The significance of outdoor recreationists' digital technology engagement in peri-urban settings

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Caroline Dépatie

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Abstract of a thesis submitted in partial fulfilment of the requirements for the Degree of Doctor of Philosophy

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Outdoor recreation is reported to facilitate a range of benefits including increased physical, social, mental and spiritual well-being by giving individuals an opportunity to disconnect from their day-to-day lives (Driver, 1998b; Manning, 2011). These benefits are realised through activities in specific settings within individual experiences (Driver & Brown, 1978; Manning, 2011; McCool, 2006). A digital technology revolution is reshaping outdoor recreation participation and experience, potentially undermining principal values of nature-based recreation engagements. While the impact of digital technology on the outdoor recreation experience has been researched in remote recreation settings (Amerson et al., 2020; Ewert & Shultis, 1999; Lindell, 2014; Martin, 2016; Pohl, 2006; Shultis, 2001, 2012, 2015), little is known about how outdoor recreationists use digital technology in peri-urban settings. Growing urbanisation has increased demand for, and value of access to outdoor spaces located on the urban fringe. These accessible outdoor recreation spaces, referred to as peri-urban, are the interaction zones where urban and rural activities are juxtaposed, and form an increasingly important component of urban recreational systems (Pigram & Jenkins, 2006).

Using a mixed-methods approach, this study examined the significance of digital technology from outdoor recreation users' perspectives in the context of a peri-urban setting. Quantitative survey data was collected on the use of digital technology by outdoor recreationists (N = 520), evaluating engagement with digital technology and the implications of this engagement. Additionally, qualitative interviews (N = 40) with recreationists, recreation managers, and members of outdoor recreation groups were completed focusing on the digital technology experience and perspectives on the role of digital technology in outdoor recreation. The research was undertaken in the peri-urban recreation area of the Port Hills (Te Poho-o-Tamatea) in Christchurch, New Zealand, known for its importance as a place of recreation and natural resources.

This research found that the majority of recreationists carried at least one digital device, the most common of which was the smartphone. During the outdoor recreation experience, digital devices were primarily used for self-logging and quantification, to listen to music, and to communicate and stay connected for safety, for social reasons, or to access information. Findings led to the development of a typology of digital technology engagement in the peri-urban setting. The typology revealed that for a minority of recreationists digital technology was absent from the activity, and that for the majority of recreationists technology acted as a form of reassurance, support, or dependency in the experience.

Through drawing on conceptual ideas included in the recreation demand hierarchy framework, and in the literature on technology usage in urban and in outdoor recreation settings, these findings expand our understandings of how and why recreationists engage with technology. Of particular importance is the interconnectivity of the variables such as activity, setting, and outdoor recreationists' personal preferences and experiences. The varied experiences suggested tensions between our increasingly technologised existence (Lindell, 2014; Shultis, 2001, 2016) and traditional reasons for recreating outdoors, which played out through the range of responses in this study.

Keywords: device, communication, digital technology, engagement, experience, New Zealand, outdoor recreation, peri-urban, recreation manager, recreationists, setting, safety.

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Table of Contents

List of Tables

List of Figures

Chapter 1

Overview

1.1 Research context

The literature on outdoor recreation provides a wealth of evidence for the health benefits of spending leisure time in natural resource settings. Among the positive outcomes are documented improvements in physical, social, mental, and spiritual well-being, which have been linked to the opportunity for individuals to disconnect from their day-to-day lives while experiencing meaningful interactions with each other and with the physical environment (Driver, 1998b; Manning, 2011). Outdoor recreation, as a form of leisure, is distinguished by being an activity that is practised in natural environments and typically involves a physical component that meets a range of purposes determined by the needs of individual participants (Plummer, 2009; Sport New Zealand, 2009).

Scholars in the late 20th century framed outdoor recreation as a hierarchy of participant demand for activities, settings, experiences, and benefits (Driver, 1998b; Driver & Brown, 1978; Manning, 2011; McCool, 2006). Individuals engage in recreation activities in particular settings in order to have experiences that ultimately result in benefits, which may be personal, social or environmental (Albrecht, 2017; McCool, 2004). This thesis integrates elements of the hierarchy of recreation demand model by looking at specific recreation activities such as mountain biking and rock climbing in the context of a unique recreation setting, with a focus on experiences using digital technology. The peri-urban setting of the Port Hills in Christchurch, New Zealand, was the location chosen to collect the data (Appendix A). The choice of setting addresses the outdoor recreation research gap specific to peri-urban areas identified by Booth and Lynch (2010). It is also justified by the limited research on technology use in outdoor recreation conducted in peri-urban environments and by the significant impact of digital technology on people's lives.

With increased urbanisation and half of the world's population now living in urban areas, it was predicted, prior to the pandemic, that over 70% of the world's population will live in urban areas by 2050 (Ritzer, 2015). For many developed countries such as New Zealand, this could be as high as 86% (Ritzer, 2015). For those seeking outdoor recreation experiences, the extent of urbanisation has increased the recreational value of open spaces such as the Port Hills. Such highly accessible spaces, referred to here as peri-urban locations, are interaction zones where urban and rural activities are juxtaposed and provide an increasingly important component of urban recreational systems (Pigram & Jenkins, 2006).

Alongside urbanisation, a digital technology revolution is shaping the way that social life is organised. The rapid growth and adoption of digital technology for the first generations of digital natives, individuals who were born after 1980 and raised in the digital world, is shaping the role of digital technology in our social fabric (Palfrey & Gasser, 2008). We live in a world where we are constantly connected and where digital and non-digital identities are blurred (Palfrey & Gasser, 2008). Poslad (2009) argued that digital technology is becoming an essential part of life: "Applications and technologies, such as mobile phones, email and chat messaging systems, are considered as a necessity by some people in order to function on a daily basis" (p. 11). Young (2012) claimed digital technology is becoming an extension of the self, enabling people to monitor their performance in a way they were not able to before. This is especially relevant in the outdoor recreation context. It has become popular for recreationists to use fitness applications to record various performance measures and activity-related information such as running time or mountain biking speeds (Millington, 2014; Vanderbilt, 2013). Whether quantifying the self, listening to music, or staying in constant communication while recreating, digital technology is likely to have an important influence over how individuals participate in and experience outdoor recreation, with some authors observing the potential for such developments to undermine the core values of nature-based interactions or keep people from using natural areas altogether (Dickson, 2004; Louv, 2005, 2009, 2011a; Pergams & Zaradic, 2006, 2008; Pohl, 2006; Wray, 2009; Zaradic & Pergams, 2006).

Research on the use of technology is increasingly part of the outdoor recreation research literature, much of which focuses on remote settings. Early research from Ewert and Shultis (1999) contained a typology of technological impacts on backcountry recreation, including access and transportation, comfort, safety, communication, and information. Since then, research into outdoor recreation and digital technology has expanded to include the impact on the outdoor experience, on safety and on the increased ability to communicate while recreating (Blackwell, 2015; Martin & Blackwell, 2016; Martin & Pope, 2012; Shultis, 2016). These areas are important aspects of this thesis. As a whole, this research betters our understanding of human experiences in natural settings and of how digital technology engagement shapes these experiences.

1.2 Research aim and research objectives

Despite research linking technology and outdoor recreation, reasons why outdoor recreationists use various digital technologies and their implications for outdoor recreation experiences remain largely unexplored, especially in the urban and peri-urban settings. Since the work of Ewert and Shultis on their typology of technological impacts on backcountry recreation in 1999, technology and more specifically digital technology, has continued to evolve and infiltrate the outdoor recreation world. New technological developments, including fitness data applications, personal locator beacons,

sports digital cameras, sophisticated smartphones, and activities such as geocaching have stimulated recreationists to experience the outdoors in new ways. Furthermore, the advancements in technology have enabled recreationists to document their experience in a more refined way should they wish to do so (Neustaedter, Tang, & Judge, 2013; Suarez & Dudley, 2012; Vanderbilt, 2013). To understand contemporary outdoor recreation experiences, it is important to understand how and why recreationists engage with digital technology. Consequently, the following aim and objectives were developed as a guide for the research.

The aim of the research was to study the significance of digital technology from outdoor recreation users' perspectives in the context of a peri-urban setting. The three objectives of the research allowed for different levels of analysis from describing and comparing digital technology use to critically evaluating the significance of this use on the outdoor recreation experience. The research included the following objectives:

1. In the context of a peri-urban setting, describe what digital devices are carried and used by outdoor recreationists and for what purposes.
2. Compare and contrast the use of digital technology between outdoor recreation user groups in a peri-urban setting.
3. In the context of a peri-urban setting, identify and critically evaluate the variables that influence outdoor recreationists' engagement with digital technology including implications for management practices.

The research utilised a mixed-methods approach to achieve the research aim and tackle the three research objectives. Using a quantitative survey, the research addressed the first two objectives by asking walkers, runners, mountain bikers, and rock climbers about their digital devices habits while recreating in the Port Hills. The third research objective, although supported by the quantitative data, was mainly explored via qualitative interviews with Ports Hills recreationists, members of affiliated Port Hills outdoor user groups, and recreation managers.

1.3 Technology

Technology is a challenging term to define. According to Braudel (1982), technology is everything. It can broadly be defined as the application of scientific knowledge for practical purposes to understand our world. Heidegger (1977) presented technology as a means to an end, and as a human activity. Furthermore, Heidegger defined technology as the manufacture and utilisation of equipment, tools and machines, and the needs and ends that they serve.

Outdoor recreation researchers Ewert and Shultis (1999) have explored the impacts of technology use on backcountry recreationists. The authors' typology looked at the impacts through various technology types such as equipment from snowmobiles to soft and hard goods (i.e., fabrics, skis, mountain bikes, etc.) to electronic devices using the Global Positioning System (GPS) and personal locator beacons (PLBs). While Ewert and Shultis examined a wide variety of types of technology, this thesis focuses on digital technology and, more specifically, on the uses of digital devices during outdoor recreation experiences. Digital is defined as an electronic technology that uses discrete values, from zero to one, to generate, store, and process data (Williams, 1997). Digital is the term used in the thesis when looking at the technology use in peri-urban outdoor recreation and when discussing devices such as smartphones, music players, and cameras.

1.4 The peri-urban Port Hills setting

Given the distinctive locale for this study, it is important to introduce the peri-urban setting in order to provide the geographic context to this research. Commonly, outdoor recreation is understood as experienced in a range of settings that can span on a continuum from urban, peri-urban, to rural. These settings are distinct through their history, development, management, as well as their socio-cultural, technological, and political environments (Castree, 2013; Duncan, 2011; Fouberg, 2015). Although distinct, the boundaries of each setting can blend into one another with overlapping edges. The boundaries are flexible and also change as a result of urban growth and urban sprawl, which is particularly apparent between urban and peri-urban recreation settings (Papillon & Dodier, 2011; Swaffield, 2012, 2014).

The Port Hills of Christchurch was the peri-urban setting chosen as the field site for the research. The Port Hills (Te Poho-o-Tamatea),[1] adjacent to the City of Christchurch centrally located on the East Coast of New Zealand's South Island, constituted the research site for the study (Figures 1.1 and 1.2). The Port Hills as a peri-urban area is considered an important recreation and natural resource for New Zealanders, even more so for Christchurch and area residents (Christchurch City Council, n.d.-b). With population growth, changing demographics and urban sprawl, the Port Hills made an appropriate site for the topic of this outdoor recreation research. The diversity of visitors and sites in the Port Hills made the Port Hills a good case study for the research and provided an opportunity to target a range of recreationists seeking different recreation experiences. The diversity of sites included various levels of physical challenges, accessibility, landscapes and historical values. For example, Godley Head is a popular destination for tourists interested in visiting the military structures erected in 1939 to defend the coastline in World War II, and the Rapaki Track is attractive

[1] Te-Poho-o-Tamatea is the traditional Māori term for the Port Hills.

for local recreationists seeking to improve their level of fitness or for all recreationists seeking a view of Lyttelton Harbour and the Banks Peninsula. The Port Hills were chosen for their accessibility to the main researcher to collect the data over a one-year period. Using the Port Hills fitted the research design well and addressed the research aim and research objectives. Both accessibility and research interested were criteria discussed by Singleton and Straights (2010) when talking about selecting a study site. Other sites were not considered in the research. The Port Hills provided a good site to investigate a contemporary phenomenon in-depth, and within an applied context (Yin, 2018). The Port Hills lie between the City of Christchurch and the nearby port of Lyttelton. The hills are the eroded remnant of the Lyttelton volcano (Christchurch City Council, n.d.-a; Ogilvie, 2000).

Figure 1.1 Map of New Zealand including Christchurch.

Note. Retrieved with permission from Backpack New Zealand. New Zealand Travel Guide.

For many Christchurch residents, spending time in the Port Hills for leisure and recreation purposes is possible because of the accessibility of the terrain via the access road to the Summit Road, many major entry points, car park amenities, and extensive single- and multi-use track networks (Appendix A). According to the Christchurch City Council (2004), the Port Hills provide an "accessible getaway experience which contrasts from that available in a normal urban environment, providing

opportunities for exercise, the experience of a range of natural environments and views over the plains, harbour and peninsula" (p. 26).

The Port Hills area has a rich socio-cultural and historical meaning for the population of Christchurch. In the early 1800s, the area was used as a corridor between Lyttelton Harbour and the plains of Canterbury for the first Europeans settlers (Oakley, 1960; Ogilvie, 2000).

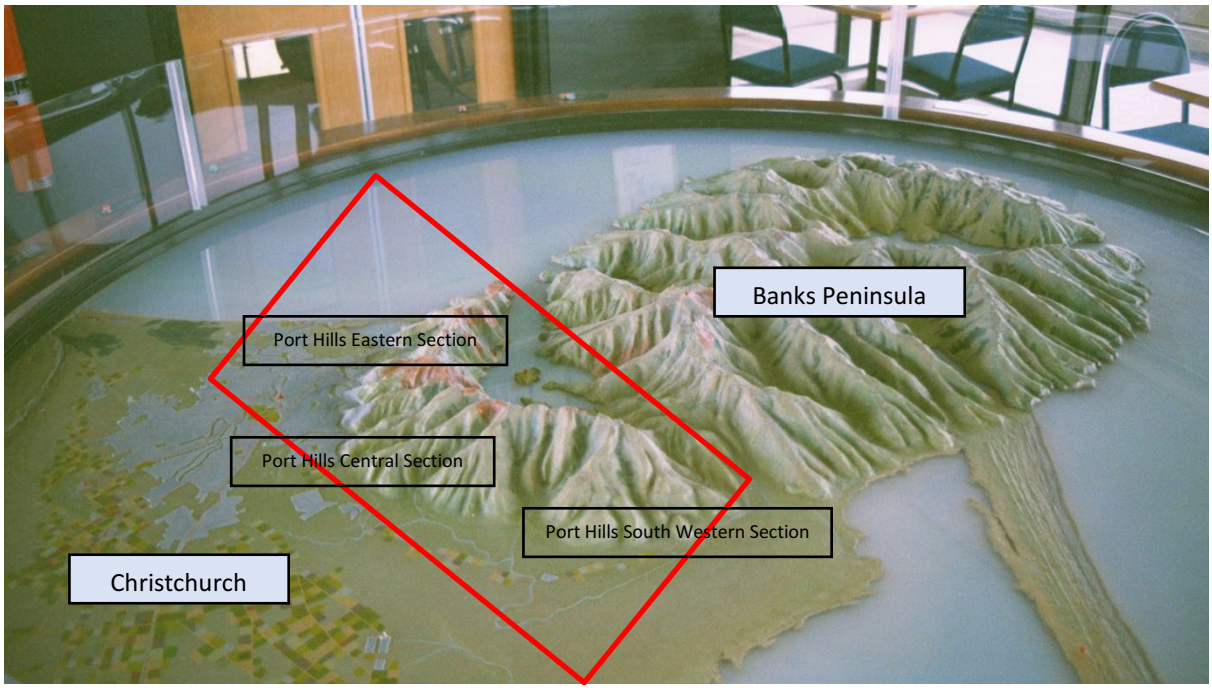

Figure 1.2 The Port Hills sits between the City of Christchurch and the Banks Peninsula.

Note. Photo credit: C. Lindberg (Use permission under CC BY 2.5)

Māori and the Waitaha tribe first populated the area in the 14th century before European settlers arrive in the early 1800's later. One of the early pathways from the harbour to the newly settled Christchurch was the Bridal Path, which remains open for recreational use today. In addition to the Bridal Path, the Lyttelton rail tunnel opened in 1867 (Christchurch City Council, n.d.b; Ogilvie, 2000). In the early 1900s, a conservationist named Harry Ell created public access to the Port Hills through the development of the Summit Road and the building of four rest-houses for walkers (Oakley, 1960). The Summit Road runs at the top and across the length of the Port Hills.

The Port Hills cover 13,700 hectares and span a distance of 35 km from Gebbies Pass to the sea at Godley Head (Appendix A), approximately 20% of which is accessible to the public for recreation (Christchurch City Council, 2004; Ogilvie, 2000). The vast majority of the area is private land and is mostly used for farming, agriculture, and forestry (Christchurch City Council, 2004).

The Christchurch City Council (CCC) manages the majority of public recreation assets of the Port Hills. Other groups involved are the Selwyn and Banks Peninsula District Councils, the Department of Conservation (DOC) and various trusts (CCC, 2004). The CCC oversees 34 out of the 41 parks and reserves of the area (Appendix B). Since the last Port Hills strategy in 2004, the Banks Peninsula has amalgamated with the CCC. The CCC is currently updating the Port Hills recreational strategy with an aim of 2021 for a final report (N. Singleton, personal communication, September 30, 2018).

