a poor rating could be denied jobs, access to housing and so forth. Meanwhile Bing Song (2019), director of the Berggruen Institute China Centre, claims referring to a Chinese 'SCS' is misleading. Instead, Song states that 'what drives this gargantuan project is an effort to build a culture of trust in Chinese society. Given this broad aim, a more appropriate term to describe the initiative is a "social trust system"' (2019: 33). As these examples indicate, there are various debates about the necessity of digital technologies in everyday life and the consequences arising from engaging with them.

The following characters are composites based on a range of different relationships to digital technologies in contemporary culture. These composites

[1] www.parentpay.com

are not intended to be representative of particular social groups or a particular individual; instead they aim to highlight some of the current issues and debates surrounding the use and importance of digital technology. In short, these composites illustrate digital reality in the context of everyday life.

Since retiring ten years ago, Sally enjoys attending a local history group, travelling to local museums, galleries, parks and going to her caravan on the North Yorkshire coast. Sally's daily life involves minimal contact with digital technologies. She has a basic pay-as-you-go mobile phone (which she can use to make calls or texts) but rarely uses it. Sally has a vibrant social life and meets her circle of friends every day at a local cafe. She does not own a computer or tablet device. On the rare occasions she wants to accesses the internet she uses the computers which are available for public use at her local library. Sally lives in a city in the north of England and shops locally for clothes, groceries and other products. She pays for shopping in cash since she doesn't have a credit card or any direct debits set up via her bank account. Sometimes she watches television but only watches broadcast television (rather than on-demand streamed content). She regularly reads a national and local newspaper and is an avid book reader. Sally's digital shadow mainly consists of her spending habits which could be tracked via her bank statements, her medical history and her reading history could be tracked through her library card. But Sally's lifestyle choice to have minimal contact with digital technologies is losing ground. Her bank no longer provides her with a physical passbook detailing her transactions. And when Sally wants to attend some workshops with online booking systems (such as Eventbrite), she asks someone to do this on her behalf. In terms of the imperatives of the digital economy, Sally's lifestyle is problematic because she is generating minimal data for harvesting and commercial usage.

Sally's daily life and mediated experiences contrast sharply with Amira, a first-year undergraduate student. Amira's lifestyle would not be possible without digital technologies (devices, apps, software). Moreover, Amira considers her digital self as just as important as her physical self. Indeed, Amira finds it hard to make distinctions between her physical and digital self because they are so entwined. Amira's access to employment opportunities, accessing healthcare services, finding a romantic partner, organizing and booking transport all involve using a smartphone. Furthermore, Amira's smartphone use also ties her to online payment systems, wireless connections, password systems and data profiling. Amira brings her laptop to lectures and seminars, accesses journals and e-books via the university library and uses

virtual learning environments to view course materials, upload assignments and obtain feedback from her tutors.

Kieran, an academic working at a post-1992 British university, attempts to negotiate the online and offline aspects of his daily life. When he first started teaching in the 1990s, his university lectures and seminars mainly involved using overhead projectors and printed module booklets. Now, Kieran finds that his role as an academic involves using an array of digital systems (email, VLEs, online staff development portal, online timetables, online reading lists, online print room requests, online holiday request forms, etc.). Kieran is also expected to maintain his online profile via the university's website, Twitter account and academic networking sites such as ResearchGate. Moreover, his publications are associated with a unique alphanumeric code (ORCID id), which is used to identify him within electronic publishing and research databases.

What these composites show is that digital technologies intersect our lives in different ways, depending on our roles, demographic factors and lifestyle choices. Even so, the dominant economic imperatives upon which digital technologies are produced, marketed and consumed seek to shape our experiences in ways that maximize their usage and the data they generate.

Digital devices and software applications can lure us into reacting to IM, comments or images posted to online social networks, through pop-up alerts that are often accompanied by hoots, whistles or tunes. Computer scientist Jaron Lanier (2013) uses the term 'siren servers' to critique the ways in which we are called or nudged to engage with digital technologies. Lanier (2018) also argues that at present digital devices such as smartphones, online social networking platforms and apps are primarily driven by business models that exploit our labour and mine our data.

The wealth of online information we encounter on a daily basis can be overwhelming. In fact, there does not seem to be enough time to read all the online newspaper reports, blogs and posts about the issues that matter to us. Skimming through headlines becomes a way of navigating the thicket of information we encounter. But skim reading may mean that we miss the finer details that create our understanding of the subjects we care about. Misinformation can arise as numerous conflicting reports are posted online and we do not have time to investigate them. In the first decade of the twenty-first century, debates regarding the relationships between digital technologies, attention, reading and learning came to prominence (Wellner, 2019). During this period, Nicholas Carr (2010) claimed that the design interface of digital

technologies encourages skim reading and shallow forms of learning. Literary scholar Katherine N Hayles (2007) also made distinctions between deep focus, attention and concentration on a single object or task and hyper attention which involves darting from one task to another. Yet in her later work, Hayles (2012) claimed hyper attention emerges from the data intensive environments of our daily lives. In this later work, Hayles asserts that hyper attention is a skill, whereby you seek the most relevant information quickly and discard the rest. Indeed, Hayles regards hyper attention as an adaption to social, cultural and technological change which helps us navigate successfully through digital environments. Writers such as Maryanne Wolf (2008) and Howard Rheingold (2014) also claim digital literacy involves developing strategies to help us locate and interpret online source material. Drawing on these studies of attention, philosophy of technology scholar Galit Wellner asserts that in the digital age 'a new mode-of-attention arises' (2019: 47). According to Wellner, this new mode of attention which she calls digital multitasking can be simultaneously distributed between several objects.

Sociocultural matters

The term 'we' appears frequently in *Digital Reality*; therefore, it is important to outline how this will be used throughout this book. In agreement with literary and philosophy scholar Tim Morton (2018), the term 'we' can elide social, cultural, economic, racial and other factors shaping and constraining our identities. Therefore in *Digital Reality* 'we' refers to Western cultural perspectives towards the body and digital technologies. At the same time, I acknowledge the cross-cultural threads that have developed digital technologies such as using the digit zero (Seife, 2000). It is also important to recognize that there are sociocultural and economic differences in accessing and using digital technologies. For example, in technologically advanced societies, there are varying degrees of adoption and usage of digital technologies. Anita Say Chan (2014) claims digital technologies are not just a catalyst for innovation and entrepreneurship in places such as Silicon Valley, where companies such as Apple, Google and Facebook are based. Instead, Chan shows that digital technologies stimulate innovation and entrepreneurship in Latin America. However, Silver et al. (2019) examine the factors contributing to mobile divides in emerging economies such as problems getting a connection, finding a place to recharge devices, concerns about identity theft and the cost of

digital devices. Meanwhile, Chayko (2017) discusses social inequalities in terms of access to digital media. For example, Chayko points out that people in rural areas may not be able to access the internet, while other people may not have the skills required to use digital media. On a similar note, Anderson et al.'s (2019) research indicates that 10 per cent of Americans do not use the internet. Moreover, Anderson et al.'s research indicates that there are various factors contributing to this lack of access to the internet including age, educational attainment and income. Therefore, access to the internet and digital media is not universal; instead it is linked to particular social cultural and economic conditions.

Furthermore, bodily movement is not 'natural' either; rather it is socially and culturally constructed and understood (Farnell, 1994). For instance, sociocultural practices shape activities such as dancing, building a shelter or making a meal. Moreover, Brenda Farnell's (1994) anthropological studies show conceptualizing and naming different parts of the body are sociocultural constructs. Therefore, *Digital Reality* attempts to avoid biologicalism, which is the notion that humans experience the world in the same way due to common physiology. Instead, I recognize that sociocultural and personal biases shape and limit my perception, which impacts on the discussion and reflections presented in *Digital Reality*.

Throughout this book I also draw on autoethnography which involves methodically analysing and reflecting upon my own experiences (Holman-Jones, Adams and Ellis, 2016; Adams and Holman-Jones, 2018; Barr, 2019). Yet autoethnography is not a self-indulgent or narcissistic approach. Instead, autoethnography alerts us to the ways in which personal experiences are shaped by social and cultural institutions, political and economic structures. For as Tony Adams and Stacy Holman-Jones state, 'Autoethnography is an approach to doing and representing social research that uses personal ("auto") experience to create a representation ("graphy") of cultural ("ethno") experiences, social expectations, and shared beliefs, values, and practices' (2018: 142). Autoethnography recognizes that the 'I' (the subject) emerges from sociocultural, economic and political relationships and contexts. Using autoethnography as a research practice feels somewhat risky since it involves talking about my personal experience which exposes vulnerabilities and biases in my thinking. While writing *Digital Reality*, I also made decisions about the tone of my writing, seeking to forge connections with readers through making philosophical and academic concepts clear and accessible. To do so, I use vignettes (short stories) based on my own experiences to illustrate my ideas. Of course, these vignettes have limitations and contain some distortions since they are based on memories of prior experiences and reflecting upon them. Even so, my

aim is to write vignettes that are lifelike, believable and resonate with the reader. The work of autoethnographer Tony Adams (2016) highlights the expectations, beliefs, values and practices surrounding sexuality. To do so, he collects texts such as YouTube videos, journal articles, song lyrics and films. He also draws on experience of how people talk about these things in settings such as cafes and shops and social media by examining snippets of conversation and overheard remarks. Similarly, in *Digital Reality* I refer to examples from popular culture such as YouTube videos, observations, overheard remarks and conversation.

I do not claim to have all the answers to the challenges arising from digital technologies. In fact, studying the ways in which gender, race, ethnicity and sexuality relate to digital technology and the body are important topics that are beyond the scope of this book. However, numerous scholars focus on these important topics including Vickery and Everbach (2018), Nakamura (2002), Nakamura and Chow-White (2011), Green and Adam (2001).

Current scholarship

There are studies of digital technologies which focus on the growth of global information and communication networks via the internet such as Castells (2000), Castells et al. (2006) and Chayko (2017). There are also studies that highlight using digital technologies to pool intelligence and create user-generated content via online platforms including Gauntlett (2011), Shirky (2011, 2009) and Zoref (2015). Sociological studies of digital technologies include the work of Couldry (2012) and Lupton (2015, 2016, 2017) who provide valuable insight into how institutions and different groups engage with digital technologies. Post-structuralist theoretical approaches also challenge binaries such as nature/culture, zero and one, the mind/body. For instance, sociologist Alexandra Howson remarks, 'Post-structuralist thinking poses the possibility of the body as a text and invites us to consider decoding its many inscriptions' (2004: 08). Post-structuralist approaches highlight how the concept of the body is constructed in literature, art, medical and legal documents, social policies and across media (Plant, 1997; Coupland and Gwyn, 2002; Foucault, 2002). Post-structuralism also pays attention to how power relations form disciplinary regimes to control the body. These bodily regimes can take the form of calorie counting or calculating the number of steps we take each day through digital self-tracking devices (these disciplinary regimes are discussed further in Chapter 5).

Movement practitioner and scholar, Sandra Reeve (2011) provides insights into how to study the body using a range of different theoretical lenses including post-structuralism and phenomenology. As Reeve remarks, these lenses are produced in specific sociocultural contexts, which guide and shape our world view and attitudes towards the body. Reeve adds that 'how we move shapes (and even creates) our attitudes – and reveals those attitudes to the world – to the same extent as the spoken word does' (2011: 02). Following Reeve's approach, throughout *Digital Reality*, I discuss how bodily movement generates meaningful experiences in relation to digital technologies.

Extending and enhancing our bodies is another important aspect of scholarship surrounding digital technologies. Indeed, this scholarship acknowledges how our bodies are interwoven with technology. For instance, Donna Haraway (1991) alerts us to drawbacks of binary oppositions between humans and machines. Instead, Haraway along with other scholars such as Don Idhe (2012), Helena de Preester (2011) and Diane Ackerman (2014) show we augment our bodies through technology in various ways including implants and prostheses.

Media and technology scholar, Ingrid Richardson also provides a thorough examination of the social and cultural aspects of our bodily interplay with digital devices. In her study of the touchscreen capabilities of the iPhone, Richardson (2012) pays attention to the ways in which players navigate and interact with the world around them as well as screen-based stimuli. Richardson's work shows some games actively encourage players to use specific movements and hand gestures. Furthermore, Richardson shows mobile devices are 'enfolded' (2012: 141) with other daily activities such as walking, commuting, eating with friends and family and watching television. Overall, I am in broad agreement with Richardson's emphasis on the entwining of digital devices, the body and movement. Applications such as the *Pokémon* game (Niantic, 2016) connect screen-based stimuli and movement. For instance, *Pokémon* features Pokémon stops, which are specific locations for the player to visit. But *Pokémon* is mainly about goal-driven behaviour such as locating and capturing digitally simulated creatures. Notably, the promotional website for *Pokémon* states, 'When you encounter a Pokémon in the wild, you can turn on the camera feature, putting the wild Pokémon into the live scene where your camera is facing.' Therefore, although *Pokémon* entwines the body and digital technology, players are encouraged to interact with digital stimuli (simulated creatures) and consider actual locations as something to be captured as an image via their digital devices.

Therefore, to some extent the experience of the world becomes flattened into an image on a screen. Though I concede that in the case of mobile gaming, players do participate (to some degree) with the world beyond the screen.

Embodiment

In previous studies, I explored representations of embodiment and virtual reality in contemporary culture (Chan, 2014). These earlier studies were part of a turn towards embodiment in contemporary philosophy, sociology, psychology, cultural and media studies. However, studying movement and performance scholarship has shifted my approach to embodiment. For Sheets-Johnstone (2015) asserts that embodiment 'bottles a body's kinetic dynamics into a convenient and immediately recognizable lexical container' (2015: 24). In agreement with Sheets-Johnstone, the term 'embodiment' can give the impression that the body is a container or package for the mind or brain. Therefore, when discussing digital technologies, I emphasize animate bodies, rather than 'the body' as a fixed object or entity.

Admittedly, limitations arise when using a linguistic label such as the term 'the body' to represent animate bodies. For the concept of 'the body' fixes animate bodies in place. In German distinctions are drawn between *körper* (the body as an object) and *leib* (the felt experiential body). Whereas in English, the term 'corporeality' refers to the materiality of our animal bodies; yet there is no specific term that refers to the experiential aspects of animate bodily existence. In this book, I consider our animal bodies as part of an interdependent web of more-than-human relationships. Yet, I also acknowledge challenges and limitations arise from representing our bodily relationship to digital technologies through the written word, since language structures and shapes what can be said about bodily experience.

Animism

Digital Reality emphasizes the connections between animism and the animation of our bodies. Animism is commonly thought of as a belief system which regards inert objects as living things. However, anthropologist Tim Ingold dismisses this commonly held view of animism. Instead, Ingold says animism is 'characterised

by a heightened sensitivity and responsiveness, in perception and action, to an environment that is always in flux, never the same from one moment to the next' (2006: 10). Therefore, animism concerns our sensory, bodily embeddedness in the world. Summarizing his perspective, Ingold states that 'the animacy of the life world in short, is not the result of an infusion of spirit into substance, or of agency into materiality, but is rather ontologically prior to their differentiation' (2006: 10). Animism concerns the wholeness and interconnectedness of all forms of life.

The term 'relationship' implies a connection between two or more things. While the term is a useful figure of speech, our bodies and the world are not separate. Instead, our bodies are integral to how we make sense of the world. *Digital Reality* indicates that human being is part of a much larger interplay of life, which philosopher Martin Heidegger (2010) calls Being. On this basis, *Digital Reality* emphasizes how bodies exist in a state of interplay and interdependence with the world around us. The term 'biophilia', which is used by renowned biologist Edward O Wilson (1984), indicates that human beings have an affiliation with other forms of life. From a biological perspective, we have an affiliation with the microbes that live on the surface of our skin, eyelashes or intestines. Therefore, human beings are interconnected with the earth, water, sunshine and plants.

Establishing boundaries

While working for Google, design ethicist Tristan Harris became increasingly concerned about the ways in which digital devices and software applications are designed to capture our attention and promote continual usage (Newport, 2019). In response to our fascination with digital devices and the content they provide, Tristan Harris co-founded the nonprofit organization Center for Humane Technology.[2] The Center for Humane Technology works with media, policymakers and shareholders to design, what Harris terms, 'human-centred' digital technologies. Harris calls for setting limits, or boundaries, around the use of screen-mediated experiences. In his work, Harris (2016) draws on Natasha Dow Schüll's study of addiction and machine gambling in Las Vegas (2012). Harris claims digital devices are designed in similar ways to slot machines: to be

[2] https://humantech.com

highly compelling and engaging. Harris asserts that the design of digital devices places a stark choice before us, between 'always on' which leads to distraction and 'disengagement' which generates a fear of missing out. To remedy this situation, Harris calls for more varied menus and options for smartphones. For instance, there could be options for smartphone users to specify how much time they want to spend on email, websites or social media platforms. According to Harris, these design features would replace reactive impulses with slower responsive choices. By becoming more aware of our choices, we could develop strategies for responding to buzzes on our smartphones and pop-up notifications. Notably, software applications such as Space[3] and Hold[4] and initiatives such as Digital Wellbeing (Google) and Screen Time (Apple) aim to limit out interplay with smartphones by creating boundaries around screen-based activities. Meanwhile, in 2014 Freewrite launched a portable word processor that is marketed as a dedicated writing tool to prevent distractions such as internet surfing or accessing social media.[5]

In agreement with the social and political theorist Evgeny Morozov (2014), technological solutionism is a process which involves managing screen time by using software applications or 'distraction free' devices. Morozov recounts how technology is positioned as generating new problems including distraction, lack of productivity and an inability to concentrate. At the same time, technology becomes positioned as something which provides solutions for these problems.

Digital Reality also recognizes how smartphones and other digital devices are an intimate part of our lives. Journalist Catherine Price's (2018) *How to Break Up with Your Phone* frames smartphone usage in language which is usually associated with an intimate relationship with another human being. For instance, Price talks about having a trial separation from our phones. Meanwhile, Tim Elmore (2014) outlines the rise of 'nomophobia', a term meaning an irrational fear of not having a smartphone with you, or losing connection to wireless technologies, or having a dead phone battery.

Computer scientist Cal Newport (2019) outlines an approach to digital technologies which he terms digital minimalism, which involves using digital devices and software applications in focused ways, to perform particular actions that support the values we care about. Newport defines digital minimalism as 'a philosophy of technology use in which you focus your online time on a small

[3] https://findyourphonelifebalance.com
[4] https://www.hold.app
[5] https://getfreewrite.com

number of carefully selected and optimized activities that strongly support things you value' (2019: 28).

There are also calls to limit the use of digital technologies which are framed in the language of digital detoxing. For example, the organization Digital Detox[6] founded by Levi Felix and Brooke Dean offer retreats, summer camps, corporate events and team building to reconnect to the world beyond the screen. I am broadly sympathetic to challenging excessive attachments to digital technologies. On the other hand, the term 'digital detox' is misleading because it suggests that all forms of technology are damaging to our well-being. For instance, journalist and non-fiction writer, Richard Louv (2011) considers ways of realigning our relationship to technology. Louv asks, '*What would our lives be like if our days and nights were as immersed in nature as they are in technology* [emphasis in the original]'? (2011: 03). Louv says, 'A reconnection to the natural world is fundamental to human health, well-being, spirit, and survival' (2011: 03). Yet at a fundamental level, we can never truly disconnect from nature. Instead we are rooted within the forces and process that make life possible. Furthermore, Louv's argument divides human beings and nature into separate categories. But even the term 'nature' is a sociocultural concept that changes over time.

Post-digital

Filmmaker and theorist, Florian Cramer claims the term 'post-digital' refers to a 'contemporary disenchantment with digital information systems and gadgets' (2015: 13). While recognizing and supporting Cramer's assertions about purely celebratory accounts of technological development, *Digital Reality* focuses on digital technologies because they are now such a major part of everyday life. Consequently, *Digital Reality* explores ways of remaining open to the possibilities arising from developments in digital technologies, in ways that support our bodily relationships to one another and to the world at large. Admittedly, it would be unwise to be completely enthralled about technological change. But becoming mired in disillusionment or dystopian fantasies about digital technologies is not helpful either. Instead, it is important to remain open to technological development, while also evaluating the possibilities

[6] www.digitaldetox.org

such changes offer, especially in relation to the body and sensory experience. After outlining these preliminary debates about digital technologies, I will now provide a summary of each chapter.

Overview of chapters

To make the study of digital technologies manageable, *Digital Reality* focuses on philosophical approaches to communication (such as conversation, writing and metaphors), sensory experience and our bodies. Chapter 1 establishes the philosophical groundwork of the book. This first chapter discusses scholars who draw upon phenomenology to develop insights into our interplay with digital technologies including Jeff Malpas (1999, 2009), Sarah Pink (2011, 2016), Ingrid Richardson (2011, 2012), Paul A. Taylor (2001, 2008) and Shaun Moores (2014, 2015). These scholars provide valuable insight into our bodily relationship with technology. Yet these scholars tend to focus on the work of certain phenomenological writers, such as Maurice Merleau-Ponty and Martin Heidegger. Consequently, some of the foundational principles of phenomenology outlined in the work of Edmund Husserl become overlooked. Addressing this gap in current scholarship, Chapter 1 outlines some of Husserl's key philosophical principles and practices. For instance, it discusses Husserl's practice of bracketing. Husserl shows how bracketing offers a way of suspending our assumptions about how we perceive and make sense of the world. Therefore, Husserl's practice of bracketing provides a useful way of exploring assumptions about our interplay with digital technologies.

Yet the chapter also concedes that phenomenology seems to universalize sensory experience, rather than providing insight into the social, cultural, economic, political and technological contexts in which they arise. In addition, postphenomenological scholarship approaches alert us to the ways in which phenomenology (particularly the work of Heidegger) tends to provide a dystopian account of technology. Consequently, postphenomenological scholar Don Idhe states that we need to move away from generalized discussions of technology to examine 'technologies in their particularities' (2009: 22). Taking these points into account, in Chapter 1 I aim to provide insight into particular examples of our bodily relationship with digital technology through specific contemporary examples.

Chapter 2 builds on the phenomenological principles of the first chapter by suspending some assumptions about what constitutes face-to-face communication. We can now communicate using an array of digital devices, networks, platforms and software applications. We can also speak to digital devices. For instance, children can interact with internet-connected toys such as Hello Barbie (Mattel) and Furby Connect electronic pet (Hasbro). Digital assistants such as Alexa (Amazon), Cortana (Microsoft) or Siri (Apple) can also help us to curate and consume media content such as television programmes, podcasts, digital photographs, music files and so on. But what happens to face-to-face conversation and our bodily presence when there are so many ways to communicate? Is face-to-face conversation a thing of the past, an archaic form of communication? Can a face-to-face conversation with a friend be replaced by typing a message to them? Alternatively, how might digital technologies supplement existing forms of verbal communication, or develop them further?

Chapter 3 extends the discussion of the bodily aspects of communication by focusing on writing. Specifically, the chapter considers alphabetical notation as a way of tracing our bodily interplay with the world. Chapter 3 indicates how letters of the alphabet are linked to the human voice and are perceived via the sense of sight and sound. In this chapter, using Abram's work (1997, 2011), I will the highlight sensory and magical qualities of language. For instance, the term spell means to put letters into a correct sequence (depending on the grammatical rules of a language). Yet the term 'spell' also links to magic and incantation, such as the power to summon something into existence. Through repetition and practice, we become attuned to hearing sounds of letters and words when we silently read a text. Abram's work also indicates how language communities are linked to the sounds and shapes of the landscape they inhabit and the life forms that live there. Therefore, Chapter 3 shows how language is interwoven with the sensory aspects of bodily experience with the world. Additionally, making shapes of letters of the alphabet will be discussed along with recent developments such as digital pens and electronic 'smart' paper.

Developing discussions about bodily experience, Chapter 4 examines movement development, agency and meaning. Drawing on the work of movement scholars such as Sheets-Johnstone (2009, 2014a,b, 2015, 2016, 2017), Moore and Yamamoto (2012), Leigh-Foster (2011) and Laban (1971, 2011), Chapter 4 explores how movement repertoires generate meaning. These approaches to movement development and repertoires will be connected to our interplay with digital technologies. For example, we may have movement

repertoires for switching on a device, opening a laptop case or typing our password. These movement repertoires may slip beneath our awareness, yet they are important because they illustrate our interplay with digital devices and software programmes.

As Chapter 5 indicates, digital self-tracking technologies (wristbands, smartwatches, etc.) are marketed on the basis that they can provide precise forms of movement analysis, such as calories burned over a specific distance. Indeed, self-tracking technologies can quickly and easily capture quantitative data about movement. Quantitative data can also be amalgamated so comparisons can be made between previous movement activities (of an individual, or the movement activities of other groups of people via online social networks). However, Chapter 5 shows how qualitative sensory aspects of movement are often overlooked by quantitative forms of data collection and processing via self-tracking devices and software applications. For example, a self-tracking device may collect numerical data about the number of steps you take each day. However, this quantitative data does not capture the sensations we felt when stepping on different surfaces such as concrete, grass or sand. Drawing on the work of Laban (1971, 2011), Chapter 5 explores the qualitative aspects of movement such as the feeling tone of movement, our sense of personal space (which Laban calls the kinesphere) and relationship to the world at large.

Chapter 6 explores how virtual reality technologies enable us to participate in immersive digitally mediated experiences. Once we wear a virtual reality headset, we are invited to turn our attention to screen-based stimuli, which reduces our perception of the world beyond the headset. But even while we feel immersed in virtual reality, we are still participating with the world at large since our bodies are rooted to a specific location. Therefore, by referring to a range of relevant academic studies, Chapter 6 considers the bodily implications arising from immersion and presence in relation to virtual reality in more detail. Chapter 6 also considers research into body ownership and virtual reality (Perez-Marcos, Sanchez-Vives and Slater, 2012; Ahn et al. 2016).

To bring previous discussions together, Chapter 7 explores how metaphors link the body and digital technologies through reference to William Gibson's novel *The Peripheral* (2014). Throughout *The Peripheral*, Gibson uses metaphors to evoke sensory aspects of the body and technology. Indeed, *The Peripheral* employs a series of metaphors that offer striking insight into digital technologies. As Chapter 7 shows, we make sense of the world through bodily metaphors (Lakoff and Johnson, 1999, 2003). Furthermore, spatial metaphors about

peripheries and boundaries provide important contributions to the production of meaning and how we make sense of the world.

In sum, the unifying thread running throughout *Digital Reality* is that our bodies provide the grounding for sensory experiences such as writing a blog post, typing an instant message, using watches or self-tracking devices to monitor our movements or playing a virtual reality game using a hand-held controller. Writing a blog or IM, for example, is not just a cognitive activity of composing, sending and receiving written symbols that are separate from our bodies. Instead, we use our fingers to push keys on a keyboard or keypad, or scroll up and down an electronic document. Indeed, throughout *Digital Reality* the body will be shown to be a crucial component of knowledge acquisition, fostering effective social relations and communication. In fact, digital technologies were integral to gaining access to online journals, books, newspaper articles and engaging with other scholars while writing this book. Furthermore, writing this book involved many hours of sitting at a desk, typing and staring at various screens. In short, *Digital Reality* aims to evoke the wondrous qualities of our sensory bodily experience and how they are entwined with digital technologies.

1

Phenomenological explorations of digital reality

Exploring phenomena

This chapter explores digital technologies as phenomena that can be observed and brought into question. Additionally, the chapter provides an introductory discussion to perception and the bodily dimensions to digital technologies. The term 'phenomenon' means to reveal, manifest and bring to light, while logos refers to reason, judgement and discourse. Explicating these meanings, Heidegger states that logos refers to making manifest 'what is being talked about in discourse' (2010: 30), while 'phenomenology means … to let what shows itself be seen from itself' (2010: 32). Although Heidegger's explication may sound complicated, what it means in practical terms is exploring how the world appears to us, through sensory perception. The term 'phenomena' refers to the things that we perceive in the world such as smartphones, screens, consoles, hand-held controllers, printers, self-tracking devices and head-mounted displays. From a phenomenological perspective, we experience a smartphone as an appearance to our senses. For instance, we may sense the weight of the smartphone in our hands or feel the smoothness of the screen as we swipe our fingers and thumbs across it.

The work of design researcher Donald A. Norman can help illuminate our sensory encounters with objects such as smartphones and how we use them. Norman states that 'the term affordance refers to the perceived and actual properties that determine just how the thing could possibly be used' (1988: 9). For example, wood is a material that provides solid support, glass is for seeing through and flat surfaces are for writing on. When affordances are well thought out, we know what to do with a device without using a manual. When considering the smartphone, it has a smooth glass display and a flat surface for displaying texts and imagery. We may also hear and respond to the noises emitted from the smartphone such as various ringtones or sonic alerts. Norman provides a

useful definition of feedback as 'sending back to the user information about what action has actually been done' (1998: 27). Therefore, the noises, clicks or vibration we sense when using a smartphone tells us that an action has taken place. We might also have a range of assumptions about smartphones, such as how useful they are or about the companies that make them. Furthermore, the linguistic terms 'smart' and 'phone' bring to mind a range of meanings about technology, intelligence, development, efficiency and verbal communication.

Phenomenology can be regarded as a philosophical approach and research practice that involves suspending some of our assumptions about digital technologies. In this way, phenomenological inquiry can bring digital technologies to the forefront of our awareness, rather than allowing our assumptions about them to be taken for granted.

There is an abundance of scholarship that has opened new insights into digital technologies using various theoretical and methodological approaches. For instance, there are studies that explore the political, economic and sociological aspects of digital technologies such as Castells (2000), Couldry (2012), Athique (2013), Keen (2012; 2015), Lanier (2013, 2018) and Chan (2014), while other scholars have also approached digital technologies via non-representational theory including Thrift (2005) and Moores (2014, 2015). Phenomenological, ethnographic and spatial approaches to digital technologies include the work of Richardson (2011; 2012), Hjorth (2010), Pink (2011; 2016) and Wilken (2011). Additionally, David Parisi and Jason Archer (2017) call for the development of haptic media studies to explore the role touch plays in using and apprehending haptic interfaces such as touchscreens, hand-held controllers and vibration feedback systems. Furthermore, Parisi and Archer challenge the notion that touch resists mediation. Instead, their work indicates that touch is multifaceted involving pressure, vibration, rhythm and movement. Parisi and Archer state that they

> take touch not to be a purely biological nor phenomenological category, but rather – like aurality and visuality – a discursively constructed and continually renegotiated category that possesses few inherent and intractable characteristics. (2017: 1527)

This existing corpus of knowledge usefully highlights the connections between social institutions, political and economic power and digital technologies. Moreover, this scholarship provides insight into how different social groups engage with digital technologies.

Phenomenology also helps illuminate the relationships between the body and digital technologies, in the context of lived experience. From a phenomenological perspective, the term 'lived experience' refers to the directness and immediacy of experience. Explaining this aspect of phenomenology, Max Van Manen (2016) says *erlebnis* is a German word that has been translated into English as lived experience. However, Van Manen explains that lived experience does not fully capture the meaning of *erlebnis*. It stems from the Latin experiential, which refers to an experiment or trial. By contrast, *erlebnis* relates to the German root word *leben*, to live. Therefore, Van Manen states that 'the verb erleben literally means "living through something"' (2016: 39). In this chapter, *erlebnis* (living through something) provides a helpful way of exploring our bodily interplay with digital technologies.

It appears that some scholarship about digital technologies is inspired by phenomenology but often downplays the historical dimensions of this philosophical approach. Admittedly, scholars such as Jacques Derrida (1973), Didier Franck (2014), Janet Donohoe (2016) and Dan Zahavi (2017, 2002) have conducted in-depth studies of the development of phenomenology through examining the work of Husserl. However, Husserl's phenomenological framework does not appear to be a staple feature of studies about digital technologies within the field of media and communication studies. Therefore, by outlining Husserl's work (1970, 1999, 2003, 2014), this chapter aims to illuminate our bodily interplay with digital technologies.

There is no single model, or unified approach, within phenomenology; rather various scholars such as Heidegger and Merleau-Ponty have built upon and challenged Husserl's ideas. Husserl (2014 (1913)) contends that his philosophical framework provides a methodology involving a series of practices and processes of perceiving the world rather than an abstract set of theories or rules to be followed. Instead, encountering and reflecting on the intersubjective aspects of existence is a key aspect of phenomenology (Van Manen, 2016). Although there are differences between Husserl's approach and that of later scholars, there are some commonalities between them. These commonalities include being open and receptive to the world, reflecting on our experiences and questioning our assumptions, all of which are central to exploring our bodily interplay with digital technologies.

Questioning our assumptions is important because we are often so caught up in using digital technologies that we may take our interplay with them for granted. Mostly, we use digital technologies such as smartphones and tablet

devices for practical purposes, that is, finding information or sending messages, rather than reflecting on our bodily interplay with them. However, a central idea in Husserl's work is that we do not encounter phenomena as things-in-themselves. Rather Husserl asserts that our encounters with things in the world are intersected by language and conceptual modes of thinking. For example, the generic word 'computer' provides a linguistic label for a range of different devices (with different screen sizes, processing speeds and so forth). We often filter our experience of a particular device by using the linguistic label, computer, as a conceptual category. As such we overlook a device as a thing-in-itself; instead, it becomes part of a category of objects known as computers. Of course, placing objects into categories such as computers, screens and smartphones has practical benefits since it provides conceptual shortcuts to help us make sense of the world. Yet placing objects in categories changes our experience and understanding of them. We also create personal stories about computers, such as where we bought our computer, how much it cost and what images and files we store on it. Through this process of personalization, the computer is transformed from a generic category of objects into a personal possession. While we generically classify computers or tell personal narratives about them, we rarely experience a computer as a thing-in-itself. This is because we cannot speak or write about the computer as a thing-in-itself without naming or categorizing the computer in some way.

Despite the numerous benefits that can be gained from Husserl's argument and methods, there are challenges arising from them. Husserl's emphasis on suspending assumptions about reality to get closer to things-in-themselves offers a way of unpacking the processes involved in perception and making sense of phenomena. Yet, according to scholars such as Merleau-Ponty (1998) and Van Manen (2016), perceiving things-in-themselves is extremely difficult. So rather than attempting to produce a grand-scale study of the ultimate foundation of phenomenology, or the intricacies surrounding the development of Husserl's work, this chapter has more modest aims. By exploring things-in-themselves, this chapter highlights how we make sense of our bodily interplay with digital technologies through social and cultural mechanisms (such as language and categorization). To begin this phenomenological exploration, the following brief biographical sketch of Husserl contextualizes his philosophical framework and provides a springboard for further discussion.

Edmund Husserl (1859–1938)

Husserl is considered to be the founder of phenomenology (Hammond, Haworth and Keat, 1991). His work developed from initial studies in arithmetic to studies focusing on suspending assumptions about consciousness, perception and reality. Husserl's work may appear esoteric because he uses complex language to outline his ideas, using terms such as 'transcendence' and 'reduction' in ways that go beyond their common usage. Janet Donohoe's (2016) study of Husserl's published and unpublished material indicates that his early work concerns the fully developed ego (or subject). This fully developed ego or subject refers to our sense of self, our identity. However, according to Donohoe, Husserl's later work shows how our sense of self is a historical, social and cultural construction. As his work matured, Husserl claimed that dividing the world into subjects and objects creates an illusory aspect to our habitual perception of the world. For instance, our perception of the world involves making distinctions between human subjects (animate beings) and inanimate objects such as computers, tablets and smartphones.

Husserl's work culminated in *The Crisis of European Sciences and Transcendental Phenomenology* (1970 (1936)). In this later work, Husserl asserts that a crisis has arisen in European civilization due to an emphasis on scientific, rational objectivity as the primary way of explaining the world. It is important to place the development of Husserl's work on *The Crisis* in the historical, social and cultural context in which it was produced. Husserl was a German Jew, and from 1934 to 1936, he was researching and teaching in extremely difficult circumstances. For example, he was forbidden to lecture in public or teach in Germany, so he lectured in Vienna and Prague. Furthermore, when Husserl was writing *The Crisis*, the ways in which objective scientific views of the world can be taken to extremes were starkly apparent in the 'death factories' of Auschwitz, Dachau and Treblinka (Abram, 1997).

Cartesian Meditations

In 1929, Husserl gave a series of lectures in Paris which were subsequently translated and published in French as *Cartesian Meditations* (Moran, 2002). Husserl's *Cartesian Meditations* provides a good starting point for discussing

his ideas since it raises a series of questions about phenomena, as things that can be observed, as well as the processes and practices surrounding them. In *Cartesian Meditations* (1999 (1931)), Husserl discusses Descartes's method of systematically examining experiences of the world to cast away what is doubtful. By casting away what was doubtful, Descartes attempted to arrive at an absolute ground for knowledge. After systemic examination, Descartes postulated that he knew without a doubt that he was thinking. Consequently, Descartes founded his philosophical framework upon the cogito (thought and the mind). He also created divisions between the immaterial mind and the material body. As such, Descartes contended that the mind is capable of rational thought, whereas the body is more closely linked to sensory perception, which is unreliable since our senses can be fooled.

Husserl's philosophical model follows in the wake of Descartes's systematic examination of what can be known and what is doubtful. Husserl claims his philosophical method can be understood as a form of *wissenschaft*, which is a German word referring 'to any systematic, rational form of enquiry with rigorous and objective … procedures of validation' (Hammond, Haworth and Keat, 1991: 15). By using the term *wissenschaft*, Husserl shows that there is a sense of order to his methodological investigations and they make sense through a process of 'inter-subjective validation' (Hammond, Haworth and Keat, 1991: 15). Indeed, the central purpose of Husserl's systematic investigations of phenomena was to provide a firm foundation for phenomenology as a philosophical model to illuminate our knowledge of the world (Idhe, 2009).

Husserl's philosophical quest to find a firm foundation for philosophy involved exploring consciousness, reality and our experience of phenomena. According to Husserl, we can be sure that we are having an experience (even though this means that we have subsequent doubts about what was experienced). For instance, I know I am experiencing letters appearing on screen as I type these words. Using a laptop computer, keyboard and typing are all familiar habitual experiences which are integrated into my daily life. Yet my habitual experiences of using laptops, keyboards and typing are sociocultural and have been learnt. However, Husserl claims that it is possible to go beyond, or above, the level of our everyday (largely unreflective) experiences of the world. He also contends that by going beyond our habitual ways of perceiving the world, it is possible to reflect upon how meaning and knowledge are produced.

Zahavi's (2017, 2002) thorough study of Husserl's published and posthumous material indicates that the conception of transcendental consciousness has

largely been misunderstood. Zahavi suggests that Husserl's discussion of transcendental consciousness is not otherworldly; rather it concerns the ways in which our experience of the world is intersubjective. According to Zahavi, Husserl's work recognizes that intersubjectivity is part of the constitution of objectivity since 'our comprehension of something as objective is dependent upon our interaction with others' (Zahavi, 2017: 128). Objectivity is based on some shared sense of reality of the material world around us. Though, of course, we perceive the material world differently based on sociocultural and personal factors (memories, beliefs and so on). Nonetheless our sensory experience of the world is not solely subjective. When I look at a row of desktop computers in the university library, for instance, I realize that others can also see and encounter these things from their perspective. How others see these desktop computers will also be inflected by sociocultural practices, gender, age and other variables such as memory and prior experience. The perception of a row of computers in a university library is also linked to a web of intersubjective relations such as shared sociocultural understandings about information technology, libraries, universities and the sorts of activities that take place in them.

Bracketing

Husserl claims that bracketing is a process that involves suspending judgements about phenomena. Richard Schmitt (1959) usefully outlines how terms such as 'bracketing' and 'reduction' have specific meaning in the work of Husserl. Schmitt remarks that 'Husserl draws his metaphor from mathematics where we place an expression in brackets' (1959: 239). Husserl's use of mathematical terminology is linked to his early studies in astronomy in Leipzig when he attended lectures in mathematics and physics. Moreover, Husserl's PhD, which was obtained in 1883, was in mathematics and his first publication was *The Philosophy of Arithmetic* (1891) (Moran, 2002). Furthermore, 'Husserl draws his metaphor from mathematics where we place an expression in brackets and put a + or − sign in front of it' (Schmitt, 1959: 239). The purpose of bracketing the external world in this way is to arrive 'at a different value of the world' (Schmitt, 1959: 239). Therefore, it is plausible to argue that Husserl uses mathematical terms and principles as a way of conveying his philosophical ideas with precision.

In *Cartesian Mediations*, Husserl uses the term 'reduction' to refer to the method of bracketing. This method of reduction involves removing

our judgements about consciousness, reality and phenomena because this impedes our experience and understanding of the world. In the context of phenomenological scholarship, the term 'reduction' does not mean reducing something to its component parts. Instead, particularly in the context of Husserl's work, phenomenological reduction attempts to lead us closer to things-in-themselves, not as independently existing objects but as phenomena that are interconnected and interdependent.

Maxine Sheets-Johnstone states that bracketing can be regarded as greeting or encountering a 'phenomenon as if for the first time in order retrospectively to understand how what was once strange came to be familiar' (2017: 10). Making the familiar seem strange is useful because digital technologies have become so commonplace. When the internet first became publicly available in the mid-1990s, visiting websites and using search facilities to find them was a novel and fascinating experience. For the first time in history, it became possible for large numbers of people to connect to a massive online global information network. Now, internet access is mostly taken for granted in advanced technological societies. Due to previous experience, we may also assume internet searches will result in acquiring information almost instantaneously. Even using the term 'googling' to refer to online search practices is now a familiar part of our everyday speech. Therefore, Sheets-Johnstone's point about retrospectively coming to understand how things that were once strange are now familiar is important, especially in relation to digital technologies.

Things-in-themselves

As outlined, a major feature of Husserl's philosophical framework involves suspending our judgements about phenomena, so we can begin to reflect upon them and gain insight into the interconnections of our life world. In Husserl's work, the expression things-in-themselves refers to how things exist in the world. Importantly, Husserl's discussion of things-in-themselves raises a series of questions about sensory perception, what we can know and how we experience phenomena such as digital devices. In *Ideas: General Introduction to Pure Phenomenology* (2014 (1913)), Husserl uses the example of perceiving a writing table to illustrate things-in-themselves. He begins by noting how his attention drifts away from perceiving the writing table to other things in his surroundings, such as other parts of the room, his garden and summer house. He also notices

that some of the things in his surroundings are there for his practical use such as a table, books, a drinking glass and piano. He then refers to perceiving the table from many different vantage points as he moves around it. Reflecting on this experience, Husserl says perception involves a 'constant flow of consciousness' (2014: 130). However, his main point is that the table transcends his perception of it because the table and other things in his surroundings exist even if he is not paying attention to them. Consequently, there are differences between how we perceive phenomena and the thing-in-itself.

Following Husserl's discussion of the table, it is possible to consider other examples. For instance, rocks or pebbles on the sea shore exist prior to human perception of them. Pebbles or rocks are not isolated, independently existing objects, since they are formed through interaction with the forces of nature, such as the wind, the energy of waves and so forth. As pebbles are worn down, they become sand, which can then be mixed with other components to make glass and used to serve human purposes. Indeed, glass is an important component in the production of screens for digital devices such as smartphones and tablets. Nonetheless, the existence of pebbles or rocks goes beyond their practical use by human beings.

Contemporary British philosopher Keith Ward also shows there are limits to our perception and knowledge of the world. While Ward is not a phenomenologist, his philosophical arguments are relevant to the discussion of things-in-themselves. Ward states that we see and perceive the world according to the human senses, so 'every time we look at something we only see the way it looks to us' (2010: 23). For example, Ward states that colour is not 'out there' in the world. Instead, he explains that 'external objects emit electromagnetic waves. Some of these impinge on the cones in the human eyes and cause electrochemical impulses that land up in the visual cortex' (2010: 23). Similarly, Lakoff and Johnson (1999) remark that the perception of colour does not just stem from light reflected from objects we encounter; rather we perceive colour on the basis of how our brains categorize and process stimuli. Outlining this process Lakoff and Johnson state that our perception of colour involves 'lighting conditions, wavelengths of electromagnetic radiation, colour cones, and neural processing' (1999: 24). Therefore, the perception of colour arises from our bodily encounters and interplay with the world. This approach to perception is significant because it challenges assumptions about divisions between subjects and objects, body and world, since colour 'is created jointly by our biology and the world' (Lakoff and Johnson, 1999: 25). In this way, the explanations of perception put forward

by Ward, Lakoff and Johnson align with Husserl's (2014) emphasis on the interconnections and interdependence of phenomena. Put simply, our senses in conjunction with the brain and stimuli from the world around us generate our experience of colour.

These arguments about perceiving colour also apply to other aspects of our experience such as taste, touch, sound and smell. For sensory experience arises through our encounters and interplay with the world. In other words, sensory perception of phenomena is intersubjective and participatory (Lakoff and Johnson, 1999; Ward, 2010). The colours we see on a website or the rectangular icons of software applications on tablets and smartphones are generated through our interplay with these images and our visual apparatus. We make sense of the perception of these images through sociocultural forms of categorization, memories of encountering similar images and language and so on. For the purposes of this discussion, seeing refers to the sensory capacities of the visual apparatus including the eye, retina, cornea and visual cortex. While perception refers to the ways in which we try and make sense of what we see through categorization, generalities, cultural conventions and habit. Seeing and perception can be categorized separately for theoretical purposes but in practice they intertwine.

Husserl's method of bracketing aims to move us closer to things-in-themselves. However, bracketing is very difficult to achieve in practice. One of the reasons for this difficulty is that we rarely pay attention to how our interaction with phenomena involves sociocultural beliefs and practices. Therefore, it is important to question whether bracketing is just a peculiar philosophical exercise, or if it is relevant to our everyday lives and our understanding of digital technologies. One way of exploring these questions is to turn to the work of Maurice-Merleau-Ponty and his development of Husserl's method of bracketing.

In *Phenomenology of Perception* (1998 (1962)), Merleau-Ponty claims that consciousness arises from our experiences in the world. Merleau-Ponty explains that 'the world is not what I think but what I live through' (1998: pxvii). Merleau-Ponty's work indicates that complete knowledge of the world is impossible. This is because the world exceeds what we think about it; so we can never fully know the world. However, Merleau-Ponty concedes that what is useful about Husserl's method is that it teaches us 'the impossibility of a complete reduction' (1998: pxiv). In this way, Merleau-Ponty's discussion of Husserl's method of reduction is useful because it reminds us of the limits to our knowledge of the world.

To summarize, Husserl and Merleau-Ponty's work highlights the enigmatic qualities to things-in-themselves. We can apply Husserl's practice of bracketing to contemporary phenomena such as smartphones, tablet devices and desktop computers in order to go beyond our habitual, commonplace, sensory perception of them. Bracketing is useful because it suspends our familiarity with the world, the objects we encounter and our habitual practices. Moreover, Husserl's method shows that dividing the world into discrete subjects and objects is limiting. Instead, Husserl provides useful insight into the participatory aspects of our bodily relations with the more-than-human world (such as other species, plants etc.). Zahavi's (2002, 2017) work also suggests that as Husserl's ideas developed, he gave further emphasis to the ways in which consciousness arises through our interplay and interconnectedness with the world. On this basis, Husserl's work reminds us that it would be misleading to simply regard human beings as subjects surrounded by a field of independently existing objects.

To delve further into the practice of bracketing and things-in-themselves, it is also helpful to turn to the work of Heidegger. Using Heidegger's study of the thing in *Poetry, Language and Thought* (1975), I will explore our sensory engagement with digital technologies. First, I will briefly summarize Heidegger's work to establish how he critiques and expands Husserl's insights.

Martin Heidegger

Martin Heidegger (1889–1976) was Husserl's assistant at the University of Freiburg (Polt, 2013). Some years later when Husserl retired from his post as professor of philosophy in 1927, Heidegger was appointed to the role. As Heidegger's work developed, he built upon and challenged Husserl's work. In *Being and Time*, Heidegger (2010) considers some of the criticisms levelled towards philosophy. For instance, Heidegger pre-empts criticisms of bracketing and reflecting on things-in-themselves as philosophical exercises which do not offer practical ways to change the world. Countering these criticisms, Heidegger asserts that philosophy cannot be judged according to usefulness or efficiency. Instead, Heidegger insists that philosophy is transformational because it changes us. Heidegger's work provides a powerful critique of the instrumental aspects of technology, whereby nature and even people become 'standing-reserves' (a term used to refer to resources that are to be utilized for human ends). Furthermore, media scholar, Paul A. Taylor reminds us that 'for Heidegger, the ability to be

reflexive about our technologized life-world is philosophy's central contribution to the modern human condition' (2008: 796). What Taylor terms 'life world' is relevant to the ways in which digital technologies are part of our everyday life. For instance, our life world includes the things we can often take for granted such as having access to the internet via digital devices such as smartphones and tablets. Indeed, when we take digital technologies for granted, they just seem to be there to get things done or to make our life easier. But as Husserl and Heidegger's work indicates rather than letting digital technologies fall into the background of our daily lives, we can reflect on how we use them and start to consider their benefits and drawbacks.

'The thing'

In his exploration of the qualities of a thing, Heidegger refers to the example of a jug. He begins by stating that a jug is a container crafted for human purposes, to hold liquid. A potter creates the jug through shaping the earth (clay) to hold liquid. According to Heidegger, when we consider how the jug is made as a vessel, we are encountering it as a thing rather than a representation (an image). Yet even when we focus on the production of the jug rather than how it is represented, we can never experience 'the thingness of the thing' (Heidegger, 1975: 165). In some ways, Heidegger's reference to 'the thingness of the thing' resonates with Husserl's approach, since it challenges and critiques the possibility of experiencing the thing-in-itself through splitting the world into subjects and objects.

As Heidegger reminds us, the jug is made with a purpose in mind which is to hold liquid. The outer form of the jug is crafted by the potter (this is the visible aspect, that which appears and is accessible via our sensory perception). When discussing the appearance of the jug, Heidegger refers to Plato's philosophical framework and the notion of *eidos* as an idea, or shape seen. Yet the way that the jug holds something is not determined solely by how it is made. There is a holding quality in the openness, the potential to contain, which exceeds how the jug appears to us. Therefore, Heidegger claims that Plato's concept of the world of appearances does not provide insight into the qualities of the thing-in-itself.

Heidegger's work takes us beyond the dualism of subjects (human beings) and independently existing objects. Instead, Heidegger uses the expression 'what stands forth' (1975: 166) to refer to the thing. The jug as a thing-in-itself

has openness and receptivity through the space within it. The emptiness inside the jug is important because we do not perceive it in the same way as the side or bottom of the jug. Nonetheless, without the bottom and sides, there would be no holding quality to the jug. Heidegger says emptiness is not something which is made by the potter; rather the potter shapes the void. Therefore, what makes the jug a vessel is the openness afforded by space. Space is not emptiness or nothingness; instead it is the site of potentiality and creative emergence.

Heidegger also refers to scientific explanations of space and emptiness. As Heidegger remarks, from a scientific perspective the apparent emptiness of the jug is filled with air and various chemicals. Therefore, when we fill the jug with wine, from a scientific point of view we are displacing air for liquid, we are exchanging one thing for another. But Heidegger questions whether a scientific account of air and liquid defines the reality of the jug. Heidegger claims that science cannot define the reality of the jug because scientific studies 'always encounter only what its kind of representation has admitted beforehand as an object of possible for science' (1975: 169). In other words, scientific studies are founded on objectivity involving what can be physically mapped and measured. Similarly, a scientific study of a digital device such as a tablet computer could involve empirical testing such as mapping and measuring its material qualities, component parts and how they fit together.

Heidegger asserts that scientific studies are premised on the existence of an independent world of objects out there in the world. On this basis, Heidegger asserts that science has split apart the wholeness of reality. Notably, Heidegger's critique of scientific objectivity was produced at a time when atomic weapons were developed.

Getting to his central thesis, Heidegger asks what 'is the thing as thing that its essential nature has never been able to appear' (1975: 169). What makes the thingness of the thing elusive? In response to this question, Heidegger provides an alternative way of perceiving and making sense of the void and holding. First, Heidegger states that holding involves taking in and retaining. But when liquid is poured from the jug, giving occurs. This giving, through pouring, is not possible without holding. In turn, this holding is not possible without the void or emptiness inside the jug. Heidegger states that when water is poured from the jug, it is also a gift from a spring. Meanwhile the spring is gifted through sky, clouds, rain, dew, earth and rock. Heidegger emphasizes these interdependent qualities of phenomena by stating that 'in the gift of water, in the gift of wine, sky and earth dwell' (1975: 170).

Heidegger discusses the gift of pouring out water and wine as something that satisfies the human need to drink, to quench our thirst. Then he discusses the pouring of water and wine in the Christian service as an act of consecration. Heidegger claims consecration is not something to satisfy human biological needs; rather it is a sacrifice to the divine. Therefore, Heidegger asserts that pouring and emptying have meanings that go beyond their practical function. Indeed, Heidegger states that there is an interweaving of the earth, sky, human and divine through the act of outpouring. Furthermore, these four things earth, sky, human and divine 'are enfolded into a single fourfold' (1975: 171). Summarizing his argument, Heidegger states that 'in the gift of the outpouring dwells the simple singlefoldness of the four' (1975: 171). The outpouring is a process of bringing together, showing 'mutual belonging' (1975: 171). What we have in Heidegger's exploration of the jug is the vessel, the space inside, the liquid and the outpouring. On this basis, the jug is an enfolding of these interrelationships.

Through exploring Heidegger's discussion of 'the thing', it is possible to trace similarities between Husserl's emphasis on the enigmatic and elusive qualities of things-in-themselves. Husserl uses the example of the table to indicate that our perception of things has limits, whereas Heidegger's example of the jug allows him to consider spatial relationships and the thing as something which exists in an interdependent web of relations. The examples Husserl and Heidegger offer (such as the table and jug) are things that we are familiar with in our everyday lives. In this way, Husserl's approach to things-in-themselves and Heidegger's discussion of the thing can be fruitfully extended in order to examine how digital technologies have become familiar to us.

It is helpful to supplement Husserl and Heidegger's discussion of interconnectedness and the life world by referring to the work of anthropologist Tim Ingold (2006). For Ingold asserts there is no solid boundary between human beings and the world. Instead there is movement and ongoing exchange with the world. Consequently, instead of conceptualizing the interplay of human beings, digital technologies and the world as a network of things, they can be considered as a 'meshwork' of interrelations (Ingold, 2006: 13). Moreover, our interplay with things such as digital devices can be considered as 'a domain of entanglement' (Ingold, 2006: 14). Through acknowledging the interconnectedness of the body, digital technologies and the world at large, it is possible to cultivate a sense of openness, astonishment and wonder in relation to the world.

Studying Husserl's practice of bracketing or Heidegger's study of the jug as things-in-themselves can seem like a complex philosophical exercise. Husserl and Heidegger's studies can also seem far removed from our experience of using digital technologies, but this is far from the case. On the contrary, Husserl and Heidegger's studies are valuable because they show the limits of our sensory perception and knowledge of the world. In addition, the notion of suspending our habitual judgement about things to arrive at an openness and curiosity about them is an important aspect of our interplay with digital technologies.

A further way of approaching the practice of bracketing is to consider this as a suspension of perceptive experience. Arguably this process of bracketing has affinities with using freeze-frame practices to study a moment in a film (such as a particular scene) in detail. Similarly, we can freeze frame our perception of the world, to temporarily hold things in suspension and study them from different vantage points such as zooming in and out (Knappet, 2016). In doing so, we start to notice things we did not see before. We can also see how things interrelate, such as the relationships between different things such as digital technologies and our bodies. In this way, the purpose of temporarily freezing our perceptions is a way to see our life world differently.

Nonetheless, while we can temporarily use techniques such as the freeze frame, zooming in and out of things to study them, the world is not fixed; it is subject to change and movement. Indeed, the world is continually coming into being. However, sociologist David Silverman cautions that there are problems arising from what he calls the world in flux position. Silverman notes that if the world in flux is taken to extremes, then we would not be able to account for any of the 'stable qualities in the social world' (2006: 47). Taking heed of Silverman's warning, it is important to recognize that linguistic labels and analytical categories are useful ways of holding things in place so that we can perceive them and collect data about them. However, it is equally important to remember that qualitative and quantitative data provides partial and selective insight into phenomena. In this regard, qualitative or quantitative data about a thing is not the same as the thing-in-itself.

Returning to the earlier example of a row of computers in the university library, these devices are entwined and embedded in the world in various ways. Computers are manufactured using an array of materials including precious metals which raises a series of environmental concerns (Sheibani, 2014). They are also produced by nimble-fingered workers in assembly line modes of factory production (Plant, 1997). In addition, computers are not stand-alone devices;

rather they are connected to wireless technologies and networks of cables and wires. These communication networks also span the landscape, through visible cables dotted along streets or fields and underground cables beneath our feet. Therefore, it is misleading to consider a computer as an independently existing object.

To summarize the various threads of the discussion, what is useful about phenomenology as a research practice is that it helps us question our assumptions about the world, especially the digital technologies we take for granted because they are familiar.

Phenomenological reflection

As discussed in Husserl's philosophical framework, bracketing is a way of suspending our assumptions about how we perceive the world. Husserl posits that after the initial stage of bracketing, there is another stage which involves reflecting on experiences and how they are meaningful. In his discussion of phenomenology, Joel Smith shows that 'reflection actually alters the character of that which is reflected upon' (2005: 562). What Smith is referring to is the ways in which reflection involves drawing out certain features of our experience rather than others, which removes them from the temporal flow in which they arise. Furthermore, as George Lakoff and Mark Johnson (1999) warn, 'The idea that pure philosophical reflection can plumb the depths of human understanding is an illusion' (1999: 12). For Lakoff and Johnson remark that reflection cannot account for unconscious cognitive processes that are inaccessible to introspection. Therefore, it is important at the outset to recognize the strengths and limitations of phenomenological reflection.

Richard Schmitt (1959) also observes that some types of reflection are not based on phenomenological methods. Reflection is commonly associated with looking inwards, such as turning our attention to our thoughts and feelings. However, as Schmitt remarks the idea that reflection involves turning inwards can create misleading divisions between the internal (mind) and the external (the world). Reflection can also be considered as a form of metacognition (thoughts about thoughts). Through metacognitive processes, we become aware of how we plan, evaluate and make sense of our experiences. For example, while writing this book I reflected on why I found Husserl's phenomenology so difficult to understand. However, Schmitt claims that 'there is much thinking about oneself

which is anything but reflective' (1959: 241). Schmitt provides several examples that illustrate this point such as 'brooding about one's own feelings and emotions, self-pity, nursing feelings of resentment or a sense of injury' (1959: 241).

Reflection is more than brooding on our thoughts and emotions because it involves 'critical detachment' (Schmitt, 1959: 241). Reflection as a form of critical detachment involves stepping back from an experience to reflect upon it. From a phenomenological perspective, the purpose of this reflection is to question our assumptions about an experience and to gain awareness of how our perception of the world is an interpretation (not an incontrovertible truth). Conversely, when we become locked into habitual ways of viewing the world, we are selective and do not notice alternative perspectives. To summarize, Husserl's call to reflect upon perception provides a way to question assumptions and heighten our awareness about our bodily interplay with digital technologies.

Van Manen remarks that 'a person cannot reflect on lived experience while living through the experience' (2016: 94). Therefore, reflection is retrospective because when we reflect about something, especially in written form, this is about something that has already happened. Through writing about an experience, we attempt to make sense of it through a process of structuring and ordering. Phenomenological research practice highlights the ways in which when we remember something, we are not reliving the former experience in its entirety. The moment has passed and cannot be recreated, what we are left with are traces and fragments of prior experiences in the form of symbolic systems of signification (writing, or visual representations). It is also fruitful to apply these ideas about reflection to our familiar engagement with digital devices and software programs. For instance, we can begin to reflect on what it is like to have a conversation using instant messaging and how this is meaningful. Or we can reflect on how we use our fingers, wrists and hands to type an instant message.

As we have seen, the process of reflection involves transposing our experiences into language. Therefore, it is worthwhile examining this transposition process in more detail. During infancy, before we acquire language, we encounter things in the world through the sensory experience of seeing, touching, smelling, tasting and hearing. Once we acquire language, we start to use words to label and refer to things we encounter such as a chair, table, tree or car. The ability to use words in this way is incredibly useful; it is a practical way of communicating with others. At the same time, there are aspects of our experience that cannot be captured and ordered through spoken language and writing. Therefore, it is

necessary to consider how phenomenological practices such as bracketing and reflection can be supplemented through a deeper consideration of language.

Poiesis

Although there are some limitations to spoken language and writing as a way of conveying sensory experience of phenomena, there are other ways of approaching the making of meaning, which can expand our insight into phenomenological research practices. For instance, 'poiesis' – a term that refers to making or bringing forth – can be used as a way of gaining further understanding of the rich associative meanings of language. Van Manen (2016) discusses the ways in which phenomenological research practice uses poiesis to evoke meaning. To evoke means to call to mind, such as imagining an experience. Poems do not convey factual messages; yet they create a wealth of rich associations. The meaning of a poem cannot be entirely captured by analysing each unit, line by line, or enumerating the use of vowels or consonants. Instead the meaning of a poem is more than a sum of its parts.

The following Zen poem by the Japanese poet Setchō evokes our experiences of the world around us in ways that resonate with Hussserl's quest to perceive (albeit briefly) things-in-themselves and the processes involved in reflection:

> Hearing, seeing, touching, and knowing are not one;
> Mountain and rivers should not be viewed in the mirror.
> The frosty sky, the setting moon – at midnight;
> With whom will the serene waters of the lake reflect the shadows in the cold?

The first line of the poem refers to sensory perceptions – hearing, seeing and touching – as ways of knowing the world around us. Sekida (2005) explains that in the second line, rivers and mountains refer to the external world. The mirror is our interpretation of the rivers and mountains. The frosty sky and setting moon evoke the sublime experience of nature. In the fourth line, the serene waters of the lake evoke a calm mind undisturbed by scattered thoughts. The fourth line also reinforces the meaning of the entire poem, that a calm mind is as silent as a frosty night and the setting moon. Overall the poem attempts to evoke existence as it is without a subject and object relationship. Sekida (2005) also illustrates the experience of non-separation through the example of touching a cup. If you touch a cup, there is awareness of the sensation of touching. Hand and cup are

not two separate things; there is a synthesis between them. The cup touches you as you touch it. After the immediacy of the sensory experience of touching, there is a reflective stage in which we make sense of that experience. It is during this subsequent reflective stage that the notion of the subject and object arises. The reflective experience then becomes caught up in the notion that I (the subject) touched the cup (object). But Setchō's poem evokes the immediate sensory experience of touching the cup. In this way, non-separation links to immediate experience, before the arising of a subject and object, which also resonates with Husserl's method of exploring things-in-themselves.

The purpose of referring to the Zen poem by Setchō is to observe similarities between poetics and the phenomenological practices of bracketing and reflection as a way of illuminating things-in-themselves. Furthermore, Fred J. Hanna (1995) examines some of the connections between Husserl's work and Buddhism in ways that resonate with Setchō's poem. Yet it is also important to note that there are many different schools within Buddhism. For Zen Buddhism arises from the coming together of Japanese culture and Buddhist ideas and practices from other parts of the world including India and Tibet. Hanna refers to Husserl's essay 'On the Teachings of Gautama Buddha' which was written in 1925 to honour a translation of Buddhist texts by Karl Neumann. In this essay, Husserl outlines his admiration for Buddhist modes of perceiving the interconnectedness and interdependence of phenomena. In addition, Hanna finds parallels between Husserl's work and Buddhist approaches to increasing awareness of intersubjectivity through methods such as mindfulness and meditation.

Phenomenology is a philosophical way of thinking and a research practice that recognizes how symbolic systems of signification such as spoken language and writing alter our experience of the thing-in-itself. Writing is a process of making something visible by indicating the presence of something. The word 'smartphone', for instance, stands in place of the thing. The word enables us to talk about this thing even when it is not immediately present. Meanwhile, 'texting' is a word that we use to label an activity. However, the presence of something (smartphones or texting) is mediated through language. Writing represents what is absent (the thing-in-itself). To put this simply, the written word becomes a substitute for the thing-in-itself.

Phenomenological research practice uses a writing style that aims to elicit meaning through using metaphor, oblique references, symbolism, imagery and poetics (Van Manen, 2016). Rather than solely constructing arguments

by bringing together theories and quantifiable data, the poetic dimension to phenomenological writing practice concerns evoking immediate encounters and experiences. The French poet Gaston Bachelard (1994) states that the poetic requires receptivity and openness to the wonder of the present moment. The poetic imagination touches us, moves us deeply and brings about a change within us. Therefore, phenomenological writing can heighten our awareness of animate sensory experience and digital technologies.

Phenomenological researchers Catherine Adams and Yin Yin (2017) outline the difficulties of returning to things-in-themselves, through reflection and writing: 'The predicament in reflecting phenomenologically on a thing is that the more we seek after its everyday occurrence or eventing, the more we are prone to colour and cover over its thingness in the midst of human experience' (Adams and Yin, 2017: 04). Writing creates a psychological and physical space or distance between the directness of encountering things and accounts of that experience. When writing about how other scholars approach digital technologies, I am physically located somewhere at a desk with pen and paper, or at a table using a computer and keyboard. Yet I am also elsewhere, in the sense of entering into a dialogue with these scholars.

Reflective phenomenological writing is not unstructured because it involves ordering material so that it is intelligible to readers. However, data is not something that is simply presented as a fact in phenomenological research. Instead, phenomenological approaches recognize that data is partial; it is not the thing-in-itself. Data is extracted from lived experience and caught up in symbolic systems of signification (language in the case of interview transcripts or mathematics in the case of the presentation of statistical findings).

A special issue devoted to 'lived things' in the journal *Phenomenology & Practice* (2017) features a range of reflective essays that aim to change familiar perceptions of everyday things such as a spoon, mirror, yoga mat and purse. Many of the points discussed in these essays can also be applied to digital devices such as smartphones, tablets or activity trackers. For in daily life we encounter an array of digital objects such as images, texts or music files. These digital objects can also be regarded as a network of relations involving various software languages and computer networks (Hui, 2012). In his study of digital objects, Yuk Hui (2012) notes that at one level they appear to us in the form of images and texts (on smartphone screens, for example). Yet at another level (beneath what we see on the surface of our screens) these digital objects are comprised of binary code. Going further, Hui says that 'at the level of circuit boards,' images,

text or music files 'are nothing but signals generated by the values of voltage and the operation of logic gates' (2012: 387). Therefore, in daily life our perception of digital objects is limited since their underlying qualities are beyond our immediate sensory experience of them (van den Boomen, 2009).

In the next section, the practices of bracketing and reflection are illustrated using the example of experiencing a tablet computer. In doing so, the discussion draws upon insights from Schmitt (1959), Van Manen (2006, 2016; 2017), Adams and Yin (2017).

The tablet computer

Husserl's example of seeing things from different perspectives resembles the processes involved in conducting research. For it is possible to research interactions with a tablet computer from different perspectives using a variety of methods and theories. Sociologist David Silverman (2006) remarks that theories are sets of concepts that help us explain phenomena. Even so, Silverman warns that there is no one theory that can produce complete knowledge. Even if we combine various theories, the totality of the world exceeds our knowledge of it. There are various theoretical and methodological approaches that can be taken when exploring digital technologies such as a tablet computer. For instance, a tablet is a device that can be explored using theories that are underpinned by the political economy approach. As such, questions can be asked about the socio-economic relations surrounding the production and consumption of tablet computers. Textual and discourse analysis could be marshalled to explore how tablet computers are represented through marketing campaigns. Alternatively, empirical studies involving interviews, focus groups or observational studies could be used to find out how different social groups or individuals interact with these devices. The tablet could also be stripped down into component parts to see how they are made. A researcher could also analyse how software and coding instructions enable the device to function. Yet even if we were to combine all these different research methods, they would not provide complete knowledge of the tablet as a thing-in-itself.

A tablet computer is also an object that can be perceived from different vantage points. It is possible to perceive the front of the tablet or turn it over to see the back. But we cannot see the front and back of the tablet at the same time. In this way, Husserl's example of perceiving the table as he moves around

it can be extended to the tablet, since the tablet as a thing-in-itself transcends individual perception.

The following vignette seeks to reflect on some of the meanings associated with a tablet computer and how it is incorporated into everyday life in contemporary culture. It is readily admitted that the vignette is partial and limited since it is based on my interplay with a single tablet device. Therefore, the vignette is intersected by a range of sociocultural assumptions and associations. Nonetheless, the purpose of the vignette is to apply the phenomenological principles and practices covered in this chapter to a specific example. In doing so, I will attempt to suspend some habitual assumptions and ways of perceiving this device as an attempt to get closer to the thing-in-itself. Studying the tablet, I take on the role and gaze of a researcher and draw upon some of the practices of autoethnography as a research method (Holman-Jones, Adams and Ellis, 2016; Adams and Holman-Jones, 2018; Barr, 2019). Notably, the gaze of the researcher is a temporary position which differs from my habitual usage of the tablet.

To begin with, I enter an initial stage involving making the familiar seem strange. I start by attempting to suspend some of my assumptions about consciousness, reality and sensory perception of the tablet. At first, the tablet appears to me as a small square device with a smooth black reflective surface. When I look closely at the glass surface of the tablet, I see a reflection of the things that are placed nearby such as a tea cup, pencil case and a notebook.

The tablet is odourless and does not appear to have any visible moving parts, so it is not obvious what it does or how it functions. Unlike other things in my daily life such as the wooden table in the dining room or the battered armchairs in the living room, or even the pen and notepaper I use to sketch out my ideas, the tablet is only functional when it is connected to a digital communication network. Once the tablet is connected to a digital network and switched on, colourful digital objects (images and text) appear on the screen. However, the tablet differs from a printed novel or paper notebook since it is not possible to tear pages from it. The tablet cannot be folded in half or crumpled.

The tablet is lightweight enough to be carried in my bag, so it accompanies me when I travel on public transport. It also accompanies me to meetings, the university library and even the cafes I frequent. Once plugged in to a power source or fully charged, the tablet emits sounds that have become recognizable to me through habitual use. For instance, various sonic alerts pings and whooshes inform me of new messages or appointments in my electronic diary. Throughout the day, I touch the tablet, using my fingers to swipe across the surface. As I

touch the tablet, it also touches me. The sensation of touching the tablet is one of a smooth surface rather than a roughly textured one. Yet the smoothness of the surface of the tablet does not appear at the forefront of my attention as I interact with various images and texts; instead it is experienced as a seamless interface (Cranny-Francis, 2011; van den Boomen, 2009).

As outlined, Heidegger's study of the jug emphasizes the ways in which it is a vessel that holds liquid. Indeed, Heidegger draws attention to the ways in which a jug takes in and retains water or wine. When discussing the case of the jug, Heidegger calls our attention to the space, the void as the capacity for taking in, holding and pouring. What Heidegger appears to be getting at in his discussion of the void is that emptiness can be regarded as a potential. The void is that which makes taking in, holding and pouring possible. So how does Heidegger's account of emptiness, taking in and pouring out relate to the tablet computer? At a basic, material level the dimensions of the tablet can be mapped and measured. The spatial qualities of the tablet can also be explained in material terms according to storage capacity (such as 64 gigabytes). In addition, the tablet computer can be considered as a thing that takes in (acquires) holds and transmits computer code. The tablet can also be perceived through spatial concepts such as a placeholder. For example, the tablet has become a placeholder for my personal information, contact lists for family members, friends, colleagues, my doctor and dentist. Other elements of personalization include the software applications I have downloaded, photo albums, music and video files.

Heidegger outlined the act of holding and then pouring water or wine from the jug as a gathering of different relationships (earth, sky, human and divine). Instead of pouring like liquid from the jug, the tablet computer enables information to flow across networks. For instance, the tablet extends my communicative reach by enabling me to make video calls using the Skype application, send emails and share photographs. It also acts as an information portal and mnemonic device, providing access to the flow of online material and providing various notifications and status updates. The tablet connects me through a digital web to the people in my contact list. It also allows me to access personal and work-related emails, blurring the boundaries between different parts of my life.

Writing this reflective vignette shows how a device becomes meaningful because it becomes integrated into daily life. While this phenomenological vignette provides rich description, it cannot provide access to immediate existence of the tablet. Furthermore, I could take numerous photographic

images of the tablet, or provide an incredibly detailed analysis of this device, but the tablet as a thing-in-itself remains mysterious.

Moreover, there are many other important factors to consider when studying a digital device such as a tablet. For the tablet is a commodity, it is mass produced and part of a complex production chain that operates at a global level, involving many different and unequal divisions of labour. In this way the tablet gathers or enfolds a range of interrelations, the mining of precious earth metals, the transformation of sand into glass, petrochemical processes to produce and mould plastics and so forth. Once the tablet is manufactured it is then shipped, transported, stored in warehouses and delivered to a retail outlet (or direct to a customer) for consumption. From this enlarged perspective the tablet can be thought of as a gathering of interrelations, such as the elemental qualities of earth, sky, sunlight and also various forms of human labour in the assembly and production of operating software. As such, the tablet cannot be considered solely as an isolated object.

Political theorist Jane Bennett (2010) usefully challenges conventional ideas in Western culture about matter as something inert and inanimate. Indeed, as Bennett says, the dominant approach to research (especially within scientific and empirical studies) involves dividing the world into animate (living) and inanimate (objects). For example, in this written reflection, I would be positioned as the living subject who studies the tablet as an inanimate object. However, Bennett's work shows that matter is not inanimate. For example, Bennett explores how rubbish secretes, gases and chemicals that get caught up in the wind and rain.

Bennett writes about her encounter with what she calls vibrant matter at Chesapeake Bay, Baltimore. While at Chesapeake Bay, Bennett sees a man's plastic work glove, oak pollen, a dead rat, a white plastic bottle cap and a stick of wood. She connects these objects to human activity: the working life of the man, the human use of rat poison, drinking and littering. Of note is that Bennett has an affective response to these objects. She felt repelled by the dead rat and 'dismayed by the litter' (2010: 04). But upon reflection Bennett began to recognize the uniqueness of this particular rat and the particular bottle top. Furthermore, she realizes these objects are part of a broader tableau of experience; they exist alongside the clouds, ground and sun. Bennett's ideas can be usefully applied to my reflection of a tablet computer. As such, the tablet computer is no longer just an inanimate object because it is created from raw materials and will

decay. At some point the tablet's operating system will no longer function due to system upgrades, technological development and so forth. Then the tablet will be disposed, shipped across the world, disassembled, recycled or dumped in landfill. However, the vibrant matter of the disassembled tablet computer involves hazardous materials such as flame retardants, mercury and lead which can pollute water and soil (Ahmed, 2016).

In short, this vignette of a tablet computer indicates that Husserl, Heidegger and Merleau-Ponty's work offers valuable insight into the impossibility of encapsulating the experience of the thing-in-itself (through symbolic representation, such as words). Instead, our perception and experience of the world we encounter and engage with occurs in specific historical, sociocultural contexts. Notably, through reflection the tablet computer is no longer just an inanimate object; rather it is composed of vibrant matter. Moreover, this vibrant matter highlights the interdependence of our world (the raw materials needed to assemble and disassemble the tablet computer).

Concluding remarks

This chapter has outlined some of the key foundational principles of phenomenology (as a philosophy and research practice) by drawing on the work of Husserl. This chapter offered a discussion of suspending or bracketing judgements about the world of appearances (phenomena). As discussed, through practising bracketing we can heighten our awareness of how our habitual perception of digital devices and software applications are partial and generated in specific socio-economic and cultural conditions. Therefore, digital devices and software applications as things-in-themselves exceed our perception and remain mysterious and enigmatic.

As outlined, the rationale for suspending or bracketing our judgements is making the familiar seem strange. Once this initial stage of suspending judgements has taken place, there is a secondary stage of reflection. The works of Husserl and other scholars such as Sheets-Johnstone and Van Manen were discussed in relation to the difficulties arising from describing experience through language. For language shapes how we conceptualize and make sense of our experiences. As outlined in this chapter, there is also a temporal dimension to language, since the meaning of a sentence unfolds over time.

The chapter also noted some of the drawbacks of bracketing and reflective processes. For instance, the discussion pointed out that reflection occurs after the sensory experience of phenomena. In this way, reflection removes phenomena from a particular moment in time (the immediate present) in order to study them. Nonetheless, by engaging in reflective writing as a way of evoking experience and using poetic examples, it is possible to open up to the wonder of digital technologies. Phenomenology as a research practice shows an attentiveness to the world of phenomena including the digital technologies that we have grown accustomed to and rarely step back to reflect upon.

There is no single theory that can provide complete knowledge of the world. Instead, we encounter the world and study it from a particular vantage point. For instance, the tablet computer which featured in the vignette could be studied from a Marxist perspective, as a commodity in a global capitalist marketplace. The tablet could also be studied as a particular branded object which is advertised and marketed in specific ways. Interviews, focus groups and ethnographic studies could also provide insight into how specific social groups interact with digital devices. But what is most important to this chapter is that phenomenology shows us the importance of lived experience, the body and our sensory engagement with digital technologies. As we shall see in subsequent chapters, the body is not an independently existing object. While it is possible to study the body from an objective position for theoretical and methodological purposes, this differs from our sensory experience of being a body. Building on these philosophical and theoretical foundations, the following chapters show how suspending our assumptions about orality and writing can yield new insights into the relationships between the body, sensory experience and digital technologies.

2

Digital communication technologies and conversation

Face-to-face conversation

The phenomenological practice of making what is familiar strange provides a useful starting point for exploring the sensory richness of face-to-face conversation and digitally mediated forms of communication. As discussed in Chapter 1, Husserl (1970; 1999) asserts that by suspending our assumptions, the familiar can become strange. Admittedly, Husserl's call to suspending our assumptions is something that is incredibly difficult to put into practice. Therefore, on a more modest note, this chapter seeks to suspend some assumptions about technology, face-to-face conversation and digitally mediated forms of communication. By suspending some assumptions about speech and digital communication technologies, it is possible to reflect upon how we experience and make sense of them.

Face-to-face conversation usually refers to a verbal interaction between two people in the same place. However, to what extent does the term 'face-to-face conversation' apply to digital forms of communication such as videotelephony? For instance, by calling their video-telephony system FaceTime, Apple gives the impression that this software application mimics face-to-face contact. When we can see, hear and chat to someone on screen so easily using digital technologies (devices and software), it becomes quite difficult to express what we mean by the term 'face-to-face communication'. Therefore, to avoid confusion, I will use the term 'face-to-face conversation' as a way of referring to speech acts that occur between people who are in the same physical location at the same time.