For management and marketing purposes, the CCC has divided the Port Hills into three sections: (a) the Eastern section starting at Godley Head; (b) the Central section, which includes the Rapaki Track and Victoria Park, and (c) the Southwestern section, including the Worsley Spur Track and Halswell Quarry (Appendix A). According to the most recent strategy, the most frequently used area which is reported as a high management zone is the Central section with Victoria Park (CCC, 2004). The CCC manages close to 2000 hectares of land (CCC, 2004) with the Port Hills Park Ranger Services Department overseeing over one hundred kilometres of tracks used mostly for mountain biking, running and walking by a variety of local residents and visitors to the area (N. Singleton, personal communication, October 23, 2013). The 2004 Port Hills strategy reported that 89 percent of users lived in the Christchurch and Lyttelton Harbour areas. The CCC considers the Port Hills as an icon of the region, highly visible from most areas of and around the city (Figure 1.3).

Figure 1.3 The Port Hills in the background from Lincoln University on the outskirts of Christchurch.

Christchurch city is also visible from the Port Hills as shown in Figures 1.4 and 1.5. Figure 1.4 is taken from the top of the Rapaki Track which is one of the most used tracks on the Port Hills whereas Figure 1.5 is showing the Bowenvale Valley Track from the Summit Road with the urban area of Christchurch in the background.

The Port Hills are well used by Christchurch residents and recreationists, and are one of Christchurch's most valued landscape and recreation resource (Christchurch City Council, 2004). According to the 2018 census, Christchurch has a population of 369,006 (Stats NZ, 2018), an 8% increase from the 2013 population of 341,469 (Stats NZ, 2013). While up-to-date data on the number or specific activities of recreationists are not available, the CCC's last published *Port Hills Recreation Strategy* in 2004 identified the main recreational activities undertaken in the Port Hills as walking (40%), mountain biking (17%), running (10%), and sightseeing (10%). Anecdotal evidence suggested mountain biking has seen the largest increase in participation (N. Singleton, personal communication, October 23, 2013).

Figure 1.4 Hikers on the Rapaki Track and view of Christchurch from the top of Rapaki Track in Port Hills.

Figure 1.5 View of Christchurch and the Bowenvale area Summit Road in Port Hills.

The Port Hills has been and continues to be a key recreational resource for the community of Christchurch (and beyond), with gradually increasing demands for recreation provision due to various issues such as urban encroachment and increased building of nearby houses (Christchurch City Council, n.d.b). The Port Hills are easily accessible by foot, bike, car, or public transit and have various access points and car parks spanning the East to Southwest, with the main access being in the Central zone via the Dyers Pass Road, which links Christchurch to Governors Bay and Lyttelton and also connects onto the Summit Road (Appendix A). The Summit Road renders the high points of the Port-Hills accessible to both motorised and non-motorised transport, although since the 2011 earthquakes some parts of the Summit Road have been closed off. The Port Hills, for the most part, have mobile phone accessibility through reception transmitted via cell phone towers. There are some areas where mobile phones have poor and/or unreliable reception, most notably at the eastern tip of the Port Hills at Godley Head and the areas of the Port Hills leading to Lyttelton and Governors Bay.

In recent history, the Port Hills have been devastated by natural hazards, specifically the February 2011 Christchurch earthquake (and prolonged aftershock sequence) and the 2017 Port Hills fires (Figures 1.6 and 1.7).

Figure 1.6 Port Hills earthquake rock damage in 2011 on Summit Road.

Note. From *Discover ideas about New Zealand earthquake*, by Bortner, n.d. Retrieved from https://www.pinterest.nz/pin/317433473714322876/

Both of these natural disasters disrupted recreation on the Port Hills with track and area closures (Guilford, 2018; Walker, 2017; Young, 2013). After the earthquakes, tracks such as the Pilgrims Way, including the Taylors Mistake to Godley Head section, and the Major Hornbrook located in the eastern part of the Port Hills were closed and reopened 2 years later (Young, 2013), while others, such as the Summit Road link between Rapaki Rock and Mt Cavendish, took almost 4 years to re-open. Two recreationists were killed by falling rocks on the afternoon of the February 22, 2011, earthquake while walking on tracks near the area of Lyttelton, located on the harbour side of the Port Hills (Young, 2013). As a reminder of the earthquakes, a brochure published by the CCC in 2014 informs recreationists of their personal responsibilities when walking in the Port Hills tracks by including the following personal safety warning on every page of the printed brochure:

> *Earthquake damage has meant many tracks and reserves remain closed due to rockfall hazard. It is the walkers' responsibility to check the status of walking tracks before setting out, stick to open tracks only and obey any closure signs. (CCC, 2014, p. 1)*

Following the 2011 earthquake, the February 2017 Port Hills fires, which spread over 2,000 hectares, resulted in the closure of many tracks and destroyed 11 houses, leaving a visible scar on the Port Hills (Guilford, 2018). Assessing risk and managing and reopening access have been an important focus for Port Hills recreation managers and rangers since the disasters (Guilford, 2018; Young, 2013).

Figure 1.7 Port Hills ablaze in February 2017.

Note. From "Christchurch Port Hills blaze in photos," by M. Hannah, 2017, *News Hub*. Reprinted with permission. Retrieved from https://www.newshub.co.nz/home/new-zealand/2017/02/christchurch-port-hills-blaze-in-photos.html

The Port Hills have a rich history embedded in the development of Christchurch, New Zealand, and are an important part of the region's outdoor recreation opportunity spectrum, given their proximity to the resident population and the accessibility of the terrain (Christchurch City Council, n.d.-a, n.d.-b, 2004; Oakley, 1960; Ogilvie, 2000). As such, the Port Hills is an ideal setting for examining the intersection of technology and outdoor recreation.

1.5 Thesis outline

This thesis comprises eight chapters, including this introductory chapter. The following section summarises the content of each chapter.

Chapter 2 presents a discussion on the outdoor recreation context. The chapter outlines the literature that seeks to explain the phenomenon of outdoor recreation through understanding the relationships between activities, settings, experiences and benefits.

Chapter 3 examines the inseparability of technology and outdoor recreation. The chapter presents the role of portable and ubiquitous technology in the social context along with the pervasive nature of digital devices into the outdoor recreation experience. The majority of technology and outdoor recreation research has a strong focus on technology used in remote areas.

Chapter 4 describes the research methods and approach used in the study. The chapter outlines the mixed-methods approach including an intercept survey and semi-structured in-depth interviews. The chapter includes details of the data collection schedule and procedures and concludes with an overview of ethical considerations and research limitations.

Chapter 5 is the first of three chapters that presents the research findings. The chapter focuses on quantitative data generated via the survey. Chapter 5 describes the demographics of Port Hills users along with their reasons for recreation participation. A section on the digital technology carried and used on the Port Hills by land-based recreationists is included. The chapter concludes with the limitations of the digital devices while recreating in the Port Hills as well as the reasons why some recreationists chose not to engage with technology.

Chapter 6 is the second research findings chapter and is organised thematically around the topic of digital technology-mediated outdoor recreation experiences in the Port Hills. The three themes are self-logging and quantification, digital sound experience, and communication and connection. The topic of staying connected for safety is developed in the chapter.

Chapter 7 is the final research findings chapter, with a focus on the intersecting worlds of digital technology-mediated outdoor recreation experiences and management practices. A comparison between the use of digital technology in the peri-urban and the remote natural setting is presented.

Chapter 8 is the concluding discussion integrating the key findings of the research in relation to the contextual and theoretical background. The focus is on digital technology engagement in peri-urban outdoor recreation. A typology of digital technology in the peri-urban outdoor recreation experience explains how some recreationists have an outdoor recreation experience where technology is absent, or with technology that is present and acts as a form of reassurance, support or dependency. The variables influencing technology engagement are also presented. A short discussion on the implications and significance of the research and on suggestions for future outdoor recreation and technology research concludes Chapter 8.

Chapter 2

Outdoor Recreation: Activity, Settings, Experiences, and Benefits

This chapter introduces the outdoor recreation context. It expands on the concepts of outdoor recreation in relation to the demand for activities and settings including management practices, which combine to facilitate outdoor recreation experiences that satisfy a demand for benefits.

Outdoor recreation recognised as a form of leisure plays an important part of people's lives, contributing to active and healthy lifestyles and positive behaviour patterns. The benefits of outdoor recreation for individuals and communities are recognised as numerous, and have been categorised as personal, social, economic and environmental (Brown, 1999; Driver, 1998a; Haas, Driver, & Brown, 1980; Manning, 2011). At the personal level, individuals benefit from outdoor recreation through the experience of being outside in natural environments when choosing to recreate in a specific setting, be it scuba diving in the Pacific Ocean, hiking in the Arctic or mountaineering in the Himalayas (McCool, 2006). More precisely, the outdoor recreation experience is "conceived as a complex transaction between people and their internal states, the activity they are undertaking and the social and natural environment in which they find themselves" (Borrie & Roggenbuck, 1998, p. 165).

The complexity and the depth of the term outdoor recreation is represented in its interdisciplinary nature. As an important and diverse research topic connected to society, culture, economy, politics, and environment, outdoor recreation has been studied through various lenses. In New Zealand alone, between 1995–2010, Booth and Lynch (2010) identified over 1,135 research publications on outdoor recreation. Booth and Lynch, in their stocktake synthesis of outdoor recreation research, identified 18 overarching topics of research addressing many issues from outdoor recreation participation, to outdoor recreation settings and management, to the benefits of outdoor recreation and more. The authors identified a gap in peri-urban outdoor recreation research (Booth & Lynch, 2010) which supports the setting used for this research. The gap still exist today with sparse outdoor recreation research focused on the peri-urban setting.

2.1 Outdoor recreation context

Leisure is defined as residual time left after the necessities of life have been met (Clawson & Knetsch, 1966; Ibrahim & Cordes, 2002; Jensen, 1995; Kaplan, 1960; Pigram & Jenkins, 2006; Plummer, 2009). Aristotle, one of the early philosophers reflecting on the meaning of leisure, viewed leisure as the state of being free from the necessity of labour and described leisure as essential to one's life (Kaplan, 1960; Pigram & Jenkins, 2006; Solmsen, 1964). Leisure activities often produce enjoyment

and satisfaction as a result of free-time activity and can be viewed as positively impacting individuals' psychological and physical well-being (Perez de Cuellar, 1987; Pigram & Jenkins, 2006).

Outdoor recreation, as a form of leisure, is distinguished by the fact that it is an activity that is practised in a natural environment and typically involves a physical and experiential component that meets a range of purposes determined by the needs of individual participants (Plummer, 2009; Sport New Zealand, 2009). Plummer defined outdoor recreation as the "voluntary participation in free-time activity that occurs in the outdoors and embraces the interaction of people with the natural environment" (p. 18). Plummer (2009) stated, "Outdoor recreation has shaped the human-environment relationship throughout history and is an ingrained part of many cultures" (p. 5). This is true for the New Zealand community, where outdoor recreation is seen as an integral part of the cultural fabric of society. It has been reported that "New Zealand has, to a large extent, been shaped by the special features of our unique environments, outdoor lifestyles and adventurous spirits" (Sport New Zealand, 2009, p. 2). According to DOC (2016, 2017a, 2018, 2019) and reported in annual reports, 90% of New Zealanders reported their lives were enriched through their connection to nature, reflecting the strong attachment to the country's green spaces and demonstrating the significance of how the environment is valued.

Adding to Plummer's work on the relationship between outdoor recreation and culture, Pigram and Jenkins (2006) noted that outdoor recreation requires movement by taking participants away from their home into outdoors settings which requires some form of resources management. Outdoor recreation has long been associated with management of public lands along with other land resources such as forestry, biodiversity, and agriculture. For example, in New Zealand, the Department of Conservation (DOC) is an important provider of outdoor recreation opportunities, managing many outdoor recreation wilderness sites located over 8.5 million hectares of public lands (DOC, 2018, 2019). For managers of outdoor recreation in protected areas including DOC, one key challenge has been achieving a balance between use and access for recreationists with the preservation and restoration of the natural environment in which the activities take place (Clawson & Knetsch, 1966; Devlin, Corbett, & Peebles, 1995; Manning, 2009). This balance is affected by factors such as technological progress, increases in population, and social trends that can influence the demand for new or changed activities, which can in turn clash with established values and current uses (Pigram & Jenkins, 2006; Plummer, 2009). Adapting to or accommodating these changing demands from various user groups can represent challenges for management and for the various settings in which the outdoor activities take place. Concepts such as carrying capacity alongside the Recreation Opportunity Spectrum (ROS) and the Limits of Acceptable Change (LAC) framework have been common methods used to assess the impacts, plan, and delivery of outdoor

recreation for a diversity of users (Clark & Stanley, 1979; Driver & Brown, 1978; Stankey, Cole, Lucas, Petersen, & Frissell, 1985; Stankey & Manning, 1986; Wagar, 1964).

Another concept that can be used to understand and manage outdoor recreation is the recreation demand hierarchy framework (Driver & Brown, 1978; McCool, 2006). The framework (Figure 1.2) includes four levels which can be seen as participants' demand for activities, settings, experiences, and benefits (Driver & Brown, 1978; Manning, 2011; McCool, 2006). The activity, setting, experience and benefits (ASEB) model reflects "that people engage in certain recreation activities in particular settings in order to have experiences" (McCool, 2006, p. 4). As a result of activity, setting, and experiences, recreationists also demand benefit to achieve physical, social, and psychological wellbeing (Albrecht, 2017). The ASEB model has been relevant for a long time in that recreation managers are consistently assessing supply and demand of activity in an attempt to match resource suitability with human recreational needs and desires (Manning, 2011; Pigram & Jenkins, 2006). It is a good and simple framework when looking at the various recreation related pressures put on any outdoor recreation setting. The framework can also be useful in supporting requests for the funding for outdoor recreation as a result of economic, social and environmental benefits.

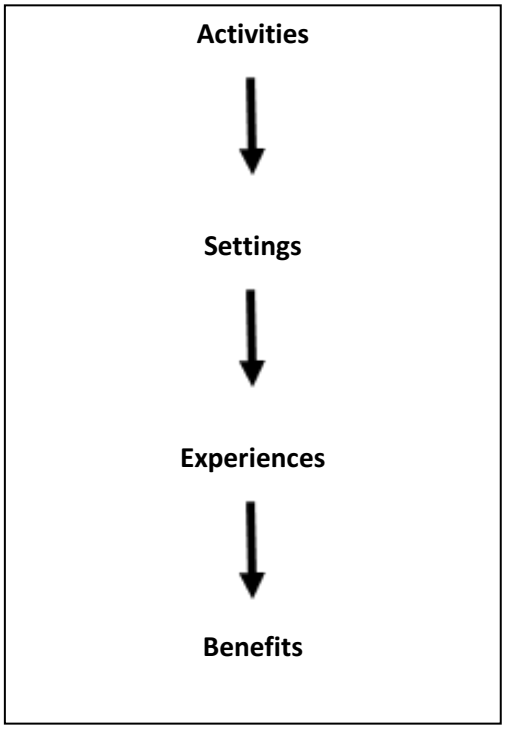

Figure 2.1 The recreation demand hierarchy framework and ASEB model.
Note. Based on the works of Driver and Brown (1978) and McCool (2006).

2.2 ASEB: Activity

According to the recreation demand hierarchy framework (Driver & Brown, 1978; Manning, 2011; McCool, 2006), the consumption of outdoor recreation is possible because of the demand for the activity itself. The activity is the form of recreation that occurs in the outdoor recreation setting: "It is the behaviour that individuals practice and display, such as their participation in camping, wildlife viewing, swimming, rafting and so on" (McCool, 2006, p. 4). When studying the outdoor recreation activity, researchers examine elements such as participation levels, demographic characteristics of participants, patterns in when and how long the activities take place, the skills and experience required, and the risks and perception of safety associated with particular activities (Booth & Lynch, 2010; Manning, 2011). Section 2.2.1 includes a discussion on outdoor recreation participation and Section 2.2.2 discusses risks associated with outdoor recreation activities. These concepts are important as they are key components linked to the outdoor activity itself.

2.2.1 Outdoor recreation participation

Outdoor recreation participation has been studied widely to increase the understanding of users and of recreation patterns to assist recreation managers provide relevant outdoor recreation opportunities and better manage recreational lands (Booth & Peebles, 1995; Cordell & Super, 2000; Dignan & Cessford, 2009; Mannell, 1999; Manning, 2011). Reports on recreation participation are often produced by groups that focus their work in parks and recreation (Outdoor Foundation, 2017; Sport England, 2015; Sport New Zealand, 2018, 2019; Statistics Canada, 2015; Statistics Norway, 2020). Reports vary in scope and often include descriptive statistics on overall recreation participation rates and comparison variables most notably around specific activities as well as demographic data (i.e., age, gender, income, income, and ethnicity). For example, Sport New Zealand (2019) reported that of 90,000 survey respondents over three years, 94% of young people (5 to 17 years of age) and 72% of adults (over 18 years of age) participated in some form of sport and active recreation at least once weekly. The same report identified that the outdoor activity with the most participation over the three year period was walking, running and cycling (Sport New Zealand, 2019). Similarly, DOC's (2018) annual performance report claimed that 60% of recreation on public conservation lands is spent on walking while 25% on cycling.