At the outset, it is important to acknowledge differences between the directness and immediacy of face-to-face speech acts and written accounts about them. Of course, there are shortcomings of using written words to refer to speech acts. Even so, the written word can be used to provide useful insight

into our sensory experiences and why they matter. As outlined in Chapter 1, phenomenology is a research practice which contends that we do not encounter the world as it is; rather we come to know the world through sensory experience, interpretation and reflection. Moreover, as postphenomenological scholars such as Malafouris and Idhe (2018) and O'Neal Irwin (2016) remind us, our experiences of technology are socially, culturally and historically situated.

Communication

The term 'communication' stems from the Latin *communicare* meaning to share, join, unite and make common.[1] In predominantly oral societies, people come together and share information and ideas through word of mouth and face-to-face discussion. Developments such as the introduction of written language using alphabetical notation (Ong, 1982; Abram, 1997), the printing press (Eisenstein, 1979; Postman, 1985) and telephony (Marvin, 1988) have vastly expanded the range of human communication. Now, in technologically advanced societies, digital technologies enable us to come together and share information, through a variety of verbal and written forms such as phone calls, IM, emails, blogs and posts on social networks. Digital communication technologies are extremely efficient at reducing the spatial and temporal factors that separate us. Numerous scholars claim digital communications are also beneficial because they provide new opportunities for sharing information, stimulating creativity and pooling intelligence (Goldsmith, 2016; Kelly, 2016; Rheingold, 2014; Shirky, 2011, 2009; Gauntlett, 2011; Thompson, 2014; Zoref, 2015).

However, when we can connect so quickly and easily with others using digitally mediated forms of communication, will we overlook the value of face-to-face conversation? Certainly, in some cases, it seems easier and more efficient to text someone rather than meet with them for a face-to-face conversation. Since by simply tapping a few buttons on a smartphone, it is possible to talk to others who are geographically separated from us. Similarly, email provides quick asynchronous textual communication. In fact, our ability to communicate appears to have been considerably expanded by using digital communication technologies.

[1] www.etymoline.com

Scope

While acknowledging that digital communication technologies provide quick and easy ways to communicate with others, I also want to explore other ways of perceiving them. To make such a vast topic manageable, the chapter focuses on the relationships between speech and digital technologies, such as video-telephony and virtual assistants. For instance, the ways in which digital technologies extend our ability to communicate with those who are not physically present with us can give the impression that focusing on the sensory aspects of bodily communication is irrelevant. However, this chapter indicates that even when digitally mediated forms of communication offer such quick and easy ways to communicate, the bodily aspects of speech and face-to-face conversation remain valuable.

Exploring the ways in which digital communication technologies can supplement rather than replace face-to-face physical contact is important because co-present communication remains inextricably intertwined with our visceral, bodily connection to other people. Yet, the chapter also recognizes how our face-to-face conversations are now spliced between other screen-mediated communications (Goldsmith, 2016). Indeed, our daily lives involve numerous forms of communication, some of which are face to face and others involving technological mediation. Furthermore, as literary scholar Ken Goldsmith remarks, there is an affective dimension to technological mediated conversation: 'Watch someone's face while they're in the midst of a rapid-fire text message exchange: it's full of human emotion and expression – anticipation, laughter, affect' (Goldsmith, 2016: 05).

Arguably screen-mediated communications are a necessity in contemporary culture since they provide access to our schedules, help us socialize with friends or keep in contact with work colleagues and so forth. Therefore, my aim in this chapter is to show how our bodies are an intrinsic part of co-present and digital forms of communication. Indeed, we use our diaphragm, lungs, mouth and tongue when we speak to other people on the telephone and we use our fingers, wrists and hands to type emails. It would be easy to romanticize about former times, before the development of digital technologies when face-to-face dialogue was the dominant mode of communication. Yet we cannot simply return to those times, and there is much to be gained by increasing our options for communication by using a range of spoken and written forms. Therefore,

a more productive approach is to harness the beneficial aspects of digitally mediated communication while minimizing their drawbacks.

Some might insist that the bodily aspects of spoken language are not that important because they can be easily replicated using digital technologies. Though it is interesting to note how the bodily aspects of spoken language are detectable through metaphors such as word of mouth, keeping in touch or being in contact (Lakoff and Johnson, 2003). Terms such as online *chat* rooms, online *discussion*, online forums and even applications such as Snap*chat* also give the impression that digitally mediated forms of communication have similarities to face-to-face conversation. Yet our everyday sensory experiences of face-to-face conversation are multifaceted and cannot be entirely replicated or replaced by technologically mediated forms of communication. For instance, George Lakoff and Mark Johnson (1999) remark that conversation involves a range of factors such as drawing on memories which are relevant to what is spoken about. Conversation also involves comprehending patterns of sounds into meaningful elements, such as phonemes. We also use the structural qualities of language to process the meanings of each word and the sentence as a whole. Then we select an appropriate response using the structure of language to compose a sentence. We also form mental images on the basis of what is said, interpret body language and anticipate what the other person might say and how we will respond to them.

This chapter indicates that contemporary mediated modes of communication through the use of digital technologies can shift our attention away from the visceral qualities of face-to-face conversation. For example, screen-mediated communication such as videotelephony primarily involves the sense of sight and sound. Consequently, rather than conversing with a three-dimensional, animate, multi-sensory human being, with videotelephony we mainly see the other person's face as a flat image on a screen. Therefore, it is important to consider the multi-sensory qualities of face-to-face conversation, whereby we can smell the other person, reach out and touch them or be touched by them.

The flesh and blood experience of face-to-face conversation enables us to look into another person's eyes, reach out and touch them. We can also observe the other person's body posture and the gestures they use when speaking (McNeill, 1995). All these factors contribute to the sensory intensity and depth of face-to-face conversations with our family members, friends, work colleagues or others we encounter during our day. Even so, these vivid sensory encounters may be part of a much larger set of daily activities involving digitally mediated and face-to-face forms of communication.

Implications

Communication scholar Sherry Turkle (2011, 2015) discusses the implications arising from digitally mediated forms of communication. Turkle says, 'We speak through machines and forget how essential face-to-face conversation is to our relationships, our creativity, and our capacity for empathy' (2015: 16–17). However, Jeffrey Hall, Michael Kearney and Chong Xing's research (2018) challenges claims that more time spent online results in reduced face-to-face contact. Yet upon close inspection, it transpires that Hall et al. informed their research participants that chatting through social media would be considered as chat, not as social media use. Therefore, as this example illustrates, we need to be wary about some of the conflations that occur between digitally mediated communications (online chat) with face-to-face conversation.

Look Up

Meanwhile, poet, performer and filmmaker Gary Turk's poem *Look Up* warns of becoming entranced by digital technologies at the expense of connecting with others via face-to-face conversation. A central idea running through Turk's evocative poem is that screen-based devices consume our attention while distancing us from the bodily sense of being with others. By contrast, *Look Up* emphasizes the value of bodily presence in relation to friendship, companionship and intimacy. But towards the end of his poem, Turk states:

> I am guilty too, of being part of this machine,
> The digital world, where we are heard but not seen.
> Where we type and don't talk, where we read as we chat,
> Where we spend hours together, without making eye contact.

Turk's poem acknowledges that digital technologies are central to our daily lives. At the same time, his poem draws attention to the ways in which practices such as online group chats involve type written messages rather than face-to-face contact. Certainly, type written messages can be deeply meaningful and elicit emotional connection with others. In fact, Turk's poem uses the written word to evoke the sensory experience of being together. Yet, Turk's poem highlights the sorts of scenarios which have become a familiar part of our everyday lives,

whereby people are sharing the same physical space but absorbed in the content of screen-mediated spaces.

The final line of Turk's poem comments on the ways in which people can be communicating for hours online, without making direct eye contact. Though I concede that using web-cameras can involve some degree of eye contact. Nonetheless, Turk's poem suggests that seeing someone via a webcam on a screen is not equivalent to looking into their eyes when they are with you, in the same space, at the same time.

Turk's short film performance of *Look Up* is available on YouTube and on his website.[2] To date, Turk's poem has over 600 million views. In fact, Turk's poem reaches millions of people worldwide through digitally mediated communication. Furthermore, Turk's work would not have reached such a wide audience without digital technologies such as the internet and YouTube.

Before moving on to a more detailed discussion of the sensory experience of face-to-face conversation, I want to take stock of some of the main points made so far. As discussed, digital technologies provide quick, efficient ways of communicating with others. Certainly digital technologies extend our communicative reach so we can contact those who are not physically present with us. We also have various choices about how to communicate (using a range of verbal and written forms) and when to communicate with others. Yet in surveying these issues and debates about the extensive range and choice of digital communication that is available to us, the bodily aspects of speech may be overlooked. Of course, there is an argument that the detrimental aspects of digitally mediated communication, in terms of bodily presence, are vastly outweighed by their benefits. Therefore in addressing such arguments, we shall see that debates about the value of speech and presence are not new; rather they have a long history.

Orality

It is helpful to explore the work of literary scholar Walter Ong (1982), cultural anthropologist David Abram (1997) and voice coach Patsy Rodenburgh (2005) to illuminate some of the debates surrounding the sensory richness of speech. This will help us gain insight into how orality links to digitally mediated forms

[2] www.garyturk.com

of communication. In his study of orality, Ong remarks that 'human beings communicate in countless ways, making use of all their senses, touch, taste, smell, and especially sight, as well as hearing' (1982: 07). Ong's remarks are valuable since they recognize the sensory richness of various forms of communication. Notably, Ong remarks that vocalized sound is particularly important because 'not only communication but thought itself relates in an altogether special way to sound' (1982: 07). Therefore, it is important to consider the relationships between the body, vocalization and communication in more detail.

Previous scholarship about orality and literacy, including the work of Ong (1982) and Marshall McLuhan (2009), tends to focus on the cognitive aspects of knowledge production rather than how our bodies vocalize sound. However, in agreement with Abram (1997, 2011) focusing exclusively on cognition when studying orality results in a limited understanding of the sensory interaction that occurs between humans and the more-than-human world. On this basis, Abram claims we cannot understand human speech as a form of communication and expression in isolation from our interaction with the more-than-human world such as plants, animals and the landscape.

David Abram's scholarship spans several disciplines including anthropology, philosophy and eco-psychology. In *The Spell of the Sensuous* (1997), Abram outlines the physicality of speech and communication and the importance of orality in indigenous cultures. Abram asserts that in the case of spoken language, the words we utter are a form of bodily communication. As such, 'Meaning is inseparable from the sound, the shape, and the rhythm of the words' (1997: 24). In agreement with Abram it is 'the sensuous, gestural significance of spoken sounds – their direct bodily resonance – that makes verbal communication possible at all' (1997: 79). Going further, Abram outlines how the bodily expressive qualities of human language connect to bird song, howling wolves and honking geese. Abram's work indicates that speech is not disembodied; rather it is rooted in our bodies and the more-than-human world of other species and the landscape.

Abram's emphasis on the sensory physicality of speech also resonates with the work of Patsy Rodenburgh OBE, Head of Voice at the Guildhall School of Music and Drama. Rodenburgh has previously worked with the Royal Shakespeare Company and the Royal National Theatre as a voice coach for actors. In addition, Rodenburgh has published widely about the importance of the voice and presence to a general audience (1992, 2005, 2009). Therefore, Rodenburgh's work is not just of relevance to theatrical contexts or professional performance.

Instead, her work highlights the bodily aspects of speech in everyday life. Rodenburgh says, 'Words can touch and shake us physically when uttered with complete authenticity and with utter conviction' (2005: 15). For example, someone may spit out words with utter conviction to bully and brutalize their victims. Rodenburgh adds, 'We think of words as hieroglyphic markings stuck to a page and not as things of substance, weight, body or contour' (2005: 16). According to Rodenburgh, the view that words are abstract, symbolic signs is misleading because 'as we make words in our mouth we actually sculpt them into shape' (2005: 16). In addition, the spoken word conveys the tonal qualities of vowels, consonants through rhythm and cadence.

In *The Need for Words* (2005) Rodenburgh claims there is a humanizing quality to the voice because 'it expresses who we are and what we want. Most of all it articulates our most vital needs as a human being' (2005: 03). Yet Rodenburgh rightly points out that speaking is something we take for granted. We tend to consider speaking as 'a physical reflex action' and rarely pay attention to how we make sounds. As such we rarely notice 'any of the connections taking place between ourselves and our words' (Rodenburgh, 2005: 04). Rodenburgh notes that oral cultures, both past and present, acknowledge the power of words. Expanding this point, Rodenburgh states that 'most oral cultures believe that if you speak, chant or sing powerful, connected words then you bring a potent force into the world' (2005: 07). For example, the recantation of certain words can be used as a curse or a magic spell. However, Rodenburgh argues that we 'have ceased being an oral culture' (2005: 09). Rodenburgh claims that several factors have contributed to a decline in orality in contemporary culture, such as the lack of training in oral skills in education and the sensational language used in advertising and tabloids.

Ong (1982) also provides an in-depth account of the shifts that have taken place from oral, literary and electronic cultures. In doing so, Ong observes that 'electronic culture' draws upon and extends written and printed forms of language. He adds that 'the electronic age is also an age of "secondary orality", the orality of telephones, radio, and television, which depends on writing and print for its existence' (1982: 03). Ong provides a useful reminder of the historical dimensions of technological development and how this impacts upon culture and society. While the development of communication technologies such as the printing press was transformative, the social and cultural changes that occurred in their wake took place over several centuries (Eisenstein, 1979; Postman, 1985). By contrast, it is fair to say that digital communication technologies such

as the internet have brought about massive changes on a global scale within a few decades (Rheingold, 2014; Harris, 2014).

When the internet first became accessible to the general public in the 1990s, a range of different text-based communication methods arose, such as chat rooms, online forums and multi-user domains. It was during these early days of the internet that Turkle outlined some of the creative and expressive possibilities of online communication in *Life on Screen: Identity in the Age of the Internet* (1996). However, in her more recent work, Turkle questions some of the earlier celebratory perspectives towards online communication in the burgeoning years of the internet. In *Alone Together* (2011) and *Reclaiming Conversation* (2015), Turkle acknowledges that we are now talking more than ever using IM, software applications such as Skype and smartphones. Yet Turkle maintains that 'this new mediated life has gotten us into trouble' (2015: 03). For according to Turkle, we are no longer in touch with ourselves because we are constantly being pulled elsewhere. Turkle takes a strong stance towards the ways in which digitally mediated communication generates experiences of being-here and being-elsewhere: 'These days, we want to be with each other but also elsewhere, connected to wherever else we want to be, because what we value most is control over where we put our attention'(Turkle, 2015: 19).

Turkle admits naysayers may dismiss her argument about the value of face-to-face conversation on the basis that it focuses on some of the negative aspects of digitally mediated communication. In response to such criticisms, she makes a similar point to Rodenburgh that face-to-face conversation 'is the most human and humanizing thing we do' (2015: 03). Turkle recognizes that some people value the anonymity of online communication because they can express themselves in ways they would find challenging through face-to-face conversation. In addition, she recognizes that our everyday lives now involve a blend of face-to-face and digitally mediated forms of communication.

While agreeing with Turkle's main points, my own experiences have shown me some of the complexities involved in making distinctions between face-to-face and digitally mediated forms of conversation. Therefore, to illustrate the main ideas presented so far, I will provide a personal anecdote about conversation and discuss this further. Anecdotes are a form of everyday storytelling that can be used to illustrate an example. As Van Manen (2016) points out, anecdotes are often devalued in empirical forms of academic study because they are not regarded as providing a factual base for knowledge. However, phenomenological research practice is not about offering factual evidence, proof or quantifiable

data in the same way as empirical studies. In the context of phenomenological research practice anecdotes are effective because 'they can explain things that resist straightforward explanation or conceptualisation' (Van Manen, 2016: 253). Furthermore, anecdotes have a conventional structure, and they are not just idiosyncratic. Anecdotes are short, simple stories, based around a single event or experience. They also refer to concrete details and end with a punchy or poignant note. Therefore, my anecdote of an observed conversation seeks to highlight the complexities of face-to-face and digitally mediated forms of communication. Admittedly, the anecdote is based on a single example; yet it illustrates the sorts of encounters with digitally mediated communication that are fairly typical in contemporary culture. The anecdote also provides a way of unpacking some of the philosophical dimensions surrounding our relationships with digitally mediated communication.

An empty chair

I walk into a well-known franchise cafe, nested inside a busy metropolitan train station in the north of England. It is Saturday afternoon and the cafe bustles with many customers. Rows of pre-packaged sandwiches, snacks and drinks line the corners of the cafe, ready to be consumed on the go. The cafe is the sort of place that customers frequent briefly, rather than linger. Those customers who are alone gaze at their smartphones. Meanwhile, couples and groups of people sit and chat while their phones are placed on the table in front of them. There is a faint hum of conversation and piped music, alongside the whirring of the coffee machines behind the counter. Two television screens at either end of the cafe are affixed to the wall, displaying the latest train arrivals and departures but no one seems to look at them.

I sit at a small table with two chairs (one at each side). There is not much room to manoeuvre, as the tables in the coffee bar are arranged in close proximity to maximize the number of customers that can be accommodated thereby increasing revenue. However, this seating arrangement also minimizes my sense of privacy and personal space. While eating lunch, I hear the young woman sitting at the table beside me, conversing to someone else. As I glance in her direction, I see that she has one arm outstretched and is holding a smartphone in her hand. Her phone screen displays an image of a young man's face and they are chatting. What I find striking is that her outstretched arm is positioned

towards the empty seat at the opposite side of her table. By doing so, the young man displayed on the screen appears to be virtually present, hovering ghost-like above the empty chair facing her. The conversation continues for about ten minutes. After ending the call the young woman gazes towards the empty chair opposite her, gets up and leaves.

Of course, my observation is based on a single conversation and my subjective interpretation (which is inflected by all sorts of sociocultural factors and assumptions). For instance, I have no way of knowing if this screen-mediated conversation is a rare occurrence for this young woman. In addition, the anecdote does not indicate why this conversation took place. It is possible that the young man and woman had been separated for months, studying or working in different cities. If that were the case, then this videophone call would provide some welcome contact. Indeed, the phone call may fulfil a similar function to love letters in the past, as a means of expressing longing and seeking connection. Alternatively the phone call could have been a way for this young woman to fill time, to alleviate the boredom of waiting for a train. These sorts of issues could be answered in part by empirical studies, such as interviewing the young woman, collecting and analysing data about the conversation. Semiotic analysis or conversation analysis could then be used to analyse the transcription of the interview conversation to see how the words used construct meaning in a particular sociocultural context. For instance, conversation analysis can be used to highlight the structural qualities of conversation, such as openings, closings and turn taking (Clift, 2016; Sidnell, 2010). However, it is also possible to use this observed conversation to consider the philosophical implications arising from screen-mediated communication, especially in relation to the body and presence.

Anecdotes provide useful insight into phenomena because they have a 'punctum', a term that Roland Barthes uses in his book *Camera Lucida* (1980). In *Camera Lucida*, Barthes discusses the punctum of a photograph. According to Barthes the punctum is a sharp point, a sting, something painful, a puncture or tear. The punctum is something that is emotionally sharp and painful, something that unsettles us. According to Van Manen (2016), anecdotes can also puncture through our psychological defences, unsettle and prick us. Therefore, by referring to the observation of the screen-mediated conversation between the young woman and man in the cafe, I aim to highlight those things which are unsettling about digitally mediated forms of communication. In doing so, I consider how screen-mediated conversation might puncture, or tear, some of

the assumptions we have about conversation, communication and connection. The punctum of this screen-mediated conversation is that the chair opposite the young woman is empty; the young man is not there. Ultimately, we cannot be in two places simultaneously because our bodies anchor us to a particular place.

Upon reflection, it appears that that these two young people were having a synchronous, in person face-to-face conversation even though they were geographically separated. Both participants in the conversation were sculpting and shaping words (as discussed by Rodenburgh and Abram) and the capabilities of videotelephony enabled them to convey emotion through tone of voice and some degree of eye contact. As the young woman's smartphone display screen was small, it was not possible to see the young man's body. Consequently, he appeared to be just a talking head. Yet, the ways in which is his body was anchored to a specific time and place appeared to have been overcome through videotelephony. By bringing this young man's face into close proximity with her via a screen, the young woman did not seem to be alone.

Most people would probably agree that it would be foolish to equate videotelephony with the conversations we have with others who are literally within our reach, in the same time and space. On the other hand, is videotelephony the next best thing to face-to face conversation? For this digitally mediated phone call between the two young people provides a semblance of face-to-face co-present conversation. So perhaps, it is the term 'face-to-face conversation' that misleads us. The young man and woman were having a face-to-face conversation; but they were not experiencing the multi-sensory experience of each other's bodily presence. Instead they were experiencing one another as technologically mediated images and sounds on their digital devices.

In a study of video conferencing in the context of education, Norm Friesen (2014) also outlines some of the differences between digitally mediated and face-to-face conversation. Friesen points out that with face-to-face conversation there is the possibility of 'reciprocal contact … to be touched and felt' (2014: 24). In the case of the video telephone call between the two young people, there was reciprocal turn taking. But there was no reciprocal bodily contact; the young man and woman could not hold hands, embrace or kiss. Additionally, Friesen contends that with video conferencing applications 'you cannot truly look an interlocutor in the eye since seeing another's eyes means looking at the screen' (2014: 25). In agreement with Friesen looking into someone's eyes using webcam technology is not the same as when you are directly with them.

To some extent, videotelephony brought the young man closer to the young woman. Yet as Abram (1997) notes vision and hearing are senses that are connected to distance. For when we survey our surroundings we can see the horizon, we can hear sounds sweeping across the landscape. By contrast, touch, taste and smell involve direct contact with things (other people, or the objects we encounter). Consequently, touch, taste and smell cannot be easily replicated using digitally mediated forms of communication. Furthermore, by placing her attention on a digitally mediated conversation, the young woman became less aware of the other people surrounding her in the cafe.

The observation of this digitally mediated conversation is a single encounter that is extracted from daily life, for reflective purposes. Even so, in the course of our daily lives, we can observe many similar conversations involving screens and digital devices. For instance, it is common to see customers sitting in cafes sipping drinks while peering into screens, talking to others who are not co-present or using their fingers to type IM. In these scenarios, there appears to be less opportunity to strike up a conversation with others who are directly present. Instead customers are absorbed in a digital reality of sorts through their devices, perhaps communicating with someone who is familiar to them, rather than risking talking to strangers sitting at the tables around them.

The website for the video-telephony application Skype proclaims that you can share 'experiences with the people that matter to you, wherever they are'.[3] However, the promotional claims made about Skype overlook many of the qualities that make face-to-face conversation valuable, such as reciprocal contact, feeling, even smelling the person next to you. Videotelephony also requires some sort of internet-enabled device (smartphone, tablet, laptop computer) and software. Furthermore, in terms of domestic usage, video-telephony services such as Skype require a contract with an internet service provider. Using videotelephony at an internet cafe may also require a fee. By contrast, speaking to someone directly via a face-to-face conversation does not require such technological paraphernalia and associated costs. Taking these points into consideration, video-telephony services extend our communicative reach and make it quick and easy to contact others who are geographically separated. Yet at the same time, these video-telephony services can bind us into complex technological infrastructures and commercial transactions that primarily aim to make a profit.

[3] www.skype.com

Speaking with machines

It is not only videotelephony that can shift our understanding of face-to-face communication. For instance, digital technologies can now replace some of the snippets of face-to-face conversation that are part of our daily lives. These snippets of face-to-face conversation include those brief encounters where we speak to other people, while shopping in stores, or boarding a bus or train. However, these snippets of conversation can now be overlooked when we use self-service ordering and payment systems. For these digitally mediated interactions reduce the need to speak to another human being. In fact, we tend to only speak to other people when this self-service technology does not operate successfully. For instance, when an item is not recognized at the self-service checkout, we call for a human assistant to help us. In addition, a frequent source of frustration with automated machines is the rigidity of their responses. Every time we use a self-service checkout, the encounter ends with the same phrase, in the same tone of voice. I am certainly not suggesting that we return to a situation, whereby we only speak to those we come into direct physical contact with, for this is not practical in a complex technological society. And sometimes we just want to get our shopping done as quickly as possible and the thought of having a creative, improvisational speech encounter at the checkout is the last thing on our minds. Similarly, it would be absurd to suggest that using self-service checkouts or online check-in facilities are eroding our humanity. Instead, the point I want to make is that digitally mediated forms of verbal communication can make it easy to overlook the sensory richness of speaking directly to another person.

Furthermore, in contemporary culture, children are learning to talk with internet-enabled toys (Arnott, Palaiologou and Gray, 2018). For instance, the Hello Barbie doll (Mattel) can ask a child a simple question such as 'want to play a game?' However, Barbie can also ask more exploratory questions such as 'what's your favourite colour?' The Barbie doll speaks and listens (through voice-recognition software) to what the child says to it. In this way the doll solicits an affective connection between them. However, there are many safety and privacy issues arising from children interacting and speaking to internet-enabled toys such as Hello Barbie and Furby Connect electronic pet. For as Hannah Kuchler's article in *The Financial Times* (2015) indicates, internet-enabled toys can be hacked and subject to data theft.

We can also speak to virtual assistants such as Alexa (Amazon), Cortana (Microsoft) and Siri (Apple) to supply information or select media content for

us. For example, Apple promotes Siri as a way to call people, provide reminders and open mail. Meanwhile, Amazon's virtual assistant Alexa provides news, information and can be used to give vocal commands to other devices. However, Maurice Stucke and Ariel Ezrachi (2017) critique the ways in which digital assistants such as Alexa serve the interests of the corporations who produce them, rather than their users. Furthermore, Stucke and Ezrachi state that 'digital assistants can provide more than information and services; they can anticipate a user's needs and requests' (2017: 1243). Indeed, these digital assistants collect and analyse data about their usage. This data analysis enables digital assistants to build commercially valuable profiles about their users and learn about their preferences for marketing purposes.

Additionally, Stucke and Ezrachi state that Amazon has 'opened its Alexa Voice Service to third-party hardware makers' (2017: 1246). What this means is that Alexa software can now be connected to a range of products and services including refrigerators, vehicles and self-tracking devices such as Fitbits. Exploring the implications arising from the usage of digital assistants, Stucke and Ezrachi note that this may alter how people perform online searches. For instance, Stucke and Ezrachi state that 'as consumers spend more time conversing primarily with their digital assistant, who will increasingly predict and fulfil their needs, they will less frequently search the web, look at price-comparison websites, or download apps' (2017: 1255). Moreover, instead of entering text-based online searches, users will make verbal requests to their digital assistant. However, as Stucke and Ezrachi point out, at present when entering text-based searches into a search engine, the user receives a range of results which they can scroll through (even if they are likely to just look at the first few 'hits'). On the other hand, it is likely that a digital assistant such as Alexa will provide one or two results. Not only that, if a user wants to find recommendations for products and services using a digital assistant, the results may not be impartial. Alexa, for example, will be more likely to suggest products from companies who are affiliated with Amazon.

These virtual assistants beguile us into considering them as human-like, through having human names and parsing human conversational patterns. For instance, the promotional material for Microsoft's virtual assistant states that 'Cortana is great at reminders and helping you keep your commitments. She can even remind you to do things based on time, places or even people'.[4] Note the

[4] https://www.microsoft.com/en-gb/windows/cortana

use of the pronoun 'she' in relation to Cortana, which personalizes this software application and gives the impression that it has female like qualities. Professor of Digital Humanities Andrew Prescott (2018) claims that 'commercially constructed personas' such as Alexa, Cortana and Siri have default settings which are racist and sexist (2018: 56). For instance, Prescott remarks that Siri cannot be set up 'to be a Jamaican man or a Haitian woman' (2018: 56). Meanwhile, writer and game designer Ian Bogost (2018) discusses the ways in which the female names for virtual assistants are linked to outdated sociocultural ideas about female servitude.

Despite the allure of the speed and efficiency of virtual assistants such as Alexa, Cortana and Siri, it could be a bit of a stretch to say that we converse with them. Rather, at present, we issue commands to them, to meet our needs. Moreover, virtual assistants do not connect words and meaning in the same way as human beings. Alexa, Cortana and Siri operate via the rules enfolded in software codes and algorithms which process connections between different words; but they do not understand the nuanced meanings of those words. And these virtual assistants may have difficulty responding to impromptu, spur-of-the-moment questions posed by a human being. In short, virtual assistants can provide factual information; but they cannot explain how they feel because they are not human.

In a reflection about his writing practices, Ken Goldsmith (2016) outlines the usefulness of Siri as an aide memoire and recording device. Goldsmith says running stimulates his subconscious and generates ideas that contribute to his writing. Goldsmith uses Siri to dictate these ideas while running then edits them afterwards. Notably Goldsmith adjusts his speech patterns to accommodate Siri's programming. For instance, he tells Siri when to insert a comma, period or new paragraph. In this way, Goldsmith's reflection highlights the ways in which we shape our conversational patterns in line with the voice-recognition programming of virtual personal assistants.

Meanwhile, dramatic accounts of our interplay with artificial personality constructs appear in fictional representations. The film *Her* (2013, dir. Spike Jonze), for example, offers a fictional portrayal of an intimate and fulfilling relationship with an operating system. When the film's main character Theodore (Joaquin Phoenix) acquires a new operating system named Samantha (voiced by Scarlett Johansson), he starts to have a romantic relationship with 'her'. However, William Gibson's much earlier science fiction narrative *Neuromancer* (1986) offers a less desirable vision of communicating with an artificial personality

construct. Gibson's novel highlights some of the important differences between human life and simulated personalities. In *Neuromancer*, the main protagonist Case questions the existence of the Flatline which is a programmed personality created by digital code. The Flatline tells Case that its existence is not equivalent to human life because it cannot feel anything.

As an admirer of Gibson's novel, I decided to play with his ideas about communicating with a personality construct in relation to Siri. First, I asked Siri, 'How do you feel?' And it replied (in a simulated human male voice with an English accent), 'Very well, thank you.' My interaction with Siri also reminded me of Janet Murray's (2012) discussion of the ELIZA program created by Joe Weizenbaum in the 1960s. ELIZA operated according to programmed commands, yet they appeared to be expressive. Although ELIZA responded to text input by a human, the program did not understand the meaning of the words. Instead, ELIZA followed pre-designed, pre-programmed rules for responses. Similarly, Siri did not understand the meaning of 'how do you feel' in the same way as a human being. The response Siri gave 'very well, thank you' was pre-programmed as a conventional response to my question. However, the limitations of Siri's programming soon became apparent when I followed my initial question with 'do you feel pain?' The point of asking this question was to find out what sort of answer would be given. Siri's reply was 'I don't have an answer for that'. This encounter with Siri highlighted the limited repertoire of a simulated type of conversation involving a question and answer format. Indeed, the encounter lacked the improvisational and unpredictable qualities of conversation with another human being. Of course, there is the possibility that the software programming of virtual assistants such as Alexa, Cortana and Siri will become increasingly sophisticated. Indeed, it is possible that Alexa, Cortana and Siri's software programming could provide some algorithmic randomness which gives the impression that they are able to craft a creative response to a question. Yet feeling pain is a subjective sensory experience that arises from a flesh and blood mortal body. Therefore, pain is not something that an artificial intelligence could feel.

However, research is underway in developing conversational agents and personal assistants that use artificial intelligence programming to build rapport with human users. Researchers at Articulab, Carnegie Mellon University, for example, are working on a series of projects which study human and computer interaction. Researchers at Articulab have developed SARA (the socially aware robot assistant) which can collaborate with human users, recognize vocal

inflections and generate appropriate forms of feedback through body language. Talking about the limitations of conversational agents such as Siri and Alexa, Articulab researchers Pecune, Matsuyama and Cassell (2018) point out that these systems 'do not yet allow multimodal input, or provide embodied output for their users' (2018: 1241). However, Pecune, Matsuyama and Cassell are already working on field trials of SARA to develop human interaction and communication with artificial intelligence generated systems.

The work of Andrea Guzman also investigates human–machine interaction, particularly in relation to automation and journalism. Guzman's work has also shown that human–machine interaction is becoming increasingly multifaceted and cannot be fully understood as simply talking to machines. Moreover, Guzman and journalism and communication scholar Seth Lewis (2020) raise a series of significant questions about researching human–machine interactions in relation to communication. Guzman and Lewis point to three significant aspects of human–machine communication: the functional, relational and metaphysical. In doing so, their work provides insight into the complexity of human–machine interaction and points to the importance of further research into this phenomena.

Concluding remarks

To summarize and conclude, the discussion in this chapter has explored the relationships between the body, face-to-face and digitally mediated conversation. In doing so, the discussion challenges the idea that the spatial and limitations of the body are irrelevant because we can now extend our communicative reach using digital technologies. Granted we can use smartphones to speak to others or use videotelephony to see and hear another person. Yet these digitally mediated experiences differ from having a tactile sense of being together in the same space and time, reaching out and touching someone. As discussed, there are some parts of the sensory experience of having a face-to-face conversation that cannot be fully accounted for using words, such as smell, touch and taste.

Due to the speed, efficiency and ease of use we might turn to digitally mediated forms of communication rather than trying to speak to a person face-to-face. We might even regard videotelephony as offering some sort of face-to-face conversation. At first sight, videotelephony does seem to enable synchronous conversation to take place. It is also possible to detect tone of voice

and some facial expression using videotelephony. However, by looking closely at videotelephony, we saw that there are some limitations to this digitally mediated form of communication. When we use webcams and screens, we do not look directly into another person's eyes. Webcams used with videotelephony also display the head and face, rather than other parts of the body. Consequently, on screen the other person we are conversing with becomes a flat image.

The penetration of digital technologies into our daily lives means that we can lose out on opportunities to speak to someone directly. When we go to the supermarket checkout, or when we buy bus, train or theatre tickets, we can use self-service machines instead of speaking to another human being. We are also speaking commends to virtual assistants because they appear to make our lives easier. Alexa, for example, can be used to provide information about the weather, appointments that are scheduled via other digital devices (if they are networked to Alexa), make voice calls and shop. Alexa can even be linked to 'smart' digital objects in the home, such as managing the temperature of our living room. Alexa, Cortana and Siri can also serve an array of media content to us. These virtual assistants also simulate conversation and appear human-like through having names. Moreover, these virtual assistants employ human-like qualities to encourage us to use them and have a continual relationship with the companies who provide them. Yet by using these virtual assistants on a regular basis, we are producing valuable marketing data that can then be used for commercial purposes.

Speech remains a physical act, even when we engage with face-to-face and digitally mediated forms of communication. However, communicating and connecting with others directly through face-to-face discussion is not something that can be edited, paused or replayed and this is what makes it so valuable.

After outlining the value of face-to-face conversation, Chapter 3 considers the ways in which the development of alphabetical writing systems contributes to the social and cultural construction of reality. In doing so, the discussion considers the phenomena of writing in the digital age, using keypads, keyboards and smart-pens. In this way, the discussion aims to extend Ong's (1982) study of orality and literacy to the study of digital technologies in contemporary culture.

3

Writing and digital technologies

Writing as a sensory experience

There is a performative and kinaesthetic aspect to all forms of writing, on paper and while using digital devices. Therefore this chapter pays attention to writing texts such as IM, tweets, blog entries, status updates and word-processed documents as a bodily practice. The chapter also explores how producing the words that we see on digital screens differ from handwritten inscriptions. In the case of handwritten inscriptions, the hand, fingers, wrists, shoulders are involved in shaping the letters, creating the marks that can be seen on paper or some other suitable surface. However, with the use of keyboards or voice-recognition programmes, the shapes of letters appear ready-made on screen (Adams, 2016). Not only that, the words that appear on electronic screens can be manipulated and erased, more easily than handwritten letters on paper, or marks etched on clay or stone.

This chapter is not about the aesthetic qualities of handwritten inscription such as calligraphy. Nor is the chapter about the history of writing, from Roman times to digital texts (Clayton, 2013). Instead, the discussion that follows is about writing with the body. To make such a huge topic manageable, the discussion is based on a selective overview of the bodily aspects of alphabetical notation systems. The discussion also concentrates on writing in relation to various tools such as keyboards, smart-pens and augmented electronic 'paper'.

Themes

There are two overarching themes to this chapter: first, there will be an exploration of the connections between the development of alphabetical writing systems and the sensory aspects of the body. Abram (1997, 2011) shows this shift

occurred because alphabetical notation created phonetic symbols that are linked to human voice. Consequently, the link between bodily sensory experience of the more-than-human world and symbolic systems of signification became more complex and oblique (Abram, 1997). Studying alphabetical forms of notation is important because it is central to our experience of producing and interpreting digitally mediated forms of communication such as texts, tweets, IM and other word-processed documents we encounter on a daily basis.

Second, studying writing is important because it is a form of self-expression that bears the traces of our unique existence (Neef 2011; Hensher, 2012). In contemporary culture, with the development of digitally mediated forms of communication using smartphones, tablets and computers, there is a reduced need to handwrite. On this point, media scholar Sonja Neef remarks that 'compared with the spectacular acts on the stage of our contemporary media culture, handwriting comes over as an anachronistic leftover, a relic of a pre-technical age' (2011: 22). Even so, as Neef points out, we still handwrite certain things such as love letters, letters of condolence and short messages such as shopping lists, or reminders on sticky notes. However, writing with keyboards and the use of other visual symbols such as emojis has proliferated (Danesi, 2016). Outlining some of the advantages of digital writing, Neef remarks that there are 'no ink blots, no blunt pencils, no chalk squeaking or scraping on the [chalk] board' (2011: 19). Indeed, digital writing is advantageous in many ways, it is quick, easy to edit and erase. For example, we can type on a keyboard, click an electronic button and use our fingers to swipe across a digital screen to make travel arrangements, order food or purchase a new pair of jeans.

Neef (2011) also shows how the physicality of writing can be traced to the development and importance of the human hand. In doing so, she explores the historical development of handwriting and writing implements. However, this chapter differs from Neef's approach since it places more emphasis on philosophical understandings of writing, especially the phenomenological approach to sensory experience.

Studies of written communication

There is a body of scholarship which focuses on the shifts from predominantly oral cultures to literary cultures and writing as a symbolic mode of inscription.

Many scholars have approached this topic by referring to Plato's dialogue *Phaedrus* in which the merits of orality and writing are outlined and scrutinized (Ong, 1982; Postman, 1985; Carr, 2010; Derrida, 2012; Rheingold, 2014; Thompson, 2014). Yet within this existing scholarship there is a strong emphasis on the cognitive shifts arising from this shift from oral to literary culture. The scholarship surrounding *Phaedrus* also appears to be largely underpinned by the same sort of philosophical framework as Plato, whereby cognition is valued (because it posited as something that transcends physical form) while the body is seen as less important because it is mortal and impermanent. In turn, what appears to be less developed in these studies is a sensory approach to the bodily aspects of writing, of making marks on various surfaces to produce meanings that can be communicated to others. The following discussion does not deny the importance of the cognitive aspects of symbolic mark making since this is an indispensable aspect of our daily lives. But there is a danger that we can privilege the cognitive aspects of writing as a meaningful activity, in such a way that writing becomes detached from the body. For it is not possible to fully understand our engagement with digitally mediated forms of communication by focusing solely on writing in relation to cognitive processes.