Government reports from countries such as Norway, Canada, and the United Kingdom have all reported on overall outdoor recreation participation rates and patterns identifying who participates and what activities are the most practised (Canadian Tourism Commission, 2003a, 2003b; Sport England, 2015; Statistics Canada, 2015; Statistics Norway, 2020). In general, a significant proportion of individuals in Norway (79%) and Canadian households (72%) had participated in outdoor activities

in a predetermined yearly period with the most practised activities being walking, jogging and running, and a form of cycling such as road cycling or mountain biking (Statistics Canada, 2015; Statistics Norway, 2020). Although many countries measure outdoor recreation participation rates, cross-country comparisons are generally difficult to make due to variations in research models and data collection methods.

Inequalities have been found in outdoor recreation participation in relation to ethnicity, gender, age and life cycle stages, physical capabilities, geographic location, and socio-economic status of outdoor recreation participants (Floyd, Shinew, McGuire, & Noe, 1994; Ghimire, Green, Poudyal, & Cordell, 2014; Lee, Scott, & Floyd, 2001; Little, 2002; Raymore, Godbey, & Crawford, 1994; Sport England, 2015). Researchers reported a lack of ethnic diversity in outdoor recreation participation as well as differences in recreation patterns amongst various ethnic groups often associated with issues such language, culture, confidence, and perception of safety (Booth & Lynch, 2010; Cordell & Super, 2000; Dwyer, 1993; Floyd et al., 1994; Lee et al., 2005; Manning, 2011; Sport England, 2015). In New Zealand, underrepresentation of Māori, Pacific Islanders, and other ethnic groups in non-consumptive outdoor recreation (i.e., running, mountain biking, and rock climbing) as opposed to their overrepresentation in consumptive activities (i.e., fishing and hunting) has been reported (Booth & Lynch, 2010; Dignan & Cessford, 2009). Differences in the way that groups recreate have also been reported in which "Māori, as well as Pacific Islanders and many other ethnic groups, favour communal recreation and sporting activity by family groupings" (Booth & Lynch, 2010, p. 66). Similarly, Lee et al. (2005) found, in urban parks in the Eastern United States, members of various ethnics groups preferred to recreate in small groups amongst those of the same ethnicity.

In a study based in North America, researchers found that older women of lower socio-economic backgrounds were less likely to participate in any form of outdoor recreation (Lee et al., 2001), while in their study conducted in New Zealand, Dignan and Cessford (2009) reported lower participation rates by women from younger ethnic groups. In general, for all groups facing challenges to participation in outdoor recreation, Ghimire et al. (2014) found the perceived constraints were often linked to personal safety, language, money, time, and transportation, which could be addressed by recreation managers in various ways to increase participation.

Further studies examining the psychographics or personal traits of recreationists found that women were less likely than men to participate in outdoor recreation lifestyle or extreme sports such as rock climbing and mountain biking (Ko, Park, & Claussen, 2008; Wheaton, 2004). Sport New Zealand (2015, 2018, 2019) surveys reported higher participation rates from male participants in sports such as surfing and mountain biking. Providing a rationale for these findings and consistent with gendered norms, Ko et al. (2008) noted that more male than female lifestyle sports participants were attracted

to the aspects of risk-taking, mastery of skills, aesthetics, competition, and social affiliation contained in the extreme-based outdoor activities. With regard to risk-taking, outdoor recreation activities have an inherent risk aspect embedded in them. Activities identified as softer adventures such as hiking, birdwatching and snowshoeing typically require less experience and are lower risk as opposed to hard adventures such as snowboarding or rock climbing (Canadian Tourism Commission, 2003a, 2003b).

With risk being a significant characteristic of any outdoor recreation activity, Section 2.2.2 briefly expands on this concept. The theme of risk, risk mitigation and individual perception of safety has been discussed in outdoor recreation and communication technology research and is an important theme in the context of this study.

2.2.2 Risk component and perception of safety of the outdoor recreation activity

Due to the nature of outdoor activities and the settings in which they take place, there is often an inherent element of risk to any visit to the outdoors (Espiner, 2001; Grant, Thompson & Boyes, 1996; Haddock, 2013). The risk can amplify depending on the activity itself and where it takes place. For example, outdoor activities considered extreme or hard adventures such as rock climbing, mountain biking, mountaineering, and backcountry skiing require a higher skill levels with their participants more susceptible to risks (Brown, 1999; Gilchrist & Osborn, 2017; Haddock, 2013; Krein, 2007; Miles & Priest, 1999; Salome & van Bottenburg, 2012). In addition to the amount of risk relating to activity and place, other factors such as overall increased participation in outdoor activities and recreationists' technology use, technical skills, and decision-making abilities have an impact on risk and on recreationists' perception of safety associated with an activity.

Krein (2007) identified that the level or amount of risk is affected by recreationists' personal knowledge, skills, and experience and decision-making. For example, increased risk can occur when recreationists are ill prepared and equipped with improper footwear, equipment failures, and lack of familiarity with how their equipment properly functions (Brown, 1999). Furthermore, Gilberston and Ewert (2015) discussed that because of increasing trends in outdoor recreation participation, and of technological advances, less skilled participants are involved in outdoor recreation and more recreationists are accessing places that were less accessible in the past. In addition, Dickson (2004) implies that communication technology has affected recreationist's perception of safety by raising "people's expectations of being in constant contact with the world they have departed for the day or more" (p. 51).

In the context of this study, the relationship between technology and safety is important. Several researchers suggested the use of technology impacts the perception of outdoor recreation safety

with recreationists taking unnecessary risks as well as increasingly relying on their technology during the outdoor activity (Dickson, 2004; Ewert & Shultis, 1999; Jain & Mavani, 2017; Martin & Pope, 2012; Pawson, 2018; Shultis, 2001, 2012). With technology being used while pursuing outdoor activities and impacting safety, the idea of self- responsibility is important. Self-responsibility as a personal benefit developed through outdoor recreation focuses on achieving self-reliance, independence and autonomy, a sense of control over one's life, problem solving, and acceptance of one's responsibility (Driver & Bruns, 1999). Although self-responsibility is an important concept in outdoor recreation, risk mitigation is also the responsibility of recreation providers. For example, unsafe tracks that could cause harm to recreationists should be closed by recreation managers. Outdoor safety becomes a shared obligation between users and providers of recreation (Haddock, 2013; Haegeli & Pröbstl-Haider, 2016). The idea of a shared model of responsibility between recreationists and providers of recreation opportunities accepts that both, to a certain extent, have responsibilities:

> *Modern adventurers want to experience a sense of adventure and challenge in outdoor activities, without being injured. They expect outdoor leaders to protect them from harm. Adventurers should also take responsibilities for keeping themselves safe, whether or not they are with a leader. (Haddock, 2013, p. 2)*

Within this shared model of responsibility, there is pressure on managers of recreational lands and private providers of recreation to be thoughtful in what activity they manage and in how they mitigate risk. Outdoor recreation research on perceived risk and safety often targets remote settings when in fact issues around risk and safety are also prevalent in outdoor recreation taking place in peri-urban and urban settings (Turkseven Dogrusoy & Zengel, 2017; Wesely & Gaarder, 2004). Weseley and Gaardner (2004) reported that for women, feelings of fear of violence against them in urban outdoor recreation resulted in them using strategies such as recreating during the day when park lighting is an issue at night. In the same study, women were also commenting that they felt conflicting with the suggestions that parks should hire female patrols and install emergency phones since it would increase the concept of surveillance that impeded on their sense of freedom and solitude. Turkseven Dogrusoy & Zengel (2017), in an address to recreation mangers, found that an increased perception of safety from recreationists resulted in more frequent visit to urban parks.

Providing safe and positive outdoor recreation experiences is a common goal for recreation managers, it is achieved in various settings. While the overall demand for outdoor recreation is dependent on the demand for activities, these take place in varied settings.

2.3 ASEB: Setting

In understanding outdoor recreation demand, the place in which the activity occurs is an essential component (Manning, 2011; Pigram & Jenkins, 2006; Plummer, 2009). Settings where outdoor recreation is delivered and consumed differ, and have been termed differently in various outdoor recreation research reports and across the academic literature (Figure 2.2).

Outdoor recreation settings are under the influences of particular socio-cultural, economic, environmental and political influences, as they all contain attributes that make them unique and give them recreational value (Clark & Stanley, 1979; Donaldson, Ferreira, Didier, Rodary, & Swanepoel, 2016; Papillon & Dodier, 2011). More specifically, McCool (2006) described how settings comprise attributes and characteristics that, combined together, provide inherent value to attract recreationists. The attributes can be related to social elements, types of access, physical and biological features, and managerial practices (Manning, 2011; McCool 2006). The characteristics include the natural and cultural heritage (Haas et al., 1980; Manning, 2011; McCool, 2006). Table 2.1 compares urban, peri-urban, and remote setting characteristics in relation to social attributes, activity attributes, physical dimensions, and technology considerations as related to communication access and first aid response in the context of outdoor recreation.

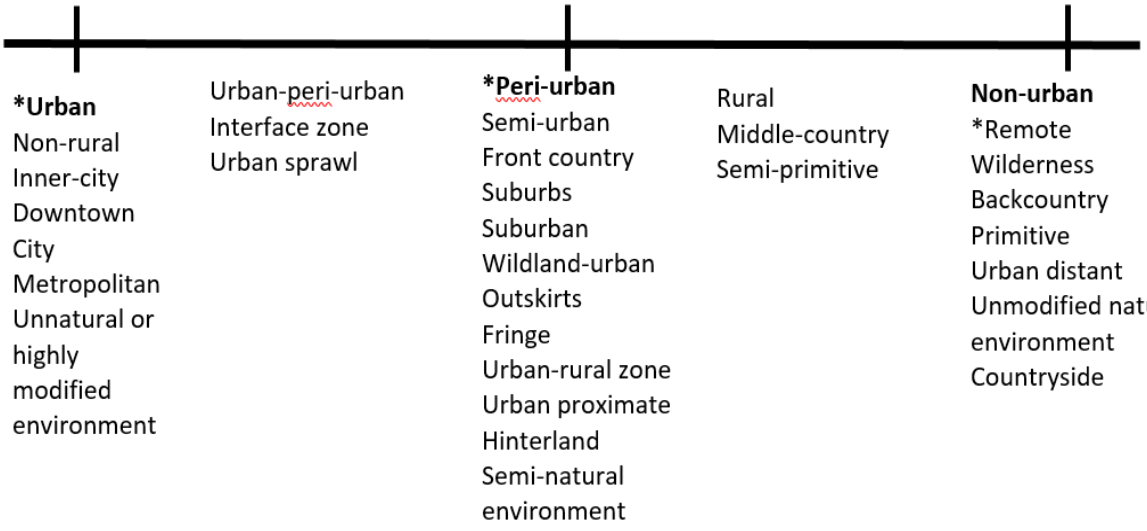

Figure 2.2 Outdoor recreation urban to non-urban settings and terms used in the literature

Note. Based on the following works: Ewert (1998), Ewert and Hood (1995), Gomez and Hill (2016), Manning (2011), Millward and Spinney (2011), Pigram and Jenkins (2006), Plummer (2009).
* Terms used in this research. Remote is used versus non-urban as remote is used more frequently in research than non-urban.

The attributes and characteristics included in Table 2.1 are generalisations reported in the literature. At times, these generalisations may not apply to all areas of a setting. For example, a specific area of a national park in a remote setting can be modified to accommodate a larger number of

recreationists as per the ROS of the park. Another example can be that not all areas of a large urban park experience a high usage rate or have been modified. Although, unlike a remote setting, an urban park tends to experience a higher volume of visitors and has typically been modified to a higher level. Table 2.1 also includes examples for the various settings that have been carefully selected to demonstrate the attributes and characteristics included.

Table 2.1 Outdoor recreation settings characteristics

	Urban outdoor recreation	Peri-urban outdoor recreation	Remote outdoor recreation
Social context			
Use of the area by recreationists and/or contact with others	High	Medium	Low
Activity attributes			
Recreation activities	Wide range	Lesser range	Limited range
Length of time in setting	Hourly to daily use	Hourly to daily use with some overnight use	Daily and overnight use
Physical character			
Location	Within urban centre	Outskirts of urban centre	Remote from urban centre
Size of area	Small to large	Medium to large	Large
Access	Short distance Easy Car, walk, bike, or public transport	Easy and limited Car, bike, walk, and public transport	Longer distance Limited Personal and commercial transport
Environment	Modified	Semi-modified	Unmodified
Technology considerations			
Technology & being connected	Unlimited and reliable	Unlimited/limited and reliable/unreliable	Limited and unreliable
Access to first aid/rescue	Immediate Local medical emergency services	Limited Local medical emergency services & Search and Rescue groups	Limited/challenging Search & Rescue groups
Examples			
	Hagley Park (Christchurch, NZ) Central Park (New York, USA) Table Mountain (Cape Town, South Africa).	Port Hills (Christchurch, NZ) North Shore Mountains (North Vancouver, Canada) L'Arche de la Nature (Le Mans, France)	Aoraki/Mount Cook National Park (New Zealand) Kluane National Park & Reserve (Canada) Grand Canyon National Park (USA)

Note. NZ = New Zealand; USA = United States of America.

Based on several researchers' work (Alexander, 2013; Bruns, Driver, Lee, Anderson, & Brown, 1994; Clawson & Knetsch, 1966; Devlin et al., 1995; Ewert & Hood, 1995; Gómez & Hill, 2016; Haas et al., 1980; Manning, 2011; Newsome, 2013; Parry & Gollob, 2018; Pigram & Jenkins, 2006; Plummer, 2009).

For example, the remote setting of Kluane National Park and Reserve in Yukon, Canada, is located 160 kilometres the Yukon capital of Whitehorse, is more difficult to access, sees less visitors and is less modified.

2.3.1 Peri-urban setting

As previously noted, this study focused on outdoor recreation in peri-urban settings. Peri-urban areas are defined as the spaces between urban developments and rural (i.e., remote) areas where competing demands for "land-use, between recreation, housing, commercial and other development" (Field et al., 2013, p. 7) exist. Pigram and Jenkins (2006) emphasised that it is important to consider outdoor recreation in peri-urban settings, as these areas are "increasingly perceived as an extension of life in the city" (p. 197) where busy urbanites recreate.

One of the challenges between urban and peri-urban recreation is in determining when one ends and the other begins due to the continual expansion of the city and urban sprawl (Pigram & Jenkins, 2006). To add to the complexity of defining peri-urban areas, these locations can have various layers called peri-urban rings (Dodier, 2007; Papillon & Dodier, 2011). Papillon and Dodier (2011) identified three peri-urban rings, each characterised by unique environmental features, management structures, and socio-economic subtleties, and each can contain public parks and forests (national and private) that offer outdoor recreation amenities. Peri-urban rings occur due to urban sprawl, with the first ring being the suburbs and highly populated, the second ring can be categorised by the development of secondary towns, while the third ring includes smaller towns with less population density (Dodier, 2007; Papillon & Dodier, 2011). In discussing the urban–peri-urban relationship, Pigram and Jenkins (2006) called the peri-urban area the urban fringe or the transition zone. The authors emphasised the importance of outdoor recreation in the urban fringe as a place where recreationists extend their urban lifestyle:

> *The neighbouring countryside is increasingly perceived as an extension of life in the city. The tendency for people to seek natural settings to offset the pressures of an urban-industrial existence is well documented and, is prompted, in part, by the urbanisation process. (Pigram & Jenkins, 2006, p. 197)*

This 'offsetting' of pressure is directly linked to the personal benefits of outdoor recreation reported in the literature and the idea of improving physical and psychological health (Driver, 1992). When studying urban recreation, Gómez and Hill (2016) made a distinction between urban parks, wildland-urban recreation, and urban-proximal forests and parklands. With a focus on participation patterns and perceived health outcomes, the authors found that urban recreation was an important setting to study recreation as a result of the increase in urbanisation and population diversity (Gómez & Hill,

2016). Framing outdoor recreation research within an urban-to-remote geographical continuum was also reflected in the work of Ewert and Hood (1995), who conceptualised outdoor recreation within urban, urban proximate, and urban distant protected areas (see also Ewert, 1998). Urban-proximate (UP) is described as area that is located within 100 miles of a 1 million or more populated urban centre while urban-distant (UD) as an area over 100 miles of a 1 million or more populated urban centre (Ewert, 1998; Ewert & Hood, 1995; Gómez & Hill, 2016).

When recreating in peri-urban areas, the possibility of contact with others can be frequent and recreationists seem to be in all the areas where development or modifications exist (Parry & Gollob, 2018). The physical dimensions of the setting show evidence of use with areas that have been highly modified to make room for tracks, parks and open areas, and paved roads (Parry & Gollob, 2018). The spectrum of recreational opportunities offered in peri-urban outdoor recreation areas tends to be diverse and reflects the proximity to urban centres and the demand for activity that comes from a large diversified potential user group (Pigram & Jenkins, 2006).

In comparison to recreation in more remote settings, the majority of recreationists in peri-urban areas might spend less time recreating, less time planning, and might not travel as far to access recreation (Ewert, 1998). In addition, social behaviour can vary. As Ewert (1998) reported, individuals recreating in peri-urban settings were inclined to recreate with more people than when recreating in a remote setting, with 3.9 people in peri-urban settings versus 2.0 in more remote settings.

The ability to use communication devices and to access emergency services varies between settings and can have significant implications for management and recreationists. Communication technology and accessing emergency services has been the subject of outdoor recreation research, particularly in remote settings. Recreationists carry communication technology to keep them safe and to be able to contact emergency responders if necessary (Holden, 2002; Martin & Pope, 2012). The reliability of mobile phone coverage is currently dependent on the number and range of cell towers in an area, as towers emit the frequencies needed for the mobile phones' communication feature to work. Mountainous areas typically have less coverage with fewer towers or frequencies that are interrupted by the terrain (Holden, 2002). In comparison to an urban setting, peri-urban and remote settings may have less reliable cell phone coverage due to less accessible and fewer cell towers along with terrain features such as rolling hills and mountains. It can be considered that physical landscapes such as mountains, rolling hills, and valleys can hinder mobile technology where they provide a barrier to mobile phone use (McBride, 2003).

A peri-urban area such as the Port Hills in Christchurch, New Zealand, is an important recreation space for local residents and tourists with its ease of access, natural semi-modified environment,

opportunities for diverse activities, and the potential personal benefits gained from outdoor recreation such as an increase in fitness levels and the adoption of a healthier lifestyle. Peri-urban areas that include geographical features such as mountains become part of the urban landscape with their visibility and these often become a significant natural attraction for frequent as well as not so frequent users. Many peri-urban areas have rich historical and cultural meaning that become part of the urban identity of the area; this is the case for the Port Hills (Oakley, 1960; Ogilvie, 2000; Papillon & Dodier, 2011). For some peri-urban recreation areas, the connection to the urban world, although permanent, can change over time, with increasing urbanisation and urban sprawl (Papillon & Dodier, 2011). This change impacts recreation managers and their role in delivering the outdoor recreation product to users.

2.3.2 Managing outdoor recreation experiences and the Recreation Opportunity Spectrum

How protected recreation settings are managed is essential to the safety of users and to the overall outdoor recreation experience. The topic of outdoor recreation management in various settings has received significant attention in leisure and outdoor recreation research (Manning, 2011; Pigram & Jenkins, 2006). Over time, approaches have been developed to assist recreation managers of protected areas to appropriately oversee the natural environment while offering positive outdoor recreation experiences to recreationists who choose to recreate in these areas (Clark & Stanley, 1979; Driver & Brown, 1978; Manning, 1986; Pigram & Jenkins, 2006). When discussing specific management approaches, Parry and Gollob (2018) wrote, “At the heart of each of these [management] approaches is the assumption that land must be managed to meet the needs of outdoor recreationists while simultaneously protecting the resources on which they recreate” (p. 61). With some recreation areas being the subject of land modifications (e.g., tracks, roads, physical structures), to accommodate recreation and, ultimately, because outdoor recreation takes place in natural environments, nature management is of major importance along with managing the needs of recreationists and their safety (Aasetre & Gundersen, 2012). This constant balance between providing a positive and safe recreation experience while maintaining ecological values and integrity of the land is fundamental to outdoor recreation management (Baas & Burns, 2016; Driver, Dustin, Baltic, Elsner, & Peterson, 1996; Manning, 2011; Pigram & Jenkins, 2006).

One of the approaches used by recreation managers, not so much for ecological protection but more so for providing a diverse range of activities to recreationists is the Recreation Opportunity Spectrum (ROS). Fundamentally, “ROS is a conceptual framework for encouraging diversity in outdoor recreation opportunity” (Manning, 2011, p. 192) and is a tool that supports the management of protected areas around issues such as impact on the environment, social interaction, and

recreationists' access. In providing for diverse activity offerings, ROS is based on the idea that high-quality recreation experiences can be facilitated through provision of a range of activities in different settings that match the experiences sought by recreationists (Clark & Stanley, 1979; Newsome, 2013; Pigram & Jenkins, 2006). The ROS framework includes various steps to help recreation managers in the planning and implementation of recreation opportunities within various geographical settings (Newsome, 2013). The steps are to estimate demand for recreation, determine the capability of the area, look at what is currently offered in the areas, evaluate and recommend if new opportunities can be created within the land designation or class, and implement the recommendation when possible (Clark & Stanley, 1979; Newsome, 2013; Stankey & Brown, 1981).

On a broader level, land managers use strategies classifying the use of public lands for activities such as recreation, agriculture, resources extraction, etc. In New Zealand, there are different land-use classifications that govern activities that can take place on publicly managed lands, including recreational activities. For example, the New Zealand Reserves Act (1977) has classified reserves into seven types: recreation, historic, scenic, nature, scientific, government purpose, or local purpose (DOC, 2017b) with each having clear guidelines on activities that can take place. In the Port Hills, the majority of the 40 reserves are classified under scenic and recreation, as shown in Appendix B (CCC, 2004). The classes guide the management practices and the creation of strategies and plans, including what can and cannot be done on protected lands like the Port Hills.

In addition to management models such as the ROS and regulatory land-use classifications, another consideration when managing outdoor recreation is the social context within which the outdoor activity takes place. This is discussed in the following section.

2.3.3 Social context for outdoor recreation management of peri-urban settings

Since 2008, "for the first time in history more than half of the world's population lived in towns and cities" (Louv, 2011b, p. 41), changing the traditional way that humans experience nature. In Western industrialised countries, cities' growing population or urbanisation is well established and has brought growing concern over the provision of outdoor recreation within urban spaces in challenging our understanding of how outdoor recreation experiences are consumed (Pigram & Jenkins, 2006). The following section of the chapter discusses the pressures of urbanisation and demographic changes on managerial practices in peri-urban outdoor recreation settings.

Urbanisation can be described as "the process by which an increasing percentage of a society's population comes to be located in relatively densely populated urban areas" (Ritzer, 2015, p. 564). Not only has 50% of the population lived in urban centres since 2008, before the pandemic it was predicted that over 70% of the world's population will live in urban areas by 2050; for most

developed countries such as New Zealand this could go up to 86% (Louv, 2011c; Ritzer, 2015). Roberts (2009) described urbanism, or the way of life of urban residents, as a different lifestyle than living in a more rural area. Differences such as a higher diversity of individuals, higher population density, and different social relationships including urban residents having more social encounters than individuals who live in rural areas (Roberts, 2009). The impacts of the coronavirus (COVID-19) pandemic on urbanisation and mobility is as yet unknown but as time goes by there will be a need to understand how cities, urbanisation and urban sprawl might be affected (Sharifi & Khavarian-Garmsir, 2020).

With the increasing number of people living in urban centres leading to urban sprawl there is heightened global concern that urbanisation will have a mounting impact on public recreation areas and on biodiversity conservation in the future (McDonald, Kareiva, & Forman, 2008). Impacts such as a diminished recreation experience or environmental degradation could occur as a result of an increase in human-nature interface bringing higher traffic, noise, pollution, and so forth.

In New Zealand, Dignan and Cessford (2009) recognised that population growth and urbanisation have affected, and will continue to affect, the outdoor recreation sector and activity patterns. For example, activity patterns might be impacted by greater demands for activities such as (a) mountain biking that require a diversity of tracks, (b) rock climbing and the need to increase the numbers of climbing areas, or (c) recreationists adopting new recreation activities not accommodated by the recreation area.

In addition to meeting the recreational demands of a growing population, there is a desire to meet the needs of a population that is demographically increasingly diverse and/or ageing (Dignan & Cessford, 2009; Field et al., 2013; Manning, 2011; Pigram & Jenkins, 2006). For example, the 2017 DOC annual performance report recommended the development of initiatives to connect members of cultural groups, primarily those of Asian, Indian, and Pacific Island origins to nature and conservation ideas (DOC, 2017a). The same report mentioned providing recreation opportunities to the ageing population in order to increase engagement:

> *Over the next 30 years, the number of people aged 65 years+ will roughly double from about 700,000 now to between 1.3 million and 1.5 million in 2046. These people may still want to use the outdoors, but differently to the way they do now. (DOC, 2017a, p. 30)*

There are significant pressures ahead for recreation managers to continue offering positive outdoors experiences to users that are increasing in numbers. This increase especially in urban and peri-urban areas, and to users that are changing demographically.

2.4 ASEB: Experiences and Benefits

Outdoor recreation activities take place in a variety of settings in order to produce satisfactory experiences which ultimately lead to a range of benefits. In the third and fourth levels of the ASEB model of the recreation demand hierarchy framework, experiences are expressed along with benefits, which are "the improved conditions experienced by individuals … as a result of satisfactory recreational engagements " (McCool, 2006, p. 5). Driver and Bruns (1999) contends that the benefits are also derived from realising a specific recreational goal. Section 2.4.1 expands on outdoor recreation experiences and Section 2.4.2 explores the benefits.

2.4.1 Outdoor recreation experiences

While engaging in certain activities in particular settings, recreationists are seeking satisfactory experiences (Driver & Brown, 1978; McCool, 2006). This can be related to the expectancy theory, which is the idea that certain behaviours will yield certain rewards (Quick, 1988; Solomon, 2002). The expectancy theory grounded in social psychology suggests that recreationists engage in activities in specific settings to arrive at psychological outcomes that are known, expected and valued (Atkinson & Birch, 1972; Fishbein & Ajzen, 1974; Lawler, 1972). As an example, a recreationist who seeks better physical health will choose an appropriate activity (i.e., running) and setting (i.e., an uphill track such as the Port Hills Rapaki Track). The expectancy theory intuitively makes sense in that a person engages in a behaviour to arrive at an anticipated outcome or experience (Plummer, 2009). Different individuals recreating in the same setting may seek very different experiences based on the dimensions they are looking for in their activities. McCool (2006) identified these as experiential dimensions such as adventure, challenge, stress release, appreciating nature, and escape. Typically more than one dimension is sought and realised during the activity to achieve satisfaction (Manning, 2011; McCool, 2006).

As a result of demand for activities, settings and experiences, benefits are achieved. The last and fourth hierarchies of demand for outdoor activities, benefits, flows from satisfying experiences derived from recreation participation in specific settings (Manning, 2011). The benefits are discussed in the following section as the "deepest level of the demand of hierarchy" (McCool, 2006, p. 5).

2.4.2 Benefits approach to outdoor recreation

Authors have written on the benefits of outdoor recreation from individual or personal, societal, economic, and environmental levels for a long time (Clawson & Knetsch, 1966; Driver, 1992, 1998a; Driver & Bruns, 1999; Jensen, 1995; Manning, 2011; McCool, 2006; Pigram & Jenkins, 2006). The benefits directly derive from the experiences sought; for example, as a result of wanting physical

exercise, a recreationist could benefit with and increased self-esteem or with reduced healthcare costs (Hass, Driver, & Brown, 1980). Understanding the benefits is central to the study of outdoor recreation for different reasons such as understanding the impact of recreation on individuals and on understanding economic impacts of recreation. In the 1990s, the benefits approach was used to advocate for outdoor recreation and to convince funders of the value of outdoor recreation services through the tangibility of benefits (California State Park, 2005; Canadian Parks Recreation Association, 1997; Parks and Recreation Foundation of Ontario, 1992). Driver and Bruns (1999) advocated for increased leisure services, including outdoor recreation saying that leisure services "provide more aggregate benefits to society than any other service, including educational and medical services" (p. 351). Driver (1998a) earlier argued, "The benefits of parks and recreation seem to pervade practically all domains of human behaviour and performance" (p. 2), from mental and physical health to personal value clarification to environmental stewardship. Driver (1998a) wrote about the importance of promoting outdoor recreation as a social service, which provides significant personal (psychological and psychophysiological), social and cultural, economic, and environmental benefits as seen in Table 2.2. The table establishes a relationship between benefits and settings highlighting sample benefits possibly as a result of outdoor activities. A hike in a remote setting versus a family picnic in an urban park both results in experience and personal, social, economic and environmental benefits that could be similar or different.

Table 2.2 Benefits level of hierarchy of demand (adapted from Manning, 2011)

Benefits	Hike in remote setting	Family picnicking in urban park
Personal	Enhanced self-esteem	Enhanced personal health
Social	Lower crime rate	Increased family cohesion
Economic	Lower health costs	Increased work production
Environmental	Increased commitment to conservation	Improved relationship with natural world

Note. Adapted from *Studies in Outdoor Recreation: Search and Research for Satisfaction* (3rd ed., p. 168), by R. E. Manning, 2011, Corvallis, OR: Oregon State University Press. Copyright 2011 by Manning.

Additional research undertaken in the 1990s on parks and recreation benefits included the *Benefits Catalogue* published by the Parks and Recreation Federation of Ontario in 1992 and updated by the Canadian Parks Recreation Association in 1997 (Canadian Parks Recreation Association, 1997; Parks and Recreation Foundation of Ontario, 1992; Sefton & Mummery, 1995). The purpose of the initial benefits catalogue was to provide a resource that could be used to highlight, promote, and increase the provision of recreation services in the Province of Ontario (Parks and Recreation Foundation of Ontario, 1992). The second catalogue of parks and recreation benefits had a similar purpose to its predecessor but expanded its focus to all of Canada with an aim to "articulate the value of such

intangibles as developing self-esteem, contributing to quality of life, building leadership, or supporting families" (Canadian Parks Recreation Association, 1997, p. vi).

Throughout this time, Driver (1998b) and Driver and Bruns (1999) developed the benefits approach to leisure (BAL) as a model to be used to guide policy, research, instruction and management. The management focus led to the concept of benefits-based management (BBM). The BBM considered the types of opportunities to be provided through comprehensive considerations of impacts on stakeholders including recreation (Driver, 1998b). This also included determining when, where, for whom and at what cost activities would be offered (Driver, 1998b). After the benefits catalogues, BAL and BBM, and as part of their outdoor recreation planning, California State Parks and the State of California Resources Agency produced an important report on the health and social benefits of recreation (California State Park, 2005) which further supported outdoor recreation development. The report identified very specific outdoor recreation health benefits such as the reduction of obesity, heart disease, and depression, while also promoting social benefits such as reduction in crime, increase in volunteerism, promotion of stewardship, and an increased support in positive youth development (California State Park, 2005).

An additional model which was inspired by the work done on benefits is the beneficial outcomes approach (BOA) developed and adopted for the planning process of recreation managers. More specifically, the BOA framework was "structured around identifying the outcomes for which areas are to be managed, and which direct management objectives and policies" (Kay, 2008, p. 6). The BOA focused on outcomes in terms of "value added to, or detracted from, individuals and society" (Booth, Driver, Espiner, & Kappelle, 2004, p. 9) and sought community involvement in determining these outcomes (Booth, 2008; Booth et al., 2004). This model was a way to make public land agencies responsive and accountable to the community.

Research on benefits and benefits management of outdoor recreation has been relevant for a long time and will continue to be as it helps explain and support the importance of this form of leisure. The earlier work on the benefits approach to outdoor recreation remains a focus in outdoor recreation research today, with studies on the benefits and positive impacts of outdoor recreation on individuals, societies, cultures, economies, and environmental practices. In New Zealand alone, Booth and Lynch (2010) examined over 188 studies between 1995 and 2010, which reported positive impacts or benefits of outdoor recreation. Researchers found fitness and health, general enjoyment, and socialising with others to be important benefits or positive impacts sought from users of outdoor recreation (Sport New Zealand, 2015). Similarly, US-based research reported the main benefits to be exercise and physical fitness, connection with family and friends, the ability to observe scenic beauty,

the opportunity to be close to nature, and a way to get away from the usual demands of life (Outdoor Foundation, 2017).

2.5 Chapter summary

Although outdoor recreation is a well-researched topic including many important concepts that have received extensive focused attention, it will always require more investigating as a result of society's growth and progress. Social and technological changes are constantly reshaping both the outdoor recreation landscape and people's opportunities to experience leisure. Urbanisation is one example of this change, challenging recreation managers to rethink their delivery models. Technological progress and adoption of new technologies such as the mobile phone are also impacting the recreation experience and how it is managed. Technology use in general and the use of digital devices are changing the nature of outdoor recreation in many ways, some of which are examined in the following chapter.

Chapter 3

Technology and Outdoor Recreation

Technological change is a recurring theme in the analysis of society's evolution, impacting all areas of life including leisure and outdoor recreation (Bryce, 2001). Advances in the uptake of digital technologies have led to the claim that technology is enmeshed with humanity and has taken on an agentic role in the technological mediated world in which we live (Latour, 2005; Young, 2012). This is something that few outdoor recreationist researchers have paid attention to over time (Amerson et al., 2020; Ewert & Shultis, 1999; Lindell, 2014; Martin, 2016; Martin & Blackwell, 2016; Martin & Pope, 2012; Pohl, 2006; Pope, 2012; Shultis, 2001, 2012, 2015). For many, technology has changed people's way of being as well as how the environment is experienced (Bull, 2005; McQuire, 2006). This chapter presents an overview of main concepts related to historical and contemporary use of technology and its relationship to the experience and management of outdoor recreation.

3.1 Technology and society

Technology is everywhere, is in constant evolution, and is used by individuals and/or organisations for many different reasons that can range from personal to professional to societal motives (Braudel, 1982; Greenfield, 2006; Matthewman, 2011; Poslad, 2009) . Weinberger (2013) wrote, "Generally our story of technology is a tale of small technical achievements that enable the next set of achievements, and so on until the end of time" (p. 23). According to Braudel, technology leads to,

> *slow improvements in processes and tools, and those innumerable actions which may have no immediate innovating significance but which are the fruit of accumulated knowledge: the sailor rigging his boat, the miner digging a gallery, the peasant behind the plough or the smith at the anvil. (Braudel, 1982, p. 334)*

Technological progress is constant and with this progress comes the accumulation of knowledge that creates change and/or action and impacts the ways of doing things and the way of being (Braudel, 1982; Weinberger, 2013).