In this chapter current debates about contemporary technologies and symbolic systems of signification will be regarded as part of a long and complex history. Therefore, divisions between old and new media will be shown to be misleading (Standage, 2013). However, this chapter does not aim to present a full historical account of changes in the field of written communication (Clayton, 2013). Instead, the discussion in this chapter refers to selective instances, examples and debates which highlight the importance of the body in relation to writing as a visceral communicative activity. By presenting a selective account of some of the historical aspects of symbolic mark making, it is possible to trace similarities between current anxieties and former debates about technological change. Tracing these similarities is important because it challenges the idea that contemporary technologies are novel and somehow fundamentally different from prior technological developments. However, while tracing these historical connections, the discussion also recognizes that the social, cultural, political and economic impact of developments, such as alphabetical writing systems and printing in Europe during the fifteenth century, reverberated over several hundred years. By contrast, the impact of the internet and digital devices such as smartphones has been transformative at a global level in decades rather than centuries (Harris, 2014; Kelly, 2016).

Marks, traces and meaning

Abram discusses how animals leave marks as they traverse the environment, such as broken twigs, claw or paw prints. In indigenous cultures, when humans hunt they read these marks left in the landscape, so they can trace and kill animals (Abrams in Damery, 2013). These discussions about mark making can seem far removed from our everyday experience, in technologically developed cultures. Nonetheless, echoes of these connections between bodily marks and the landscape can be detected in various ways. For instance, the term 'digital footprint' refers to the trails of information we create as we traverse numerous digital screens and devices.

Early forms of human inscription were produced by using surfaces such as animal bones or clay tablets. In his study of the historical development of handwriting, Philip Hensher remarks that circa 4,000 BCE, inscriptions were made to record economic transactions in the Neolithic culture of Yangshao China (2012: 31). When humans started to make marks such as ideograms, they were stylized shapes representing recognizable physical phenomena. Even today, some Mandarin Chinese logograms and Japanese kanji connect the symbol to the more-than-human world (such as the symbols for tree, sun, moon or water).

The aleph-beth

In his study of the alphabet, John Man (2000) offers a plausible account of how Egyptian hieroglyphics were adapted by Semitic scribes into a system of letters. At first there seems to have been a tangible link between our sensory, bodily perception of the more-than-human world and symbolic modes of inscription. For instance, the aleph which is the first letter of the Semitic system refers to the Hebrew word for ox (Abram, 1997). The depiction of the aleph as an ox's head also reveals something of the life world of the culture in which it was used. Furthermore, Man explains that the sign for the head of an ox was used to define 'the sort of meat to be used in rituals like funerary offerings' (Man, 2000: 86). It is also notable that other Hebrew letters, such as beth (meaning house) and mem (water), have a tangible connection to physical phenomena that are part of everyday life.

When the aleph-beth phonetic system was first developed, it did not have vowels. However, in the seventh century CE dots and dashes below or above the

letters were introduced to signify vowels. In ancient Hebrew philosophy vowels are linked to breath 'while the consonants are those shapes made by the lips, teeth, tongue, palate, or throat, that momentarily obstruct the flow of breath and so give form to our words and phrases' (Abram, 1997: 241). Through the breath we are linked with the more-than-human world. Since the wind or air is invisible, making marks to represent the vowels would be regarded by ancient Hebrews as an attempt to make the invisible become visible (Abram, 1997). It would have also meant fixing the breath in place by creating a letter to represent it. Yet the breath cannot be fixed in this way because it is part of our interaction and interdependence with the world. We breathe in the oxygen generated by plants and plants use the carbon dioxide we breathe out. When the aleph-beth was developed it was not a complete transcription of the human voice into symbols. Instead, something needed to be added to it. There is a participatory and creative aspect to the aleph-beth since there are varying interpretations of the written letters according to contexts in which they are used.

The alphabet

The Semitic aleph-beth notation system underwent further changes when it was transported to Greece and Rome. These changes resulted in what we now know as the alphabet. Ong (1982) indicates that the Greek phonetic alphabet was developed around 750 BCE. Ong also explains that the term 'phonetic' can be traced to the Greek terms *phōneo* meaning to speak, voice and *phōno* meaning sound. We can still detect traces of these Greek terms in words such as *phono*graph (which reproduces and records sound) and the tele*phone*. Ong's thorough and expansive study of oral and literary cultures also illuminates some of the cognitive and conceptual changes arising from the development of alphabetical writing systems. Ong contends that the alphabetical writing system is a technology that makes abstract, conceptual thought possible. He adds that the word literature means 'writings' (1982: 11) and that it stems from the Latin term *litera*, meaning letter of the alphabet. The Greek system subsequently influenced the Roman alphabet, which we are still using today, as we write blogs, social media posts or IM.

Discussing the changes made from the aleph-beth to the alphabet, Abram (1997) remarks that the letter for aleph was rotated and became alpha (the letter *a*). Similarly, the Hebrew letter for eye which was represented as a circle became

the omega (the letter *o*). When Greek scribes added symbols to represent the vowels to the alphabet this gave the impression that the invisible (the air, wind, spirit or breath) could be made visible. Adding vowels to the alphabet also meant that the Hebrew practice of improvising vowel sounds was no longer necessary. However, when the aleph-beth was developed by Greek scribes, the connection with the sensible world of phenomena became more distant. The shapes of the letters were no longer connected to Hebrew words referring to tangible things in the world. As we shall see, these historical developments are relevant to debates about increasing levels of abstraction, whereby symbolic systems of signification become detached from physical phenomena. Furthermore, these moves towards abstract mark making through alphabetical notation systems are central to the unfolding discussion of how our perception and understanding of writing as a form of communication using digital technologies are linked to the body.

Yet abstraction through symbolic systems of signification is not an all or nothing state; rather there are varying degrees of abstraction from the more-than-human world. To help elucidate these ideas about symbolic notation and abstraction, it is helpful to trace some of the main points raised in Plato's dialogue *Phaedrus* and connect them to contemporary debates about digital technologies and the body. Plato's dialogue was connected to debates about orality and literacy in Plato's lifetime. For Plato was teaching philosophy 'precisely at the moment when the new technology of reading and writing was shedding its specialized "craft" status and finally spreading' (Abram, 1997: 108). Yet Plato's dialogue remains relevant today especially in relation to debates about the body and digital technologies.

The Platonic Ideal

The debates about orality and writing which are found in *Phaedrus* connect to Plato's overall philosophical framework, which posits the existence of an Ideal realm of pure, unchanging essences. Plato's philosophical framework acknowledges that the material world is fleeting and impermanent. However, Plato maintains that the Ideal transcends this impermanent material world and is unchanging. Plato's view of the fleeting qualities of the material world and the unchanging essences of the Ideal can also be linked to the development of alphabetical writing. For alphabetical writing attempts to affix the fleeting impermanent world by creating linguistic labels that generate meaning. In this

context, the written word can be regarded as an attempt to provide a fixed, permanent record of phenomena such as people, places and events. For example, the River Aire, one of the major rivers in Yorkshire, England, is not a static thing. After heavy rainfall the river swells, sometimes breaking its banks and flooding adjacent fields. In extremely windy weather the river appears choppy, as silt stirs up from its depths. In contrast to the dynamic changing qualities of the river, the written word river has a fixed structural quality. The letters spelling out the word river must be placed in a set combination to make sense. It is also possible to apply these ideas about overcoming transience through symbolic notation to the body. Our bodies are impermanent, subject to change, growth, disease and decay. Yet, to some degree the word 'body' fixes the flux and messiness of human existence. Taking these points into consideration, it is possible to detect differences between the changing qualities of the world around us and the fixed quality of alphabetical writing.

In contemporary culture, the material world is also becoming increasingly transposed into digital code as the written words that appear on the surface of screens (such as social media posts, blogs, emails, websites and tweets) are generated by digital code and algorithmic processing. On screen we see the familiar shapes of words as we read and write texts. Yet each letter is formed by digital code that operates beneath our immediate perception. The shape and combination of the words we write or read on blogs, social media or online newspapers are meaningful to us and we can make sense of them. But the words we see on screen are also operational elements in a sequence of programmed rules (that are understandable to a machine).

Socratic dialogue

In Plato's lifetime, philosophy was a practice involving oral transmission from a master (such as Socrates) to a student (Plato). Through writing *Phaedrus*, Plato is producing a written reminder of what was transmitted through face-to-face dialogue with his teacher. In Plato's dialogue, Phaedrus is carrying a written text which is a copy of a speech given by an eminent orator called Lysias. Crucially, it is the use of alphabetical notation that enables Phaedrus to analyse this speech and reflect upon it. Socratic dialogue uses reflection as a way of questioning beliefs and assumptions. During a Socratic dialogue, the speaker has to defend their statements by clarifying and explaining the points they make. In the case

of oral cultures, teaching and learning involve stock phrases which can be easily repeated and remembered, so there is less emphasis on explaining or clarifying points. In ancient Greece, the Socratic dialogue conveyed concepts such as virtue and justice by connecting them to concrete actions and particular situations. By doing so, abstract concepts were linked to sensible phenomena, the things we perceive in the world. But with the development of the alphabet, abstract concepts could now be illustrated using written examples.

In *Phaedrus*, Socrates is a city dweller who goes on a journey from Athens along the river Ilisus. Socrates appears to be someone who feels more at home in the city than in the countryside, for he tells Phaedrus that trees and the open country cannot teach him anything. In Plato's lifetime the countryside was considered as something which was beyond the confines of the formal structures of society. By contrast, Athenian culture was regarded as the site of institutions for culture and learning. Consequently, in this Socratic dialogue we detect some degree of separation between the more-than-human world and culture. Furthermore, this separation from the more-than-human world in *Phaedrus* shows how contemporary debates about the development of digital technologies and alienation from the body have a long history.

Notably Phaedrus and Socrates are walking, resting and conversing. As such they are engaged in a shared temporal, spatial and bodily experience. Their physical journey also has affinities with the construction of a philosophical argument since Plato offers signposts along the way to explicate his points. Moreover, when the argument reaches a conclusion Phaedrus and Socrates turn back towards Athens.

While Socrates claims that trees and the open country will not teach him about philosophy, the dialogue is set in the countryside rather than the city. Also, in one part of the dialogue Socrates makes an oath by calling upon the spirit of a tree (Abram, 1997). By calling upon the spirit of the tree, Socrates seems to be acknowledging that the more-than-human world does have power. Furthermore, *Phaedrus* shows the importance of animism in oral cultures through referring to sounds made by cicadas (Abram, 1997). Socrates recites a mythological story about cicadas to Phaedrus. The story details the ways in which the muses (goddesses representing the arts and science) enchanted people through their music and song. People became so enticed by music and song they forgot to eat or drink and died. After their death these people were transformed into cicadas, so they could sing continually. Therefore, in Ancient Greek culture cicadas were considered mouthpieces of the muses. On the surface, Socrates appears to value

oral culture by referring to animistic beliefs about the cicadas and the muses. However, Abram cautions that the view towards animism and oral culture in *Phaedrus* needs to be set in 'the context of a more subtle devaluation' (1997: 121). For Abram reminds us that overall *Phaedrus* values culture and cognition rather than sensory experience of the more-than-human world.

John Cooper (1997) contends that *Phaedrus* shows the limitations of even the most esteemed orator Lysias, in relation to erotic love. According to Cooper, *Phaedrus* explores whether the passion of erotic love can transfer to the love of philosophy. Socrates attempts to persuade Phaedrus to love philosophy with the same passion as erotic love. Socrates presents the view that speech consists of words, which are forms of resemblance; they do not offer access to unmediated truth. Yet in some cases, words can take us away from the truth and mislead us. These points about crafting words and misleading forms of writing are relevant to current debates about fake news and click-bait stories. When writing becomes digitized (and becomes computerized code), it can be produced in larger quantities, parsed, edited and circulated at greater speeds. Therefore, a statement written and posted to social media such as a tweet can reach millions of people in a few minutes. However, according to critics such as Morozov (2014) and Lanier (2018), the economic model underpinning social media usage favours maximizing the circulation of a post to increase advertising revenue, rather than considerations about accuracy.

In Plato's dialogue, Socrates tells Phaedrus a story about the God Theuth and Thamus, the king of Egypt. Socrates prefaces this embedded narrative stating that 'I can tell you what I've heard the ancients said, though they alone know the truth' (Cooper, 1997: 551). Therefore, Socrates makes his point through offering a mythological story within the context of a larger story. Instead of speaking directly about truth and symbolic systems of signification and meaning, Socrates uses an oblique approach which is more evocative, nesting these ideas in the legendary tale of Theuth and Thamus.

In the legendary tale, Theuth claims written language will develop the intellect of the Egyptians and improve their memories. However, Thamus disagrees with Theuth and claims that the Egyptians' mental faculties for memory will decline because they will grow dependent on using external symbols. Thamus claims symbols are merely tokens which represent reality. Therefore, people will be fooled; they will think their intellectual abilities are developing but in fact they will lose important cognitive skills. There are some parallels between the argument presented in *Phaedrus* and contemporary debates about the cognitive

impact of technology in relation to orality and literacy. For the idea that memory will decline through dependence on external symbols has affinities with contemporary debates about the use of the digital technologies as a mechanism for acquiring and storing information (Carr, 2010; Rheingold, 2014). For instance, we often use the Google search function as a way to recall information rather than attempting to remember it ourselves.

Thamus claims Theuth's judgement is clouded by his enchantment with writing. In fact, Thamus says writing 'will introduce forgetfulness into the soul of those who learn it; they will not practice using their memory because they will put their truth in writing, which is external and depends on signs that belong to others' (Cooper, 1997: 551–2). Socrates's discussion of this legendary tale shows how signs are socially and culturally constructed symbols which are embedded within language communities (on this basis they belong to others). Whereas the speech that occurs in face-to-face conversation also connects to the unique particularities of the speaker's breath and their lived experience of being-in-the-world (which is also socially, culturally and historically inflected). Therefore, as outlined in Chapter 2, in the case of face-to-face speech, each speaker is not just using signs that belong to others. Instead, the vocal sounds they emit are dependent on using their lungs, vocal tract, lips and mouth. Yet oral culture is based on what you can remember. In oral cultures different strategies are used to help with memorization such as rhyming and the rhythmic qualities of speech. On this basis Carr states, 'Intellectually, our ancestors' oral culture was in many ways a shallower one than our own' because this was based on formulaic repetition (2010: 57).

Plato was an esteemed writer, and the dialogue between Phaedrus and Socrates has been transmitted to us through writing. However, as Jacques Derrida (2012) remarks, there have been several translations of Phaedrus which will have changed the nuances of the dialogue. In this way, a dialogue (the living voice) has been transposed into what Derrida terms 'a breathless sign' (2012: 95). Digital communication technologies have also extended the reach of Plato's dialogue; for instance, we can learn about *Phaedrus* from Wikipedia, blogs, YouTube videos or read the full text online. After outlining *Phaedrus* in relation to speech and writing, the discussion now moves on to consider how alphabetical systems of writing spread first through handwritten texts copied by scribes and later by the development of the printing press. In doing so, the discussion will explore some of the scholarship surrounding the social and cultural transformations that are linked to alphabetical writing systems.

As discussed, the development of symbolic systems of signification began with inscriptions that were linked to tangible phenomena such as the sun, moon, trees and water. But as symbolic systems developed, written forms of inscription became increasingly abstracted from sensory experience and the more-than-human world. As the discussion has indicated, one of the consequences arising from the development of the aleph-beth and the alphabet is that the phenomenal world of experience can be transposed into marks that represent the sounds made by the human voice.

Alphabetical notation spread from Greece across Europe through networks of monasteries and churches, where scribes would copy religious tracts. In his study of medieval monastic practices, Ingold explains that scribes produced written texts as a way of allowing the mind to travel from one point to another. He states that writing involved pulling ideas such as 'places previously visited' (2010: 17). Ingold goes on to explain that the term 'pulling' in Latin (*tractare*) is linked to the English word 'treatise', as a form of writing. In this context, 'The flow of the thinking mind, as it proceeded along the trails of the written text, was known as ductus' (2010: 17). In these medieval texts there were various sites, or signposts, along the way to aid comprehension. On this point, Ingold says, 'To walk is a journey in the mind as much as on the land: it is a deeply meditative practice. And to read is to journey on the page as much as in the mind' (2010: 18). Ingold's discussion of the similarities between journeying through the imagination and traversing through physical spaces is reminiscent of *Phaedrus*, and it also opens up new ways of perceiving the connections between writing, space and movement. However, it is important to add that the journeying process Ingold outlines does not just concern the mind; rather it is a bodily experience.

Printing

A major transformation occurred in written communication with the development of the printing press by Johannes Gutenberg in the fifteenth century. The printing press made it possible to format and reproduce letters, words and sentences in large quantities. Pamphlets and books became available spreading political and religious ideas. In *The Printing Press as an Agent of Change* (1979), Elizabeth Eisenstein discusses how the printing press contributed to the development of rational thinking by presenting orderly, sequential points. She also outlines the social and cultural impact of the printing press as a way

of disseminating and preserving knowledge. For instance, she highlights how printing transformed attitudes and beliefs about science and religion in Western culture. While the printing press was transformative, the social and cultural changes that followed happened over several hundred years. By contrast, digital technologies are bringing about changes on a global scale within a much shorter timescale, even within a single generation (Harris, 2016).

In *Amusing Ourselves to Death*, Neil Postman (1985) outlines the ways in which printing is a way of labelling things, creating conceptual categories and modes of classification. Building on this argument, Postman contends that 'in a culture dominated by print, public discourse tends to be characterised by a coherent, orderly arrangement of facts and ideas' (1985: 52). According to Postman, printing generates certain ways of thinking and speaking which provides the backbone of public discourse. Postman refers to the public oratory of President Abraham Lincoln (1809–65) and Senator Stephen A. Douglas (1813–61). Postman recounts that the public debates between Lincoln and Douglas were based on the printed word and involved setting out a logical argument, rational thinking and rebuttal. Postman adds that the debates between Lincoln and Douglas often lasted several hours so the audience 'must have had an equally extraordinary capacity to comprehend lengthy and complex sentences aurally' (1985: 47). Postman moves on to outline the main cognitive characteristics associated with print culture such as the ability to construct concepts, the use of deductive reasoning, setting out sequential points, order and rationality. Moreover, Postman claims that print culture fosters detachment, objectivity and has 'a tolerance for delayed response' (1985: 64). As his argument develops, Postman compares and contrasts print culture with the age of television in the mid-twentieth century. For Postman states that unlike print culture, television does not convey lengthy, complex sentences; instead it provides quick, easily digestible sound bites.

Memory, learning and concentration

Many of the points Postman raises about the cognitive characteristics of print culture and their decline in the age of television are similar to Carr's (2010) arguments about the detrimental aspects of digital technologies in relation to memory, learning and the ability to concentrate. Offering a different perspective, technology and communication scholar Howard Rheingold (2014) acknowledges

debates about the negative cognitive implications of contemporary technology. But in doing so, Rheingold asserts that it is important to increase our awareness of how we engage with contemporary technology because these provide powerful communication tools that can be used to disseminate what we think, believe and value on a global scale. However, Rheingold cautions that if we use contemporary technology mindlessly such as responding automatically to stimuli, then we can become easily misled, confused or overwhelmed. Rheingold also dismisses Carr's work for focusing predominantly on the perceived negative impacts of digital technology. Rheingold claims that 'Carr's literary device of exaggeration is entertaining, but his extreme stance weakens his dismissal of the power of culture to tame media's attentional effects' (2014: 53). Furthermore, Rheingold is critical of Carr's idea that the negative impact of technology is inevitable. Instead, Rheingold emphasizes agency by arguing that we can choose how to engage with contemporary technology.

Galit Wellner (2019) also points out that there are various and contradictory definitions of attention. For example, Wellner refers to the ways in which attention is regarded as a filtering mechanism, a way of organizing perceptive experiences and is also linked to working memory. She contends that there are different ways of approaching attention, one involves classification (defining different modes of attention) and another is historical (examining how modes of attention change over time). As she remarks, attention is mostly regarded as something to be cultivated and managed. Moreover, lack of attention is framed in negative terms as loss, or incapacity. Wellner also claims that digital multitasking is not a fast switching back and forth from one thing to another. Instead, she states that 'this new mode of attention is simultaneously distributed among several objects' (2019: 48). Wellner adds that the ability to simultaneously give attention to various objects challenges the notion that attention is scarce. Furthermore, she states that 'concentration should not be abandoned' (2019: 61). Instead, 'It should be taught as a complementary strategy, but certainly not as an exclusive one' (2019: 61).

The work of Postman, Carr, Rheingold and Wellner makes a significant contribution to debates about the implications arising from technological development, especially in relation to written communication. Yet their work tends to focus on the cognitive impact of technological change, while discussions about the body remain relatively unexplored. However, phenomenological practice can take the discussions further by considering how technology impacts upon the sensory experiences of everyday life. In particular, phenomenological

practice can illuminate the ways in which digital technologies intersect writing practices.

To avoid accusations of producing a sentimental account of handwritten inscriptions rather than writing with keyboards, or software recognition programmes, I want to end this chapter by exploring the ways in which all forms of writing can be considered technological. Moreover, handwriting and producing texts via keyboards or smart-pens can be considered bodily activities.

Contemporary technology, writing and the body

In his study of symbolic systems of signification, Idhe observes that writing is 'technologically mediated language' (1993: 222). In his discussion, Idhe uses the term 'technology' to refer to equipment or machinery (the printing press, typewriter or word processor). Idhe also states that writing involves various mark making tools such as the stylus, quill, pen, pencil, chalk or charcoal, which fulfil a particular function. Written forms of language also require some sort of writing surface such as a tablet, scroll, paper or screen.

Derrida also claims that handwriting is a technological process. When we write by hand, 'we are not in the time before technology; there is already instrumentality, regular reproduction, mechanical iterability' (Derrida, 2005: 20). Therefore, Derrida cautions against comparing and contrasting handwriting and mechanical forms of writing with a typewriter or word processor. Importantly, Idhe and Derrida's comments remind us that even writing with tools, such as a pen and paper, are technologically mediated forms of communication.

Further insight into technologically mediated writing can be found in the work of professor of education, Catherine Adams (2016). Adams provides an insightful phenomenological account of typing using a keyboard, which was produced a few days after she had fallen and broken the fifth metacarpal of her left writing hand (2016: 482). In her rich description of typing, Adams notes the differences between holding a pen or pencil in a single hand when handwriting and typing using both hands: 'On a QWERTY keyboard … my otherwise "non dominant" right hand participates as an equally skilled partner, commanding not only half the keyboard, but also the mouse or trackpad' (Adams, 2016: 483). She also pays attention to how her hand movements synchronized when tapping computer keys and how one hand operated the mouse to scroll through documents and click on menu options.

Adams provides a vignette of using her laptop in a coffee shop to illuminate the phenomenological aspects of writing further. In this vignette, she refers to using Microsoft Word software and how this differs from writing on paper. First, she notices that opening a new blank word document is not the same as a blank sheet of paper. Instead, the new word document is framed by various toolbars and icons. Moreover, the document has already been given a name by default, document 1.

Adams then moves on to a compare and contrast discussion of the differences between writing using a word-processing programme and handwriting in a paper journal. When using her paper journal, she flips it open, goes to a blank page and writes the date in the top right-hand corner. Although there are horizontal lines printed on the page of the journal, Adams barely notices them. What she does notice, however, is that when she is writing by hand on paper, there is no auto spellcheck or red lines appearing under the text she has written.

Reflecting on these writing experiences, Adams asserts that she is not romanticizing handwriting. In fact, 'It is an error of nostalgia to argue that the artisanal craft of handwriting is more cognitively callisthenic than the navigational gymnastics of the keyboarding and mousing fingers and hands' (Adams, 2016: 496). Instead, Adams indicates how writing using a keyboard and word-processing software are different forms of bodily activities. To summarize, handwriting in a paper journal or typing letters on a keyboard which appear on screen can both be considered as technologically mediated bodily practices.

The work of Van Manen and Adams (2009) provides additional insight into the bodily aspects of writing. First, Van Manen and Adams consider writing as a spatial and temporal process. For example, through writing we use our imagination to travel to places that have never existed. Moreover, Van Manen and Adams contend that 'the writer dwells in an inner space, inside the self' (2009: 11). Yet they also warn that the idea of being inside our thoughts could lead to a misleading division between the inner and outer self. Similarly, such arguments could slip back into Cartesian dualism, whereby the writer's body is locatable (and can be measured empirically) at a certain place and time while their thoughts transcend their physical location. Instead of falling into binary oppositions of the inner and outer self, Van Manen and Adams state that 'it is just as plausible to say that the writer dwells in the space that the words open up' (2009: 11).

It is also important to call attention to the materiality of writing both on paper and on screen. When we handwrite, we leave traces of the pressure we have

applied to our writing implement. This pressure can leave heavy indentations or light strokes on the surface of paper. Furthermore, Sheets-Johnstone (2016) remarks that handwriting bears traces of the rhythm, tempo and movements we make as we shape letters on paper. While typing also involves various interplays between the movement of different fingers and the keyboard, it does not leave indentations on a surface. Instead, ready formed words appear as flat images on a screen. Expanding these points, Van Manen and Adams point out that 'there are spatial aspects even to the graphic nature of the letters we produce: letters written with a pen or pencil possess a certain substantiality in terms of the ink or graphite that is deposited on the paper' (2009: 12).

When we write by hand, we can physically cross out letters, words or entire sentences, then start again. We move our pen or pencil vertically then horizontally, crossing out a letter. Or using an eraser we rub the surface of paper to remove the marks we have made. Derrida says when writing on paper 'previously, erasures and added words left a sort of scar on the paper or a visible image in the memory' (2005: 24). But with word-processing software, it is easy to delete words; they just disappear from the screen without a trace (if we are not using the track changes feature of some programmes). In addition, when we write using a keyboard and word-processing software, we can edit as we write. There are also numerous writing software programmes including Grammarly (Grammarly Inc), Scrivener (Literature and Latte) and Ulysses (Gmbh & Co.KG) which can be used to write, proofread and edit documents and synchronize them across a range of digital devices.

However, as Van Manen and Adams state, 'The text that emerges from writing online constantly looks perfect already' (2009: 13). Word-processing software creates various fonts, sizes and colours. But the words that appear using word-processing software are pre-programmed and standardized. Consequently, 'On the screen, authored words stare back at their writer in a new an unexpected way. They are strikingly clean and professional' (Van Manen and Adams, 2009: 13). As we type, word-processed text appears immediately on screen largely removing the labour of using our hands to shape the letters of the alphabet ourselves. By contrast, our handwriting bears our personal stamp, the trace of our unique existence.

Recent technological developments such as augmented paper and smart-pens disrupt strict divisions between writing using word-processing software, pen and paper. For these augmented writing systems combine handwriting with word-processing software. Mont Blanc, for example, has developed augmented

paper that can be used with a smart-pen that transposes handwritten text to digital devices. Mont Blanc[1] also sells augmented paper notebooks which are considerably more expensive than traditional paper-based notebooks. By using a Mont Blanc smart-pen and augmented paper, the marks made by this implement can then be displayed as handwriting or typed text. Similarly, the Moleskin smart writing set combines writing through the use of a tablet notebook, smart-pen and software applications. Promoting these smart writing systems on their website, Moleskin proclaim that products such as the Ellipse smart-pen combine 'the natural immediacy of expressing yourself on the pages of a notebook with all the advantages of borderless digital creativity'.[2]

These smart-pens and electronic notebooks not only transpose the bodily movement of the hands into digital script; they also integrate the written word into a digital network where it can be spliced, recombined, tracked and measured in ways that go beyond handwritten text in a printed notebook. In addition, there are now a plethora of digital techniques for calligraphy including software applications and online tutorials, which also disrupt strict divisions between handwriting and digitally formed texts (Thomson, 2003).

Concluding remarks

While not denying the importance of the scholarship surrounding the social, economic, political and cultural ramifications of digital technology, or how technology might impact upon cognition, it is equally important to explore how technologies relate to our sensory experience of writing. As discussed, the development of alphabetical writing systems brought about a momentous shift in human perception and relationship with the more-than-human world. For in the case of the alphabet, the marks represent human sounds; they are not connected to the full myriad of sounds and stimuli found in the more-than-human world. Even when we read written words silently, we hear the sounds of words. The visible (written words) are intertwined with the aural (the phonetic sounds). Notably, the sound we hear when reading written text is the human voice.

As discussed in this chapter, previous scholarship has tended to emphasize the cognitive rather than sensory and bodily aspects surrounding the development

[1] http://www.montblanc.com
[2] https://us.moleskine.com/en/

of alphabetical writing systems. For instance, Plato's dialogue *Phaedrus* largely emphasizes the development of writing in relation to cognitive processes such as memory and the construction of knowledge. Likewise, the subsequent scholarship surrounding *Phaedrus* mainly concerns cognition rather than the sensory qualities of the body in relation to speaking or writing. Indeed, it appears that the scholarship surrounding *Phaedrus* is largely underpinned by the same sort of philosophical framework, whereby cognition is valued (because it transcends physical form), while the body is seen as less important because it is mortal and impermanent.

This chapter has also considered how the increasing use of digital technologies makes it easy to overlook the bodily connections between writing as mark making. For in the case of word processing, fully formed letters appear on screen by simply pressing down letters on a keyboard or by using a voice-recognition programme. Using word-processing programmes, we can quickly and easily produce or edit texts. We can start producing a text on one device such as a tablet, upload this text to cloud storage and continue working on it via other devices (such as personal computers or smartphones). Yet unlike a handwritten document, the writing which appears on the screens of these devices does not give any indication of the physical effort made in producing them.

The discussion in this chapter does not claim that handwriting is preferable to typing or texting using keyboards. Instead, I recognize that handwriting is technologically mediated, through the development of different tools (reeds, quills, steel nibs, plastic pens), ink and supporting surface (such as paper or stone). Even so, the discussion in this chapter highlighted some of the differences between handwriting documents and word-processing software. Indeed, the chapter indicated that the development of digital writing systems using augmented pens and paper brings to light new connections between the bodily aspects of writing and the ephemerality of digital texts.

The development of alphabetical writing systems has been incredibly advantageous. For written language has fostered legal systems, economic growth, scientific study and creative expression through literature and poetry. Yet when considering the enormous benefits arising from alphabetical writing systems, it is equally important to consider the sensory aspects of writing, rather than simply focusing exclusively on cognitive changes. Indeed, as discussed in this chapter, writing is a kinaesthetic activity that bears the trace of our movements. In Chapter 4, further consideration will be given to how movement repertories are entwined with digital technologies in daily life.

4

Movement, meaning and digital technologies

Studying movement and meaning

This chapter explores how movement as a bodily practice generates meaning. Following on from the phenomenological research practices outlined in earlier chapters, this chapter attempts to suspend some sociocultural assumptions about movement. Chapter 1 discussed Husserl's account of moving around his writing table and perceiving it from different directions. He also commented on the ways in which his gaze could move from the interior of his room to the summer house and garden. In this way, Husserl's reflections concerning perception point to the importance of kinaesthetic experience. For Husserl's perception of his writing table is based on how his body is positioned and how it moves. In addition, Chapter 1 referred to Heidegger's essay 'The Thing', which explores the meanings arising from encountering a jug. Notably, a jug is formed by the movements of the potter as they mould and shape clay into a recognizable form. Movement also occurs while pouring liquid in and out of a jug. These examples from Husserl and Heidegger show how the sensation of movement arises from our interplay with things and the world at large.

The following discussion draws upon the work of various movement, performance and anthropological scholars. These are specialized studies beyond my own academic area of media and communication studies. But by drawing together these different strands of inquiry, the discussion seeks to present further insight into the entwining of movement and meaning. Anthropologist Brenda M Farnell (1994), for example, makes important connections between the somatic (body) and the semiotic (meaning). Farnell claims the human body is 'a moving agent in a spatially organised world of meanings' (1994: 93). Dance artist Miranda Tuffnell takes a similar view pointing out that 'all the tissues of our bodies depend on the circulation and movement of energy, information,

nutrients and waste within us' (2017: 03). Therefore, at a fundamental level movement is intrinsic to lived experience and the production of meaning.

This chapter will show that movement is a fundamental aspect of bodily experience, being-in-the-world and the production of meaning. For Carol-Lynne Moore and Kaoru Yamamoto (2012) remind us that 'not a word is uttered or a thought shaped without an accompanying motion, however, subtle, somewhere in the body' (2012: 05). During our everyday lives we make a variety of movements as we engage with smartphones, tablets, ATMs, keypads and remote-control devices. We peck at keyboards, use hand-held controllers to navigate within virtual environments, swipe our fingers across the smooth surface of a tablet computer and clutch our smartphones in the palm of our hands. As we do so, our fingers, wrists, hands and shoulders become entwined with these digital technologies. Dance and movement scholar Peggy Hackney also reminds us why paying attention to bodily movement is important. For Hackney says, 'We can be attentive to change as movement wherever it exists and mindful of our participation in it. This implies an interactive and co-creative existence with movement and ourselves in our world' (2002: 204). In agreement with Hackney, focusing on our bodily movements is central to our participation with digital technologies.

The following explorations of the body, movement and meaning also provide the catalyst for subsequent chapters, in which there will be more detailed discussion of movement analysis in relation to tracking and digital devices and immersion in virtual reality. Digital devices such as smartphones are used on the move. Therefore, as we swipe, click and push digital buttons on touchscreens we are also moving through space (Richardson, 2012). The movements we make while engaging with smartphones as we walk along involve coordinating our fingers, hands, wrists, shoulders, legs and feet. Through repetition we have developed movement repertoires, so we can coordinate all these different movements without paying much attention to them. Even when we are not interacting with the digital stimuli provided by these devices, we carry them around in the palm of our hand, sometimes even holding them to our chest, keeping them in close contact with us.

Our bodily movements seem obvious because they are so familiar. Consequently, we rarely pay attention to movement dynamics in everyday life because we are caught up in habitual (and familiar) ways of doing things (Sheets-Johnstone, 2014a). Therefore, our awareness of bodily movement often falls into the background because 'the instrumental body – the one that's busy getting

things done – dampens experience' (Sheets-Johnstone, 2014b: 16). For example, we can be so busy clicking, swiping on screens to send and receive messages that we do not pay much attention to the sensations of our bodies as we perform these actions and the movements associated with them.

As discussed throughout this book, the term 'digital reality' indicates how these technologies are embedded within our daily lives. Indeed, digital technologies have become an intrinsic aspect of our sociocultural reality. Yet even though these technologies are embedded with our routines, the movements we make while engaging with them are not usually at the forefront of our awareness. Additionally, as these habitual movements slip into the background of our awareness, they appear to be just a means to an end. We switch on our smartphones and key our passwords into on-screen boxes without giving much attention to how we perform these actions. Because we switch on our phones daily (perhaps we rarely switch them off), it is easy to become habituated to these actions so that we no longer notice the fine-tuned configuration of movements that makes this possible. Though, if we acquire a new device, we can no longer operate in such an automatic fashion, since our movements have not yet become attuned to this device through repeated usage.

Increasing the awareness and sensitivity to our bodily movements in relation to lived experience has a bearing on our relationships with one another and the world in which we live. The work of dance and performance scholar Sondra Fraleigh (2015), for instance, seeks to heighten our awareness of bodily movement in the context of daily life. For according to Fraleigh, heightening our awareness of bodily movement can increase the possibility that we respond to situations and conditions in creative ways, rather than lapsing into our usual movement habits. Fraleigh admits that habits are necessary in some parts of our lives because they are useful and provide efficient ways to get things done. However, I support Fraleigh's call to cultivate variety in terms of our responses to the situations we encounter because this is how we learn, grow and change.

Instead of positioning ourselves as isolated subjects in a world of objects, we can become open to other ways of being-in-the-world. This sense of being-in-the-world recognizes the interdependence of our lives and the world at large. Bodywork scholar, Deane Juhan (2003) says movement and meaning arises from our interplay with the world. Furthermore, 'The *meanings* of the world we encounter must continually be made by each of us, and this absolutely requires my active, voluntary participation in both my own being and that world' (Juhan,

2003: 351; emphasis in the original). Being-in-the-world is a process of moving and experiencing various bodily sensations. By studying bodily movement and meaning, it is possible to open up new ways of perceiving and understanding our interplay with digital technologies. In this chapter we shall see that configurations of movement stem from evolutionary development of the human body. The chapter will also make connections between movement as a form of expression and the development of non-verbal communication. Using the ideas presented by Sheets-Johnstone (2009) on dance improvisation, the discussion will highlight bodily intelligence, a way of knowing the world that exceeds language. For Sheets-Johnstone's work underscores the ways in which our bodies are 'semantic templates' (2017: 10) creating meaning as we interact with the world.

Movement scholarship

Surveying existing research about the body, movement, meaning and digital technologies indicates that there are empirical studies that involve tracking eye movements in relation to online games (Maurer, Lankes and Tscheligi, 2018), long-form journalism in the digital age (Marino, 2016) and hand-motor control in relation to writing (Heuer, 2016). In addition, some humanities-based scholars have produced insights into hand-movement and keyboard use (Moores, 2014) as well as tactility and touchscreen devices (Pink et al., 2016; Richardson, 2012). Yet, overall the study of the bodily movement as a meaningful activity is not a central feature of contemporary media and cultural studies. For as ethnologist Deidre Sklar observes, the body and movement 'ha[ve] been too often trivialized or ignored in academic discourse' (1994: 12). Instead, theoretical and analytical approaches to the cognitive aspects of experience are often given emphasis in academic studies of digital technologies. When the body is featured in media and cultural studies scholarship, for example, this is often in relation to theoretical concepts and concerns arising from representation. In this theoretical and analytical context, concepts such as ideology, discourse, performativity and identity provide useful ways of understanding representations of the body (Foucault, 2002; Bordo, 2003; Featherstone, 2010).

The discussion in this chapter also acknowledges the processes involved in transcribing movement through academic language. A linguistic label, which appears in written or verbal reflections, stands in place for movement but is not equivalent to that movement. Movement is fleeting and dynamic, whereas

the written word has a fixed quality. In addition, performance scholar Susan Kozel (2015) remarks that academic writing is often detached from experience, becoming a primarily intellectual activity which eschews the bothersome aspects of the materiality of the body. In her studies of performance, Kozel acknowledges that sensory experiences are ephemeral, though they can become durable through producing written documents about them. Therefore, this chapter recognizes the temporal lag between experiencing movement in the moment and subsequent written reflections about them. Language allows us to communicate our experiences so they are meaningful and can be shared with others. Yet the linear structure of a sentence orders and fixes the ephemeral qualities of movement. Despite these drawbacks, writing can evoke or point us towards movement dynamics in relation to digital technologies. Written commentary and analysis also play a key part in constructing arguments about why movement is an important aspect of our lives.

The central discussion begins by considering how movement develops from the moment of conception, throughout infancy and in adulthood. This will provide the foundation for further discussion about the relationships between the body, movement, meaning and digital technologies. As we shall see, the experience of moving and interacting within digital technologies such as clicking buttons on devices or swiping our fingers or thumbs across the screen of a tablet is based on our learning development in the world at large from infancy onwards.

Movement development

Movement stems from evolutionary development, linking us to other life forms. Movement scholar Bonnie Bainbridge-Cohen (2012) discusses patterns of movement development such as rhythm, vibration and oscillation. These movement patterns are also about attraction and repulsion, expansion and contraction. Additionally, Bainbridge-Cohen outlines the ways in which some aspects of human spinal movement are linked to other life forms. These include head to tail movement (which is linked to fish), homologous movement in which there is a symmetry between the movement of two upper and two lower limbs (which is linked to amphibians), homolateral movement which is the movement of an upper and lower limb on the same side of the body (which is linked to reptiles) and contralateral movement where there is a diagonal movement in the upper body and the opposite lower body limbs. In this way, Bainbridge-Cohen's

work shows how movement is structured around particular configurations of the human body.

Bainbridge-Cohen states that our movement patterns establish 'perceptual relationships [including spatial orientation and body image] and the basic elements of learning and communication' (2012: 05). Therefore, our understanding of movement is linked to the experience of crawling, standing upright and the sensation of our feet touching the ground as we walk (Abram, 2011). By raising awareness of these factors, it is possible to make connections between these evolutionary aspects to movement development and our interplay with digital technologies. For example, evolutionary aspects of movement provide a foundation for how we learn about the world and communicate using digital technologies. Moreover, Bainbridge-Cohen's work reminds us that as we interact with digital technologies we do so in a bodily way that is materially rooted in the physical environment.

Placing a similar emphasis on the evolutionary and foundational aspects of movement, Sheets-Johnstone states that 'an animate organism … is not just a living organism but a moving organism, an organism that feels the dynamic flow of its movement' (2014a: 248). Furthermore, an organism has 'an affective impulsion to move' (2014: 248). In utero, a foetus moves and feels its own movement. According to Sheets-Johnstone, a foetus is also affectively attuned to movement. For instance, Sheets-Johnstone explains that 'when lips open and close at eleven weeks, a foetus can feel their movement and hence begin to distinguish open and closed' (2014: 251). Likewise when commenting on animate life and the earliest aspects of human development, Mark Johnson states that it is through movement that 'we come to inhabit a world that makes sense to us – that is, a world that has meaning for us' (2007: 20). It is through our movements that we learn about the world around us and our capabilities. We start to become aware of how we can use our bodies and what we can do with them. An infant learns to communicate with caregivers, through recognizing and manipulating a range of objects and coordinating body movements because this is essential to their survival.

Sheets-Johnstone contends that the awareness of movement and change provides the foundation for linguistic development because when infants move, they also make sounds such as babbling, wailing and gurgling. In this regard, the meanings that arise from movement are not just individual because the feelings stemming from movement are something which other human beings with the same sensory motor capabilities are capable of experiencing. Yet, at the same time

it is important to acknowledge that the meanings that become associated with movement are constructed in specific social, cultural and historical contexts.

Agency

Movement is central to learning and the development of agency. Commenting on movement in infancy, Sheets-Johnstone states that 'we made inchoate reaching movements, we kicked our legs, we grasped things, we opened and closed our fingers, we made an unmade a fist, we turned over, we turned things over in our hands, we threw things …' (2014b: 118). As Sheets-Johnstone outlines, our sense of agency and the development of our ego stem from our movements in infancy. Infants learn to grasp, sense and feel the texture of different objects. Touch and the sensation of feeling are vital to the survival and the thriving of infants (Tuffnell, 2017). For instance, infants experience the sensation of touch through the surfaces they encounter and explore. Infants can pull a toy closer to them and then push them away. Through this process of moving toys, infants learn about spatial and temporal relations. Johnson states that 'feeling what it takes to cause an object to move from one place to another is a core part of our basic understanding of physical causation' (2007: 21). As infants move in accordance with various relations, repetitions and patterns, they develop a sense of agency. Sheets-Johnstone states that agency develops when infants 'discover in exacting ways their capacity to make things happen' (2014: 251). In doing so, the infant develops a series of repertoires, which Sheets-Johnstone refers to as 'I can's', such as standing up on two feet, bringing a spoon to their mouth, moving their head away when offered food (to communicate that they do not want to eat, before they have the linguistic capacity to express their desires). Infants notice things; they reach out and touch them to feel their surface qualities. They also notice that things can be moved; for instance, how they can change position in relation to their bodies. Infants start to become aware of what sorts of things move and which things stay the same in their world (such as the floor, or the ceiling). They also have a sense of things coming towards them or moving away from them.

It is through movement that we gain awareness of structures and patterns of experience such as direction (forward and backward), time, weight, texture, density and levels of tension. A sense of tension arises from the levels of force or exertion required to perform a movement. We become aware that it is possible to perform movements via different pathways, at different speeds and in different

directions. We start to notice whether our movements are tightly contracted around the body, or if they are more open and expansive. Patterns of movement begin to form during infancy and we repeat them. As we develop from infancy into the early years of childhood, we learn many movement patterns such as tying our shoes, brushing our teeth, making the shapes that form letters of the alphabet, opening and closing doors and pulling up zips (Sheets-Johnstone, 2014b).

In contemporary culture infants can now learn how to use various touchscreen digital devices by swiping their tiny fingers across tablet computers and pressing buttons that appear on electronic screens to make things happen. Indeed, infants learn a series of 'I can's' in relation to digital technologies through engaging with devices such as My First Tablet (Toyland), Pre-School Laptop (V-Tech) and Peppa Pig Smart Touch Tablet and the Flip and Learn Phone. Notably, these toys encourage infants to develop movement repertoires that will assist them in acquiring the skills necessary to use digital devices later in life.

There is now a growing corpus of empirical scholarship surrounding infants and touchscreen devices. For instance, studies have been conducted into child-computer interaction via touchscreens and visual feedback mechanisms (Anthony et al., 2015), the relationships between digital devices, media consumption and children's vocabulary size (Taylor, Monaghan and Westerman, 2018) and the development of literacy (Harrison and McTavish, 2018). Other research has also been conducted in relation to digital play in early childhood (Fleer, 2014). Yet within this emergent scholarship, there seems to be an emphasis on cognition, learning and language development rather than bodily movement in relation to infants and touchscreen devices.

After briefly outlining the ways in which movement develops from infancy onwards, the next part of the discussion places more emphasis on movement as a meaningful activity. At the forefront of the discussion of meaning is the ways in which movement is part of a bodily way of encountering and making sense of the world. These points will then be discussed in relation to our bodily interplay with digital technologies.

Movement, thinking and knowing

Sheets-Johnstone's (2009) exploration of thinking through movement goes beyond a narrow focus on the relationships between thinking and language. However, as Sheets-Johnstone points out, drawing attention to thinking in

movement can unsettle entrenched views of human cognition and intelligence, especially in relation to language and rational thought processes. But according to Sheets-Johnstone, cognition does not just involve the brain, or neural processes; instead it relates to the whole body. For 'to assume that thinking is something only a mind does, and doing or moving are something only a body does is, in effect, to deny the possibility of thinking in movement' (2009: 38). On a similar note, geographer Nigel Thrift (2005) acknowledges the existence of bodily intelligence and claims it is misleading to solely focus on the brain in relation to cognitive activity. On this point, Thrift states that 'we now know that what we call "thinking" in human beings does not occur just in the brain but at a series of sites in the body' (2005: 472).

To explore movement and meaning in ways that go beyond cognition and linguistic analysis, Sheets-Johnstone discusses the differences between bodily awareness and language as a symbolic system of signification. Sheets-Johnstone explains that 'thinking in movement is … clearly not the work of a symbol making body, a body mediating its way through the world by means of a language' (2009: 35). Rather thinking in movement 'is the work of an existentially resonant body' (2009: 35). Sheets-Johnstone illustrates thinking in movement in relation to dance improvisation. The following section draws on Sheets-Johnstone's ideas about dance improvisation and shows how they provide useful ways of explicating our experience of engaging with digital technologies.

Outlining her approach to improvisation, Sheets-Johnstone states 'to say that the dancer is thinking in movement does not mean that the dancer is thinking by means of movement or that her/his thoughts are being transcribed into movement' (2009: 30). Instead, Sheets-Johnstone offers an approach that emphasizes the living quality of movement and meaning through dance improvisation. She readily admits that challenges and limitations arise when using language to convey the spontaneity and creativity of dance. Yet Sheets-Johnstone insists that dance improvisation is not thinking *about* exploring the world. Rather, exploring and thinking are *intrinsic* to movement. Dance improvisation is also interpersonal since it involves responding, in the moment, to other dancers. As we shall see, these ideas about the entwining aspects of thinking, movement and responsiveness to the world at large can be usefully extended to our bodily relationship to digital technologies.

Importantly, for Sheets-Johnstone 'movement and perception are seamlessly interwoven; there is no "mind-doing" that is separate from a "body-doing"' (2009: 32). Consequently, dance improvisation is not about thinking then acting

upon that thought to achieve a pre-planned outcome. Dance improvisation does not involve mentally running through a range of options, then moving in according to the decisions that are made about those options. An impulse or a thought to move in a certain direction, or move a body part in a particular way, may arise; yet this does not interrupt the flow of the performance. As Sheets-Johnstone remarks, the dancer does not stop, think and then move. The dancer isn't thinking shall I move this way, or what will happen if I do this or that.

The qualities, energies and rhythms of movement are key aspects of improvisation. Movement occurs through interaction and responsiveness to evolving conditions of possibilities. On this basis, Sheets-Johnstone asserts that there is 'a kinetic body logos' (2009: 33). At some level the body knows how to move and respond to changing conditions. In sum, thinking is not just about the mind and brain 'thinking in movement is a way of being-in-the-world' (Sheets-Johnstone, 2009: 35).

Sheets-Johnstone's discussion of bodily movement, improvisation and responsiveness to changing conditions is helpful because it takes us beyond a narrow focus on the cognitive impact of digital technologies. For movement repertoires can be linked to our habitual usage of digital devices. Upon arrival at my desk at the office, for example, I make familiar movements when I key in the digits of my computer password using a keyboard. After numerous repetitions these movements have become familiar and tend to slip beneath my awareness. Game players can also become attuned to using their thumbs to press down buttons on key pads and consoles. Other gamers may make rotating and vertical movement patterns when using a joystick to play their favourite games.

As mentioned earlier in this chapter, generally within media, cultural and communication studies, the body and movement are mainly studied as sociocultural concepts and theorized in relation to representation, discourse, power and ideology. For instance, there are studies which examine the representation of the body in relation to body image (Harris-Moore, D. 2016; Kyrola, K. 2014). While other sociological-based studies of digital media focus on politics, citizenship, activism and economic transformations (White, A., 2014; Lindgren, S. 2017). However, media and social theorist Nick Couldry provides significant insight into how media practices are grounded 'in the analysis of everyday action and habit' (2012: pxi). As Couldry remarks, one of the functions of media research is to 'analyse media as practice, as an open-

ended set of things people do in the world' (Couldry, 2012: 30). Couldry's remarks remind us of the importance of studying media as a set of practices and processes which become habitual and integrated into our everyday experience. Couldry's work involves analysing how people engage with media content, such as how they interpret texts and produce meaning. On this basis, Couldry asserts that 'media rituals are formalized patterned actions relating to media that enact a particular way of organising the world' (2012: 72). Couldry's theoretical approach to media practices and rituals is important and can also be usefully supplemented by placing further attention on bodily movement. A useful place to start that process is to examine hand movements, since this is particularly relevant to using keyboards and swiping screens.

Digital technologies, the hand and movement dynamics

The relationships between bodily, movement and contemporary technologies can be detected through examining the history of the term 'digital'. Benjamin Peters (2016) outlines the ways in which the term 'digital' stems from the Latin *digitalis* (meaning fingers) and *digitus* (the index finger). Peters notes that in the past our fingers were used to count and perform basic mathematical calculations. He also discusses how the term *digitus* is connected to the ways in which we use the index finger to point to things in the world around us. These historical connections between the term 'digital' and the fingers provide a useful starting point for the discussion of the body, movement and meaning, particularly in relation to the hand.

In his in-depth study of the hand, psychoanalyst Darian Leader states that even in utero, a foetus can 'fan, curl, flex and extend' their fingers (2016: 15). In addition, babies continually make movements between their hands and mouths. From these initial comments about human development, Leader moves on to present a convincing argument about the centrality of the hand in relation to our sensory experiences. Offering observations about the changes that have taken place as digital technologies permeate our lives, Leader (2016) claims that the main function of digital devices is to keep our hands busy. Furthermore, Leader shows that the impulse to keep our hands busy has a long history 'from weaving to spinning to knitting to texting, human beings have always kept their hands occupied' (2016: 03).

Perhaps one of the factors that have contributed to the swift incorporation of smartphones into our daily lives is that they can be placed in the palm of our hands. The No Phone Project,[1] for example, is a dummy phone which is offered as a surrogate device for a working smartphone. An array of similar dummy phones can also be found online (via sites such as Amazon and eBay), most of which mimic the design of working phones produced by well-known brands. The production of these dummy devices suggests that holding and feeling devices in the hand, as we swipe and click across their screens with our fingers, is a key part of our bodily engagement with them. To further examine the relationships between movement dynamics and the hand, the discussion will move on to consider previous studies of keyboard use and then discuss them in relation to digital technologies.

In *The Phenomenology of Perception* (1998), Merleau-Ponty discusses the ways in which typists using manual typewriters built up knowledge of the spatial location of each key. After repeating their hand and finger movements, typists became proficient at using these keys. However, when the typists moved their fingers quickly, they jammed the keys of their typewriters. Media scholar Jonathan Sterne has also examined the development of the QWERTY keyboard indicating that it 'was originally designed to impose slowness on the user of a mechanical typewriter' (2015: 21). By slowing down the speed of the typists finger movements, the jamming of the keys could be prevented. Notably, Merleau-Ponty and Sterne's work reveals the synchronization between the movements made by typists and the operational capacities of the typewriter.

At present, there are biomechanical and ergonomic-based studies that analyse our bodily engagement with keyboard or keypads. For instance, research conducted by Nancy Baker et al. (2007) identifies two distinct patterns of keyboard use: the plant and the float. The plant refers to when a person rests their wrists on a desktop when typing on a keyboard. In other words, their wrists are planted on a surface. By contrast, the float refers to the ways in which a person floats their wrists, hands and fingers just above the keyboard and makes movements from that position to push down the keys. Research conducted by Sarah Coppola et al. (2018) also focuses on the ways in which tablet computers instigate new forms of gestural patterning, particularly in relation to thumb use. While biomechanical and ergonomic research yields important insight into our engagement with digital devices, the discussion in this chapter is not about

[1] www.thenophone.com

the health-related aspects of movement (such as repetitive strain injury from prolonged keyboard use). Instead, this discussion focuses upon the qualitative aspects of bodily movement and meaning in relation to digital technologies. Therefore, it is particularly useful to discuss how repetition and practice of hand movements create a bodily way of knowing.

The synergy between hands, fingers and keyboard use is central to the work of sociologist David Sudnow (1993). In *Ways of the Hand* (1993) Sudnow describes how he learnt to play the piano. In his reflective account of this learning process, Sudnow takes on the role of an external observer. Sudnow says during the early days of learning to play the piano, he had to look at the keys to see where his fingers were located. Sudnow explains that 'for a long time I guided my hands on the keyboard by moving along all kinds of notes and scales that I conceived in my mind's eye, and, when I did look at the piano, I was so involved in an analytic mode of travel that I didn't see the hand's affairs as I now do' (1993: 02). After becoming familiar with the piano keys, Sudnow no longer had to keep looking at them while playing. Sudnow goes on to say he started to practice jazz improvisation and how this opened up new ways of thinking in movement. He states, 'There was a critical time, not long ago, when I had the most vivid impression that my fingers seemed to be making the music by themselves' (1993: 02). Sudnow's piano tutor would demonstrate their movements while playing improvised jazz. Yet his tutor had difficulty verbally expressing how these movements were performed. Reflecting on his experiences, Sudnow says his tutor had reached a level where he did not seem to consciously think or verbalize which keys to press. Instead his tutor's piano practice had become a non-linguistic, non-conceptual bodily way of knowing that was felt and expressed through his fingers. Notably, Sudnow and his teacher's non-linguistic and non-conceptual forms of knowing were acquired through repetition and practice.

Sudnow's discussion of piano playing and keyboard use can be usefully extended to the study of hand and finger movements when using digital devices. For instance, media scholar, Shaun Moores has produced a wealth of studies about the phenomenological and anthropological aspects of media practices especially in relation to movement and mobility. In *Digital Orientations: 'Ways of the Hand'*, Moores (2014) sketches out his morning routine. Moore explains that his routine is based on using his laptop computer during a typical working day. In a similar manner to Sudnow, Moores reflects on his movements by taking on the role of an external observer. Moores reveals that he places his laptop on his kitchen table to access his email inbox. He provides a particularly rich and detailed description

of how he uses his hands to open the lid of the laptop and start typing on the keyboard: 'Gently applying pressure to the base of the machine with the thumb of my right hand, my left-hand thumb lifts the lid while the other fingers of that hand lie on top' (2014: 197). He also pays attention to the multi-sensory aspects of using his laptop such as looking at the content of the screen and hearing the sounds made by his fingers as he presses the keys on his keyboard.

Moores states that the movements he makes when using the laptop have mostly become habitual and taken for granted. Consequently, he had difficulty writing about these movements because they had fallen into the background of his awareness. Only through studiously recreating these movements could he write about them. He says this process involved performing a movement then writing about it. Out of this process, he produced 'an embodied and sensuous knowledge' about his movements when using his laptop (2014: 198). He was also struck by how his movements had become entwined and attuned with the spatial qualities and operations of his laptop.

Through his phenomenological and anthropological insights, Moores has produced valuable observations about engaging with digital media, especially in relation to hand movements. Taking inspiration from Moore's work I observed my hand movements while typing the words digital reality. I was amazed to find that typing just these two words involved a series of complex movements. There were also subtle variations in the movements I made while typing these words via different devices such as my laptop, chrome-book and iPad. Notably, movement patterns emerged through this process of observation and self-reflection. For instance, my left index finger moved from the letter *d* then upwards and right towards the letter *I*. My finger then moved backwards and left towards the letter *g*. After that my finger travelled back up towards the letter *I* again then across the top of the keyboard to the letter *t*. Furthermore, these movements were not just isolated to my fingers; rather they involved my palm, wrist, forearms, elbows, shoulders and neck. While making these movements, my attention also flitted from the keyboard to the screen and back again. As I have typed the words digital reality many times when writing this book, I have built up a series of movement patterns for these words, on different keyboards and devices over several months.

By exploring the work of Merleau-Ponty, Sterne, Sudnow and Moores, this section of the discussion has explored the ways in which finger and hand movements create a bodily way of producing meaning. Notably, their work demonstrates the challenges involved in writing about bodily experience. For example, in order to write about their experiences, Sudnow and Moores temporarily take on the role of an objective observer. In this way, Sudnow

and Moores stand apart from their bodily movements and write about them. Similarly, my self-reflective account of typing the words digital reality involves standing back to observe movements for research purposes. But in daily life, the movements I make while typing on my keyboard are largely beneath my awareness because they have become habitual.

Leader's work also provided useful insight into the sociocultural meanings surrounding the centrality of hand movements in daily life. Moreover, Leader's argument about keeping the hands busy was usefully applied to dummy mobile devices which can be carried around in the palm of our hands. Arguably, in the context of everyday life, we have become accustomed to engaging with digital devices, particularly in terms of processing and making sense of the stimuli they provide (text, moving images, sound, etc.). When we are caught up in making sense of various stimuli, it is easy to overlook the fine-tuned synergy between our movements and these devices. Through performing movement patterns such as tapping and swiping of touchscreens, we can quickly find, produce and send information. Consequently, we can be more interested in receiving, processing and sharing content than heightening our awareness of the swiping movements we make as we tap or peck at keyboards, or use flicking and gliding movements of the fingers as we use touchscreen devices. We can get so caught up in doing things to achieve goals such as accessing and retrieving information using digital devices that we fail to notice how we physically perform such actions (Sheets-Johnstone, 2009). However, it is also important to go beyond studies that focus predominantly on the fingers, hands and keyboard use.

Additionally, the discussion of hand movements and keyboards in the work of Merleau-Ponty, Sterne, Sudnow, Moores and my own self-reflection is based on activities that take place in a fixed location. Merleau-Ponty and Sterne's insights stem from studies of typists sat at a desk. Similarly, even though Sudnow's account is based on the mobility and agility of fingers dancing across piano keys, it is based on sitting at a fixed location while playing the piano. Similarly, Moore's places his laptop on his kitchen table to access his emails; but now digital devices such as smartphones enable us to type while on the move.

Flow

At first glance, there seems to be connections between the dynamic aspects of movements made by proficient typists or jazz pianists and what Mihaly Csikzentmihalyi (2013) terms the flow state. In the case of proficient typists and

accomplished jazz pianists, through continual practice their movements have become entrained with the keyboard. As such there may no longer be a sense of separation between the typist and what they are typing or the piano player and the music they are playing. When this flow state is achieved, a bodily knowing comes to the fore which cannot be entirely captured by language.

Yet it appears that the habitual movements made when using smartphones, such as pushing digital buttons to open a notification or social media feed, are for the most part about reacting to stimuli rather than entering a creative state of flow. Moreover, it is easy to overlook our bodily movement dynamics as we become engrossed in the content represented to us via digital devices. In fact, swiping or clicking on screen seems to require minimal cognitive and physical effort. For as we engage with digital devices, our minds seem to dart from one thing to another as we click on hyperlinks and respond to pop-up messages that open up new rich informational vistas. The continual partial attention that is given to digital devices and the content they provide seems to differ from the focus required to enter into the flow state that Csikszentmihalyi associates with improvisation and creativity. For instance, the multifunctional aspects of digital devices such as smartphones encourage us to engage with an array of content such as clicking on a social media post, sending an instant message, replying to a text, scrolling through news feeds while chatting with friends. This continual processing of digitally generated stimuli can differ from the concentration that occurs in relation to a single focused activity such as typing or learning to play the piano.

Galit Wellner (2019) states that arguments which are based on attention as a form of concentration reinforce what she terms the hyper-capitalist attention economy. Offering a different approach, Wellner claims that distributed attention is a reflection of our daily lives in the digital era. Going further into her explanation of digital multitasking, Wellner asserts that this 'mode of attention calls for dual, triple and even quad attention, like a dual core processor computer that performs two tasks at the very same time' (2019: 57). Yet it might be misleading to make analogies between human beings and machines. We do not necessarily operate in the same way as machines because we are sensory, emotional beings. Illustrating the virtues of digital multitasking, Wellner states that distributed attention 'may explain how one can write an academic article while listening to music; change diapers while attending a conference call; or drive a car while talking on the cellphone' (2019: 58). Yet, is it possible that writing an academic article while listening to music might be related to a

particular type of music? Perhaps, classical music might be more conducive to writing the article than thrash metal or rap? Similarly, it seems plausible to argue that changing a nappy is a physical task involving a form of bodily knowing, whereas a conference call draws upon our intellect and cognitive resources. Driving is another activity that could involve bodily knowing developed through habitual practice. Furthermore, talking on a mobile phone while driving would also depend on the content of the call. If we are driving along and receive a call with devastating news, it seems likely that we would pull over and stop the car.

Wellner calls for digital literacy training to enable us to engage in digital multitasking 'in order to be able to safely drive a car while talking to a passenger or on the cell phone, in order to be a parent while having a career; or in order to successfully manage several projects simultaneously' (2019: 62). However, Wellner's example of driving a car while talking to a passenger refers to an activity which is of a different magnitude (in scope and duration) to being a parent and having a career. Furthermore, from the perspective of an employer, it seems that employing someone who can manage several projects simultaneously and be more productive would be incredibly favourable. While Wellner's call for learning skills in digital multitasking may become necessary in some contexts, there are also significant drawbacks to losing attention which also need to be considered.

Phone zombies

When we become entranced by screen-based content appearing on our digital devices, we can easily disregard our bodily movements. The colloquial term 'phone zombie' refers to people who shuffle around their environment while their attention is fixed on the content displayed on the screen of their mobile devices. Consequently, phone zombies do not give full attention to their surroundings. In popular cinematic and literary representations, there is an ambiguity to the zombie's existence. Zombies are physically dead; yet they are animated. In this way the zombie's existence unsettles binary oppositions (Derrida, (1972) 2012).

Because phone zombies can be so absorbed with screen-based content, they can lack awareness of their bodies and their surroundings. However, dangers arise from inattentiveness to our surroundings, especially when we navigate through crowds or cross busy traffic intersections. Acknowledging the

dangerous consequences of absorption in screen-based stimuli, two Chinese cities, Xi'an and Chonquing, have introduced designated walkways for mobile phone users (Tang, 2018; Benedictus, 2014), while Honolulu has passed a 'distracted walking law' to help prevent accidents caused by distracted mobile phone users (Pasha-Robinson, 2017). Meanwhile, the Dutch town Bodegraven has installed pavement lights to help attract the attention of mobile phone users who are about to cross the road (Bridge, 2017; Titcomb, 2017). In the last few years, there has also been an increase in taking digital photographs using smartphones in precarious situations (such as on top of cliffs, tall buildings or during thunderstorms). In some extreme cases, taking photographs in risky conditions has resulted in selfie related deaths (Bansal et al., 2018). Meanwhile, the promotional video accompanying *Are You Lost in the World like Me* (2016) by Moby and the Void Pacific Choir highlights the dangers of screen-based absorption. The animated video for the song produced by Steve Cutts depicts a line of people clutching smartphones. These people are so engrossed in digital stimuli that one by one they fall down a hole in the street. Although the examples of phone zombies, flashing pavement lights and a video parody of smartphone usage are extreme, they provide a useful springboard for further discussion of kinaesthesia (the sense of the body's position in space) in relation to the body and digital technologies.

Kinaesthesia

Dance and performance scholar, Susan Leigh-Foster traces the term 'kinaesthesia' to the 1880s. Leigh-Foster explains that in the nineteenth century kinaesthesia-based research investigated 'nerve sensors in muscles and joints that provide awareness of the body's position and movement' (2011: 07). Leigh-Foster also refers to the work of psychologist James J. Gibson (1904–79) and his exploration of kinaesthesia. Gibson's work focuses on the perceptual aspects of kinaesthesia especially in terms of muscular exertion and our bodily sense of position in space. Gibson's work shows how kinaesthetic information is synthesized from various sources including muscles, audition and visual stimuli. Leigh-Foster explains that 'Gibson's theory proposed an ongoing duet between perceiver and surroundings in which both were equally active' (2011: 116). However, Leigh-Foster says Gibson tends to overlook the ways in which sociocultural factors intersect perception.

Sheets-Johnstone also reminds us how 'it is extraordinary that, even today, we are still under the illusion that we have only five senses and remain virtually ignorant of kinaesthesia' (2016: 118). Yet Sheets-Johnstone remarks that without kinaesthesia we would not be able to make sense of putting one foot in front of the other. Furthermore, Sheets-Johnstone asserts that the kinaesthetic sense is not just a building block for language to develop; rather it stays with us throughout our lives.

Tactile-kinaesthetic engagement is intrinsic to our lives, for 'like other animals, we are always in touch with something, however far from focal attention that tactilely-felt something might be – the inside of our shoe, for example, or the shirt on our back, or the chair on which we sit, or the pencil with which we write' (Sheets-Johnstone, 2009: 138). As discussed touch and movement form a rich interplay of sensation in daily life. Touch is linked to our sense of aliveness, our exploration of the world (Classen, 2005). Our sense of being-in-the-world is tactile, such as sensing the ground our feet walk upon. Although the sense of touch is always with us, we often take it for granted. But we are animate creatures who respond kinaesthetically to our surroundings. There are deep structural relations that arise from our animated lives, from kinaesthetic experience of moving and exploring the environment such as containment, a sense of inside and outside, near and far, relationships between parts and wholes and verticality (Sheets-Johnstone, 2009; Lakoff and Johnson, 2003). These initial points about the importance of kinaesthesia from Leigh-Foster and Sheets-Johnstone provide the basis for further discussion about the body and digital technologies.

Turning her attention to digital technologies, Leigh-Foster warns that global position systems (GPS) and mobile telephony 'disrupt the integration of kinaesthetic with aural information by establishing a new privileged contact with another body across an unspecified distance' (2011: 124). For instance, when someone talks to us and starts to move away, we have trouble hearing them. However, smartphones change this experience since there is no loss of volume when speaking to someone at a distance. In addition, GPS satellites provide an omniscient view from space, looking down upon us. Smartphone cameras can then track our location using GPS and map this onto a display. In these ways, GPS and mobile telephony can disrupt our kinaesthetic experiences of movement and our interplay with the world.

Media and communications scholar Jason Farman (2012) also provides a reflective vignette which illustrates the relationships between the body, digital devices and movement. On a trip to Boston, Farman used his mobile phone

to find his location because he wanted to find a restaurant nearby. When using his mobile phone, he felt disorientated when the blue map pin displayed on his screen did not match what he was seeing around him, such as a street sign. Consequently, Farman lost confidence in the effectiveness of the digital mapping system he was using. Reflecting on this experience Farman notes that using a mobile device mediates our sensory experience as we interpret symbolic information on a screen as well as external stimuli. Notably, Farman states that when a person uses a smartphone with GPS tracking, they become the anchor point for the technological experience, as their body movements are continually mapped. In this way, the body is actually intertwined with the digital mapping process.

Studying kinaesthesia takes us beyond a narrow focus on the fingers or hands and keyboard use. For Leigh-Foster and Farman's work shows how bodily movements are enveloped within digital communication networks such as global positioning systems. Our bodily connection to technological networks that map and track our location also provides a foundation for the discussion of digital devices such as activity trackers and fitness bands in Chapter 5.

Concluding remarks

This chapter has indicated that movement repertoires are linked to evolutionary development and the configuration of the human body. As such, movement is intrinsic to our lives as animate beings. The work to Sheets-Johnstone indicates that we use movement to make sense of the world around us. Her work also indicates that movement contributes to the development of agency. Sheets-Johnstone's study of dance improvisation also highlights the ways in which there is a bodily intelligence, a way of knowing that differs from language.

As discussed, previous studies into hand and finger movements in relation to keyboard use have yielded important insights. While studying hand and finger use is an important aspect of movement, it is also important to avoid focusing exclusively on them, so that other aspects of bodily movement are occluded. On this basis, Leigh-Foster's study of kinaesthesia was a way of heightening our awareness of the body's position in relation to movement. Indeed, Leigh-Foster and Farman's work indicates that our bodily movement is interconnected with digital technology such as GPS tracking which shifts our experiences of time, space and distance.

Drawing upon studies from dance, movement and performance studies, this chapter aimed to provide fresh insights into our bodily movement and meaning in relation to digital technologies. In doing so, the chapter sought to contribute to debates within the field of media, cultural and communication studies and other cognate areas. Extending these interdisciplinary debates further, the next chapter considers how insights from dance and performance can be used to analyse movement in relation to digital devices such as activity trackers.

5

Movement analysis and digital technologies

By exploring the sensory aspects of movement, this chapter aims to go beyond purely quantified modes of self-tracking. At present, digital self-tracking devices can be used to collect quantified data about the number of steps we take per day. Yet quantifying our steps in this way does not tell us anything about where these steps took place or the different surfaces we have walked upon. Furthermore, just counting our steps does not provide insight into the motivations for taking those steps or the qualities of our movements.

There are now various self-tracking gadgets on the market including Fitbit,[1] Garmin,[2] the Apple watch[3] and jewellery-like devices such as the Motiv smart ring[4] and Misfit Ray Bracelet.[5] Additionally, there are software applications (apps) in the marketplace which are promoted as tools that empower consumers to take charge of their health and fitness such as Runtastic,[6] Argus[7] and Nike Fitness Club.[8] These self-tracking technologies are promoted on the basis that they provide a wealth of data about calorie intake, heart-rate variability, sleep patterns, moods and even fertility cycles. However, questions have been raised about the accuracy of the data produced via self-tracking devices. For instance, in an article for the *Washington Post*, journalist Brian Fung (2018) reports on a series of class-action lawsuits against Fitbit in relation to inaccurate data. Furthermore, the discussion in this chapter contends that the quantifiable aspects of self-tracking can be reductive since they provide a particular form of knowledge about the body which may overshadow other ways of perceiving and making sense of bodily movement.

[1] www.fitbit.com
[2] www.garmin.com
[3] www.apple.com
[4] www.motiv.com
[5] www.misfit.com
[6] www.runtastic.com
[7] www.azumio.com
[8] www.nike.com

Despite questions about inaccurate data and self-tracking devices, the mapping, measuring and monitoring capabilities of self-tracking continue to be positioned as ways to improve our knowledge of the body and make effective decisions about our health. An example of this ethos towards empowerment, health improvement and self-responsibility can be found in the Quantified Self (QS) Movement, which was established in 2007 by Greg Wolf and Kevin Kelly (editors of *Wired* magazine). Indeed, the tagline of the QS movement, 'self-knowledge through numbers' emphasizes quantified data and empowerment.[9] The QS website also provides copious information about how to start self-tracking and links to online forums where members discuss topics such as lifelogging and biometric data. The QS movement has also established groups in Asia, Europe, North and South America, Australia and New Zealand. It is important to note, however, that QS members are highly interested in self-tracking and have the social, economic and technological means to enable them to make choices about their healthcare and overall lifestyles.

This chapter explores how quantified data through self-tracking technologies connects to ideologies about gaining power and control over the vulnerabilities of our flesh and blood bodies. For instance, the data outputs of these digital self-tracking technologies can be amalgamated and then represented in the form of quantitative charts and statistics so individuals can map out their health-related risk factors. In this way, their bodily processes and health-related risk factors are regarded as opaque until they are revealed through digital self-tracking technologies. In other words, these self-tracking technologies are promoted on the basis that they can provide objective, precise insight into our levels of physical activity or calorie intake to maximize our health.

Self-mastery is an ideology that is used to sell an array of products and services, such as self-tracking devices, self-help books, retreats, meditation classes and so forth. However, American journalist and political activist Barbara Ehrenreich (2018) considers quests for self-mastery and control over the body as futile. Ehrenreich contends that the body is not a machine that can be controlled; 'it is at best a confederation of parts – cells, tissues, even thought patterns – that may seek to advance their own agendas, whether or not they are destructive of the whole' (2018: xiii). Moreover, despite measuring movement activity, sleep cycles and calories via self-tracking technologies, there is no guaranteed protection against the vulnerabilities and impermanence of the body.

[9] www.quantifiedself.com

There is also a socio-economic dimension to quests for self-mastery, health and fitness. In agreement with Ehrenreich, 'unfit behaviour like smoking or reclining in front of the TV' is associated with 'lower class status' (2018: 59). On the other hand, 'dedication to health, even if evidenced only by carrying a gym bag or yoga mat', is considered a symbol of 'a loftier rank' (2018: 59). Similarly, wearing a self-tracking device, or becoming a member of the QS movement, can be a way of signifying social status.

Significance and scope

The design and promotion of self-tracking technologies focus on features such as automatic forms of data collection and screen-based interfaces that represent bodily movement and physical activity in quantitative form. However, digital self-tracking technologies can be regarded as an attempt to position consumers in a dependent relationship within a powerful technological network. In daily life, we are already enmeshed within digital information and communication networks. These networks can be used to produce digitized medical archives, detailing visits to our doctor and prescribed medication. Even when we use software apps to book fitness classes, we leave a data trail about our activities. Similarly, our online searches about health and fitness provide valuable commercial data about us. But what is particularly significant about digital self-tracking technologies is that because they are small, lightweight wearable devices they can continually map monitor and measure our bodily movements. As such, these devices become intimately connected to us, tracking our sleep patterns, moods and activities throughout the day and night. In addition, the companies producing these devices encourage us to depend on these devices and apps to analyse and optimize our bodily movements and increase our well-being. But by doing so, we can become locked into a techno-economic system of self-surveillance, internet subscriptions, smartphones, 'in app' purchases and upgrades.

To summarize, the main aim of this chapter is to enlarge and enliven debates about the relationships between self-tracking technologies and the body. On this basis, the following discussion is not just about tracking bodily movement as a form of exercise, disciplinary regime or a way to achieve peak fitness and optimal health. Instead, the discussion in this chapter points to the qualitative sensation of aliveness through bodily movement (Sheets-Johnstone, 2014).

Self-tracking scholarship

Many useful insights have arisen from critiques of neoliberalism in relation to self-tracking as a form of labour, data mining and surveillance including Ajana (2017), Lupton (2015, 2016, 2015, 2016), Morozov (2014), Till (2014) and Schüll (2016). As these studies indicate using self-trackers, we can map, measure and monitor the energetic force that we expend (such as our heart rate or the number of calories we have 'burned'), and these can be added to a numerical daily target. Moreover, digital self-trackers enable users to share their performance (such as their personal best levels of achievement) and even compete with others, via online social networks.

Digital culture and technology scholar Jill Walker Rettberg (2018) also provides significant insight into self-tracking and the use of conversational agents in apps such as Lark[10] and workout assistants such as Vi.[11] In her study, Walker Rettberg compares and contrasts conversational agents and paper diaries. In doing so, she makes a series of significant points about narrative, self-disclosure and self-reflection. Walker Rettberg states that she compares diaries to apps to show 'how these technologies, or media, act not simply as objects but also as narratees or audiences to our human narratives' (2018: 28). As Walker Rettberg remarks, when we write in a paper diary, the diary does not answer back. However, conversational agents such as Lark and Vi appear to provide feedback on our performance and health. Moreover, these agents offer encouragement to help users remain motivated to make behavioural changes or reach their goals. Walker Rettberg adds that apps such as Vi, in which a conversational agent speaks to users through their earphones, appear to be empathic, appealing and supporting. However, when discussing Lark, Walker Rettberg notes that it 'doesn't usually allow the user to write back in natural language. Instead, it usually offers a few different responses to its questions that the user can choose between' (2018: 34). Consequently, Walker Rettberg alerts us to some of the issues surrounding agency, choice and empowerment in relation to digital self-tracking devices and software.

Meanwhile, digital culture and sociology scholar, Btihaj Ajana (2017) points out that it is not always clear who owns the data generated by self-tracking, apps

[10] lark.com
[11] vitrainer.com

and devices. Though Ajana notes that the terms of use for these devices and software usually state that the company who provides them owns the rights to sell the data, provided it is anonymized. As Ajana remarks in the discourses surrounding self-tracking technologies, data is often positioned through a personal property model, as something an individual owns. Yet as Ajana observes, in contemporary culture, the personal property model of data is positioned as something which conflicts with other imperatives such as the greater good (the philanthropic model) or national security. Consequently, Ajana contends that debates which position the personal (private) and public (philanthropic) models as binary oppositions are simplistic and therefore problematic. Taking a different perspective, Ajana asserts that 'privacy has a crucial social function. It is not about the individual versus society but constitutes a key element of a "healthy" functioning interface between the individual and society' (2017: 11). Going beyond considerations of data mining and surveillance, Ajana also usefully contextualizes the growth of digital self-tracking in relation to declining support for public health.

Philosophy of technology scholar, Tamar Sharon (2017) critiques some of the existing scholarship surrounding self-tracking in relation to surveillance and the reductive aspects of quantification. In doing so, Sharon claims that these sorts of studies often provide theoretical speculations that are abstracted from the messiness and complexity of bodily practices. Moreover, Sharon contends that this scholarship is overly concerned with the economic drivers of self-tracking. But focusing exclusively on the economic aspects of self-tracking tends to position people as either autonomous agents who are taking charge of their own health, or mindless, naive and uncritical consumers (Sharon, 2017). In response to the gaps in existing studies, Sharon conducted an ethnographic study of members of the QS movement. Notably her research outlines the growth of communities of interest, spaces and places where people come together to share insights into their self-tracking practices.

However, we still need to question what we can know about our bodies through quantifiable modes of self-tracking. Moreover, we need to consider how the sensations and feelings arising from bodily movement evade numerical data capture. For once bodily movement becomes transposed into numerical units it can be manipulated using the principles of arithmetic to produce quantifiable data such the speed, duration and distance of a run in the park. When a run in the park becomes quantifiable and represented in numerical form using self-

tracking technologies, further calculations can be performed to chart progress on a daily, weekly or monthly basis. Furthermore, self-tracking technologies enable the numerical representation of a run in the park by one person to be compared to others via online social networks.