3.1.1 Technology defined and the shift to digital

Technology is a challenging term to define, as it is "in permanent state of transition and a single technology can have multiple uses and meanings" (Matthewman, 2011, p. 10). Technology can be thought of as a traditional action made effective, in which action from one generation to the next moves ideas and knowledge forward (Braudel, 1982). The origin of the word comes from the Greek root "techne" relating to art or craft and "ology" referring to knowledge; the original meaning being

the “knowledge of art or craft” relating to the applied arts from the 17th century (Matthewman, 2011). In a more practical way, the history of technology includes the inventions of tools and techniques which are used for advancements and changes which affects the environment around us (History of technology, n.d.). In more recent times, electronic technologies and new media have changed our way of communicating and living. Misa (2004) wrote that this most recent technological period calls for an intelligent embrace of technology to help shape the future. This idea of intelligent embrace is reflected in the work of Matthewman (2011) who identified human activity and human-interaction as perspectives defining technology.

Matthewman (2011) identified three components that define any technology. The first describes technology as a physical object, whether physical or virtual; the second views technology as a form of human activity; and the third as the knowledge used in the human-technology interaction. The author argued, in order to be realised, the technology (object) needs to be used by someone (human activity) in an effective way (knowledge). Matthewman’s work was influenced by the earlier work of Heidegger’ who also proposed that technology is an instrument used as a means to an end and in need of human activity. Heidegger’s (1977) influential work on technology noted the tensions between relying on technology and accepting the role of technology without becoming enslaved to it. Heidegger mentioned adopting an attitude of releasement where individuals can say yes and no to technology at the same time.

In consideration of these technology characteristics, technology becomes part of our daily networks and can be responsible for social organisation where social relationships and behavioural patterns are lived and organised as a result of its use (Beer & Burrows, 2007; Bull, 2005; Campbell & Park, 2008; McQuire, 2006). McQuire (2006) pointed to the example of steam-powered trains in the 1800s that “radically transformed the way that people saw and experienced the landscape” (p. 260). This is an example of technology creating a new socio-cultural experience. Trains become more than physical things moving goods and people from A to B, extending to become non-human actors that play a role in transforming the way that people experience landscapes or the way that people are connected.

As in the example of the train above, technology can affect people’s lives in different ways by assisting and/or disrupting the social setting (Bull, 2005; Campbell & Park, 2008; Coppard, 2001; Latour, 2005). In earlier communication technology studies, McLuhan (1964) saw traditional media technologies, such as the home phone, radio, and television as a medium to carry messages to the individuals using them. According to McLuhan, these communication technologies act as mediums assisting to transport information and knowledge that contributes to an individual’s social and intellectual growth. Today these communications devices and many other electronic devices have

changed their operations from an analogue to a digital system (Misa, 2004; William, 1997). This has allowed for personal communication digital devices such as the mobile phone to be able to use more features such as voice mail and internet access by more individuals in a single coverage area all at once.

3.1.2 Digital technology and our social sphere

Digital technology is pervasive and for some individuals has become an essential of life: "Applications and technologies such as mobile phones, email and chat messaging systems, are considered as a necessity by some people in order to function on a daily basis" (Poslad, 2009, p. 11). Some have reported that digital devices are the most used technology in human history with close to five billion users worldwide (Lopez et al., 2017). Emphasising the constant presence of technology is the idea of ubiquitous technology, sometimes referred to as pervasive computing or the internet of things, and related to the term *everyware* coined by Greenfield (2006). Everyware refers to "ubiquitous, barely detectable technologies, operating within and across spaces" (Gilmore, 2016, p. 2525). We are living in an increasingly digital world of ever-present computing that is found in devices designed "to assist and automate more human tasks and activities, to enrich human social interaction and enhance physical world interaction" (Poslad, 2009, p. 1). Encompassing mobile phones and interfaces, heated digitally controlled clothing and coffee cups, contactless keys, security cameras, location aware technologies, and wearable fitness technologies, "producers and implementers of 'everyware' thus strive to make it so pervasive to everyday experience that its presence becomes taken for granted" (Galloway, 2004, p. 388). In some instances, the technology has become so invasive that its use affects overall wellbeing. Kushlev, Proulx, and Dunn (2016) and Fitz, Kuslev, Jagannathan, Lewis, and Paliwal (2019) found that smartphone notifications and alerts impacted wellbeing by increasing inattention and hyperactivity syndromes. In addition, as a result of increase smartphone pervasiveness, dependency and impact on well-being, the term 'nomophobia' or no mobile phone phobia, has been coined as a psychological condition where individuals have increased anxiety over being detached from their mobile phone and fear of feeling disconnected with the digital world (Rodriguez-Garcia, Moreno-Guerrero, & Lopez-Belmonte, 2020). McBride (2003) wrote about the new reality of mobile phone usage,

> *At some point the use of mobile communications becomes an essential and standard part of the person's life. The technology becomes part of the physical landscape as well as the social landscape. It then becomes impossible or very difficult to go back not using it. (p. 271)*

As technologies evolve, the way humans interact with each other and their environment has also changed. As de Souza e Silva and Fritz (2012) outlined, "Mobile technologies can be viewed as

interfaces to public spaces, that is, systems that enable people to filter, control, and manage their relationship with the spaces and people around them" (p. 5). Gere (2008) stated, "Our technologies are always in the process of changing us and our relationship with our environment" (p. 8).

As an example of how our human environment relationships have shifted due to technology, Bull (2005) considered the social impact of the iPod device and how it affected contemporary human experiences within the urban environment. Used as a mobile device in an urban setting, the iPod blurs the line between personal or private and public settings in order to enhance the individual's audio experience (Bull, 2006, 2013; Creeber & Martin, 2009). This action of listening to music on a digital device such as the iPod reconceptualises the use of public spaces enabling users to transform the site of their experience into a place where they can find solitude and disconnect from the world around them (Bull, 2006).

Researchers looked at the social implications of mobile devices and how individuals personalised their public spaces and used their phones as an opportunity for self-expression (Campbell & Park, 2008; Foley, Holzman, & Wearing, 2007; Syed & Nurullah, 2011). Mobile phones are becoming such an integral part of life that people consider themselves to have a 'personal relationship' with their phones (Kolsaker & Drakatos, 2009). An individual's identity can be expressed in the brand, colour, or ring tone of the mobile phone. Through the importance of appearing fashionable through mobile phone ownership and the general use of the phone, Coppard (2001) argued that Japanese youth built an identity and a shared cultural experience. For example, in forming their identity and sense of place within their social groups, teenage girls in Tokyo mentioned a most embarrassing moment as being the only one whose mobile phone does not ring while being with a group of friends (Coppard, 2001). Syed and Nurullah (2011) summarised research on the use of mobile phones within the social lives of urban adolescents and emphasised that phones strengthened existing social networks through increased connectivity. The texting function provided instant gratification in that users were able to avoid unwanted conversations, presented a different image or were gratified by the certainty of the arrival of the message as opposed to a call that may not be answered (Syed & Nurullah, 2011). Several researchers reported that the mobile phone, in public spaces, can facilitate isolation from the immediate environment and can, for individuals who are alone, give the impression that they are socially connected (Bull, 2005; Caronia, 2005; Caronia & Caron, 2004; Foley et al., 2007). While providing isolation, Lopez Fernandez et al. (2017) when researching European young adults and mobile phone use reported that the most common phone activity was social networking. The authors also reported that young female adults were the most highly dependent mobile phone users with close to six hours of daily usage on average.

Research on listening to digital music on portable devices, such as a mobile phone, an iPod, or a digital music player, has shown that these devices, or more specifically the music played on the devices, have become highly personalised, providing the user with a sense of empowerment and self-confidence (Bull, 2001, 2005; Creeber & Martin, 2009). For example, digital devices playing music and providers of music such as Apple Play and Spotify can aid in the customisation of music to fit the current mood of the individual, who can browse through tracks at will and fit the choice of music to their frame of mind (Creeber & Martin, 2009). In a study on Walkman users, Bull (2001) found the "maintenance of mood or the need to be in a particular frame of mind features prominently in users accounts" (p. 185) of their use of the mobile device. For example, users might listen to more upbeat music if they are in a good mood or more gentle music if they are tired. In his research on auditory experience, Bull (2001, 2005, 2013) described devices such as the Walkman and the iPod as mediums that provided users control over their daily experiences including their space, time, and boundaries around the self. Although the devices used in Bull's research are dated, the findings are not. When discussing empowerment and control of space, Bull (2005) noted, "The creation of a personalised sound world through iPod use creates a form of accompanied solitude for its users in which they feel empowered, in control and self-sufficient as they travel through the spaces of the city" (p. 12). Bull (2005) also claimed, "The use of these mobile sound technologies inform us about how users attempt to 'inhabit' the spaces within which they move" (p. 344). To illustrate this Bull (2001) found that more females used the Walkman as a strategy to avoid unwanted personal communication in public spaces, thus empowering women to feel in control of their space. Beyond personalisation and control of space, devices such as the mobile phones act as safety devices for users while also assisting in communication that is either perceived as micro-coordination or hyper-coordination of daily life (Campbell & Russo, 2003; Kumar & Prakash, 2016; Pain et al., 2005). Section 3.1.3 discusses these two terms.

3.1.3 Micro-coordination and hyper-coordination

Micro-coordination refers to "the instrumental use of the mobile phone for logistical purposes, such as determining the place and time for a meeting" (Campbell & Russo, 2003, p. 320) and hyper-coordination refers to "the use of the mobile phone as a means of self-presentation and personal expression, such as romance, chatting, and sharing jokes with friends" (p. 320). Illustrating these ideas, Bayer, Dal Cin, Campbell, and Panek (2016) reported phones are sometimes used in a minimally conscious or habitual way when micro-coordinating via texting while at other times used in a highly conscious or immersive manner when hyper-coordinating.

The space in which habitual or immersive communications took place was the topic of research for Bjørner (2016), who studied time use on trains. Bjørner found phones were used extensively on

trains and that during the study research participants were not annoyed by other passengers' phone conversations, although half of them had been annoyed by mobile phone conversations during previous train trips. These annoyances came from passengers talking on their phones in quiet zones or too loudly. Bjørner noted some of the annoyance would have been the same in face-to-face conversations. This demonstrated that the issue was not around making the communication public but more about the nature of the immersive discussions, the loudness of the discussions and where they took place. The concept of annoyance of listening to mobile phone users talk in public spaces has been researched prior to Bjørner by others who found some level of annoyance in a concept called 'need-to-listen' (Brendan & Bennett, 2014; Forma & Kaplowitz, 2012; Monk, Carroll, Parker, & Blythe, 2004). This concept is linked to the fact that when individuals can only hear one side of a mobile phone conversation it is very difficult to understand what is being said and creates some cognitive dissonance.

> *As such, mobile phone conversations demand a greater need-to-listen in order to fathom the unheard half of the conversation and fulfil the understanding desired by the cognitive system. This need-to-listen effect is considered to be annoying because it makes mobile phone conversations harder to ignore. (Monk et al., 2004, p. 35).*

Other annoyances are triggered by things such as loud conversations and unexpected disruptions for individuals who are in the same public spaces as the phone users (Monk et al., 2004). Manufacturers of mobile phone related products keep working on making phone features and earphones more sophisticated to help reduce some of the annoyance triggers (Brendan & Bennett, 2014). In addition to better manufactured technology, mobile phone use is increasingly becoming more accessible in public spaces such as trains and airplanes resulting in increased acceptance levels and in decreased annoyance levels (Bjørner, 2016; Brendan & Bennett, 2014).

Beyond mobile phones and the way users employ them to communicate with others, another example of a technological development that has provided an avenue for social change is Web 2.0. Web 2.0, a progressor of the World Wide Web has allowed users to be an integral part of content generation, thereby challenging the way that information and experiences are produced and consumed.

3.1.4 Participatory culture

Web 2.0 has created "dynamic matrices of information through which people observe others, expand the network, make new 'friends,' edit and update content, blog, remix, post, respond, share

files, exhibit, tag and so on" (Beer & Burrows, 2007, Section 2.1). Through wikis,[2] folksonomies,[3] mashups,[4] and social network sites, Web 2.0 is argued to have created a participatory culture in which content is always evolving (Beer & Burrows, 2007).

Participatory culture designates where individuals are involved in the creation of accessible information as opposed to information being created by a handful of institutions such as newspapers, businesses, and so forth (Delwiche & Henderson, 2013). Delwiche and Henderson (2013) argued, we are creating a collective intelligence, as "our world is being transformed by participatory knowledge in which people work together to collectively classify, organise and build information" (p. 3).

Delwiche and Henderson (2013) linked the concepts of participatory culture and the creation of collective intelligence to the impact of building culture, fostering civic engagement, encouraging activism, and rethinking education—all areas of our social world that are in a state of constant change. One way that participatory culture occurs is through digital mobile technologies being taken out of the home context into mobile spaces (Hills, 2009). In this sense "mobile media can be said to be about taking a sense of home out into the cultural world" (Hills, 2009, p. 109). This mixing of public and private space has brought a sense of individualism and privacy into the social world allowing digital technology users to experience their technological devices in public spaces versus private spaces such as their homes. Social network sites (SNSs) such as LinkedIn (n.d.), MySpace (n.d.), YouTube (n.d.), Twitter (n.d.) and Facebook (n.d.), Instagram (n.d.) and Snapchat (n.d.), have emerged as ways for individuals to connect online and to share or create collective knowledge. The importance of online social connections is not a new concept and, as boyd and Ellison (2007) reported, SNSs started in 1997 with a site named Six Degrees, which did not succeed. Since then a variety of sites have appeared and have become popular due to different features, including the ability to construct a profile, display connections, provide a way of communicating between each other, and contribute to the information offered on the site. The social connections are made with already existing friends of acquaintances or with strangers who share common offline interests, political views, or activities (boyd & Ellison, 2007). The need to be socially connected is central to

[2] A wiki is a website that allows site visitors to add and edit content (Technopedia, n.d.)

[3] A folksonomy is the process of using digital content tags for categorisation or annotation. It allows users to classify websites, pictures, documents, and other forms of data so that the content may be easily categorised and located by users (Technopedia, n.d.).

[4] Geospatial mashups are digital tools that bring data together from diverse sources and present them visually (Technopedia, n.d.).

being human and is well developed in the work of Maslow (1943) and his theory of human motivation. Maslow (1943) developed the idea of common human needs such as belonging and esteem as motivational impulses. The term belonging relates to the desire for social acceptance, while esteem is closely related to the desire for achievement and recognition from others (Maslow, 1943). These two needs can be applied to SNSs today with the fact that individuals connect online to fulfil a sense of belonging and a desire to be recognised and be acknowledged by others. Although motivational theories were not a focus in the current research, it is relevant in the explanation of the social needs embedded in online social network relationships.

The concept of belonging can also extend to mobile phones used in outdoor recreation, for example, Strava[5] (n.d.) and activities such as geocaching involve users connecting with others using the same technology by sharing their experiences. Strava (n.d.) and its ability to measure physical activity experience through the mobile phone quantifies the self through technical mediation (Jethani, 2015).

3.1.5 Self-tracking and wearable technology: "Everywear"

Young (2012) examined the practice of people quantifying their experiences or themselves and the growing trend of self-tracking, discussing the impacts on privacy, information control, and on people's sense of self. "Technology offers the possibility of capturing data from everyday life both continuously and unobtrusively" (Sellen et al., 2007, p. 81). Wearable technology such as point-of-view (POV) cameras are able to capture as much of life and human conditions as possible (Chalfen, 2014). As a play on Greenfield's (2006) everyware concept, introduced previously, Gilmore (2016) introduced the term everywear when discussing self-tracking and wearable technology and argued that a balance between quantified and phenomenological or experiential information should be considered when dealing with fitness related data. Phenomenology, the knowledge created by our senses and experiences (Roberts, 2009), has traditionally excluded forms of quantitative measurements in its quest to understand human experience (Gilmore, 2016). In tracking fitness or activity information, body senses and lived experiences are important, while "everywear permits individual access to [quantifiable] knowledge about the body in ways previously inaccessible in the realm of everyday life" (Gilmore, 2016, p. 2534).

Lupton (2014) noted, with technology becoming smaller, wearable, and even implanted in the body (i.e., heart pacemakers and insulin pumps, etc.), the line between where the body ends and the

[5] Strava is a is a social network fitness platform that is used to track cycling, running, and swimming activities, among others, using GPS data. Activities are recorded via the Strava mobile application or GPS-enabled fitness watches or cycling computers. The activity data collected, such as speed, distance, and elevation, can be compared with other Strava users.

technology begins is not as obvious as it once was. Butryn (2003) examined the technological life histories of seven elite track and field athletes and concluded, "Our humanness has been profoundly altered by more intimate, available, and seemingly unavoidable engagements with technology, and therefore that humans should reconceptualised as post-humans, or cyborgs" (Butryn, 2003, p. 17). From a technological perspective, the term cyborg has been used to describe a person that associates themselves with technology on a very frequent basis, it is a term used to describe a hybrid of machine and human (Butryn, 2004; Butryn & Masucci, 2009). The athletes from Butryn's study were found to have various levels of cyborgification, from being strongly connected with technology to seeing it as disconnected from themselves. Ryan (2002) also adopted the cyborg lens in studying the relationship between outdoor recreation and the ecological crisis, and when defining the relationship between the human body and technology noted,

> *Now we are not sure where the purely human ends and the machine begins. Our physical body is bound up in and inscribed by technology to such a degree that to remove technology from our body must mean altering how we think about ourselves at a fundamental level. (p. 277)*

In his study, Ryan (2002) suggested the relationship between cyborgs and the concept of minimum impact in wilderness settings can sometimes be conflicting, ironic and/or complementary. Both Butryn (2003) and Ryan (2002) supported the idea that technology is embedded in the human experience, impacting the outcomes and the relationship to the setting in which the experience takes place. Section 3.2 further examines the relationship between technology and outdoor recreation.

3.2 The nature of digital devices usage in the outdoor recreation experience

In their introduction to the topic of technology and backcountry recreation, Ewert and Shultis (1999) wrote about Mount Everest and the growth in numbers of climbers that made it to the summit, starting with Hillary and Norgay in 1953 to 600 climbers in 1996. Today's numbers have surpassed 5000 (Wilkinson, 2019). Amongst various factors that may have been responsible for this growth, the authors attributed some of the growth to a host of technological advances, including the hand-held GPS and communication devices. Ewert and Shultis made a case that technology advancement had an important part to play in how individuals experience outdoor recreation. With the development and adoption of digital technology, Martin (2017) expressed that technology has "begun to significantly influence, and even drastically change, the very nature of modern outdoor recreation" (p. 98). Examples of this have been reported in the way recreationists anticipate devices such as personal locator beacons to keep them safe or when recreationists carry devices to collect fitness data (Martin & Blackwell, 2016; Millington, 2014, 2016). Ryan (2002) argued that the use of technology in outdoor recreation may have become so pervasive that "human beings are not good

enough; they need technology to be outdoors" (p. 270). In contextualising this, Ryan explained the increased dependence that recreationists have on innovations such as clothing (i.e., better fabrics) and gear (i.e., tents and sleeping bags) and on location-aware technology including GPS and PLBs.

Although researchers have been interested in the changing relationship between technology and outdoor recreation over time (Baas & Burns, 2016; Borrie, 1998; Devlin, 1993; Ewert & Shultis, 1999; Manning, 2011; Martin, 2017; Plummer, 2009; Shultis, 2001, 2012, 2015), the research has been scarce. Researchers have highlighted the importance of the topic by identifying various categories of technologies relevant to recreating outdoors (Ewert & Shultis, 1999; Shultis, 2001). These authors looked at the impact of technologies on outdoor recreation participation and assessed the implications for management (Ewert & Shultis, 1999; Shultis, 2001).

3.2.1 Outdoor recreation and technology classifications

Ewert and Shultis (1999) argued that technology has influenced outdoor recreation participation in remote settings in five distinct yet interrelated categories: access and transportation, comfort, safety, communications, and information. Each category impacts outdoor recreation participation differently and has varying implications for management (Ewert & Shultis, 1999; Shultis, 2001).

The first category, of access and transportation, relates to the physical development of new transportation methods such as jet skis, mountain bikes, and helicopters. All these have increased outdoor recreation participation by creating access to a wider variety of terrain (Ewert & Shultis, 1999; Shultis, 2001). Access and transportation technology have increased the amount of possible conflict between users due to differing values between recreationists (Cessford, 2003; Horn, 1994; Manning, 1985, 2011; Stankey & Manning, 1986). Manning (2011) reported that conflict seems to be increasing as the demand for outdoor recreation continues to grow, and also with the diversity in that demand. The author listed recreational conflict research between various groups such as motorised and non-motorised, canoeists and motorboaters, and hikers and mountain bikers (Manning, 2011). However, if effectively managed by recreation managers, conflict between user groups can be mitigated. One study looking at conflict between walkers and mountain bikers on the New Zealand Queen Charlotte Track managed by DOC identified possible conflict based on transportation technology (i.e., the mountain bike versus hikers); however, the author reported effective management strategies of shared-tracks have resulted in positive experiences for all (Cessford, 2003). Effective management strategies such as permitted access to different uses at different times of the year. With access and transportation technology continually advancing, recreation managers need to assess carrying capacity issues, limits of acceptable change, and how and where a diverse set of recreationists can be accommodated (Shultis, 2001).

The second category relates to an increase in comfort through fabric developments and improved equipment such as better backpacks with internal frames, tents, sleeping bags, and lightweight stoves for cooking. This improved technology has resulted in new outdoor recreation behaviours such as the possibility of longer visits into the outdoors and expanded use by families and less fit or experienced recreationists (Ewert & Shultis, 1999; Shultis, 2001). From a management perspective, the change in outdoor recreation participation due to increased comfort as a result of advancement in technology has put pressure on carrying capacities and environmental impacts (Shultis, 2001).

The third category of technology is safety. With better transportation possibilities, improved fabrics and more reliable communication technologies comes a greater feeling of safety (Ewert & Shultis, 1999; Shultis, 2001). Researchers have identified the increased feeling of safety as only a perception, in which the risks are real but are perceived to be less by users (Dickson, 2004; Martin & Pope, 2012; Shultis, 2012). Increased safety has created discrepancies between the type of outdoor activities practised in a setting and the skills and experiences of recreationists. It is possible that recreationists have a heightened feeling of safety and expect their experience to be less risky with the use of technology (Borrie, 1998; Shultis, 2001). If recreationists do feel safer due to technological advances, there may also be a transfer of their self-responsibility onto search and rescue services (Dickson, 2004).

The fourth and fifth categories of technology, the most relevant to this study, are communication and information technologies. The development of digital technologies such as mobile phones, tablets, wireless modems, and two-way radios have allowed recreationists to access information and stay connected to family members and friends (Ewert & Shultis, 1999; Krcik, 1995). The use of the Internet and the World Wide Web at home or while recreating has increased access to information such as online campsite bookings, checking the weather, or accessing mapping information for route finding (Ewert & Shultis, 1999). Hinze, Chang, and Nichols (2010) reported that depending on where the mobile phone user is and the type of activity undertaken, the information query will vary. For example, when outside of the home during leisure time a mobile phone query may start with the word ‘where’ or ‘what.’ This need for information and participatory culture through constant connectivity has led to an expectation that recreation managers will provide accurate and update outdoor recreation information in various forms, particularly digitally (Shultis, 2001). More recently, evidence that recreationists are contributing to a digital participatory culture can be seen in the over 70% of visitors to New Zealand’s public conservation lands sharing their experiences on social media (DOC, 2017a).

In his research on the relationship between technology, outdoor recreation, and protected areas, Shultis (2001) concluded, “Recreationists, managers, and the general public will continue to have

conflicting attitudes towards the use of technology in outdoor recreation areas" (p. 64). Using digital devices in the outdoors has implications for recreationists' outdoor experiences and on the management of outdoor recreation. This topic is discussed further in the following section.

3.2.2 Outdoor recreation and digital technology

There has been some research on the types of digital technology carried and used by outdoor recreationists (Colorado Outdoor Foundation, 2013; Lindell, 2014). A report published by Colorado's Outdoor Foundation (2013) identified that approximately 70% of outdoor participants between the ages of 18–44 years use some form of digital technology while engaging in outdoor recreation. The same report identified that the two most used technologies were iPods or music players and smartphones, although the report did not identify the reasons and motivations for using the technology or how it can influence land management actions. Amerson, Rose, Lepp and Dustin (2020) reported that 97% of Pacific Crest thru-hikers carried smart phones more so for navigation applications, for taking photos and listening to music while in remote areas and more so for surfing the net, checking emails and communicating with friends and family while in a town. Lindell's research (2014) on the use of technology, in a remote area located 100 km from a large urban centre, identified that 88% of participants (*N* = 155) carried a phone. Lindell found people's main reasons for carrying the devices included taking pictures (47%), safety (31%), and connecting with family or social groups (10%); the same author also reported that one quarter of park visitors were motivated by health and fitness benefits. The link to health and fitness benefits and technology is apparent in the increased choice of mobile phone applications available to collect fitness and activity data (Brown, 2014; Gilmore, 2016; Millington, 2014; Vanderbilt, 2013). Schneider, Silverberg, and Chavez (2011) also found that physical fitness was one of the benefits of geocaching, along with intellectual stimulation, relaxation, nature experiences, autonomy, and socialisation.

Although digital devices are carried for specific purposes, such as taking pictures or collecting fitness data, they are not always used and sometimes carried out of habit:

> *The majority of hikers did not significantly use the mobile technology device while hiking but did have the device while in the State Park. Participants took steps to mitigate the intrusion of the device on the outdoor experience and brought the device primarily for picture taking, safety, and because carrying the device is a habit. (Lindell, 2014, p. iv)*

Carrying the device as a habit addresses the idea that separating the self from our digital devices is becoming increasingly difficult in any settings, and as expressed by Ryan (2002) seems to be difficult for some individuals. Whether using the carried devices or not, researchers offered conflicting opinions on using digital technologies while recreating. The conflict comes from the notion that

technology, which may negatively or positively influence outdoor recreation experiences, also changes individuals' connections to the natural environment. In an article discussing the increased usage of smartphones on the Pacific Crest Trail (North America), the authors wrote, "We believe smartphones are a distraction" (Dustin, Beck, & Rose, 2017, p. 29). Furthermore, Dustin et al. (2017) took the point of view that smartphones, as opposed to other technologies used in outdoor recreation, are "antithetical" (p. 29) to the wilderness experience as they distance recreationists from experiencing nature. While some authors questioned the value of digital technology in outdoor recreation others, such as Lindell, wondered if one can benefit from both nature and technology: "Mobile technology can both aid and hinder outdoor recreation. Recognizing the ways mobile technology changes recreation experiences encourages a world where humans can benefit from nature as well as technology" (Lindell, 2014, p. iv).

Furthermore, in her research on technology in remote settings, Blackwell (2015) reported handheld or wearable digital technology, such as PLBs, smartphones, and GPSs, can provide a sense of safety and assist in navigation in a positive way amongst visitors. Similarly, the relationship between safety and communication is important in urban studies featuring mobile communication (Campbell & Russo, 2003; Pain et al., 2005). Other outdoor recreation studies on digital device usage in both urban and remote settings reported a perception of overreliance from the recreationists using the technology resulting in a false sense of security (Borrie, 1998; de Souza e Silva & Frith, 2012; Martin & Pope, 2012; Pain et al., 2005; Pope, 2010; Shultis, 2015; Wiley, 2005; Wray, 2009). When discussing the feeling of safety provided by carrying a phone in urban settings, youth noted the limitations of phones and mentioned that the safety aspect of the phone would be lost if the phone got stolen, was out of the transmitting area, or was switched off (Pain et al., 2005). The perception of safety with mobile phones is also challenged through the concept of surveillance: "At the same time people feel empowered and secured by the use of technology, they also give up power of control over their location to have it tracked by others" (de Souza e Silva & Frith, 2012, p. 144). Outdoor recreation studies reported various situations with the over-reliance centred on accidents possibly leading to first aid responders being contacted to attend emergencies when this could have been avoided by common sense and better preparedness. "The predominance of cellular or mobile telephones raises the expectation that emergency assistance is only a phone call away. Technology can provide a false sense of security and ability to cope" (Borrie, 1998, p. 87).

Some researchers acknowledge perception of technology overreliance to be related to the recreationist's personality (i.e., high risk takers) and level of experience. When interviewing overnight visitors to a remote setting in Northern California in the US, Martin and Pope (2012) found recreationists who were high risk takers and pro-technology over-relied on technology along with

recreationists who were ill-prepared and inexperienced. By contrast, in his interviews with experienced recreationists associated with New Zealand tramping clubs, Shultis (2015) found more experienced recreationists reported they did not rely on technology as much as less experienced recreationists. This finding is consistent with research on hiker preparedness in a New Hampshire remote setting, where less experienced, less-fit and younger hikers were insufficiently prepared with essential safety items such as whistles and compasses (Mason, Suner, & Williams, 2013). In the same study, 90.3% of research participants carried communication devices (mobile phones or PLBs) even though the mobile phone reception was unreliable in the area (Mason et al., 2013).

Although some would argue that digital technologies have made search and rescues easier and quicker, stories of recreationists over-relying on their devices and demonstrating high risk behaviours have made news media headlines for needing intervention from emergency services which could have been avoided (Kaufman, 2010; Pawson, 2018). The change in risk-taking behaviour mirrors the finding that mobile phone use amongst urban youth changed the attitude towards risk and increased resilience in the face of risk (Pain et al., 2005). Jain and Mavani (2017) reported an increase in self-portrait death especially in individuals under the age of 25 who take uncalculated risks when seeking the perfect image to share on social media. In extending the concept of digital devices affecting the perceptions and changing risk-taking behaviour, research on visitors' perceptions of technology in wilderness areas reported a belief that "technology makes people feel that their safety is not their personal responsibility" (Pope, 2010, p. 20). Dickson (2004) agreed and noted there is an "apparent shifting of responsibility for decisions and actions from the individual and moving it to technology and external, often volunteer or community-funded, search and rescue services" (p. 52).

Shultis (2012) found that most recent digital technologies changed the nature of the traditional wilderness experience and, in general, the mediated technological outdoor experiences created a new perception of risk among wilderness recreationists. His research on New Zealand recreationists revealed that research participants, who were recruited via their association with a New Zealand tramping club, saw their use of technology as positive and contributing to their comfort and safety (Shultis, 2015). In the same study, recreationists reported that mostly others over-relied on the technology (Shultis, 2015).

Relating to the concept of comfort, Dickson (2004) questioned if technology contributed to the idea that outdoor adventures were now less adventurous and more predictable and questioned recreationists' ability to make non-technology mediated decisions (e.g., could recreationists read a topographic map or use a compass for route finding?). This touches on the aspect of self-reliance, which is a factor included in the benefits model of leisure (Driver, 1998b). Self-reliance can be experienced in traditional ways of navigating outdoor recreation settings, particularly in remote

areas. As an example, the skills of reading a topographical map and using a compass help recreationists to be more self-reliant, although knowledge of these skills is becoming lost and replaced by the usage of more modern tools such as GPS and mobile phones (Pohl, 2006). According to Pohl (2006), there is an increasing tendency to replace more traditional tools that require skill and engagement with technological devices that instantaneously solve problems; however, "developing skills and being engaged in our activities is precisely what gives meaning to our backcountry experiences" (Pohl, 2006, p. 155). Pope (2010) argued that access to digital devices distracts recreationists from learning the traditional skills that provide a deep connection to the natural environment. This also raises concerns as digital devices can have reliability issues such as running out of power or breaking (Pope, 2010).

In addition to concerns about safety and self-reliance while outdoor recreating, questions have also arisen around surveillance and a reduced sense of escape and solitude. "The very existence of this technologically-supported noosphere[6] alters our relationship to nature because it makes it impossible to exit human-surveilled space; in effect, it makes it impossible to leave civilization" (Wiley, 2005, p. 27). Wray (2009), when studying the remote wilderness experience among knowledgeable wilderness users in New Zealand, suggested the increasing use of technology as a major threat to the recreational use of New Zealand's remote wilderness alongside rising numbers of tourists and commercialisation of wilderness areas. In her research, Wray (2009) noted that communication technologies "have the potential to detract from traditional wilderness values (such as remoteness and isolation) by providing a constant link to the outside world" (p. 222). Wiley (2005), in researching the value of solitude while recreating in nature, wrote, "The connectivity that mobile communication devices make possible affects the experience of solitude and remoteness that many seek in the wilderness" (p. 11). With the possibility of constant connectivity to our everyday demands, the aspect of solitude while in nature is being eroded (Wray, 2009). In addition, Dwyer, Kushlev and Dunn (2018) found that smartphone use can distract from the enjoyment of face-to-face interactions which in return threatens the importance of the social aspect of recreating outdoors with others.

Wiley (2005) questioned if managers need to take action and guide the use of technologies to address the digital wilderness occupation provided by permanent technological connectivity. The impetus behind this line of questioning refers to frequent digital technology use by recreationists in remote natural settings and to modification of the environment, such as the installation of cell phone towers, which create physical modifications to the land but also modify behaviour. The term "disney-

[6] A noosphere is the "sphere of human consciousness and mental activity especially in regard to its influence on the biosphere and in relation to evolution" ("Noosphere," n.d., para. 5).

fying" has been used to describe the expansion of technology access in US National Parks and the possible change taking place (Repanshek, 2013). For some, expanded connectivity through more Wi-Fi access and the installation of cell towers is a threat to the solitude and social values found in parks, while for others, such as parks concessionaires (i.e., private businesses), it could be a new avenue to encourage business and attract clients (Repanshek, 2013).

Martin (2017) questioned the degree to which managing agencies should be involved in regulating digital device usage and provided the example of the Wilderness Act (1964) in the United States of America, explicitly mentioning solitude and a primitive recreation experience as defining characteristics of wilderness. With increasing use of digital technology in society and in outdoor recreation settings, this has become an important consideration for recreation managers.

3.3 Digital technology and the management of outdoor recreation

When considering the outdoor recreation experience, the role of outdoor recreation management is an essential component. As discussed previously in Chapter 2, recreation managers' responsibilities include the development, implementation, and governance of regulations linked to outdoor recreation activities, including the use of technology. Policies on track use exist in New Zealand's national parks with the intent of avoiding activity and user conflict, with some tracks restricted to hikers only with no access to mountain bikers (Cessford, 2003). Another example is the drone use policy implemented by DOC requiring recreation and/or commercial drone users to apply for a concession prior to using their flying cameras (Department of Conservation, n.d.-b). This policy regulates where and when drones can be operated within the protected natural areas managed by DOC and is guided by the Civil Aviation Authority (CAA) rules for unmanned aircraft and the Privacy Act (1993).