Admittedly the discussion that follows is partial and selective since it refers to philosophical concerns rather than other ways of studying self-tracking technologies such as user-centred empirical studies. Nevertheless, the chapter shows that these philosophical conceptions of quantification are particularly significant because they shape sociocultural ideas about bodily norms and practices. To provide further insight into movement analysis, this chapter will refer to dance and movement scholars including Laban (2011), Moore and Yamamoto (2012), Sheets-Johnstone (2009, 2014a, 2014b) and Leigh-Foster (2011). In doing so, the discussion acknowledges that written representations of movement analysis differ from the dynamic and fleeting qualities of movement as it happens. As Moore and Yamamoto point out, movement 'is an ephemeral phenomenon that disappears even as it is occurring' (2012: 10). While acknowledging the shortcomings of using the written word to represent movement, this chapter aims to broaden and deepen our insight into the sensory aspects of our movements.

In the discussion that follows, attention will be given to the ways in which Laban's notation system embraces quantitative and qualitative aspects of movement. Indeed, Laban's work shows the limitations arising from focusing solely on representing movement in quantitative terms. Laban also critiques mechanistic approaches to the body and movement. As Laban points out, mechanistic approaches to the body reduce movement to an account of nerve centres controlling muscles in response to external and internal stimuli. In contrast to this type of mechanistic approach, Laban offers insight into the qualitative aspects of movement whereby 'each phase of movement, every small transference of weight, every single gesture of any part of the body reveals some feature of our inner life' (1971: 22). Initially it might appear that Laban's work chiefly concerns the realm of professional dance and performance, rather than how digital self-tracking devices quantitatively analyse and represent movement. To counter this notion, the chapter shows how Laban used his movement analysis framework beyond professional dance studies. In this way the chapter indicates that Laban's work has relevance to contemporary debates about digital technologies and the body.

Quantifying space and time

Space and time are fundamental concepts underpinning the design and function of self-tracking devices and software applications. Highlighting the significance of design processes, Murray states that 'digital artefacts pervade our lives, and the design decisions that shape them affects the way we think, act, understand the world, and communicate with one another' (2012: 02). This chapter shows how the design and operation of digital self-tracking technologies are based on the principle that space and time are things which can be precisely measured, monitored and evaluated. For example, self-tracking devices are based on dividing time into discrete units such as seconds and hours and space into units such as miles and kilometres.

The ways in which mathematics, space and time are philosophically conceptualized in Western culture provide a useful foundation for the discussion of the quantitative aspects of digital tracking devices. Since this is an enormous subject, the discussion focuses on those approaches which are particularly relevant such as how self-tracking devices conceptualize space and time in mathematical terms so they can be represented through quantifiable numerical symbols. The website of the company Fitbit, for instance, promotes self-tracking devices by claiming that 'fitness is the sum of your life' and stresses the importance of 'making every minute count'.[12] Even the name of the company, Fitbit, generates associations between the term bit (binary digit) as a discrete unit of value and fitness. Similarly, the Apple watch (series 4) quantifies daily life through the representation of three rings of activity which are underpinned by algorithmic processing, metrics and numerical outputs. There is a ring for 'active calories' burned through various activities, a second ring for exercise (which is based on minutes of activity) and the final ring tracks levels of standing-based activities throughout the day. The design, function and promotion of the Apple watch is based on the premise that 'everything counts' and that this device 'puts every metric you need right on your wrist'.[13]

Dawn Nafus, a research scientist at Intel labs, and media, communication scholar Gina Neff focus on the ways in which 'self-tracking takes place in social situations' (Neff and Nafus, 2016). Furthermore, Neff and Nafus stress

[12] www.fitbit.com
[13] www.apple.com

that 'the numbers of self-tracking may focus on the individual, but they stem from fundamental beliefs about how societies function' (2016: 03). For instance, quantitative forms of measurement such as the daily requirement to take 10,000 steps are socially constructed mechanisms that contribute to setting parameters for bodily norms (Tudor-Locke et al., 2008).

It is possible to gain further insight about quantifying space and time in Western culture by considering the ways in which mathematics and geometry were associated in ancient Greece as an ideal realm, beyond direct sensory experience. Abram (2007) outlines how Pythagoras considered mathematics to be pure and untainted and explains that this notion influenced Plato's philosophical framework. Plato extended the idea that maths was pure and untainted to the realm of the Ideal (of eternal forms or essences). According to Plato's philosophical framework, the things we directly experience are imperfect, imitations or impure derivatives of the Ideal realm. Consequently, according to Plato's philosophical framework, qualitative sensations are associated with the body and impermanence. Arguably, traces of this Platonic framework persist today through the sociocultural value which is placed on mathematics and measurement and the devaluation of qualitative sensations as imprecise and unreliable.

Other developments in mathematics in Western culture include the growth of mercantile capitalism, particularly during the Italian renaissance (Baxandall, 1972). The growth of early forms of capitalist commercial trading during the renaissance was connected to the measurement of goods to calculate an exchange value for them and the formation of banking systems. Moreover, in Western culture numbers became underpinned by a world view 'that deals in the concepts of classes, or collections of objects' (Peat, 1995: 163).

In Western culture, space and time are also quantified into measurable units. Sociologist Barbara Adam remarks that 'the clock marks time by dissociation, by abstracting it from human events and assigning it a number value' (1995: 120). The work of historian and sociologist Lewis Mumford (1963) also outlines the ways in which the sequential ordering, scheduling and managing of time were linked to the monastic practices of Benedictine monks as a means of avoiding idleness. Arguably, traces of these negative social and cultural associations towards idleness remain today but are given different inflections. Self-tracking technologies encourage us to stay as active as possible to maintain our fitness and health. For instance, the Apple watch has a setting which detects motion and reminds the user to keep moving if they have remained still for a particular period of time.

Providing further insight into temporality, communication scholar, Marshall McLuhan observes that 'as a piece of technology, the clock is a machine that produces uniform seconds, minutes, and hours on an assembly-line pattern' (2009: 158). We are trained to schedule our lives via standardized clock time through the practices that are embedded within educational institutions such as timetables, the academic year, break time, lunchtime, deadlines and examination periods. This educational training in time management is also a way of preparing children for their future lives in the workplace.

During the Industrial Revolution, the employee traded their labour for time to obtain monetary income. But from a Marxist perspective, the forces and relations of production in a capitalist economic system are based on unequal power relations (Marx, 1990). For those who own the means of production (such as factories and the equipment within them) attempt to extract as much productive labour power from their workforce as they can, for as little monetary value as possible to create surplus value (profit). Arguably, some aspects of Marx's account of the capitalist system remain relevant today, especially in relation to the body, movement and some aspects of self-tracking. Indeed, from the perspective of capitalist economic systems, the body is perceived as a productive object, a human resource. As such the bodily movement of the worker is an energetic, productive force that is locatable in a specific spatial context (such as the office, or factory floor) has a particular duration (working hours) and can be exchanged for numerical units of value (money). Furthermore, quantification is linked to competitive relationships in the workplace, whereby the performance of employees are measured in relation to one another. For example, performance reviews in the workplace often takes the form of quantifying the worker's outputs, in terms of reaching a budgetary target, such as sales revenue for a particular period of time. These ways of perceiving the body as a productive object can also be seen in relation to using a self-tracker to monitor bodily performance (Till, 2014). Even the notion of 'free time' and leisure time is bound up with the commodification of time as an exchange value. Yet, the notion of using our free time or leisure time to increase our levels of activity and fitness is a sociocultural and economic construction which makes sense in a framework in which time is considered to be a commodity.

Yet the concept of time as standardized measurable units differs from variable fluctuations and rhythms of bodily processes. As McLuhan points out, 'Time measured not by the uniqueness of private experience but by abstract uniform units' has pervaded all aspects of daily life (2009: 158). As a result, 'not only

work, but also eating and sleeping, came to accommodate themselves to the clock rather than organic needs' (2009: 158).On a similar note, Adam discusses 'body time' noting that 'the rhythms of the environment and the body are inseparable from human being, from well-being and from everyday social life' (1995: 45). The term 'body time' refers to circadian rhythms of activity, rest, the rhythmic aspects of breathing and the heartbeat. Yet we often eat according to the time of day such as our 'lunch-hour' rather than when we are hungry, or set our alarm clocks so that we wake up 'in time' for work, regardless of how physically exhausted we are.

Temporality is also intrinsic to movement, for as Moore and Yamamoto remark 'catching a ball, modulating tempo when playing the piano, gauging the moment it is safe to cross the street – all these activities depend upon having a sense of timing'(2012: 22). Yet we do not just experience these sorts of activities as a series of quantifiable temporal and spatial movements; instead we find these activities enjoyable because they feel good. Furthermore, we are not necessarily consciously aware of performing calculations to gauge the exact moment to run and catch a ball. Instead we draw upon bodily, tacit knowledge which is based on prior experiences of movement, speed and distance (Polanyi, 1969).

There is also a qualitative aspect to the experience of temporality. For example, if we are experiencing something pleasant, time seems to pass quickly. But if we are doing something we do not enjoy, time can seem to drag. For instance, someone can use a self-tracking device to push themselves to meet some numerical target to increase their fitness. In doing so, they may set a goal that is beyond their current fitness levels so that each step taken during a run becomes a strain.

The values associated with mathematics in Western culture are now deeply entrenched, especially in terms of how we think about space and time. For instance, space and time are often regarded as nouns, rather than verbs. In this way space and time are perceived as things that can be analysed by dividing them into measurable units and expressed as a numerical value, rather than processes. Moreover, the world view of quantifiable classes and collections of objects persists today in terms of the ways in which spatial and temporal relationships are enumerated and represented in quantitative terms via self-tracking technologies. For instance, as mentioned earlier, these technologies divide space into classes or units (such as inches, miles, centimetres and kilometres) in order to precisely calculate distance. From this perspective, a five-mile (or five kilometres) walk is

accorded a numerical value in terms of distance, while the qualitative aspects of traversing the landscape evade capture in this way. In this way, the quantification of space and time can draw attention away from the different sensory experience of walking on different surfaces such as tarmac, pebble, sand, grass or mud. Instead, the walk is considered as having a precise measurable length, which can then be analysed algorithmically to arrive at another numerical output, which are the calories burned during that walk.

Arithmetic

The design and promotion of self-tracking technologies whereby movement, such as the number of steps walked, is expressed as quantifiable numerical values brings us to the issues surrounding arithmetic as a symbolic system of signification. Arithmetic is a branch of mathematics that concerns the properties of numbers and the manipulation of numerical symbols according to rule-based operations. For instance, the Garmin 4 device provides an array of quantitative data which is expressed in numerical form based on the number of calories burned, floors climbed, distance travelled and intensity minutes. The Vivosmart device also has an automatic repetition counter which functions according to rule-based algorithms, which can be used alongside gym equipment. Furthermore, the Vivosmart device can be synchronized with software apps that feature numerical charts and graphs that are based on various physical activities.

Phenomenological scholar Peter Woelert's (2017) study of Edmund Husserl's philosophical approach to arithmetic provides useful insight into quantification and self-tracking technologies. Woelert recounts that in *The Philosophy of Arithmetic* (1891), Husserl refers to 'material artefacts that are designed and employed to aid, structure, and guide processes of thinking' (2017: 290). Furthermore, Woelert examines symbolic technologies in relation to 'processes of meaning constitution' (2017: 291). Taking these points into consideration, self-tracking technologies can be regarded as material artefacts that are promoted on the basis that they aid, structure and guide how we interpret bodily movement as a meaningful activity.

Husserl's study of arithmetic creates distinctions 'between authentic and non-authentic symbolic number concept' (2017: 292). In Husserl's work, the

term 'authentic numbers' refers to numbers that 'are constituted through the enumeration of concrete objects of intentional experience' (Woelert, 2017: 292). In other words, authentic numbers are linked to tangible things that can be counted, or aggregated such as sticks, or stones. In this way, Husserl's notion of authentic numbers is connected to our practical interplay with tangible things. These authentic numbers, which range from two to twelve, can be easily calculated using our fingers. By contrast, non-authentic numbers are regarded as representational signs that refer to mathematical concepts. Elucidating the differences between Husserl's conception of authentic and non-authentic numbers, Woelert states, 'While the basic number concept "four" can be easily and precisely grasped by the human mind without any mediation by symbolic representations, the same cannot be said about the number concept of, say "11,938"' (2017: 292). Some aspects of Husserl's study of arithmetic, authentic and non-authentic numbers can be applied to the ways in which digital self-tracking devices and apps display levels of activity through graphical representations such as 12,000 steps or the duration of an activity as 30 active minutes. For representing movement and activity levels as numerical symbols helps this quantified data to be perceived quickly and easily.

The development of the symbolic representation of numbers is connected to writing, mark making and external notation. These marks or notations of numbers have material qualities; they can be seen and read. Furthermore, once numbers become representational signs they can also be manipulated according to mathematical rules of operation. Woelert makes the point that if only a very small range of numbers (between two and twelve) are connected to tangible observable things, then there is a much larger array of symbolic numbers which play a significant role in cognition. What is useful about Husserl's study of arithmetic is that it provides insight into symbolic notation and the production of meaning. For the numerical outputs displayed via self-tracking devices, such as the number of footsteps, are not just regarded as having an arbitrary connection to meaning. Instead, they are perceived as providing an accurate representation of bodily activities and processes. However, problems arise when quantitative data is positioned as the only way to understand the movement of our bodies. It is also important to recognize that Husserl's work on arithmetic can create unhelpful divisions between knowledge that is constituted on the basis of experience (such as counting observable phenomena using the fingers and hands) and symbolic numerical processing.

The limits of quantification

Focusing exclusively on the quantitative and calculative aspects of movement via self-tracking can be reductive. For our bodily movements cannot be fully understood as a spatial and temporal change from point *a* to point *b* and something which 'burns' *x* amount of calories. Quantitative and calculative aspects of movement can be effectively applied to mechanical objects and modes of transport such as a train or bus. Indeed, it is useful and practical to track the movement of a train or bus to calculate the distance they have covered and how much fuel they have consumed. Yet, in the case of the movement of the human body, there are qualitative variables to take into consideration when analysing movement. Undoubtedly there are incredible benefits from calculating time, such as organizing work production flows, scheduling train or bus timetables and the practicalities of knowing where and when to meet someone. Even so, the ways in which self-tracking technologies are promoted on the basis that they provide effective and precise information about the body, through numerical representation and calculative operations, tend to subsume the organic aspects of lived experience into a quantified form.

Philosophy and humanities scholar, Timothy Morton (2018) provides further insight into sociocultural construction of data. Morton points out that the term 'data' stems from the Latin term *dare* meaning 'to give'. In this sense, data refers to 'aspects of things that are given to us when we observe them' (Morton, 2018: pxxvii). Importantly, Morton reminds us that data is partial because it is extracted from the complex and changing aspects of reality. For instance, Morton states that we can measure an apple, weigh it, price it, bite into it and taste it; yet the totality of the apple eludes us. Similarly, we can weigh the body, measure our movements, ascribe those movements a numerical value and calculate the weekly total of steps we have taken. Although self-tracking devices capture an array of data about the body and movement, this quantitative information is a partial representation of our bodily experience.

A further point to consider is that data is not self-evident; rather it needs to be interpreted. Users of self-tracking devices and apps are not passive dupes who simply believe promotional messages about self-tracking devices. Nor do they simply accept the numerical outputs that are produced via self-tracking devices (Neff and Nafus, 2016; Pantzar and Ruckenstein, 2017; Sharon, 2017). Instead users make sense of technologically mediated representations, such as the

number of steps they have taken, or the duration of a particular run, in various ways due to their prior beliefs, values, life experiences and so forth. Therefore, it is important to acknowledge that people may not be using digital self-tracking devices in a purely quantitative way.

In summarizing this section on quantification, I want to reinforce the point that self-tracking technologies are programmed to capture quantitative data. In this regard, self-tracking technologies aim to quantify bodily movement through measuring spatial and temporal relationships. Moreover, these spatial and temporal relationships are divided into measurable units which are ascribed with numerical values, so they are calculable. Consequently, these self-tracking technologies display bodily movement in numerical form via screen-based interfaces. Indeed, the screen-based interfaces of trackers or apps can display tables showing the number of movements made, distance covered, speed or provide graphical representations of quantified data in the form of charts that calculate performance of a certain period of time. Yet, those who engage with these self-tracking technologies do not necessarily make sense of their movements in purely quantitative ways. Instead, users may create narratives to explain their movements and levels of physical activity. Having outlined the connections between self-tracking technologies and quantification, the discussion now turns to other ways of analysing movement. Specifically, it is useful to consider how studies of movement within the field of dance and performance can provide further insight into the quantitative and qualitative dimensions of bodily movement and self-tracking technologies. To begin with the discussion will explore the historical, social and cultural aspects and connect them to the symbolic representation of bodily movement.

Choreography

Choreography can be considered as the ordering and sequencing of movement to convey meaning in a sociocultural and political context. Susan Leigh-Foster traces the etymology of the term 'choreography', noting that *choreia* is a Greek term referring to the synthesis of 'dance, rhythm, and vocal harmony manifest in the Greek chorus' (2011: 16). The Greek term *orches* refers to the space between the stage and the audience, where the chorus was performed, whereas *chora* refers to the concept of geographical space. Furthermore, choreography has another etymological strand, which links to the meaning of the term 'chorography',

which refers to the geographical practice of mapping a terrain. Leigh-Foster adds that chorography was identified by the mathematician Claudius Ptolemy (100– AD 160) as 'the study of a specific region, in contrast to geography, the study of the Earth as a whole' (2011: 76). Ptolemy also claimed that geography emphasized geometrical and mathematical aspects of space, whereas there was an aesthetic aspect to chorography.

Leigh-Foster explains the historical usage of the term 'choreography' in the English language stating that it 'was first used at the end of the eighteenth century to refer back to the practice of notating dances' (2011: 17). Specifically, choreography as a form of notating dance stems from the work of Raoul Auger Feuillet (1659–1710) which operates according to the principle that dancers move on the surface of a blank horizontal plane. Outlining Feuillet's notation system, Leigh-Foster comments that it 'broke steps, such as skip, a turn, or a triplet, down into constituent parts, posited as universal actions' (2011: 23). Feuillet's system was also underpinned by the notion that space was formed by vertical and horizontal dimensions: 'The symbols used also signified underlying principles of movement that referred … to its direction, timing and the spatial orientation of the body performing it' (Leigh-Foster, 2011: 23). There are also connections between Feuillet and Laban's notation systems since they both refer to the sinking, rising, springing, linear, circular and spiral aspects of movement. Building on the discussion about choreography, the next section of this chapter focuses on Laban's system of movement analysis and how it can be used to inform our understanding of digital self-tracking technologies.

Laban's movement analysis

Influential dance theorist and choreographer, Rudolf Von Laban (1879–1958) devised a system of movement analysis that remains relevant today, especially in relation to digital self-tracking technologies. Laban's framework for movement analysis can be studied from a first-person perspective (as a mode of reflection) and objectively through the recording and notation of movement. However, Farnell (1994) points out that Laban notation is always 'written from the actor's perspective rather than the observer's and so has a built-in assumption of agency' (1994: 939). As outlined in earlier chapters, movement is entwined with meaning and stems from our interplay with the world (such as other people and the things around us). Through movement, we gain a sense of agency, temporal

and spatial change. What is particularly significant about Laban's work is that it challenges many sociocultural assumptions about the body, movement, space and time. According to Laban (1971, 2011 (1966)), Western culture has lost awareness of movement because too much emphasis is placed on the brain and cognitive processes. Even so, he concedes that some people living in Western culture are more closely aware of their movements such as those who are engaged in combat, have physically demanding jobs or work as movement specialists.

In the early years of his career, Laban worked in Paris before founding a choreographic institute in Zurich (1915), which expanded to other parts of Europe. In the 1930s he was appointed the director of the Allied State Theatre in Berlin and choreographed dance for the 1936 Olympic Games. With the onset of the Second World War, Laban fled Nazi Germany and came to the UK. During this time, there was a shortage of film to record dance performances. Consequently, 'Laban was recruited by a management consultant F.G. Lawrence (1895-1982), to notate and analyse workers' movements'(Moore and Yamamoto, 2012: 97). In their study of Laban's work, Carol-Lynne Moore and Yaoru Yamamoto state that during his role as a consultant, Laban analysed the movements of the management, clerical and manual workers at a tyre factory. While conducting this research, Laban noted that women who were working in the factory were required to lift tyres that were above the prescribed lifting limit. Laban then devised a way of overcoming this problem by swinging tyres in order to work with the momentum of movement. Laban's study of workers at the tyre factory is significant because it challenged the existing notion that eliminating unnecessary movement would increase productivity. Instead, Laban's analysis and interventions indicated that by establishing rhythmic movement and momentum it is possible to minimize fatigue and increase productivity.

Laban's movement analysis is based on the awareness that all objects, things and animate life forms move. Therefore, when we perceive stillness, this is an illusion because all things are in flux. This stillness is created by the ways in which we habitually perceive reality. For our perception of the world around us involves making discriminations, that is, focusing on some things and disregarding other things. In doing so, our perception separates different aspects of a unified whole. Moreover, Laban states that the perception of stillness creates an illusory, artificial separation of time and space. It also gives the impression that space is an empty container in which objects exist and move. But Laban states that there is no such thing as empty space since everything moves, fluctuates, waxes and wanes.

Even if we aggregate our fragmented perceptions of movement, we would still not have the whole. Laban warns that 'cutting a film in pieces and heaping up the single pictures in a pile can never give the impression of movement' (2011: 03). But when the film unfolds, movement appears. Laban also compares the snapshot like quality of perception with the construction of architectural plans. An architect cannot show us the inside and outside of a building simultaneously. Therefore, the architect creates a plan that displays the ground floor and two elevations to represent the three-dimensional whole of a building. Applying these ideas to his work, Laban refers to movement as 'living architecture' (2011: 05). One level of Laban's approach to movement relates to the intangible aspects of life such as thought and emotions. At a secondary level, his movement analysis involves the concept of an objective observer. Third, Laban's work shows there is someone who experiences bodily movement from a first-person perspective.

Laban created a symbolic system for analysing movement in which each notation has three dimensions. The first dimension refers to the spatiality of movement, the second to the rhythmic qualities of movement and the third to the emotional characteristics of movement. Laban's notation system also includes symbols that help contextualize movement. For instance, there are notations that symbolize if a person is moving towards or away from something, or if they are addressing someone. Laban's notation can also be used to indicate whether movement involves the surface qualities of the limbs.

Referring to Laban's work suggests that digital trackers which capture numerical data reduce the complexities of movement into that which can be solely measured and expressed in quantitative terms. A digital tracking device, for example, can be used to log the number of footsteps we have taken in a day and amalgamate this into a weekly or monthly record. This numerical data can be displayed as a digital readout on the device, or as part of a spreadsheet that calculates our performance over a specified time period using a software application. For instance, the digital tracker Vivofit (Garmin) is promoted on the basis that it features Move IQ which 'automatically detects activity'.[14] In this way, Vivofit logs, calculates and represents the user's steps from the perspective of an objective observer (a programmed machine). From this objective perspective each step is regarded as having the same value, a single step becomes expressed by the digit 1, or a hundred steps becomes 100. But if we draw upon Laban's insights, it is possible to see that qualitative aspects are

[14] www.garmin.com

missing from these purely quantitative data collection methods of self-tracking. These qualitative aspects of movement refer to the feelings associated with the rhythmic aspects of our gait or how these steps were experienced from a first-person perspective.

Laban (2011) makes useful connections between space in general and a sense of personal space. He asserts that our personal space or 'kinesphere' is linked to the space around our bodies; it is the space we can reach, or extend into, from a fixed position of the foot. We extend our kinesphere into space when we move from our resting position which Laban calls 'the stance' (2011: 10). As we move, we create a new stance then another and so on. Laban states that 'when we move out of the limbs of our original kinesphere we create a new stance, and transport the kinesphere to a new place' (2011: 10). We never leave our kinesphere; it is part of us. When we move, space and time intertwine. Indeed, Laban asserts that we create space through movement. By contrast, the design and function of digital self-tracking devices give the impression that the body is a fixed object that can be precisely located and tracked through space and time using quantitative measurements (that numerically represent distance and duration). But Laban's work indicates that space and time are dynamic qualities which are inseparable from our existence as animate beings.

Laban's notation system is like a musical score. In the case of the music, the notation that appears on the score and the sounds that are created by playing music are two different things. For the musical notes which are represented on the score do not exist until they are played (Morton, 2018). Similarly, the marks made using Laban's notation system are symbolic pointers that differ from the dynamic, emerging and unfolding aspects of movement. In addition, Laban's work indicates that as one part of a movement is manifest, then it is replaced by another, then another and so on. In this way, a prior movement becomes the current movement and then flows into the future. Again, this is similar to music in which one note is manifest, then another and so on.

In terms of music, the sequencing of notes creates a sonic pattern such as a melody. Similarly, Laban's work indicates that there are sequences and patterns of movement that are related to different parts of the body and levels of energetic force or emphasis. Laban pays attention to the ways in which our bodies are constructed so that we can reach some parts of the kinesphere more easily than others. For instance, we can make 'monolinear' movements involving one part of the body and moving in one direction in space (Laban, 2011: 21). Alternatively, we can move two or more limbs simultaneously forming 'polylinear' movements

(Laban, 2011: 21). Movement scholar Peggy Hackney points out that in Laban's work the temporal and spatial unfolding of movement is known as phrasing. For 'every phrase of movement has a preparation, an initiation, a main action (exertion) and a follow – through or recuperation' (Hackney, 2002: 212). In addition, Moore and Yamamoto note that 'movement may begin distally, with the head, arms, or legs leading the action' … [or] 'movement may begin centrally, with the chest or pelvis initiating the motion' (2012: 138). Yet these phrasing aspects of bodily movement do not appear at the forefront of the quantifiable modes of data capture provided by digital self-tracking technologies.

Laban's analytical framework does not just concern how we move various parts of the body; it also considers the emotional tone to those movements. For Laban asserts that movements can be made with different levels of force, such as a light touch and a dynamic kick. Laban makes connections between the spatial dimension, feeling tone and effort involved in movement. In doing so, he focuses on the ways in which we can move up, down, to the left, right, backwards and forwards. He then makes associations between these spatial orientations, feeling tones and levels of effort. For instance, Laban contends that moving the arm upwards is associated with feelings of lightness, whereas downward movements are associated with strength and rootedness to the earth. Furthermore, when we make a sudden movement, such as a jerk, this involves a contraction backwards. In this way, Laban makes useful connections between the feeling tone of a movement and its aim. For instance, reaching an external goal might involve grabbing something energetically. Alternatively, if we are feeling doubtful about something, we tend to make halting cautious movements. We can also put a great deal of energy or force into the movement of our body as a whole, or just a particular part, such as finger, arm or leg.

It is not possible to trace and analyse every aspect of our movement. Instead, Laban's framework (2011) explores 'peaks' which are moments of particular intensity. Furthermore, he urges us to remember that in reality these peaks are part of a larger flowing series of temporal unfolding. However, when digital trackers attempt to capture moments of particular intensity, these moments are expressed numerically as changes to our heart rate, rather than the feelings that are associated with them. For instance, the digital tracker Fitbit Charge 2 analyses heart rate, steps, distance and 'active' minutes which are displayed via a digital readout accompanied by the icon of a heart.[15]

[15] www.fitbit.com

As we have seen, Laban's framework of analysis and notation offers insight into the qualitative aspects of movement, which exceed purely quantitative modes of calculation and value. Indeed, Laban's work indicates that space is not something that can be understood solely through the mapping and measuring of different units such as miles or kilometres. Instead, Laban's work indicates that we create space through movement. Furthermore, Laban's work highlights the ways in which time flows, as one movement ends another begins. Yet none of these qualitative aspects of space and time are prominent in the design features or promotional materials surrounding digital self-tracking technologies.

The work of movement scholar Maxine Sheets-Johnstone (2009) can be seen as building upon Laban's work as well as phenomenological approaches to the body. For instance, in her critique of biological, scientific approaches to the body, Sheets-Johnstone points out that studying bipedal aspects of the human body differs from feeling your tired and aching feet. Biological approaches to the body also focus on the function of different body parts, what they do and how they operate. A similar argument could be made with respect to self-tracking devices, since they focus on the operational features of bodily movement, such as speed, distance and duration. By contrast, our first-person living body is the one we feel and know from direct experience. Sheets-Johnstone refers to the living body as the primordial and immediate sense of aliveness. Although we can deny or overlook this primordial sense of aliveness, it is always there since it is the ground of our experiences. The work of Laban and Sheets-Johnstone indicates that qualitative, emotional aspects of movement can be separated for analytical purposes; but they are not experienced in this way. Sheets-Johnstone uses walking to illustrate her argument. Walking is expressive; it is not just a mechanical set of movements. For instance, we can make striding, rigid or carefree movements while walking. Therefore, how a person walks is not simply something that can be captured through quantified data that represents changes in position, or that is measured as a numerical output. For as Sheets-Johnstone contends, 'In effect movement does not simply take place *in* space and *in* time. We qualitatively create a certain spatial character by the very nature of our movement' (2009: 207).

On a similar note, Farnell (1994) stresses the importance of contextualizing movement. Farnell gives the example of a man raising his arm and the various contexts and meanings arising from this movement. The man could be raising his arm to hail a taxi, waving to someone or to attract attention. Extrapolating from this example, Farnell remarks that even if we focus just on the movement

of raising an arm, this occurs in many different contexts. A passenger on a bus can raise their arm to grab a shoulder level strap to steady themselves, when the bus swerves unexpectedly, or travels at high speeds. We can also hail a taxicab by raising our arm, as a signal to the driver that we are seeking a ride. Alternatively, we can raise our arms to stretch them after long periods of sitting down. In some cases, young children are also taught to raise an arm to ask permission to leave a classroom. Therefore, the meanings associated from the movement of the arm arise in different contexts. However, digital tracking devices do not really alert us to the context in which movement occurs. Instead, digital trackers may be used to quantify raising the arm as part of an exercise regime, in terms of calories burned or repetitions performed.

Arguably the focus on quantitative modes of movement analysis and the numerical representation of movement via digital trackers provides a reductive account of bodily movement. Even so, self-tracking technologies are promoted on the basis that they offer efficient and precise knowledge about movement. In turn, the qualitative, sensuous aspects of our movements are often dismissed as misleading. Technologically mediated experiences, such as reading numerical readouts of the number of steps walked, or the distance we have run, can provide useful insight into our bodies and how they move. But placing too much emphasis on quantitative aspects of experience can mean that other qualitative, sensory aspects of movement can be overshadowed. It is not my intention to claim that the sensory, qualitative aspects of movement are more valuable than quantifiable data. Indeed, setting up binary oppositions between the quantitative and qualitative can be unhelpful. Instead, referring to the work of Laban and Sheets-Johnstone provides a way of bringing together the qualitative and quantitative aspects of movement analysis.

Concluding remarks

Throughout this chapter connections have been forged between self-tracking technologies and socio-economic concerns about taking responsibility for our health. However, this chapter has shown that quantifiable modes of self-tracking tend to overlook the intrinsic pleasure of a meaningful activity, such as bodily movement. As discussed, valuable insights have emerged from empirical studies that explore how people negotiate the meanings that arise from self-tracking. Yet, the philosophical dimensions of how space, time and movement

through self-tracking are conceptualized remain relatively unexplored. The discussion of the philosophical aspects of bodily movement is not based on sentimentality or nostalgia for former times, when our life experiences were less mediated by digital technology. Instead, this chapter showed that there are other perspectives, beyond the quantitative, that offer alternative ways of perceiving and sensing our bodily movements.

The discussion has also indicated that quantified data represent movement. In other words, numerical symbols stand in place of movement. When our movements are quantified, represented in numerical form and displayed on screen-based interfaces (such as tracking devices and apps), they appear to provide accurate insight into levels of activity and physical performance. Moreover, once movement becomes analysed and quantified, this information can be compared and contrasted with previous levels of activity, or with others who are also using self-tracking technologies.

What is particularly significant about self-tracking devices and apps is that they extend the reach of technological networks into the intimate aspects of our lives, by offering the possibility of continually mapping, measuring and monitoring our bodies. As discussed, rather than heightening our awareness of the sensory feedback from our bodies (which has evolved in relation to environmental conditions in the world at large), we are encouraged to put our trust in digital self-tracking technologies and the data they generate. From this perspective, the body is a mysterious entity that can only be understood via specialized digital tools (trackers and apps). In this regard, self-tracking technologies can be disempowering, especially if we become over reliant on digital data about our bodies and discount sensory feedback.

Chapter 6 continues the discussion of the entwining of space, time and movement through studying presence and immersion in virtual reality.

6

Presence, immersion and virtual reality

Virtual reality technologies (consoles, headsets and hand-held controllers) simulate a world of appearances, where we experience and interact with computer-generated stimuli or 360° video. In the early 1980s and 1990s, virtual reality systems were mainly found in gaming arcades and entertainment centres (such as shopping malls or out-of-town retail and leisure parks). During this time, there was hype surrounding the possibilities of transcending the limitations of the body through immersion in virtual reality. Indeed, the idea of transcendence through immersion in virtual reality technology was promulgated in popular magazines, films and science fiction literature. In my previous book, *Virtual Reality: Representations in Contemporary Media* (Chan 2014), I explored the ways in which these popular representations of virtual reality were connected to claims of transcendent minds and disembodiment. In doing so, I outlined and supported critical approaches to virtual reality, simulation and cyberspace in the work of a range of scholars (Biocca and Levy, 1995; Hillis, 1999; Wertheim, 1999; Merrin, 2001 and Franck, 2002). Now commercially available virtual reality systems such as Google Daydream, HTC Vive, Oculus Rift, Samsung Gear and Sony Playstation (PSVR) are lightweight and portable. Our bodily connections with virtual reality are also more evident than before. For instance, there are various virtual reality fitness applications, such as the boxing game *BOXVR* (FitXR) and *Sprint Vector* (Survios), which utilize arm movements instead of the legs.

Sociologist Deborah Lupton (2015) claims that the term 'virtual reality' is now redundant because our lives are so intertwined with technologically mediated experiences. Lupton asserts that 'new ways of using and interacting with digital technologies have fundamentally changed the ways that we think about the "space" of online interaction and experience' (2015: 68). Therefore, Lupton insists that 'virtual reality is almost a nonsensical term in today's

digitised world' (2015: 168). Lupton has a valid point since our understanding of the concept of space and spatial relationships has shifted as digital technologies permeate our daily lives. For instance, while sitting at my desk using a tablet device and internet connection, I can type and send a message from my location in the north of England to the publishers of this book in Manhattan, giving the impression that it is possible to overcome temporal and geographical constraints. In addition, as Lupton asserts, the digital realm is no longer a discrete experience, since being online is intertwined with our daily actions in the world beyond the screen, such as ordering food online, receiving the delivery and eating it. Yet at the same time, it is important to unpack the ramifications arising from Lupton's assertions about our technologically mediated lives and virtual reality, especially in terms of the body. Therefore, taking Lupton's assertions as a starting point, this chapter indicates that virtual reality technology raises a series of questions about immersion, presence and the body which require further examination. At the outset I find myself in an ambivalent position, drawn towards the creative and imaginative aspects of immersion in virtual reality; yet also concerned about the ways in which wearing a head-mounted display tends to swamp our visual field while shielding awareness of our bodies and our interplay with the world at large. The discussion in this chapter presents the case that while virtual reality technologies have become more widely available and now offer some degree of bodily engagement, there remains a sense that this technology unsettles our sense of bodily presence in the world. For once we wear a head-mounted display to become immersed in virtual reality, we reduce our capacity to see our arms, legs and feet as our senses are flooded with computer-generated stimuli.

This chapter also provides insight into some of the initial academic research about virtual reality in the 1990s such as the development of presence questionnaires to study immersive experiences. Outlining this earlier virtual reality research will prepare the ground for the discussion of more recent research. At present, research conducted into virtual reality technology indicates that it can be used in many different contexts, to treat phobias such as social anxiety (Maples-Keller et al., 2017), provide immersive news stories (Jones, 2017) and in theatrical and artistic contexts to create immersive and compelling experiences. In recent years, the academic scholarship surrounding virtual reality has developed considerably. For instance, this chapter will indicate that the concept of immersion is more multifaceted than initially envisaged. Theories and approaches to presence, plausibility and illusion have also become more

nuanced (Slater and Sanchez-Vives, 2014; and Grabarczyk and Pokropski, 2016). Additionally, there is also a greater understanding of the participatory elements of virtual reality and the degree to which such systems are responsive (Murray, 2012).

This chapter presents a selective rather than encompassing account of contemporary virtual reality research. Mostly, the examples given in this chapter have been selected for inclusion on the basis that they link to the discussions that are outlined in previous chapters. For instance, Sylvia Xueni Pan and Antonia F de C Hamilton's (2018) study of virtual reality and human social interaction builds on earlier discussions about digital technologies and conversation in Chapter 2. Similarly, the work of Grace Sun Juo Ahn et al. (2016) which explores the relationships between immersive virtual environments and involvement with nature connects to the discussions in Chapters 4 and 5 about movement and meaning.

The discussion that follows is divided into three main areas: first, there will be an overview of some of the most relevant empirical scholarship surrounding the body, immersion and presence in virtual reality. To illustrate these empirical approaches further, there will be reference to how they can be marshalled as ways of illuminating specific examples of virtual reality in contemporary culture. Second, there will be an overview of phenomenological approaches to spatiality and the body, particularly the notion of being-in-the-world and how this relates to being-in-the-virtual-world. Finally, the phenomenological approach will be developed through a consideration of a more expansive, ecological perspective towards our bodily interplay and interdependence with the world.

Spatiality and virtual reality

In an early paper about virtual reality, Bob Witmer and Michael Singer (1998) conceptualize presence in virtual reality according to spatiality. For instance, Witmer and Singer claim that 'presence is defined as the subjective experience of being in one place or environment, even when one is physically situated in another' (1998: 225). More recently, Pawel Grabarczyk and Marek Pokropski alert us to some of the difficulties arising from a sense of 'being-there' in relation to virtual reality. As Grabarczyk and Pokropski remark, 'A virtual environment is not somewhere "there", thus speaking about "being present there" is misleading' (2016: 29). In other words, Grabarczyk and Pokropski propose that virtual reality

is a simulation rather than a physical space. Consequently, from Grabarczyk and Pokropski's perspective virtual reality technology attempts to create the illusion of a spatial realm. Indeed, there are important differences between spatial simulations and the world at large. As the discussion proceeds, further emphasis will be given to the world at large and how our lives are enmeshed by our interplay with climatic conditions, plants and animals.

It is important to question the use of spatial metaphors such as virtual environments and virtual worlds because when someone interacts with virtual reality technology, they only appear to be present in that 'space' via the use of a head-mounted display and other peripheral controls. Therefore, Grabarczyk and Pokropski propose that when someone engages with virtual reality, they are 'virtually present in a virtual environment' (2016: 29).