While policy can set standards of use for digital technology, such as the drone policy noted above, recreation managers can also look at strategies involving digital technologies that will help them achieve their strategic vision and goals. Some have argued a need for managers and other stakeholders to consider integrating technology as a way to connect younger users to the natural environment (Cordell et al., 2011; Harmon, 2008; Houge Mackenzie et al., 2017; Suarez & Dudley, 2012; Zaradic & Pergams, 2006). This is in light of an increased electronic media lifestyle in youth termed videophilia. Videophilia is described as "the new human tendency to focus on sedentary activities involving electronic media" (Zaradic & Pergams, 2006, p. 130). The increase in sedentary habits raised concerns for Dickson (2004) and Louv (2005) when it comes to the future of caring for nature and green spaces. The virtual space in which primarily younger generations are living in has the "potential to dominate their experiences, perceptions of themselves, others and the world as

well as influence the nature of their network" (Dickson, 2004, p. 48), and "this online access is contributing to them being further removed from the 'real' world such as the outdoors" (p. 48). As a result of being less connected to the outdoors, the understanding and appreciation of nature is diminished, and, therefore, efforts around protecting the biodiversity and recreation opportunities of our public lands will possibly be lessened (Louv, 2005). The impact of videophilia can also have an impact on healthy lifestyles linked to outdoor recreation activities where is has been documented that "the use of computer technology and the internet as a major focus for leisure may influence health indirectly by reducing participation in active health-enhancing leisure activities" (Bryce, 2001, p. 13).

To combat videophilia, researchers have suggested that social media and the use of mobile applications could be beneficial in connecting urban youth and underserved urban youth to nature (Cardozo Moreira, 2017; Houge Mackenzie et al., 2017). Geocaching is an example of an outdoor activity that can engage all, including youth and children, which combines technology, physical activity, and nature (Schlatter & Hurd, 2005). Geocaching uses GPS locations to discover items called caches that have been hidden and recorded by users. The activity has been described as a scavenger hunt game that has gained momentum through the involvement of users who are typically members of geocaching online social networks (Neustaedter et al., 2013; Schlatter & Hurd, 2005; Suarez & Dudley, 2012). Environmental education offers another way for children and youth to engage with technology:

> *As environmental educators, we aim to increase environmental literacy in those we educate and to instil a fierce love for nature that will encourage our children to choose to protect nature for their children and their children's children. If fully educating our children means accepting possibilities for teaching that are not as conventional, but present the information through a means that better connect with our children, shouldn't we at least give it a shot? (Kacoroski, 2015, p. 35)*

Although Kacoroski (2015) advocated for the possibility to engage with technology, for others in the outdoor education sector the role of technology remains controversial and has raised the question of whether modern technology encourages involvement in outdoor activities or separates human from nature (Bolliger & Shepherd, 2017; Cuthberston, Socha, & Potter, 2007; Kacoroski, 2015). In a research project exploring children's outdoor recreation experiences, research participants utilised body-worn cameras to record what they saw, heard, and did during an outdoor recreation outing (Loyd, Gray, & Truong, 2018). The recordings were used for environmental education purposes as a strategy to engage children in a discussion on what environmental features they saw and experienced while outdoor filming (Loyd et al., 2018). DOI: 10.1080/00222216.2019.1680264

Technology driven initiatives that increase outdoor recreationists' engagement are gaining momentum (Houge Mackenzie et al., 2017; Jaquiery, 2016; Nickerson & Rademaker, 2009; Suarez & Dudley, 2012). Augmented reality has been tested in New Zealand parks as a way to engage younger children and their families and provide them with an opportunity to explore parks and be more active (Jaquiery, 2016). Similarly, in 2015, DOC cooperated on initiatives linking digital technology to outdoor recreation experiences, such as the Google Trekker (n.d.) mapping system and the mapping of New Zealand's Great Walks[7]. Other examples are the Janszoon conservation project[8] and the Kiwi Guardian[9] programmes (DOC, 2015, n.d.-a; Project Janszoon, n.d.), both of which use applications and online tools to engage recreationists. Project Janszoon (n.d.) connects recreationists with initiatives linked to their mission to "restore and preserve Abel Tasman's rich wildlife for all to enjoy" (para. 1). The Kiwi Guardian is a nationally park-based children and young persons' interpretation programme modelled on the Junior Ranger United States National Park Service. Participants learn about nature through a variety of activities such as downloading New Zealand area maps for trip planning on the Kiwi Guardian webpage[10] and from participants' postings of Kiwi Guardian stories and photos on social media, such as Instagram (n.d.) and Facebook (n.d.) (Department of Conservation, n.d.-a). This is one programme where DOC has engaged young recreationists and achieved its obligations of advancing conservation and recreation as required under the Conservation Act (1987).

When discussing the impact of technology on leisure, Hill and McLean (1999) suggested the role of recreation managers and the private recreation sector "will be to ensure the leisure technology not only amuses individuals, but helps to develop human potential as well" (p. 3). With this statement, the authors emphasised the role of recreation managers in connecting recreationists to conservation knowledge through technology vs using technology simply for entertainment purposes. The idea of technology use to present interpretative information within a park was discussed over 60 years ago by Tilden (1957) in his work on heritage interpretation. Tilden mentioned that when using technology in interpretive programmes the focus should remain on the importance and meaning of the content

[7] *New Zealand's ten "Great Walks" are well developed premier tracks managed by the Department of Conservation.*

[8] Project Janszoon is a "philanthropic trust on a mission to restore and preserve Abel Tasman's. rich wildlife for all to enjoy" (Project Janszoon, n.d., Our Story section, para. 1).

[9] A DOC initiated education programme for children to learn about nature and conservation efforts (Department of Conservation, n.d.-a, Become a Kiwi Guardian)

[10] https://www.doc.govt.nz/parks-and-recreation/places-to-go/toyota-kiwi-guardians/

presented, and on the information as a whole rather than in parts (Tilden, 1957). The technology should not overshadow the interpretation.

3.4 Chapter summary

Throughout time, technology has influenced the way that individuals interact with each other and with their environment. Research examining the impact of technology on the outdoor recreation experience has predominantly focused on remote settings and reports on the conflicting views of technology use are frequent (Dustin et al., 2017; Lindell, 2014; Pope, 2010; Shultis, 2001; Wiley, 2005; Wray, 2009). The conflict appears stronger in the discussion around how technology use in natural settings threatens traditional values such as escape, solitude, and self-reliance espoused in the outdoor recreation experience. While some see digital technologies as an integral part of ensuring that outdoor spaces remain relevant and accessible to new generations of recreationists (Cardozo Moreira, 2017; Houge Mackenzie et al., 2017, Jaquiery, 2016) others have challenged whether the benefits of using digital devices outweigh the threat to traditional ways of recreating that have often been claimed to provide a deep connection with the natural environment (Borrie, 1998; Cuthberston & Socha, 2007; Dustin et al., 2017; Pohl, 2006).

Research on digital and communication technology in urban cultures has shown how technology is becoming an extension of the self and how it has impacted the social setting (Bull, 2005; deSousa & Frith, 2012; Syed & Nurullah, 2011; Young, 2012). Digital technology use raises issues around private and public worlds, control of space, social identity, feelings of empowerment, safety and issues of control, and surveillance, which impact more or less intensively various segments of the population. With peri-urban recreation settings bordering urban centres and gaining popularity as places for individuals to recreate in, some of the points highlighted in the urban technology literature raise questions on the relationship between technology use and recreation in peri-urban settings such as the Port Hills. Prior to this research, the outdoor recreation literature on digital technology used in the peri-urban areas has been limited and the extent to which digital technology used in peri-urban settings is unknown. Also limited is knowledge about how recreationists' use of digital technology influences the work of managers of recreational protected lands. Chapter 4 describes the mixed methodology used to collect the research data to address the inquiry aim and objectives.

Chapter 4

Methodology

This study employed a mixed-methods approach, including quantitative and qualitative data collection methods, comprising a survey and in-depth semi-structured interviews to study the relationship between digital technology and the outdoor recreation experience. In social science, using a mixed-method research approach can lead to a more complete understanding of the topic as well as robust interpretation of the data (Babbie, 2013; Creswell & Plano Clark, 2018). The use of both methods balances social research well as the qualitative data can complement the quantitative data in offering explanations to assist in the interpretation of the statistical data (Flick, von Kardorff, & Steinke, 2004).

This methodology chapter includes the epistemological approach and how the methods used contributed to the study of empirical and collective knowledge, a detailed account of the approach used in the research, the study's ethical considerations, and a discussion of the research limitations. Sections 4.2 through to 4.4 discuss the methodological approach and describe the steps taken to develop the survey and interview guides as well as the data collection process, including the sampling and analysis approaches. The chapter concludes with a section on how the research findings are presented in the thesis.

4.1 Epistemological approach: Empirical methods and theoretical context

Epistemology is the theory of knowledge with regard to methods. In general terms, "knowledge is related to the way in which we organise and experience our world" (Flick et al., 2004, p. 256), and, in social science research, empirical knowledge is constructed through observation of social exchanges as related to a particular aspect of life. In order to be effective in social science research, personal experiences and intellectual curiosity are good starting points that act as powerful motivators to start the research process and the observation of social life (Lofland, Snow, Anderson, & Lofland, 2006). The topic of outdoor recreation and its relationship to digital technology was chosen out of personal interest and curiosity. The researcher was interested in the motivations and constraints impacting how individuals recreate outdoors from a human health perspective and how social trends, such as digital technology, impact recreation behaviour and experiences. The researcher's educational, professional, and personal backgrounds have been highly influenced by outdoor recreation in some shape or form. The researcher has earned a baccalaureate degree in physical education specialising in outdoor recreation management and a Master of Arts in leisure and sport management. The researcher has worked in sports, leisure, and outdoor recreation academic units

for close to 20 years. In addition, the researcher and her family live in a British Columbia mountain resort called Squamish, where they recreate outdoors on a daily basis. The researcher was cognisant of her own positionality throughout the study through an awareness of her lived life as a white, middle-class, middle-aged female and of her educational, professional, and personal experiences with outdoor recreation and technology use. The researcher often questioned how her position impacted the research and developed strategies to reduce subjectivity and increase objectivity. Initiatives to do this included forming research objectives, involving research assistants in the data collection and interview transcripts, developing interview guides, and establishing sampling and recruitment parameters that were, as best as possible, representative of the overall population.

This research took an interpretivist perspective as an ontological approach with the belief that knowledge is socially constructed and that is important to understand motives, meaning, and reasons. The goal of interpretivist research is to understand and interpret the meaning in human behaviour rather than to generalise causes and effects (Edirisingha, 2012). Interpretivists try to understand the world as lived by the people in it. This research also uses a socio-constructivist approach, in which the study of social life included culture and context (McMahon, 1997). Understanding people's relationship to digital culture, the recreational context, and how the technology is used were central to the main aim of the study. The use of qualitative methods primarily supported the approaches of interpretivism and socio-constructivism along with the quantitative data that were used to describe the digital technology use.

The mixed-methodology applied in the research strengthened the findings and results by collecting, analysing and interpreting a combination of quantitative and qualitative data, various authors have noted the benefits of using a mixed methodology (Babbie, 2013; Creswell & Plano Clark, 2018; Singleton & Straits, 2005; van den Hoonaard, 2015). The core argument is that the combination of qualitative and quantitative methods provides a more complete understanding of a phenomenon than either method alone (Creswell & Creswell, 2018; van den Hoonaard, 2015). In the research, the choice of the methodology was guided by the nature of what the researcher wanted to explore, as outlined in the research objectives (see Section 1.2 in Chapter 1). The survey and interview tools were chosen as a means to address the aim and objectives of the research (Table 4.1). The limited amount of existing data on recreationists' digital technology use in peri-urban recreation settings was the main driver in starting the research with the collection of quantitative data. Subsequent qualitative data complemented the quantitative data by providing in-depth and rich insights on the topic. The interaction and layering of multiple forms of data create more possibilities to understand the topic from various perspectives and in more depth (Creswell & Creswell, 2018). This was imperative in addressing the research aim and objectives.

Table 4.1 Research aim, objectives and tools

Research aim	Research objectives	Tools
To study the significance of digital technology from outdoor recreation users' perspectives in the context of a peri-urban setting using a mixed-methods approach	In the context of a peri-urban setting, describe what digital devices are carried and used by outdoor recreationists and for what purposes.	Primary: Survey Secondary: Interview
	To compare and contrast the use of digital technology between outdoor recreation user groups in a peri-urban setting.	Primary: Survey Secondary: Interview
	In the context of a peri-urban setting, identify and critically evaluate the variables that influence outdoor recreationists' engagement with digital technology including implications for management practices.	Primary: Interview Secondary: Survey

The survey was a useful tool to answer the first two research objectives, as these were predominantly descriptive. The interview was a more appropriate tool to achieve the third research objective, which required a more in-depth and critical perspective. Over a 1.5-year period from December 2013 to April 2015, the research informally started with some basic observations of the setting, then the survey was developed, piloted, and administered, followed by the interviews. There was an overlap in collecting the quantitative data (survey) and the qualitative data (interview) as shown in Table 4.2. The informal observations were used to gain awareness of the setting and to develop an idea on the types of recreationists frequenting the Port Hills on a daily basis. It was very important for the researcher to familiarise herself with the setting at an early stage through observations. The observations were completed over a 1-month period and at sporadic times during the main data collection phase. Brief handwritten notes were taken but not analysed in this thesis. Together, the observations, the content of the literature, the research questions and objectives, and the researcher's personal knowledge guided the development of the survey content.

Table 4.2 Data collection timelines

Data collection	**Months**	**Duration**
Observations	December 2013 to February 2014	3 months
Survey	April 2014 to May 2015	12 months
Interviews	July 2014 to April 2015	10 months

Once the data was collected, the goal in the interpretation of the results was to apply an explanatory sequential mixed methods model in which the quantitative data started to be collected first followed by the qualitative data (Creswell, 2013; Creswell & Plano Clark, 2018). The explanatory sequential

model allows for the quantitative data to be presented and then further explained and supported by the qualitative data.

4.2 Quantitative approach: The survey

The quantitative survey data collection process was conducted over a 1-year period. The following sections outline the reasons behind developing the survey, the steps of survey development including the pilot study, the data collection process, the sampling method, the response rate, and the data analysis plan.

4.2.1 Developing the survey

The goal of the survey was to support the first two research questions of the study, as identified above in Table 4.1. These questions required quantitative and descriptive information collected through the survey. In addition, the survey helped guide the development of interview questions for the semi-structured in-depth interviews.

Various stages informed the overall development of the questions. The first draft of the survey was informed by site observations, the researcher's prior knowledge, meetings with recreation managers, secondary printed material such as already existing surveys, peer-reviewed academic research on the topic, and popular culture articles. Following the initial first draft development, a convenience sample of 15 land-based recreationists and recreation managers piloted the survey. For the pilot study, recreationists were asked to comment on the content and the overall structure of the survey. They gave feedback resulting in a second draft of the survey that was tested through another pre-test or pilot study approved by Lincoln University's Human Ethics Committee, which resulted in the third and final draft. Pilot studies are an important part of the research process and exist to test out the methodology tool used in data collection. "The surest protection against errors is to pre-test the questionnaire" (Babbie, 2013, p. 256).

The second pilot study was conducted between March 22 and April 1, 2014, over 8.5 hours. The survey was administered in the Port Hills at six sites and resulted in 22 completed surveys as presented in Table 4.3.

Table 4.3 Pilot study details

#	Dates	Location	Time	Participants	Comments
1	March 22, 2014	Rapaki (*Central section)*	3:30 – 4:30 pm	3	iPad only
2	March 23, 2014	Bowenvale (*Central section)*	10:30–11:45 am	5	iPad only
3	March 25, 2014	Transmitter (*Central section)*	6–7:30 pm	N/A	Cancelled due to heavy rain
4	March 26, 2014	Halswell Park *(SW section)*	10:30–11:45 am	4	iPad only
5	March 30, 2014	Rapaki (*Central section)*	10 am–12 pm	10	Link/QR code and iPad
6	April 1, 2014	Transmitter and Britten *(Central & Eastern sections)*	5–7:30 pm	0	No recreationists at sites
		Total:	8.5 hours	22	

At the time of survey completion, pilot study participants were asked to provide feedback on the structure and content of the survey, which included feedback on clarity and relevance of content and on answer choice options. Most of the survey questions for the pilot study included an "other" option to improve the comprehensiveness of response choices. The pilot study resulted in minor changes in the final composition and administration of the survey. A more substantive change related to the intercept and recruitment of research participants. Initially, for the pilot study, participants were asked to complete the survey on a tablet computer only. Various challenges arose with this recruitment method including the need to interrupt runners and mountain bikers engaged in their activity and the timing of the interruption that required recreationists to be near activity completion. Another challenge with this method was the time required to complete the survey that prevented the survey administrators from recruiting other possible participants. While the tablet was in use by participants, other recreationists missed the opportunity of being recruited and filling in the survey. Halfway through the pilot study, a second method of recruitment was introduced. This included the distribution of a printed card with an online link and a quick response (QR) code to access the survey online (Figure 4.1).

Figure 4.1 Research participant recruitment card.

With this method, recreationists were intercepted and directed to fill out the survey as soon as possible after the completion of their activity from a personal portable or home device. Details on the research participant recruitment methods are included in Section 4.3.2 titled "Participant Recruitment and Survey Implementation."