Meanwhile, a nuanced and multifaceted account of spatiality and virtual reality is offered by Mel Slater and Maria V. Sanchez-Vives (2014). Slater and Sanchez-Vives discuss the ways in which research participants wearing head-mounted displays 'tend to act as if they are in a real place engaging in real events' (2014: 24). Slater and Sanchez-Vives's use of the term 'as if' suggests that when their participants were immersed, they made distinctions between virtual reality as a 'place' and the world at large. On this point, Slater and Sanchez-Vives remark that there are distinctions between being immersed and responding to virtual reality simulations as if they are real. Explaining these distinctions further, Slater and Sanchez-Vives state:

> Originally presence was simply thought of as the sensation of 'being-there' in the virtual environment, but more recent interpretations focus on the extent to which people respond realistically, with a fundamental distinction between the illusion of being in a place (place illusion, PI) and experiencing events as if they were real (plausibility illusion, PSI). (2014: 25)

The plausibility illusion in virtual reality can be heightened by creating responsive simulations. To illustrate how this works, Slater and Sanchez-Vives state that while immersed in virtual reality, if one avatar waves at another and the other avatar waves back, this heightens the sense of place illusion and plausibility illusion. In agreement with Grabarczyk and Pokropski, we can be virtually present (experience an illusion of presence) in virtual reality. However, it is also necessary to explore the empirical scholarship surrounding presence and immersion in virtual reality in more detail, especially in relation to the body.

Presence

Bob Witmer and Michael Singer's early work focuses on presence and immersion in relation to the technological capabilities of virtual reality. Outlining their approach, Witmer and Singer state, 'We believe that the strength of presence experienced in a VE [virtual environment] varies both as a function of individual differences and the characteristics of the VE' (1998: 230). Witmer and Singer's work concerns individual experiences of presence, focus and attention. Witmer and Singer state that 'presence refers to experiencing the computer-generated environment rather than the actual physical locale' (1998: 225). Witmer and Singer also discuss how our attention can drift away from our physical environment through getting caught up in memories, ruminating, planning and daydreaming.

According to Witmer and Singer, our attention is lower when engaging in habitual activities rather than novel situations. Therefore, to explore Witmer and Singer's claims about attention and novel situations, I will refer to the virtual reality game *Project Cars 2* (Slightly Mad Studios). *Project Cars 2* attempts to place players into a range of different racing cars and locations. Although someone can be playing *Project Cars 2* while sitting in a cramped, urban apartment, when they put on a headset and start playing the game, they appear to be transported to a simulation of a racetrack in Monaco, Chesterfield Karting, Dubai Kartdrome or many other racing car tracks available on the menu of the game. *Project Cars 2* also seems to support Witmer and Singer's point about presence, immersion and novel situations. *Project Cars 2* aims to focus the player's attention on the simulation by continually offering novel stimuli such as new racing situations and various driving conditions such as snow, ice and rain. While *Project Cars 2* appears to offer various simulations that come close to the exhilaration of driving in different conditions, there are important differences between playing this game and actually driving in different weather conditions and terrains (in terms of safety, handling the vehicle, possibility of crashing, injury, etc.).

When driving the same route each day, we may go on 'automatic pilot', drawing on forms of thinking and knowing which are based on previous experience and habit. As such, we may stop noticing many of the streets or landmarks on the route because they are so familiar. However, driving in unfamiliar territory is likely to increase our attention because we are stimulated by novelty (something

we have not seen before). Therefore, Witmer and Singer's point about creating virtual reality simulations that offer novel experiences provides useful insight into these processes.

Presence questionnaires

Witmer and Singer's work is also significant within the field of virtual reality since it provided impetus for the empirical study of virtual reality through the development of presence and immersion questionnaires. Discussing their methodological approach, Witmer and Singer state that 'a valid measure of presence should address factors that influence involvement as well as those that affect immersion' (1998: 228). To address these issues, Witmer and Singer's Presence Questionnaire (PQ) examines the extent to which different individuals feel immersed and present in a virtual reality via 'self-report information' (1998: 231). The PQ utilizes a seven-point scale to assess presence; for example, it asks respondents to rate how compelling the virtual reality experience was according to a sliding scale of not compelling, moderately compelling to very compelling. The different questions posed via the questionnaire are aligned with a range of factors including control factors, sensory factors, distraction factors, interface and realism. The control factor measures the degree of interactivity and responsiveness of the virtual reality system. Sensory factors refer to the sensory richness of simulated stimuli. Distraction factors refer to the degree to which the virtual reality simulation isolates stimuli from the world beyond the screen. While the interface refers to the ways in which peripheral devices such as the head-mounted display or controllers operate seamlessly. Finally, realism refers to the resolution of virtual reality imagery and the ability for the technological system to provide meaningful situations for participants. Some questions on the PQ focus on a single factor, whereas others focus on two or three of these factors. For instance, one question asks respondents, 'How completely were you able to actively survey or search the environment using vision?' Notably, the PQ correlates this question with realism, control and sensory factors.

As discussed, Witmer and Singer's PQ questionnaire divides the immersive experience into a range of factors. But in the context of everyday life, our experiences are not divided in this way. Therefore, analysing the factors relating to immersive experiences using PQs can be understood within the contexts, conditions and conventions of academic research. Through completion of

such questionnaires research participants are invited to stand back and reflect upon their immersive experience after it has happened. In this regard, the PQ draws on research participant's memory of their immersion in virtual reality. So there is a gap between the actual experience of immersion (as it happens) and reflections on that experience. Moreover, the questionnaire structures participants' responses linguistically (in the form of written questions and responses) and according to pre-set categories. Nonetheless, the advantage of this method is that responses provided by research participants can be easily captured, analysed and measured.

To summarize this section, the use of PQs involves soliciting information from research participants about their levels of awareness as well as immersion in virtual reality. PQs have the potential to yield some valuable data on the factors involved in awareness and immersion. It is possible that some people are highly aware of the virtual reality environment that they are engaging with and therefore feel incredibly immersed within it. Furthermore, a sense of awareness could be heightened by the degree to which the virtual environment is interactive and responsive. On the other hand, other participants might be less aware of the virtual environment because they are focusing on other things; for example, they might be physically uncomfortable, tired or hungry. As outlined, using a questionnaire to measure the levels of presence in virtual reality is valuable in some respects. Yet caution needs to be taken when making widespread claims about their findings. This is because the findings of these questionnaires are based on reflection, language and pre-set categories. As such these responses differ from immersive experiences as they happen, or in different contexts (such as a game-playing tournament rather than a university research lab). Therefore, PQs can be considered as one means (among others) of examining levels of awareness as well as presence in virtual environments. To further explore presence and virtual reality, it is helpful to consider the concept of immersion and the qualitative, sensory aspects of immersive experiences.

Immersion

In an early paper about virtual reality and immersive environments, computer scientists Mel Slater and Sylvia Wilbur (1997) discuss various aspects of immersion. Slater and Wilbur explore what they term the objective aspects of immersion by focusing on the characteristics of virtual reality technology.

From this perspective immersion concerns the extent to which virtual reality, as a technological system, generates an encompassing illusion of reality for a human participant. Slater and Wilbur's framework is based on identifying key characteristics of virtual reality technology, such as the degree to which it is inclusive, extensive, surrounding and vivid. First, they discuss the ways in which virtual reality is inclusive on the basis of removing stimuli from the external world at large. Second, they consider the extent to which virtual reality is able to offer multi-sensory experiences. Third, they examine the ways in which virtual reality can produce an encompassing, panoramic environment. Finally, they consider the vividness of the virtual reality simulations in terms of colour, resolution and realism. A major claim of Slater and Wilbur's paper is that the technological characteristics and capabilities of the virtual reality simulations are measurable. Consequently, a major component of Slater and Wilbur's approach is making distinctions between the objective, measurable aspects of virtual reality and subjective experiences of feeling immersed in virtual reality simulations. But a potential drawback of this approach is that dividing the subjective and objective could get caught up with other binary oppositions such as mind versus body or presence versus absence.

Slater and Wilbur concede that presence in virtual reality involves some subjective aspects such as the sensations and feelings of being-there. However, they add that there are objective aspects to presence, such as observable behaviour in virtual reality. Specifically, Slater and Wilbur consider the extent to which a person who is immersed in virtual reality behaves in a similar manner to the way they would in everyday life. While this approach yields some important insights, it focuses on what is observable and therefore measurable. Consequently, those aspects of behaviour which are not observable and measurable, such as our imaginative faculties and the ways in which a virtual reality experience might trigger a lucid memory, are excluded. A further challenge arising from Slater and Wilbur's approach is the ways in which immersive virtual reality experiences are regarded as offering opportunities to behave in ways that are similar to how we behave in everyday life. But in everyday life we are not shielded from external stimuli by a head-mounted display; we can see our bodies. Moreover, our behaviour in everyday life arises from our responsiveness to unpredictable, uncertain and in some cases uncontrollable conditions. In addition, our behaviour in everyday life involves our encounters with other people, plants and animals, rather than just computer-generated stimuli.

To highlight the challenges arising from Wilbur and Slater's point about virtual reality offering opportunities to behave in ways that are similar to real life, I will examine a contemporary example, which is an advertisement for the Peugeot 3008 sport utility vehicle (SUV). For this advertisement draws parallels between observable forms of behaviour in virtual reality simulations and everyday life. Peugeot markets this advertisement through a virtual reality software application.[1] According to Peugeot, this virtual reality software provides users with an 'amplified experience'. This software is promoted through an accompanying video which draws on the generic conventions of action and adventure films. The Peugeot video begins with the provocative statement, 'Can reality still surprise you?' The video features a young, white professional male sitting at a desk in front of a computer screen. As he puts on a head-mounted display, he appears to be transported behind the wheel of an SUV. The vehicle is traversing a mountainous region surrounded by fjords. The advertisement cuts back and forth between the movements the man makes while sitting at his desk and how this appears in the virtual reality simulation. For instance, when he leans to one side while sitting at his desk, there is a rapid cut to him swerving through winding roads. The parallels between this young man's actions in these environments are heightened when he swerves and splashes water into the surrounding landscape. Immediately, the camera cuts back to the man knocking over a glass, spilling water over his desk. The parallels which are drawn between the man's actions in virtual reality and at his desk give the impression that driving this SUV in real life will be just as exciting as the simulation.

Yet there are also important differences between the Peugeot simulation and real-life driving conditions. In the simulation the man is able to drive on icy surfaces without the threat of physical injury. If the man in this advertisement was actually driving this vehicle, in the context of daily life, it is likely that he would encounter a range of unpredictable factors such as a pedestrian suddenly alighting from the pavement into the road, traffic jams, roadworks and so forth. He would also be able to see his body and respond to multiple sensory stimuli in the external world such as the sounds of tyres screeching on the road, or the taste and smell of vehicle exhausts in the air, when he opens a window. Although virtual reality attempts to recreate some of the sensory stimuli that are available to us in the world at large (beyond the headset), these conditions

[1] www.peugeotamplifiedexperience.com

change from moment to moment and can never be fully captured or simulated in their entirety.

In some ways, the Peugeot advertisement emphasizes the excitement of actually driving this SUV, rather than promoting the allure of virtual reality simulation. Indeed, Peugeot are utilizing virtual reality technology in their app and advertisement to create the desire for consumption, which can be fulfilled by actually purchasing this car. A test drive in the SUV, with a local car dealer, would involve driving in actual conditions such as busy roads, traffic lights, pedestrian or train crossings, roundabouts and roadworks. By contrast, having a virtual test drive of this car in a scenic location aims to facilitate the exhilaration of driving this vehicle. Arguably, this feeling of exhilaration is a key stimulus for purchasing the car. This examination of the Peugeot advertisement shows there are important differences between virtual reality simulations and actual driving conditions. Therefore, it could be difficult to determine, or predict, if someone behaves in virtual reality in a similar way to their activities in the world at large.

A further limitation arising from Slater and Wilbur's approach is that virtual reality software and hardware are regarded as fixed objects of study. Not only that, Slater and Wilbur's work seems to create divisions between the objective and subjective aspects of immersion in virtual reality. At first glance, approaching the study of immersion in terms of subjectivity and objectivity seems to be a sensible way to proceed. On the other hand, there are also doubts about this approach because it could reinforce dualistic thinking, by dividing the subjective from the objective. Moreover, the sense of presence and immersion in virtual reality does not just relate to the technological specifications of equipment; it also involves the person who engages with it. Without a human participant who engages with this equipment, issues such as how inclusive, extensive, surrounding or vivid the virtual reality simulation are meaningless. For a sense of inclusiveness or vividness of a virtual reality simulation arises in the interplay between the system and how the human participant interprets it and finds the experience meaningful. To be fair, what Slater and Wilbur might be alluding to in their work is the way in which certain features of a technological device or system can be measured and evaluated, and the results of this process can inform the development of immersive experiences.

Slater and Wilbur's study of presence and immersion in virtual reality is over twenty years old and much has changed since its initial publication. More recent studies claim that immersion is 'a state of deep engagement in the medium

(be it a book, a movie, video game or virtual environment)' (Grabarczyk and Pokropski, 2016: 28). Murray also warns that 'immersion is often confused with sensory stimulation' (2012: 101). Presenting an alternative view, Murray points out that immersion is experiential; it is how we engage with digital technologies. Murray goes on to explain engagement in more detail, stating that 'immersion is related to the experience of being completely and pleasurably absorbed in a challenging task' (2012: 102). Murray also emphasizes the active aspects of immersion, stating that we actively create belief in virtual reality rather than suspending our disbelief.

In their discussion of immersion, Grabarczyk and Pokropski refer to the work of Laura Ermi and Frans Mäyrä (2007) who outline three different types of immersion: challenge-based, sensory and imaginative. According to Ermi and Mäyrä, challenged-based immersion occurs when performing a task, or activity. This aligns with Murray's (2012) definition of immersion as becoming absorbed in a challenging task. Grabarczyk and Pokropski state that challenged-based forms of immersion are 'less about being transferred or transported to another place and more about losing the feeling of being in a particular place' (2016: 31). In challenged-based immersion, the absorption in a task or activity itself is the focal point of attention, so less emphasis is placed on the vividness of sensory experiences or degrees of illusion and reality. However, with sensory immersion, emphasis is given to the ways in which a person responds to stimuli in virtual reality rather than a specific task, or reaching a certain outcome. Finally, in the case of imaginative types of immersion, Ermi and Mäyrä suggest that they are associated with different types of narrative experience.

Adding further explication to Ermi and Mäyrä's work, Grabarczyk and Pokropski state that 'imaginative immersion is a state into which people enter whenever they are closely following a given narrative' (such as reading a book, listening to a story, etc.) (2016: 31). This notion of immersion as a state that involves engaging with a narrative is useful because it offers insight into the structuring of imaginative experience. Further work in this area could examine how different narrative types function. For instance, immersion in a novel could be linked to the specific context of the reading experience, which differ according to the pace of the reader and the degrees to which they interpret sequential letters, words and sentences to make sense of them. In some cases, a novel might be read slowly, just a few pages per day. In other cases, the novel might be read for longer periods of time as the narrative becomes more absorbing and compelling. However, immersive virtual reality experiences differ

from immersion in a novel. For immersion in virtual reality involves processing visual stimuli (shapes, colours, textures) and is bounded by different temporal constraints (such as minimizing eye strain by using a head-mounted display for a limited time).

A further point to consider is that the experience of immersion in virtual reality can involve a combination of two (or three) of the factors outlined by Ermi and Mäyrä. How a person experiences a simulated experience could be due to a particular blend of task focused, sensory immersion and narrative. For instance, *The Climb* (Crytek, 2016) is a virtual reality game that invites players to engage in various task-based features, such as completing specific rock-climbing challenges. At the same time, the player is encouraged to imagine the sensory aspects of the climb and form a narrative (a journey, from start to finish). It is also notable that *The Climb* attempts to create similar experiences to the full-bodied sensation of climbing, but it does so by presenting a fragmented view of our bodily interplay with the world at large, through displaying free floating computer-generated hands climbing various mountain terrains.

Contemporary studies of virtual reality

Chapter 2 discussed how digital technologies intersect communication, noting that terms such as 'face-to-face discussion' are now multifaceted, as we can communicate at a distance using videotelephony and talk to virtual personal assistants such as Alexa, Cortana and Siri. Building on the discussion in Chapter 2, it is important to examine how virtual reality can be used as a research tool to explore human interaction and behaviour. For instance, Pan and de C Hamilton (2018) examine how participants interact with a real or virtual person while immersed in virtual reality.

Studying social interaction involves complex variables, which operate simultaneously. However, Pan and de C Hamilton state that 'in a VR scenario it is possible to manipulate just one variable at a time' (2018: 396). Pan and de C Hamilton give the example of studying how race or gender intersect social interaction and influences 'perspective taking or empathy' (2018: 396). As Pan and de C Hamilton point out, an experiment could be set up using different actors in a live (face-to-face, co-present) situation. If this were the case, several actors would be required who were diverse in terms of their gender and race.

Yet other factors might intersect the results such as the actor's facial features, attractiveness, height, weight, tone of voice and gesture. According to Pan and de C Hamilton, by harnessing the capabilities of virtual reality, it is possible to create a range of variables that intersect human interaction and produce different combinations of them. Yet, in reality we perceive a whole person. So the virtual reality research scenarios outlined in their paper could result in the fragmentation of human interaction into a range of pre-defined categories and characteristics, which might limit our understanding of communicative experiences.

Pan and de C Hamilton also discuss the ways in which virtual reality could simulate different interactive situations. For instance, participants could be mimicked by a virtual character to explore how they might respond to this situation in real life. However, what happens when participants know a virtual character is not a real person? Virtual characters operate according to coding algorithms which enable them to be responsive to human participants. However, a virtual character cannot feel pain and humiliation in the same way as a human being. Even if the virtual character is under the control of another human being, that person is at a distance, not co-present with the participant immersed in virtual reality.

Pan and de C Hamilton admit that there are limitations with current virtual reality technology such as graphic fidelity and refresh rates, especially in terms of conveying subtle emotional displays on the human face. Nonetheless, they point out that motion capture systems can be used to record the movement of the hands, head, face and eyes. In their paper Pan and de C Hamilton use the term 'avatar' to refer to 'characters which are fully controlled in real time by another person' (2018: 402). By contrast, they use the term 'agent' to refer to non-player characters controlled by algorithms and the term 'quasi agents' to refer to partially autonomous and partially controlled characters.

According to Pan and de C Hamilton, computer-generated characters 'can engage in realistic interactions' by responding to participant's gestures, body movements and gaze (2018: 403). However, they also point out that agents can only respond to specific social contexts and pre-programmed topics. Therefore, at present, virtual reality simulations of human interaction involving a human participant and an artificial agent lack the improvisational, creative and flexible responsiveness of human to human interaction. Furthermore, Pan and de C Hamilton point out that simulated scenarios of human interaction have a short

duration because participants cannot be immersed in virtual reality for long periods of time due to eye strain or bodily discomfort.

Virtual bodies

Pan and de C Hamilton remark that the lack of vision of the participant's body while immersed in virtual reality can also impact upon self-image. Therefore, 'Giving a participant a realistic and believable experience of having a body can be critical to many studies' (Pan and de C Hamilton, 2018: 405). Research conducted by Perez-Marcos, Sanchez-Vives and Slater (2012) also indicates that a virtual body can be synchronized with movements of the participant's real body. They outline how studies of body ownership indicate that if a rubber hand is placed on a tabletop and aligned as if it is part of a participant's body, then a sense of ownership can occur, and add that 'even a computer-generated virtual arm in an immersive virtual environment (VE) can be integrated into the body representation' (2012: 295). They also discuss some of the factors which contribute to the illusion of body ownership including the synchrony between visual and tactile stimuli and the distance and placement of the virtual arm. Virtual body parts such as the arm can be synchronized with a participant's actual arm so that if the virtual body appears to be touched, participants feel the touch on their actual body.

Building on this research into body ownership and virtual reality, the discussion now turns attention to the work of Ahn et al. (2016). This research involved producing an immersive virtual environment that enabled participants to be immersed in the virtual body of a cow, or a coral reef, in an attempt to experience nature from other perspectives.

Virtual reality and nature

Grace Sun Joo Ahn et al. (2016) developed a virtual reality simulation to study inclusion and involvement with nature, which raises a series of intriguing questions about immersion and the body. Ahn et al. (2016) claim immersive virtual environments enable participants to explore different perspectives, to see the world differently. Outlining their hypothesis, Ahn et al. assert that their experimental design involves taking the perspective of animals because this

'will promote caring for nature and the environment' (2016: 400). However, it is important to unpack some of the assumptions arising from this hypothesis. First, this research appears to be based on a human understanding of what it is like to be an animal. Second, human participants will have a partial understanding of what it feels like to be an animal due to differences in their physiology, movement repertoires and experiences (Sheets-Johnstone, 2009).

In the 1920s and 1930s, biologist Jakob Von Uexküll published research that challenged the dominant behavioural approach towards organisms and their environment. Uexküll (2010 (1934)) discussed animals and the environment-space they encounter and experience, which he referred to as their life world (*umwelt*). Uexküll posited that animals are not machine-like; rather they have a dynamic, animated and responsive relationship to other life forms and their environment. The life world of an animal is not isolated; rather it is formed through relationship and connections with other organisms and the environment. Animals create and share meanings, in an environmental and evolutionary context. They also have a fundamental awareness of the structure of their environment and changes that occur within it. For instance, Sheet-Johnstone (2009) states that animate life forms are aware of the movement from day to night and cause and effect relationships (such as when they move an object and something happens). The work of Uexküll and Sheets-Johnstone suggests that while the life worlds of different animals intersect and are relational, we need to be cautious about projecting human interpretations of experience onto other species, which is pertinent to Ahn et al.'s (2016) experimental studies of virtual reality.

Ahn et al. created three experimental studies, the first was based on 'what it might be like to be a cow in a pasture being bred for its meat' (2016: 400). Using words such as 'might' and 'like' point to the speculative aspects of this experimental study. The wording of their statement could also cause confusion, since it appears to be based on human awareness of the cow's situation and from an instrumental perspective (the cow will become meat for human consumption). Their second experimental design is based on participants perceiving the virtual environment from the perspective of a 'coral reef in an acidifying ocean' (2016: 400). In the first experiment, there may be some deep structural similarities between mammals (humans and cows), based on touching and feeling the ground, the movement of the sun across the sky, the passage from day to night. However, with the coral reef there is a greater experiential distance from human

experience. Therefore, it is unclear if human participants could take on the perspective of a coral reef.

In some parts of their paper, Ahn et al. admit that problems occur because human participant's lack the 'scheme for experiencing the world as an animal' (2016: 402). Yet they go on to claim that because immersive virtual environments 'allow individuals to put themselves inside the virtual body of an animal, they would directly feel the threats it is up against and feel connected to its plight' (2016: 402). This gives the impression that an avatar of a cow becomes a container for the human mind to be placed into. Moreover, in this experiment, participants are experiencing a simulation, their bodies are locatable in a laboratory setting and they are invited to imagine themselves inside a cow. But since this experiment is a simulation, the threats faced by the virtual cow do not have the same real-world consequences as they would for a real cow grazing in a pasture.

Ahn et al. go on to state that as participants were immersed, they were required to get on their hands and knees so they could experience life as a cow in a simulated pasture. Participants 'saw their cow avatar directly facing them as if looking in a mirror' (Ahn et al., 2016: 404). However, it is important to consider how the scale, bulk and movement repertoires of a cow differ from the human body. Participants were then asked to eat and drink water via a voice-over. 'They were then informed they would proceed to be loaded onto a truck' (2016: 404). Soon after the participants hear a truck coming towards them. Notably, real cows grazing in pastures do not have voice-over narration telling them what to do. When the truck arrives, a virtual cattle prod hits the cow avatar and participants hear a buzzing noise and feel vibrations on the floor, simulating real-world conditions. After their immersion, participants were invited to complete a questionnaire which used a Likert scale. The questionnaire included questions such as 'how strong was the feeling that the body of the cow was your body?' The responses to these questions could then be analysed using pre-categorized values.

In a second experiment, 'Participants should feel as if they have become coral on a rocky reef; seeing, hearing and feeling its habitat destroyed and its own body suffering' (Ahn et al., 2016: 406). Participants see a fishing net and pole bump up against their coral avatar. This simulated contact results in breakages to the coral reef, and as this happens, a researcher poked the participant's torso and haptic floor vibrations were also put into play.

In their conclusion, Ahn et al. modify some of the strong statements made earlier in their paper about experiencing nature from the perspective of a cow or coral reef. For example, they report that 'readers should take into consideration when interpreting these results that the effect sizes reported are small to moderate' (2016: 413). They also concede that these experiments are based on a single immersive experience which 'may not lead to powerful changes to an individual's environmental involvement' (2016: 413). In some respects, the title of their paper 'Embodying Animals in Immersive Virtual Environments Increases Inclusion of Nature in Self and Involvement with Nature' appears misleading. For in their conclusion Ahn et al. admit that 'technology alone is not sufficient to induce the sense that nature is part of the self, or to induce involvement with nature' (2019: 413).

In sum, there are various stands within the empirical scholarship surrounding virtual reality technology. In some cases, there is an emphasis on the objective, technological capabilities of virtual reality systems. This focus on objectivity has shown to be understandable in part because this is something which is measurable and is therefore regarded as an approach that yields tangible results. Similarly, Witmer and Singer's (1998) development of a PQ was shown to offer valuable insight into the various factors that might contribute to our engagement with virtual reality. Furthermore, using questionnaires to capture data about immersive experience continues to be a key part of empirical research.

As discussed, early scholarship into virtual reality in the late 1990s has been developed further. For instance, it is now recognized that immersion in virtual reality takes various forms, which Ermi and Mäyrä (2007) refer to as challenged-based, sensory or imaginative. In addition, further attention has been given to the relationships between interactivity, responsiveness and immersion (Murray, 2012). Importantly, Grabarczyk and Pokropski's work (2016) questions some of the assumptions that are made about virtual reality as an environment, or spatial realm, into which we can be immersed and feel present within.

Rooted in the world

I will now expand the discussion of virtual reality by drawing on phenomenological approaches to the body, spatiality and presence. By using this phenomenological approach, it is possible to reflect upon the qualitative, experiential aspects of our bodily interplay with virtual reality in more detail. As discussed earlier in

this chapter, the term 'virtual environment' implies that computer processing can generate a spatial realm into which we can be immersed. Therefore, I made the point that it is necessary to consider the assumptions underpinning the conceptualization of virtual reality as an environment and how this relates to the body, presence and a sense of immersion. From an experiential perspective, space appears self-evident and familiar rather than something that requires further scrutiny, analysis or reflection. However, phenomenological scholars such as Heidegger (2010), Merleau-Ponty (1998) and Sheets-Johnstone (2009, 2014a, 2017) invite us to suspend familiar notions of space and consider new ways of thinking about the body and lived experience. The work of Heidegger and Merleau-Ponty provides a starting point for these considerations as their ideas are frequently used by other scholars within media and communication studies including Moores (2015, 2014), Taylor and Gunkel (2014), Farman (2012), Ingold (2010), Richardson (2012; 2011) and Taylor (2008). Therefore, it is important to understand how Heidegger and Merleau-Ponty's ideas are relevant to this study of the relationships between the body and virtual reality.

Being-in-the-world is a central feature of Heidegger's philosophical framework. In *Being and Time* (2010 (1927)), Heidegger outlines how he uses the term 'being-in-the-world': 'The compound expression "being-in-the-world" indicates in the very way we have coined it, that it stands for a unified phenomenon' (2010: 53). Heidegger emphasizes the wholeness of Being, which cannot be grasped by breaking it down into components (i.e. the analytical philosophical method). Instead, Heidegger questions what it means to 'be' in the world pointing out that being-in (*In-Sein*) is connected to presence and spatiality. Yet 'being-in' also has an existential aspect because we are living beings which are also part of Being as a whole. Heidegger stresses that 'being-in' does not mean that human beings are in something else, like an object in a container. Instead, Heidegger contends that space relates to dwelling, habitat and belonging. Heidegger uses the term '*Ich bin*' (meaning I dwell) to convey this sense of belonging. Heidegger claims we are together with the world. Yet this togetherness is not like two or more objects placed together, like books on a shelf because being and world are not two objects. Therefore, according to Heidegger, human beings are placed in an interdependent relationship with Being.

In his discussion of space and the body in *The Phenomenology of Perception*, Merleau-Ponty also emphasizes the interconnections between self and world. According to Merleau-Ponty, 'I am not in space and time, nor do I conceive space and time. I belong to them; my body combines with them and includes

them' (1998: 140). Indeed, Merleau-Ponty insists that 'the body is our anchorage in the world' (1998: 144). Furthermore, Merleau-Ponty states that the body is a 'mediator of a world' (1998: 144). Merleau-Ponty's statements show how we engage and interact with the world in a bodily way. It would be hard to disagree with Merleau-Ponty's statements because it seems obvious that we experience and interact with the world around us in a bodily way. Then again, perhaps it is because our bodily engagement with the world is so obvious that we can take such experiences for granted. However, we also need to consider what happens to our bodily anchorage in the world when we become immersed in virtual reality. Abram (1997; 2011) builds on the phenomenological ideas espoused by Heidegger and Merleau-Ponty yet also takes them further, into a closer consideration of human beings and the world at large. Therefore, Abram's work can fruitfully broaden the discussion of presence and immersion in virtual reality.

I am certainly not claiming that we need to forgo immersive experiences in virtual reality simulations so we can return to some form of idyllic nature. In agreement with Abram (1997; 2011) nature is not a halcyon realm. Natural phenomena such as cyclones, tornadoes and avalanches can be utterly devastating. Animals hunt, kill and often struggle to survive due to changing climatic and environmental conditions. Despite many scientific and technological advances, human beings cannot control the weather to suit our purposes. In addition, our bodies remain enmeshed within the natural world, so we are subject to impermanence and death, just like other living beings. Taking these points into consideration, maybe we clamour for immersion in virtual reality to hide from the distressing aspects of the world around us. One of the reasons why the notion of transcendence from the physical body through immersive virtual reality experiences seems so attractive is that our bodies are subject to illness, pain and death. But sheltering our vulnerable bodies from the wild, unpredictable aspects of nature can be self-defeating. Moreover, it may prevent us from acknowledging our embeddedness with the world. In machine-made virtual worlds, we seem somewhat cut off from our bodies, other species and plants in the world around us. Yet at a fundamental level human existence is a process of mutual exchange and interplay with the world.

There is a dynamic quality to existence because nothing stays exactly the same; everything is in motion. There is also a participatory aspect to sensory experience since 'we can sense the world around us only because we are entirely a part of this world' (Abram, 2011: 63). One of the problems Abram identifies is that the philosophical notion of a world of subjects (humans) and objects

(plants, rocks, animals) distances us from the participatory aspects of sensuous experience. For as Abram observes even the term 'the environment' can be flattening because it can be taken as meaning that the world around us is just a backdrop to human activities.

Our bodies, organs and modes of sensory perception have been forged through evolution and our participation with the world. Though it is also important to recognize that this participation with the world is also inflected by sociocultural and technological factors (such as artefacts and symbols). Even so, when our eyes encounter the stimuli we see within a computer-generated virtual reality, we are engaging in activities that are shaped through evolutionary connections between our organs, the elements around us and our participation in the world. But when we place a head-mounted display over our eyes, we are temporarily reducing our participation in the world beyond the simulation. Once we are wearing a head-mounted display, we cannot even see the ground beneath our feet. Instead, we are invited to focus our attention on computer-generated stimuli which lack the dynamism and unpredictability of the world at large.

Ultimately, we are animate creatures that are formed by earthly conditions (climate, gravity, chemical processes, etc.). Clouds, rain, rivers, forests and human beings are all linked through the dynamic conditions of our world. The rotation of our planet, changes in the length of daylight hours and temperatures impact upon all forms of life. Admittedly technological development has resulted in beneficial ways to mitigate the vagaries of our climatic conditions. Nonetheless, we cannot completely transcend or escape climatic conditions through technologies such as heating and cooling systems, electric lights or immersion in computer-generated virtual realities.

Computer-generated virtual realities attempt to convey a sense of depth perception through the use of perspective (creating the illusion of three dimensionality) and by the degree to which the technological system responds to a person's movement as they engage with it. In contrast to the body which is predominantly stimulated visually through a virtual reality head-mounted display, we are sensuously immersed within the landscape, through our bodily senses (touch, sight, smell, sound and taste).

The notion that virtual reality offers an escape from our rootedness in the world is deceptive. This is because being-in-the-world is being among others because humans are participants in a much larger web of being. As discussed even though we are all participants in the web of being, we do not perceive the world in the same way as one another (for this depends on personal, cultural,

social factors). We perceive the world from viewpoints that are contingent on our bodies and the time and place in which we live. Our sensory perception of the world is also different to other species. We do not experience the world in the same way as birds, or fishes, or insects (Uexküll, 2010). We share the same earth, the same conditions of existence but our bodies and habitat produce different ways of experiencing the world around us.

On the other hand, could virtual reality simulations and digital technologies be used to improve our understanding of the world? For instance, running simulations could be a way of helping us effectively distribute resources. Simulations can also help create interventions to stop the spread of a contagion, or assess the outcomes of rising sea levels. Perhaps software programmes and algorithmic processing can to some extent, assist with developing effective responses to such challenges. Yet the variables that intersect climatic conditions and the evolutionary aspects of life still appear to exceed our knowledge, understanding and control. Admittedly the technical parameters of algorithmic code exceed my knowledge, since this is a specialized area within the field of computer science. However, I want to consider the limitations arising from transposing the world around us into digital code to generate virtual reality simulations. Technology is not problematic per se because this is part of crafting and shaping our environment. Nonetheless, technological development becomes problematic if it is used to serve specific interests (power, economic growth) and dominance over nature regardless of the environmental outcomes.

Ultimately our bodies are open to the world through our breath which involves an interplay and exchange between us and the more-than-human world. It is through having a body that we participate in the world, along with other bodies. We do not leave the body behind when we become immersed in virtual reality: for we can only become immersed in virtual reality simulations through our bodies.

Concluding remarks

Lupton's assertion that digital technologies have changed our perception of space provided a useful starting point for this discussion. As discussed, in agreement with Lupton in contemporary culture, online experiences are entwined with our interaction with the world at large. However, we also saw that her claim that

virtual reality is now a 'nonsensical' term required further discussion especially in relation to the body, presence and immersion.

Through reference to various empirical studies, the discussion indicated that virtual reality is conceptualized as a spatial realm, a place or environment. The work of Slater and Sanchez-Vives indicated that those who engage with virtual reality do so 'as if' they are in a real place (place illusion) experiencing real events (plausibility illusion). Meanwhile, Witmer and Singer's claim that presence in virtual reality is heightened by focusing on novel situations was explored in relation to the game *Project Cars 2*. For this driving game offers players exhilarating scenarios where they are required to respond to novel situations, such as varying climatic conditions and driving terrains.

The PQ devised by Witmer and Singer was also shown to provide useful insight into some of the factors that come into play as someone engages with virtual reality (such as responsiveness, sensory richness and realism). The discussion indicated that the use of PQ is advantageous in some respects because it creates consistency by dividing the complex experience of immersion in virtual reality into manageable categories. It then becomes possible to examine the connections between those different categories. However, the discussion also indicated that it is important to consider the limitations of using questionnaires in relation to capturing a sense of presence in virtual reality. For PQs are issued to research participants after their immersion in virtual reality has taken place, so they rely on their memory. Additionally, the discussion noted that linguistic responses to questions represent immersive experiences, but are not equivalent to them.

As outlined in this chapter, Slater and Wilbur's approach divides immersive experiences into objective factors (such as the measurable aspects of the technological system) and subjective modes of behaviour. In particular, we saw that Slater and Wilbur's work explores similarities between how someone behaves in a virtual reality simulation and everyday life. Yet as this discussion indicated, in everyday life our behaviour involves greater degrees of unpredictability and risk than the actions we perform in virtual reality simulations. For the actions we take in everyday life could result in injury or harm to others; but actions taken in virtual reality simulations do not have the same consequences.

The discussion also considered how empirical studies could be supplemented by a phenomenological approach to the body, immersion and presence. The chapter noted that Heidegger's approach to being-in-the-world offered valuable insights into human participation within a larger interconnected and interdependent web of life. The work of Maurice Merleau-Ponty was also used

to show that our body anchors us to the world at large and cannot be simply transcended by immersion in virtual reality.

Finally, the work of Abram took us beyond the work of Heidegger and Merleau-Ponty by considering the ecological and evolutionary aspects of human life. Abram's work was used to show that immersion in virtual reality is a bodily experience that is rooted in the conditions that make life possible. As we are immersed in virtual reality, our bodies are subject to gravity, and we are rooted in the ground beneath our feet. Moreover, we are in a continual process of exchange with the world at large through our breathing, as we inhale and exhale.

In Chapter 7, further discussion of the bodily aspects of digital technologies will be considered through reference to the novel *The Peripheral* (2014) by William Gibson. As we shall see, this novel links to debates surrounding the use of avatar bodies. In this way, Gibson's novel expands the discussion of the body, presence and spatiality.

7

The Peripheral, metaphor and the body

This chapter examines how digital technologies relate to avatars and the use of synthetic bodies through reference to William Gibson's novel *The Peripheral* (2014). The chapter also analyses metaphorical concepts and how they relate to the body and digital technologies, since Gibson's novel offers a series of evocative metaphors to help illuminate the development and usage of synthetic bodies. As this chapter indicates, metaphorical concepts stem from movement and sensory experiences in childhood which shape our perception of the world throughout our lives. Studying the relationships between metaphors, digital technologies and the body also links to earlier discussions about phenomenological approaches to sensory experience and our participation in the world around us (in Chapters 1 and 6).

Bodily metaphors are used to refer to various digital technologies such as *Face*book and Apple's videotelephony application *Face*Time. We may also refer to technological inter*faces* and can purchase *skins* to cover our smartphones or tablet computers. Additionally, we use metaphors to help us make sense of our relationships with digital technologies, referring to swiping screens, website hits and our data shadow. Although our data shadow is connected to us, it appears to less tangible than our bodily existence. Even so, our data shadow cannot exist without our body; since it is produced as we traverse and leave trails among various digital environments (while visiting web pages, using search engines and apps). These examples provide a starting point for identifying connections between metaphors, the body and digital technologies in *The Peripheral* (2014).

The Peripheral also links to contemporary debates about the body, avatars and technological augmentation. Arguably our body provides an anchor point for our experiences and how we make sense of them, even when we use avatars, or synthetic bodies while playing computer games or becoming immersed in virtual reality. Furthermore, virtual reality or concepts such as online spaces are human constructs that stem from our bodily movements and interactions with

the world around us. For instance, spatial metaphors are frequently used to refer to digital technologies such as virtual worlds. Moreover, online environments are accessed through windows, or portals. Conceptualizing the internet as a space, platform or environment can also be regarded as an extension of our bodily experiences in the world around us.

The work of Lakoff and Johnson (2003) explores how metaphor structures our experiences by helping us understand one thing through another. But according to Lakoff and Johnson, there are some assumptions about metaphors that hinder our understanding of how they operate and how we make sense of the world. For instance, we tend to think that concepts are literal rather than metaphorical. In addition, the ways in which the body shapes rational thought through our interplay with the world is often downplayed because it is regarded as relatively unimportant. Countering these oversights, this discussion emphasizes how metaphors shape our perception of our bodies, digital technologies and the world at large. By paying attention to the metaphors, we use to think and talk about digital technologies; it is possible to explore our relationships to them. Before delving into an in-depth account of the ways in which metaphors connect to our bodies, digital technologies and the world around us, I will briefly introduce Gibson's oeuvre and the main features of the novel, *The Peripheral*.

William Gibson

The work of North American writer William Gibson is often associated with 'cyberspace', a term which was initially used in his novel *Neuromancer* (1986). When it was first published, Gibson's novel was groundbreaking, since it envisaged that computerized code could generate a spatial realm, in which we could become immersed. *Neuromancer* sets out a vision whereby characters become so immersed in virtual environments that they lose awareness of their physical bodies. For instance, consider the following description of the main protagonist in *Neuromancer*, a hacker called Case: 'He'd go straight to the deck, not bothering to dress, and jack in. He was cutting it. He was working. He lost track of days' (1986: 76). Therefore, while Case is honing his hacking skills, he overlooks his physical body and loses a sense of time. There are also several instances in *Neuromancer* where the body is associated with meat. These metaphorical connections between the body and meat suggest that the

body is an inanimate, dead object, while the mind is free to traverse wondrous computer-generated worlds.

In *Neuromancer*, Gibson also explores spatial metaphors in relation to power and control. Cyberspace is portrayed as the site of powerful corporate structures that are protected by security software which are described as Intrusion Countermeasures Electronics, or ICE. Kevin Concannon remarks that these ICE systems are a sort of border. Concannon goes on to say that 'these borders are to be seen as positions of power, both in their ability to repel attackers, as well as in their capacity to store massive amounts of data, information and capital' (1998: 438). Taking the description of ICE into consideration, *Neuromancer* provides an account of how corporate power operates through cyberspace creating boundaries to accessing information and wealth. Furthermore, Gibson returns to issues of boundaries, control, wealth and power, in his later novels including *The Peripheral*.

The scholarship surrounding Gibson's work mainly focuses on his earlier novels, particularly *Neuromancer* (Concannon, 1998; Csicsery-Ronay, 1992; Cavallaro, 2000; Taylor, 2001). By contrast, at present, there is not much scholarship about Gibson's later novels such as *Zero History* (2010) and *The Peripheral*. However, literary scholar Anna McFarlane (2016) has produced valuable insights into *The Peripheral* by drawing upon affect theory and focusing on the representation of haptics, feelings, bodies and emotions. In addition, McFarlane (2016) finds that there are links across time between *The Peripheral* and *Neuromancer*. Indeed, some elements from *Neuromancer* haunt and shift the representation of bodies and technology in *The Peripheral*. Though, in agreement with McFarlane, while there are traces of *Neuromancer* in *The Peripheral*, these two novels represent the body in different ways. As we shall see, in *The Peripheral* the body is not metaphorically conceptualized as an inert meat-like object. Instead, characters remain rooted in their bodily existence, even while they extend their communicative reach through technological mechanisms. Where my discussion differs from McFarlane is the attention that is given to the metaphorical and bodily aspects of language in *The Peripheral* and how this connects to current debates about digital technologies. After briefly sketching out some of the aspects of Gibson's oeuvre and the scholarship surrounding his work, the discussion will now move on to outline *The Peripheral* in more detail and link this to the sociocultural and economic context in which it was produced.

The Peripheral

The Peripheral is set in two different time periods and locations: the first is perhaps a few years from now, in a small town in the United States; the second is London, seventy years in the future. Gibson's novel centres on a scenario whereby information can be transferred between these two locations and time periods. In *The New York Review of Books*, Ligaya Mishan states that Gibson's novel offers 'an anthropological account of first contact between cultures'. As Mishan remarks, through transferring information between different time periods and locations, the novel highlights how sociocultural practices and values differ. Although the characters in the novel are from two different time periods, they speak English, so there is some basic understanding between them. Even so, the sociocultural practices that intersect their daily experiences of daily life in small-town America and future London are different. Notably, there are differences in terms of modes of employment, transportation, communication and clothing. Characters have different sensory experiences of the world (in London, or in small-town America), through varying degrees of technological bodily modification. By creating these two periods and different ways of life, Gibson's novel provides useful insight into our sensory experiences and bodily interplay with digital technologies.

Although there is synchronous communication between the time periods and locations in *The Peripheral*, there is not a direct causal chain between them. In this way, Gibson's novel avoids some of the conundrums arising from time-travelling narratives, such as the grandfather paradox. The grandfather paradox refers to a time traveller who kills their grandfather in the future, so their parents never existed. Therefore, the time traveller was never conceived (Wasserman, 2018). But in *The Peripheral*, the character's physical bodies are grounded in their temporal and geographical locations; they cannot time travel. Instead, some characters use their physical bodies to operate synthetic bodies, known as peripherals, so they can interact across these time periods and locations.

Gibson's vision of future London is predominantly based around the lives of wealthy characters who are seeking unusual interests as a form of amusement. These wealthy characters, such as Lev Zubov, want something that cannot be purchased like other commodities in the marketplace. Zubov, from a wealthy Russian family, has been introduced to a unique computer server. The server which is known as the stub links Zubov's present to a small town in the United States, seventy years in the past. Through the concept of the stub, Gibson

weaves together a series of relationships between the past and the future, the United States and the United Kingdom, rich and poor, presence and absence, here and there, human and post-human. Yet, Gibson's novel indicates that these relationships are of varying degrees of intensity, rather than clear-cut binary divisions.

The Peripheral was published in the aftermath of the global financial crisis of 2008, the Iraq war (2003–11) and at a time when environmental debates about climate change were framed by a sense of urgency. For instance, in *The Peripheral*, the present is referred to as pre-jackpot America. The term 'jackpot' suggests a large cash prize and seems to be a metaphorical way of pointing to the lottery-like aspects of the global financial markets in which vast sums of money can be gained and lost almost instantly.

After providing some insight into the socio, economic and cultural contexts surrounding the basic premise of *The Peripheral*, the discussion will now move on to consider the relationships between the body, metaphor and our conceptualization of the world.

Movement and metaphor

During infancy our interaction with the world around us occurs via bodily movement and object relations, and this forms the basic pre-linguistic concepts we use to create meaning (Lakoff and Johnson, 2003; Sheets-Johnstone, 2009). As Sheets-Johnstone (2009) recounts, during infancy when a child notices something, they reach out and touch it to feel its surface qualities. The child also notices that things can change position in relation to their body. The child also starts to become aware of what sorts of things move and which things stay the same in their world (such as the floor, a door and the ceiling). They also have a sense of things coming towards them or moving away from them. The child also starts to realize that physical things can be dropped. Therefore, children learn about the world through exploring relationships between things. According to Sheets-Johnstone, these early relations form pre-linguistic concepts. Moreover, these concepts which are formed from bodily movement provide the foundation for other metaphorical relationships such as spatial relationships.

According to Sheets-Johnstone (2009), a child's early experiences generate archetypal kinetic forms, such as containment which is generated through the sensory experience of the inside and outside of objects. Notably, the container

schema requires a boundary to demarcate spatial relationships. For the creation of a boundary marks the interior and exterior of a particular spatial area (Lakoff and Johnson, 1999). Not only that, a boundary also creates the sense of periphery, as the outer limits of that spatial area. Outlining how containment and spatiality develop, Lakoff and Johnson (1999) remark that even learning to perceive a butterfly in a garden requires a series of metaphorical conceptualizations. First, it is necessary 'to conceptualize the boundaries of the garden as a three-dimensional container' (Lakoff and Johnson, 1999: 31). Then we must 'locate the butterfly as a figure … relative to that conceptual container' (1999: 31). Other kinetic forms include a sense of closeness or distance, the relationships between parts and wholes and a sense of verticality. On a similar note, Abram remarks that as our bodies 'are first located relative to the ground of the earth', this generates a sense of verticality, in which we conceptualize the sky above us and the earth below (Abram, 1997: 42). These bodily forms are conceptual; yet they are non-linguistic. Instead, these concepts arise from our being-in-the-world (our lived experience of participating with the world around us). In sum, non-linguistic concepts based on bodily kinetic forms provide the groundwork for the development of language. Indeed, these kinetic forms help us make sense of our participation in the world throughout our lives.

After outlining these ideas about movement, metaphor and meaning, we can now examine some of the metaphors in Gibson's novel. For instance, consider the term 'peripheral'. The term 'periphery' is a spatial metaphor that has various layers of meaning. We can think of the periphery in relation to orientation. In other words, the periphery is a spatial position that is rooted in our bodily existence in the world. Therefore, having a sense of a periphery stems from the early infant, pre-linguistic structural relationships outlined by Sheets-Johnstone, Lakoff and Johnson. For our perception of the periphery depends on where we are located. In this context, the periphery refers to our perception of the edge of something. The term can also refer to something near the surface of the body.

Another interpretation of the term, which lends itself to Gibson's novel, is that the periphery can refer to the contact zone between two cultures. For instance, the stub acts as a periphery that provides a contact zone between the time periods and cultures in the novel. Even the expression contact zone stems from having a sense of our bodies in a particular location and relates to how we can extend our sensory, expressive and communicative reach. Furthermore, the

term 'peripheral' is also relevant to discussions about digital technologies since it is commonly associated with auxiliary devices that can be attached to computers such as the keyboard, monitor and mouse.

Lakoff and Johnson (2003) provide further explication of the ways in which metaphors provide a way of structuring and shaping our experiences. For instance, they observe that because human beings stand erect on two feet when we are in good health, upward movement is linked to positive concepts such as health and happiness. By contrast, when we are ill or when we die we are laid down, so downward movements are linked to negative concepts. Lakoff and Johnson (2003) assert that this process of making sense of the world through bodily interaction continues throughout our lives. As such, traces of these ways of making sense of the world can be detected in our relation to digital technologies. For instance, we use concepts such as up and down when referring to how we navigate through the screens of our smartphones, tablets and desktop computers. Bodily metaphors are also linked to how we think and talk about digital technologies. The concept of containment and presence, for example, is linked to the meanings that arise from experiences with digital technologies. We talk about being immersed *in* virtual worlds or *in*habiting avatar (synthetic) bodies. Indeed, these ideas of immersion in virtual worlds and inhabiting synthetic bodies are frequent themes in Gibson's novels, including *Neuromancer* and *The Peripheral*.

In *The Peripheral*, people living in the future can use synthetic beings called peripherals in a range of different settings and for various purposes. In one part of the novel, a peripheral is described as 'an anthropomorphic drone' and a 'telepresence avatar' (2014: 175). A peripheral is not sentient; rather agency and improvised movement are provided by a human operator. Peripherals can feign some degree of sentience when they are controlled by artificial intelligence software programmes. However, the representation of peripherals in the novel suggests that the human body, movement and agency remain important even while using technologically produced bodies to communicate with others.

To make sense of the world, we use metaphors that link to physical experience. Therefore, our knowledge and understanding of the world are based on the sorts of bodies we have (their physical structure) and our interplay with the world at large. In this way, the work of Lakoff and Johnson (2003) aligns with the phenomenological approach to our interconnectedness with the world (Heidegger, 2010; Merleau-Ponty, 1998). Furthermore, since our environment

is historically, socially and culturally inflected, these factors also shape how meaning is produced and understood. What Lakoff and Johnson's work shows is that there are various aspects to our experience, knowledge and understanding of the world (such as our connection to other people, things and life forms). What Lakoff and Johnson are saying is that our experiences are interpreted and understood through metaphors. On this basis, it is possible to trace the ways in which the characters in *The Peripheral* conceptualize their experiences in relation to bodily metaphors. Moreover, as the characters in the novel are in two different environments (with varying historical, social and cultural inflections), this shapes how they perceive, conceptualize and know their world.

Haptics

One of the key ways in which characters in *The Peripheral* conceptualize their world is through haptic relations. In her study of *The Peripheral*, McFarlane (2016) makes a series of connections between Gibson's novels. In doing so, McFarlane contends that there is a shift in Gibson's work from an earlier emphasis on the visual and the disembodied to the haptic aspects of bodily experience. Furthermore, in agreement with McFarlane, *The Peripheral* does not present us with a scenario whereby the limitations of the body can be transcended through technological augmentation or immersion in virtual reality. Instead, the novel offers insight into the issues and debates in contemporary culture about the body, communication and digital technologies. What is particularly significant to this discussion is that vision and hearing involve distance. On this point, Abram (1997) explains that we can see the horizon and hear sounds from a distance. By contrast, touch is an inner body sensation that involves actual contact with things in the world, or between parts of our bodies. However, *The Peripheral* explores the ways in which haptic technology can extend the sensory reach of the body, so that it is possible to have contact with people or objects that are not physically present with us.

One of the main characters in *The Peripheral*, Burton Fisher has haptic augmentation, in the form of tattoos which were etched onto his skin while he was serving in the US Army. These haptics shape how Burton perceives and conceptualizes his world. After leaving the army Burton's haptics are removed; but he still experiences 'glitching' (Gibson, 2014: 01). The US Army tells Burton that these glitches are like 'phantom limb' (Gibson, 2014: 01). Therefore,

although his haptics have been removed and are no longer in contact with his body, Burton still feels their presence.

Merleau-Ponty's investigation of reports about people who experience sensations in phantom limbs in *The Phenomenology of Perception* (1998) can also provide useful insight into Burton's character in *The Peripheral*. Merleau-Ponty claims that the phenomena of phantom limb cannot be accounted for solely by empirical methods such as measuring the stimuli and response from the limb, because the limb is absent. Yet, phantom limb cannot be explained as a delusion either because the person who lost a limb does feel these sensations. Merleau-Ponty contends that the person who experiences phantom limb sensations is following bodily repertories that they had prior to their mutilation. For instance, an amputee may attempt to move their arm in a habitual way, as they did before losing their limb. In this way, the limb is still present to them.

To illustrate his argument, Merleau-Ponty discusses the case of a man named Schneider who had been injured in the First World War by a shell which had penetrated the occipital region of his skull and damaged his visual cortex. Merleau-Ponty outlines the ways in which Schneider could perform movements, but he had difficulties in identifying which parts of his body were touched, or where each part of his body was spatially located. Although Schneider's visual perception was altered, there was no physical damage to his eyes. However, due to the damage to his visual cortex, Schneider perceived the qualities of an object, such as light or shade or length individually. Therefore, for Schneider, these qualities were separate rather than part of a synthesized view of an object. According to Merleau-Ponty, Schneider can perform tasks that are patterned from his habitual concrete interactions in the world. Yet Schneider cannot place himself in imaginary situations.

The key point made by Merleau-Ponty is that it is not possible to arrive at a simple causal explanation of Schneider's experience. Extrapolating from this case, Merleau-Ponty suggests that there is an ambiguity to our being-in-the-world. One of the problems with the empirical approaches to the Schneider case is that it involves separating variables such as sight and touch, but according to Merleau-Ponty, these do not operate independently. Moreover, vision and touch are linked to other variables such as movement. Therefore, Merleau-Ponty posits that there is no such thing as a purely visual or purely tactile experience.

Merleau-Ponty underscores the ways in which Schneider's being-in-the-world is formed through practical engagement. Those of us who do not have Schneider's cognitive impairment can imagine themselves in different situations.

We can detach from immediate experience and imagine other situations. Yet Merleau-Ponty asserts that the ability to project into imaginary situations is not solely cognitive; it is not separate from the body. What matters, according to Merleau-Ponty, is having a unified sense of the body. On this note, he writes, 'My whole body for me is not an assemblage of organs juxtaposed in space. I am in undivided possession of it' (1998: 98). Merleau-Ponty stresses that our being-in-the-world fundamentally involves the body, space and movement. Therefore, 'by considering the body in movement, we can see better how it inhabits space' (1998: 102).

Drawing on Merleau-Ponty's discussion, connections can be made to Burton's phantom limb experiences in *The Peripheral* and research concerning body ownership and immersion in virtual reality (as outlined in Chapter 6). For as Perez-Marcos, Sanchez-Vives and Slater indicate, a computer-generated arm can be aligned with the body in an immersive virtual environment. When this alignment occurs, there appears to be a connection 'between the body and the virtual arm and hand' (2012: 303).

Furthermore, it is interesting to consider the ways in which Burton's experience of phantom limb through his augmented haptics connects to the contemporary phenomenon of phantom phone vibration. Research conducted by Daniel Kruger and Jaikob M Djerf (2017), for instance, suggests that there are links between psychological dependencies and phantom communication experiences, especially in relation to mobile phones. Therefore, the references to Burton's glitching in Gibson's novel can be a way of highlighting contemporary concerns about habitual usage and even perceived dependency to digital technologies such as smartphones.

During his service for the US Army, Burton was a drone operator and his haptics were fitted 'to tell him when to run, when to be still, when to do the badd-ass dance, which direction and what range' (2014: 01). In this context, these haptics remove some of Burton's agency, rendering him drone-like. In Gibson's novel, the term 'drone' functions metaphorically. It can refer to an aircraft which does not have a human pilot (a machine) but can be tele-operated at a distance by humans. The term 'drone' can also refer to a male bee that guards the hive from predators. Therefore, it can also refer to the ways in which Burton's role in the army involved guarding the interests of the United States from hostile threats.

When Burton's haptics were removed, they left visible traces on his skin. In this way, the traces on his skin are a presence that marks an absence. The markings

which are left on Burton's body provide a visible reminder of his former military role. Furthermore, the marks on Burton's body where the haptics were removed were 'dusted with something dead-fish silver' (2014: 01). The metaphor of dead-fish silver suggests something that is cold, inhuman and has ceased to exist. An analogy seems to be set up between the 'dead-fish silver' marks and the ways in which haptic technology rendered Burton partly inhuman, removing his agency so that his actions could be controlled for military purposes. Furthermore, Burton's surname is Fisher, a term which is also used to refer to someone who catches fish. Therefore, another interpretation of the dead-fish silver metaphor is that Burton is a fisher who catches bait, such as hostile threats on behalf of the US military.

Lev employs Burton as a drone operator in what appears to be a game-like environment (though it is London seventy years in the future). The money Burton earns from operating this drone supplements his income as an army veteran. However, Burton's actions produce a chain of events that has serious consequences for his sister Flynne and their circle of friends. Ligaya Mishan remarks that the ways in which Flynne, Burton and their circle of friends get paid to play online games are reminiscent of contemporary culture whereby 'people have hired stand-ins to play the tedious early round of games as a shortcut to higher levels' (2015). However, when Burton subsequently asks Flynne to take on his shift as the drone operator, she becomes his 'stand-in'. Of note is that the term 'stand-in' is linked to the body, since it refers to the physical act of standing (Cameron and Low, 1999). Therefore, we find that Gibson's novel reinforces the metaphorical, conceptual and physical connections between the body and the characters' life world.

It is also important to consider the ways in which Gibson's representation of the world in *Neuromancer* and *The Peripheral* links to concerns about technological development. For instance, the opening sections of *Neuromancer* are set in the city of Chiba, Japan. The Chiba sky is mentioned in two very evocative ways in the novel as 'the colour of television turned to a dead channel' (1986: 09) and a 'poisoned silver sky' (1986: 13) both of which suggest that there are undesirable aspects of technological development. Further connections can be drawn between Gibson's portrayal of the adulteration of the environment by technology and his use of particular metaphors. For instance, media scholar, Paul A.Taylor (2008) observes that in the novel *Spook Country*, 'The world outside the restaurant's windows was the colour of a silver coin, misplaced for decades in a drawer' (Gibson, 2007: 10). As Taylor remarks

by using such metaphors, we are presented by a 'hi-tech informationalized world [in which] nature's beauty is reduced to a fleeting lacuna' (Taylor, 2008: 789). Moreover, in *The Peripheral*, it is not just nature's beauty that is fleeting, so are other life forms.

In the post-Jackpot era of *The Peripheral*, seventy years hence, bees are extinct. Laurence Scott (2015) usefully explores some of the connections between debates about environmental issues, bees and digital technologies, in ways that are relevant to *The Peripheral*. Notably, in contemporary culture, there are numerous bee metaphors that refer to digital technologies, such as hive mind and smart swarms. Often, the metaphorical connections between bees and networked communications are framed in a positive light, as enhancing processes that multiply human cognitive capacities. However, Scott discusses the notion that wireless technology (along with pesticides, toxins in the air and reductions in food supply) has disrupted the life world of the honey bee, resulting in colony collapse disorder. Indeed, it is recognized that a range of factors have contributed to the decline in honeybees such as the use of insecticides and herbicides (Schaker, 2008). On the other hand, digital technologies are now used to help monitor the bee population. For instance, The World Bee Project (worldbeeproject.org), a collaborative venture between the University of Reading and Oracle Cloud, utilizes smart hives to monitor bee populations.

In agreement with Scott, the situation facing bees also operates metaphorically in contemporary culture providing 'a stark pattern of sentimentality and apocalypse, past and future, a golden era alternating with the threat of dark days' (2015: 40). Indeed, Gibson's *The Peripheral* sets out a scenario in which a sequence of events, caused by the human impact upon the environment, have contributed to a cataclysm that has wiped out the majority of the world's population. Therefore, taking Scott's points into account, Gibson's novel offers insight into an apocalyptic future in which it is not only bee colonies that have collapsed; rather the human population on earth has also been decimated. In this way, the metaphors in Gibson's novel point to the interconnections and interdependence between human life and the more-than-human world.

As discussed, in *The Peripheral* the enfleshed body has become entwined and augmented by technology. Consequently, shifts have occurred in terms of the relationships between humans and the more-than-human world. In the next section, there will be more detailed discussion of the ways in which the novel envisages the use of peripheral bodies.

Peripherals

In *The Peripheral*, Lev tells his friend, a publicist named Wilf Netherton, about the stub and his interest in the information transfers that occur from their time with the past. Recalling Lev's explanation of the stub, Netherton states that it felt 'like a ghost story' (2014: 38). The people seventy years in the past, who are living in a small town in the United States, appear ghost-like to those in Netherton and Lev's present. Indeed from the perspective of seventy years in the future, it is likely that the characters in the past are dead. Lev refers to Burton and Flynne as 'polts' (2014: 40) because they are 'ghosts that move things' (2014: 41). The metaphor of the polt evokes the poltergeist, a ghost who can create physical disturbances in our world. However, Burton and Flynne use technological mediation rather than supernatural forces to control peripheral bodies. Even so, this technological scenario suggests that Burton and Flynne's consciousness is transposed into some sort of information flow across the stub, connecting their minds to peripheral bodies in the future. In this way, peripheral bodies are 'ghosted' by the minds of polts (characters in the past).

There is also a vignette in the novel, when Netherton and the character Rainey meet at a pub in Covent Garden, London, which highlights the pragmatic use of peripherals in everyday life. Netherton is perturbed to find Rainey using a child-like peripheral. Rainey recounts that her peripheral supplier did not have any adult versions available because they have all been rented to people who are going to the opera in the neighbourhood. Rainey's comments imply that peripherals are commodities and companies rent them to consumers. Furthermore, her comments indicate that people in the future use these peripherals in social situations. Therefore, we can imagine a situation in which a live theatrical performance of an opera is attended by an audience who are only partially present, since they are using peripherals. Netherton knows that Rainey is actually in Toronto, Canada (rather than Covent Garden), so he imagines that 'she'd be wearing a headband, to trick her nervous system into believing the rented peripheral's movements were hers in a dream' (2014: 30). What we find in these passages from the novel is that using a peripheral is represented as a trick, an illusion of presence.

While Flynne is working as a stand-in for Burton, she witnesses a murder in the game-like environment. This murder triggers a criminal investigation involving Lev, Netherton, Burton and Flynne. Consequently, Flynne is asked to

meet Netherton using a peripheral. Flynne's peripheral is adjusted so it closely resembles her appearance to help her adjust to operating a synthetic body. Furthermore, Flynne becomes like a pilot, who controls the movements of the peripheral body using various technological paraphernalia including a headset and joystick. Though of course Flynne is a literary figure, she is a character in a novel, not a real person. But what Gibson's novel seems to be suggesting is that the body can be partially in one place and somewhere else simultaneously, through the use of a peripheral. However, from an existential point of view, Flynne's presence is rooted in her actual location in the United States. As such, she only appears to be present in the London of the future.

Distinctions between automata (unconscious) bodies, consciousness and agency can also be detected in relation to Flynne's use of a peripheral. For instance, when Netherton first sees the peripheral, it is operated by an AI in the cloud. Netherton 'reminded himself again that she, it, wasn't sentient' (Gibson, 2014: 124). Even so, Netherton has difficulty adjusting to the experience stating that 'she didn't look like an it, though. And she did look sentient' (Gibson, 2014: 124). The AI controlled peripheral gives the impression of sentience because it has a human-like appearance; it has a body and can move. The distinction between peripheral and human is not absolute though, as Lev tells Netherton that 'at the cellular level' peripherals are 'as human as we are' (Gibson, 2014: 124). This discussion of the peripheral and its control by either a human operator or an artificial intelligence also connects to contemporary research which explores the use of virtual characters in immersive environments (as outlined in Chapter 6 in relation to the work of Pan and de C Hamilton, 2018).

Before Flynne takes control of the peripheral, *it* showers and Netherton states that afterwards *it* looked 'radiant, as though freshly created' (2014: 170). Netherton's comments highlight the artificiality of the peripheral, because while it has an adult appearance, it has been manufactured. When Flynne first makes contact with her peripheral, it seems unreal: 'She saw her own hands and they weren't hers' (2014: 175). There are also differences between the peripheral and the human body, since the synthetic being's hands cannot fully replicate Flynne's sensations. Therefore, when Flynne touches the peripheral's face, she says it was 'like touching herself through something that wasn't quite there' (2014: 176). Again, Flynne's reference to not being quite there suggests that the peripheral is experienced as a ghostly sort of presence.

Scott's (2015) discussion of the technological extension of our bodily reach is also relevant to the discussion of the use of peripherals in Gibson's novel. As Scott

contends, we are increasingly living fragmented lives whereby we are locatable in one place but also communicating with others who are elsewhere. Scott remarks, 'It's astonishing to think how in the last twenty years the limits and coherence of our bodies have been so radically redefined' (2015: 04). Scott also considers the conditions that arise from attempts to extend our communicative reach, to be in different places simultaneously: 'The pressures of everywhere-ness, which call for a collapse of here and there, can produce a sense of absenteeism, and the suspicion that despite being in many places at once, we're not fully inhabiting any of them' (2015: 15). Arguably what Gibson does in *The Peripheral* is call attention to how technology appears to collapse our sense of the here and now.

The idea of having synthetic peripheral bodies is not just the purview of science fiction narratives. For instance, in 2012 a virtual (holographic) Tupac Shakur performed alongside Dr Dre at the Coachella Valley Music Festival. More recently, there have been reports of a forthcoming tour by the Swedish pop group Abba who will be on stage in the form of avatars (or 'abbatars'). Writing about these Abba avatars in an article for *The Times*, Matthew Moore (2018) states that 'the band have been scanned using high-tech imaging equipment and "de-aged" to appear as they looked at their peak in 1979'. Moore's remarks suggest that ageing becomes something that can be technologically tweaked, so that you can remain youthful forever. Meanwhile, the entertainment company Base Hologram[1] has produced *In Dreams, Roy Orbison in Concert* tour, featuring a holographic Roy Orbison and a live orchestra. Admittedly, these contemporary examples refer to famous singers and musicians and are set in the context of lucrative public performances. However, Gibson's novel invites us to consider the possibility that in the future the use of peripheral bodies, as avatars, could be extended to more commonplace aspects of social interaction.

Centred and grounded

Flynne uses a visor (which is referred to as a viz.) to operate her peripheral and when she removes it, she tells her friend Janice what it is like to operate a synthetic body. While talking to Janice, Flynne's 'mouth was full of pork tenderloin with garlic mayo, on a crusty white bun' (Gibson, 2014: 185). This reference to Flynne eating pork tenderloin in a crusty white bun does not appear

[1] https://basehologram.com

to be a casual reference. Rather it can be interpreted as a way of highlighting the ways in which her bodily existence depends on breathing and eating. Flynne is rooted in the place where she lives through her body. Flynne cannot exist solely in a peripheral body; instead, she must nourish her actual body (McFarlane, 2016). Furthermore, another way of reading this passage from the novel is that Flynne's rootedness in a specific place concerns her existential body, whereas the peripheral is a mechanical object which she controls.

At the end of the novel Burton, Flynne, their friends and associates live in close proximity to one another. Flynne states that 'it kept her centred, living here. She thought it kept them all centred' (Gibson, 2014: 479). Flynne is no longer experiencing the world from the periphery, through the mediated sensations of a peripheral body. Instead, Flynne is centred and grounded in a bodily sense to her locale and relationships with those around her. Gibson's novel seems to leave us with the notion that we cannot completely experience life at a distance, through the mediation of a technologically augmented body. Instead, we are rooted and grounded at an existential level by our immediate and necessary bodily connection and participation in the world.

Concluding remarks

This chapter has provided an overview of the ways in which metaphorical relationships are linked to our interaction with the world. By making these connections, it is possible to go beyond semiotic approaches to symbolic systems of signification, in which the relationship between signs and the world are often regarded as arbitrary. In addition, the discussion aimed to provide insights about language that can help supplement other approaches in the field of media and communication studies, such as discourse analysis. For discourse analysis can be used to pinpoint how the concept of the body is framed ideologically through the sets of ideas we have about bodies and what we can know about them.

The discussion in this chapter calls attention to how metaphorical relationships are formed during infancy as we move, explore and learn about the world. As we have seen, the work of Lakoff and Johnson (1999; 2003) and Sheets-Johnstone (2009) indicates our bodily interaction with the world around us forms the basic conceptualization of space, containment, boundary and periphery. Moreover, these processes continue throughout our lives, as we interact, learn and make sense of the world through our bodies.

By turning our attention to *The Peripheral*, it was possible to highlight the ways in which bodily metaphors are linked to technologically mediated experiences. For instance, there was a discussion on the ways in which the representation of haptic augmentations through the character of Burton was linked to phantom sensations. Moreover, we saw that the concept of inhabiting a synthetic body generated a ghostly sense of presence. For when characters used peripheral bodies, they were neither fully present nor fully absent. In this way, the representation of peripheral bodies in the novel is linked to contemporary concerns about online communication and presence. For example, we can interpret the term 'online' as referring to something which support us, or something we are in contact with (Lakoff and Johnson, 1999). In this context, technological communication networks support our communication with others, enabling us to remain in contact.

In the end though, Gibson's novel reminds us of the importance of staying in contact (literally) with those we can reach out and touch directly, friends, family members and neighbours. At the end of the novel, Flynne centres and grounds her existence in her locale, rather than interaction with other people, living in the future or immersion using a technological body. On this basis, Gibson's representation of peripherals can act as a prompt, reminding us that we are connected to one another and the more-than-human world through our bodies.

Conclusion

In contemporary culture, we have an array of communication mechanisms at our fingertips. We communicate through digital devices such as smartphones, tablets, games consoles, using screen-based interfaces and software applications such as Snapchat and FaceTime. We can even talk to virtual assistants such as Alexa, Cortana and Siri. Even when we are co-present (in the same spatial and temporal location) with another person, we can blend face-to-face chat with screen-based communication with others who are elsewhere. Yet our attention can be drawn away from those people who are immediately beside us when we react to the vibration, buzz or ringing sounds emitted by digital devices. This electronic tugging away from face-to-face conversation may even happen without much thought because the experience has become so familiar. Through repeatedly reacting and responding to digitally mediated stimuli, our daily lives can become increasingly entwined with digital technologies, thereby generating the sense of digital reality referred to throughout this book. However, it would be unwise to simply dismiss this sense of digital reality as wholly distracting or alienating. Instead, this book aimed to go beyond a narrow focus on the cognitive impact of digital technologies, to open up new areas of inquiry. As such, this book highlights how our body interplays with digital technologies as we engage with digital devices and software applications. Indeed, as this book has indicated, we use our bodies to create digital content, to type instant messages, play computer games or become immersed in virtual worlds.

As discussed in Chapter 3, in contemporary culture there is less of a need to shape letters of the alphabet through our handwriting. Instead, it is quick and easy to type out ready-made letters using electronic keypads, or even use a visual symbol such an emoji. Admittedly, there are still cases where we handwrite, such as formal letters, or informal notes such as shopping lists or reminders on scraps of paper. But even our shopping lists and notes can now be easily produced by typing or using voice recognition via applications on smartphones and tablets.

Students in higher education can now spend their entire undergraduate studies without having to handwrite a single word (apart from their signature

on official enrolment documents). Even so, some students still bring paper notepads to seminars and lectures to take notes, sketch down their ideas and so forth. Therefore, it would be unwise to claim that typing replaces handwriting; rather they coexist. Additionally, this book has indicated handwriting and typing using electronic keypads are both bodily activities involving a coordinated choreography of eye movements, fingers, wrists, hands and shoulders.

Chapters 4 and 5 outlined some of the movement repertoires in our daily activities. In doing so, these chapters indicated that our daily lives are the site of unceasing movement and activity. Using handles, stairs, lifting a knife or fork are all aspects of our daily life that we pay little attention to due to repetition (Sheets-Johnstone, 2009). Even so there is a sort of proto-consciousness that involves bodily awareness. In the past, the development of cutlery altered the ways in which food could be chopped and consumed, which in turn changed the structure of our mouths and teeth (Leader, 2016). Now new forms of gestural patterning and bodily movements are emerging as we interact with digital devices, such as keypads or control pads on gaming consoles, particularly in relation to thumb use. Arguably, our bodily movements attune with the affordances of digital technologies, as our fingers swipe across screens, pinch and drag digital objects, click buttons, or use a mouse-based interface (Norman, 1988; Plotnick, 2012). Moreover, pre-school age children are able to swipe their tiny fingers across tablet computers and navigate through digital screens, through playing with toys that mimic the features of smartphones and tablets.

Chapter 5 noted that our bodily movements can be analysed and turned into a productive activity through digital self-tracking devices (Till, 2014; Lupton, 2016). This chapter also discussed the ways in which health is framed in relation to neoliberalism, as something which is our personal responsibility. Moreover, these neoliberalist ideas were connected to particular social, economic and political contexts, whereby funding for public health is stretched thinly (Ajana, 2017). Yet the chapter also indicated that those who use self-tracking devices create narratives about their data, what it means to them and how they can use it (Neff and Nafus, 2016). Through online social networks, users of these devices can also share and compare their self-tracking data with others. These self-tracking devices can become interwoven into the intimate aspects of life, since sleeping patterns, fertility cycles and moods are considered as something that can be tracked and analysed by digital devices and associated software. But as outlined in Chapter 5, what can get edged out by quantifiable metrics is the intrinsic pleasure of movement, or the playful aspects of an activity, which do not

have an end goal in mind. Drawing on the work of Laban (1971, 2011), Chapter 5 outlined some of the qualitative aspects of movement such as the feeling tone or affective dimension. Indeed, Chapter 5 showed that these qualitative aspects of movement cannot be fully understood through metrics.

Digital Reality is not about returning to a mythical pastoral idyll in which communication is completely grounded through immediate co-presence with others, handwritten notes on paper, or direct interaction with the more-than-human world. For our everyday lives are now underpinned by a technological infrastructure of networked devices and wireless technologies. Therefore, *Digital Reality* is certainly not about forgoing many of the incredible benefits and opportunities that are opened up via digital technologies, to communicate, create and connect with others.

Moreover, the phenomenological approach taken throughout *Digital Reality* suggests that even when we directly participate with the world at large, we are caught up in the realm of sensory experience, memories, beliefs and so forth which shape and limit how we perceive the world around us. Arguably, there is no raw, unmediated reality; human existence is technological through and through. For even our sense of nature is socially, culturally and historically constructed.

Digital Reality has attempted to highlight the qualitative dimensions to experience, our sense of aliveness, movement and interaction with a range of environments (virtual, real or hybrid). Through drawing on the work of a range of scholars and the philosophical principles and practices of phenomenology, this book has presented the case that a sense of aliveness is not dependent on knowing in a cognitive sense that you are alive. This is because conceptual thoughts about being alive are already split from an organic sense of aliveness. In this way, objective, conceptual accounts about the body are like third-person narratives in which the researcher (the subject) scrutinizes an object of investigation. By contrast, Sheets-Johnstone's work (2009) shows that the living body is the one we feel and know from sensory experience.

As *Digital Reality* has outlined, the term 'phenomenon' means to reveal, to show itself, manifest and bring to light. In this sense phenomenon refers to how things appear to our senses. Meanwhile, the term 'logos' refers to reason, judgement and discourse. Heidegger (2010) asserts that we have forgotten our embeddedness with the world of Being (the capital letter here indicates the importance of interdependent existence). Furthermore, in agreement with Heidegger, the questions arising from Being are not the same as everyday

practical questions such as where is my phone? Rather the question arising from Being go much deeper. For questions of Being are linked to how we live, what motivates us and what we find meaningful. As this book has suggested, questions of Being are now entwined with questions about digital technologies, how they are used, produce meaning and shape our sense of reality. It would be absurd to claim that human life can be sustained solely through the digital reality evoked through screens and immersive virtual worlds. For we are in the world with others; we exist alongside them (microbes, plants, animals, etc.). Put simply we share Being.

We are sensuously immersed in the landscape, through our bodily senses (touch, sight, smell, sound and taste) and kinaesthetic sense of position. Admittedly, we are also sensuously and affectively intertwined with digital technologies, such as leaping for joy when winning a computer game or laughing at silly cat videos on YouTube (Goldsmith, 2016). But in the more-than-human world, we encounter more unpredictable circumstances and consequences. A cat could run out in front of our car as we drive home, so we brake abruptly. High winds mean that high-sided vehicles turn over on the motorway. Heavy snowfall creates commuting chaos as roads become unpassable by cars and buses.

Certainly, our sensory experiences have vastly expanded through technological developments in transportation and communication. We can fly at high altitudes in aircraft, or view events that are happening across the world as they are happening, through the screens of smartphones we carry in the palm of our hands. Furthermore, as Ackerman (2014) remarks we can view the body at miniscule levels using microscopes or produce images of the brain using MRI scanning technology. Yet Ackerman also observes that 'for the first time in human history we're mainly experiencing nature through intermediary technology, that, paradoxically, provides more detail while also flattening the sensory experience' (2014: 189). We can view nature in glorious technicolour and in high definition through screens. Yet the image we see on screen is a two-dimensional flattened out landscape that supplements rather than replaces our direct sensory interplay with the world. Moreover, gazing at digital images of natural environments while on the treadmill at the gym is a different experience to running through natural surroundings, smelling grass after a fresh rainfall, splashing through puddles or feeling the wind across your face.

Digital Reality has referred to phone zombies, selfie deaths and even software apps to curb smartphone usage. These examples can appear extreme cases, since they concern exaggerated form of attachments to digital technologies. However,

the point of referring to these examples is to highlight the implications that can arise from overlooking our bodily sensory embeddedness in the world beyond the screen.

Digital technologies are now integrated into a range of objects and services we encounter on a daily basis: refrigerators, heating systems in our homes, vehicles, self-service machines and so on. In advanced technological societies, digital technologies can now be intimately interwoven with our daily activities such as checking our sleep patterns using digital self-trackers, ordering a taxi cab or food using software applications, buying clothes online, streaming music and personalizing our playlist. Taking these examples into consideration, it is hard to imagine what our lives would be like without digital technologies.

The phenomenological approach taken in *Digital Reality* renders our familiarity with digital technologies into something strange. Shifting perception so that the familiar becomes strange is a way of evoking a sense of wonder in relation to digital technologies, how they appear and our encounters with them. The phenomenology of our everyday experience of digital technologies cannot be solely understood through scientific objective methods or approaches which are chiefly analytical, conceptual and based on logical argument. Instead, the phenomenological approach taken in this book embraces the multifaceted aspects of everyday experience through creative insights, poetics, vignettes and anecdotes. Ultimately, phenomenology is an exploratory approach which does not arrive at a single conclusion or answer. Therefore, my aim in *Digital Reality* is to offer a sense of awe and appreciation for bodily experience in relation to digital technologies.

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