The survey (Appendix C) was developed using Qualtrics (n.d.) software. Qualtrics is a survey platform that supports a web-based tablet data collection system. Qualtrics features allowed for offline compatibility, which was important for collecting data in the Port Hills, and also included functions such as skip logic, which was embedded in the complexity of the survey structure. Skip logic is a function that allows a research participant to skip unnecessary questions based on a previous answer. In Qualtrics, the survey questions were divided into blocks each representing a set of questions centred on a main theme. In total, the survey included 87 questions separated into 18 blocks, as shown in Table 4.4. Blocks 1, 2, 3, 15, and 17 focused on consent, activity information, general use of technology, as well as demographic and follow-up information, while Blocks 4 to 14 focused on the specific technology themselves. The various digital technologies were chosen based on the setting observations, the literature and previous research (Lindell, 2014; Millington, 2014, 2016; Outdoor Foundation, 2013), from personal experiences of the researcher and from the pilot study. In addition, in order to reach the first two objectives of the research, it was important to clearly obtain information related to each specific digital technology that might be used when walking, running, mountain biking, or rock climbing.

Table 4.4 Survey blocks and questions

Block #	Block theme	Question #s	Total questions
1	Consent	1–2	2
2	Activity	3–11	9
3	Technology general	12–13	2
4	Basic mobile phone	14–15	2
5	Smartphone	16–26	11
6	iPod touch	27–37	11
7	Tablet	38–48	11
8	Digital music player	49–51	3
9	POV sports action camera	52–54	3
10	Digital camera for photos and/or videos	55–57	3
11	GPS	58–65	8
12	Cycle computer	66–71	6
13	Heart rate monitor	72–76	5
14	Digital watch	77	1
15	Other electronic devices	78	1
16	No electronic device	79–80	2
17	Demographic	81–84	4
18	Follow-up interview	85–87	3
		Total questions: 87 questions	

Note. GPS = Global Positioning System; POV = Point of View.

The survey included unique questions that were only asked once, such as the demographic information or which devices were used, as well as repeated questions that needed to be repeated for specific devices (see Appendix D) for more details on the questions and survey logic. The total number of unique questions was 35, with two questions repeated five times, three questions repeated four times, eight questions repeated three times, and three questions repeated two times for a total of 87 questions. The repeated questions were associated with various technologies and were required for consistency and comparison. For example, for every technological device that had the capacity to take photos, one question around the future use of the photos was asked. In the case of photos, the same question was repeated in the blocks focused on the smartphone, the tablet, the POV sports action camera, and the digital camera. Many questions included a skip logic feature; as such, participants were asked specific questions depending on their previous responses. For example, a research participant who only carried a smartphone answered Blocks 1, 2, 3, 5, 17, and 18, whereas a research participant carrying multiple devices such as a smartphone, a POV sports action camera, and a cycle computer would answer Blocks 1, 2,3, 5, 9, 10, 17, and 18.

The style of the questions was mostly multiple choice or matrix-based using a Likert scale or a semantic differential scale. Many questions included an “other” option to give research participants the opportunity to provide an answer that was not included as a choice. The matrix questions used a 7-point scale. The scale was chosen to “improve the levels of measurement in social research through the use of standardised responses categories” (Babbie, 2013, p. 169). Each point on the scale was assigned a value providing the ability to quantify each response in the analysis. The Likert scale used a “strongly disagree” to “strongly agree” wording with a measure of 1 to 7. “Strongly disagree” was assigned a value of 1 point and “strongly agree” a value of 7 points, with a neutral “neither agree nor disagree” worth 4 points. The semantic differential scales used “unlikely-likely” or “very unimportant to very important” also with a measure of 1 to 7 points.

The total time estimated to fill out the survey without interruption was between 5–10 minutes. The completion time depended upon the number of questions answered by each research participant.

4.2.2 Participant recruitment and survey implementation

The survey data collection process took place between April 20, 2014, and March 16, 2015, and resulted in the collection of 520 completed surveys. In total, 90 intercept sessions over 120 hours were completed at 18 intercept sites (Appendix E). Research participants were intercepted by survey administrators towards the end of their outdoor activity. Since the survey questions related to the actual use of digital devices while recreating, it was important to recruit participants after they had engaged in their activity for a significant amount of time. Intercept sites were chosen with this in mind, and examples of intercept sites included top of ridges, parking lots, and track heads where returning recreationists were intercepted.

A non-probability convenience sampling strategy was used and included sampling parameters in order to achieve adequate population representation. Achieving a random sample would not have been possible given that the total user population is unknown. The nature of the terrain and recreation access network with multiple entry and exit points also supported the use of convenience sampling. Although non-probability sampling has limitations such as possible investigator bias, it is often the most practical method in outdoor recreation research settings (Singleton & Straits, 2005).

While a total user population was not available, an attempt was made to approximate a representative illustration of use of the Port Hills for outdoor recreation across the time period. This was achieved via the use of available information in the form of documents, including the most recent Port Hills strategy and trail counters reports, from conversations with the head Port Hills Ranger, and from general observations as described previously. Parameters were put in place to increase reliability, which is the extent to which “a given measuring instrument produces the same

results each time it is used. Reliability is about consistency" (Abbott & Mckinney, 2013, p. 45). The parameters are presented in Table 4.5 and consist of intercept months, days, and times along with Port Hills sections (i.e., Eastern, Central and South Western), number of intercepts per intercept session, and guidelines for group intercepts.

As presented in Table 4.5, careful planning ensured representation over each of the 12 months as well as scheduled intercept sessions throughout the four seasons, the days of the week, and the times. In addition, intercept sessions were over the three main sections of the Port Hills: Eastern, Central, and Southwestern. The Port Hills Head Ranger estimated that approximately 60% of recreationists were in the Central section of the Port Hills while the other 40% were evenly split between the Eastern and Southwestern sections (See Appendix A for a map of these regions).

Table 4.5 Survey population parameters and pre-survey goals

No.	Sampling parameters	Description of parameters	Pre-survey goals or anticipated targets
1	Intercept months	12 months data collection	42 surveys per month on average
2	Intercept days	7 days per week	Saturday = 20-30% of responses Sunday = 20-30 % of responses Each week day = 8-12% of responses
3	Intercept times	Vary the times. Identified time blocks were: before 9 a.m., 9-12 p.m., 12-4 p.m., 4 p.m. +	Before 9 a.m. = 5-15% of responses 9-12 p.m. = 25-35% of responses 12-4 p.m. = 35-45% of responses 4 p.m.+ = 15-25% of responses
4	Port Hills sections	Three sections: Eastern, Central, South Western as reflecting the Christchurch City Council's mapping information	Eastern: 20-25% of responses Central: 50-60% of responses South Western: 20-25% of responses
5	Number of intercepts	The number of recreationists intercepted and asked to complete the survey at each intercept session	33% to 100% of recreationists intercepted at each intercept session
6	Group intercepts	When possible, all group members were recruited. When group members lived at the same address and/or shared a computer, the person with the closest birthday was invited to complete the survey	

Peak times were identified as weekend days and holidays between 9 a.m. and 4 p.m., while non-peak times were on weekdays from 9 a.m. and 4 p.m. and on all days before 9 a.m. and after 4 p.m., with some exceptions depending on the time of year and weather. In the research, an intercept site was referred to the selected site where recreationists were asked to complete the survey (e.g., the top of Rapaki Track in the Central section of the Port Hills was referred to as an intercept site). The research plan included 18 intercept sites (Table 4.7). The term "intercept session" was used to describe one individual data collection session and included one intercept site and an amount of time spent at the site. A goal to intercept 33% to 100% of the recreationists' population was set for each intercept session. The population was defined as every recreationist walking, running, mountain biking, or rock climbing, 13 years of age and above who frequented an intercept site during a session. Survey administrators in charge of recruiting research participants made the subjective decision to count recreationists who appeared to be 13 years of age, it was not possible to ask everyone's age. In addition, when groups were intercepted, all group members were given the opportunity to complete the survey immediately on the iPad or at as soon as possible after the completion of the activity via a link or QR code provided on the recruitment card as shown in Figure 4.1.

In situations in which recreationists lived at the same address or shared a computer, the recreationist with the first approaching birthday was recruited. A conscious effort was made to intercept recreationists well into their activity, ideally between midpoint to end of their activity. For rock climbers completing the survey in between climbs worked out well (Figure 4.2), and for runners completing the survey at the end of a run at an exit point was ideal (Figure 4.3).

Figure 4.2 Rock climbers completing surveys at a Port Hills crag between climbs.

Figure 4.3 Runner completing surveys at the bottom of the Bowenvale track at the end of activity.

The main researcher acted as the primary survey administrator and recruited research participants; however, during selected times, research assistants were also involved as additional survey administrators. Research assistants were trained on the survey implementation procedures and were briefed on relevant ethical considerations such as recruiting under-aged research participants.

A more in-depth discussion on population and samples is provided in Section 4.3.4. In addition, Table 4.5 provides a summary of the sampling parameters and the initial parameters goals, Tables 4.6, 4.7, and 4.8 present the actual response breakdown by months, days, and sites. Table 4.6 contains a summary of the data collection procedures including the months and numbers of monthly responses, intercepts sessions, and hours. More details on the data collection by month are presented in Appendix F. Data collection started late in April 2014 and continued for a period of 1 year. On average, there were 43.2 responses, 7.5 intercept sessions, and 10 hours of intercept hours per month. The initial goal of 42 surveys every month was achieved.

Table 4.6 Survey responses, intercept sessions, and hours by month

Months	Responses	Intercept sessions	Intercept hours
April 2014	10	3	5
May 2014	31	6	6.5
June 2014	46	7	10.5
July 2014	62	9	12
August 2014	51	5	8.6
September 2014	57	9	11.5
October 2014	60	9	10.5
November 2014	44	8	8
December 2014	60	9	12
January 2015	52	8	12
February 2015	21	8	12.5
March 2015	26	9	11
Total	520	90	120
Per month	43.3 responses	7.5 intercept sessions	10 hours

An effort was made to schedule intercept sessions at various times of the week to capture a broad range of recreationists. For example, an individual working 9 a.m. to 5 p.m. would most likely recreate early in the morning, after 5 p.m., or on the weekends. Table 4.7 provides an overview of the days and times the intercept sessions were scheduled.

Table 4.7 Survey intercept sessions by day and time

Day	Before 9 a.m.	9–12 p.m.	12–4 p.m.	4 p.m. +	Total	Initial goals
Monday	1	1	5	3	10 (11%)	8–12%
Tuesday	1	2	4	5	12 (13%)	8–12%
Wednesday	2	5	3	2	12 (13%)	8–12%
Thursday	2	3	2	3	10 (11%)	8–12%
Friday	2	3	2	3	10 (11%)	8–12%
Saturday	2	4	7	2	15 (17%)	20–30%
Sunday	1	4	14	2	21 (23%)	20–30%
Total intercept times	11 (12%)	22 (25%)	37 (41%)	20 (22%)	90 (100%)	
Initial goals	5–15%	25–35%	35–45%	15–25%		

As a whole, the initial goals for days and times were achieved except for Saturdays. Saturday was a challenging day to collect data due to the availability of survey administrators caused by work and family commitments. Of the intercept sessions, 17% were on Saturdays, whereas the goal was 20–30%.

4.2.3 Survey intercept sites

Table 4.8 provides an overview of the survey intercept sites along with the numbers of intercept sessions for each site and responses collected. The intercept sites were located throughout the three main sections of the Port Hills with the majority located in the Central section, as shown on the Port Hills map in Appendix E. Additional detailed information on data collection intercepts and responses collected are included in Appendix F. The Southwestern Section resulted with the lowest response, reflecting the fact that less intercept sites were used and selected in that area. Intercepts sites were chosen for their accessibility, with the majority being either track heads or ends or those that offered a natural resting point for recreationists to maximise the chance of recreationists responding positively to being asked to fill in the survey.

Table 4.8 Survey intercept sites, intercept sessions, and responses by Port Hills area

	Intercept sites	Total intercept sessions	Responses (*n*)
Eastern section			
1	Bridal Path	12	74
2	Captain Thomas	5	16
3	Cattle Stop Crag	3	21
4	Godley Head/Taylor's Mistake	5	27
5	Scarborough	1	5
	Sub-total	26	143 (27.5%)
Central section			
6	Albert Terrace Crag	4	18
7	Bowenvale Ave	11	50
8	Harry Ell	4	13
9	Mc Vicars Forest/Worsleys	4	34
10	Mount Vernon	1	0
11	Rapaki (bottom)	1	0
12	Rapaki (top)	10	76
13	Skid site	3	68
14	Sugarloaf	1	5
15	Thompsons carpark	2	11
16	Transmitter Crag	4	15
	Sub-total	45	290 (55.6%)
South-Western section			
17	Halswell Quarry (bottom)	9	51
18	Kennedy's Bush	10	36
	Sub-total	19	87 (16.8%)
	Total	90	520

The Skid Site in the Central section close to Victoria Park (Figure 4.4) was an example of a highly effective intercept location with picnic tables, a map, and a drinking fountain. This site was a natural resting point for recreationists and the picnic tables provided a comfortable place to fill in the survey. Three intercept sessions were scheduled at the Skid Site, resulting in a high number of response rates due to the characteristics of the site as explained above.

Figure 4.4 Port Hills research site – The Skid Site.

From conversations with Port Hills park rangers, the Central section of the Port Hills was the busiest with Port Hills users. This information was helpful in guiding some of the data collection plan and resulted in more data being collected in the Central section of the Port Hills.

4.2.4 Survey response rate and data analysis

In order to approximate a representative sample, maximising the number of responses from the population is important. In discussing populations, Babbie (2013) suggested that the population "is the theoretically specified aggregation of study elements" (p. 109). In this research, the Port Hills recreationists' population included walkers, runners, walkers, mountain bikers, and rock climbers who were 13 years of age and above and were recreating at the time of intercept. At each intercept session, survey administrators did a population count where the number of recreationists walking, running, mountain biking, or rock climbing who would enter the intercept site were counted (Appendix F). For the high peak times and popular sites (e.g., Sunny Saturdays and/or Sunday afternoons at the top of the Rapaki Track), two survey administrators were scheduled. One survey administrator was primarily responsible for counting recreationists while the other was primarily responsible for intercepting and recruiting recreationists to fill in the study. In the recreationist count, walkers and runners were counted together, as it was difficult to distinguish between the two groups.

Immediately after an intercept session, the counts were manually entered in a Microsoft Excel spreadsheet and measured against the survey responses in order to match them to each specific intercept session. Throughout the research data collection and the intercept sessions, a total of 2,036 Port Hills recreationists were estimated from the observation and formed the population. Of that number, 1,128 were intercepted and asked to complete the survey. The sample resulted in 520 completed surveys, 25.5% of the observed population and 46.1% of intercepted recreationists. With 25.5% of the population having completed the survey, it was felt that this was acceptable as a representation of the population for analysis and results purposes. Although the literature is not prescriptive in providing an answer for a standard response rate (Veal & Darcy, 2014), it was felt that recreationists who responded gave sufficient insight into the topic. It is worth noting that 8% of intercepted recreationists declined to participate in the study at the time of recruitment, of which 4% declined stating that they had already completed the survey. Recreationists declining to participate because they had already completed the survey started to happen more frequently in the sixth month of the data collection.

The population observation along with the numbers of recreationists by activities were counted on a daily basis and were in line with the numbers the Port Hills Head Ranger anecdotally mentioned that, excluding rock climbers, the approximate split between walkers or runners and mountain bikers would be around 65% walkers or runners to 35% bikers. Tables 4.9 and 4.10 summarise the observed population and sample (i.e., survey respondents) by activity. Table 4.9 includes all activities whereas Table 4.10 only included walkers or runners and mountain bikers. When not considering the rock climbers and others, the sample ended up with 62% of walkers or runners and 38% mountain bikers. These results are very close to the anticipated results proportions, which can be taken as another indication of a representative sample.

Table 4.9 Activity types by population* and sample

	Observed population (*n* = 2036)	Sample (*n* = 520)
Walking only	–	43% (*n* = 225)
Running only	–	11% (*n* = 55)
Walking and/or running	61.8% (*n* = 1260)	54% (*n* = 280)
Mountain biking	34.5% (*n* = 703)	33% (*n* = 173)
Climbing	3.6% (*n* = 73)	10% (*n* = 51)
Others	–	3% (*n* = 16)

Note. *Population: Observed by survey administrators during intercept sessions.

Table 4.10 Activity types by population* and sample – excluding climbers and others

	Observed population (*n* = 1963)	Sample (*n* = 453)
Walking only	–	50% (*n* = 225)
Running only	–	12% (*n* = 55)
Walking and/or running	64% (*n* = 1260)	62% (*n* = 280)
Mountain biking	36% (*n* = 703)	38% (*n* = 173)

Note. *Population: Observed by survey administrators during intercept sessions.

As a whole, the sample of research participants by activities closely reflected available information about the population. The slight differences involved the climber group who had the smallest population with a high response rate of 70% in comparison to 22% for walkers or runners and 25% for mountain bikers. The majority of climbers answered the survey on the tablet due to the nature of the activity which allowed them the time and space to answer the survey immediately.

The survey responses were divided almost equally between those using tablets on site (53%) and those completing the survey via the online link or QR code (47%) provided on the recruitment card. With 244 survey responses coming from the research recruitment cards over 810 distributed cards, the response rate for this method of recruitment reached 30% (i.e., approximately one third of intercepted recreationists who were given a card completed the survey). As an established procedure, recruited research participants were offered both options. With the tablet option, most research participants independently completed the survey. At times, the survey administrator facilitated the process of filling in the survey questions by reading the questions aloud. This happened for research participants who had vision issues or who preferred to not handle the iPad. The weather also impacted the method of recruitment. For example, during rainy intercept sessions, recruited research participants were only offered a research card in order to minimise water damage to the tablet. Irrespective of the method used to complete the survey, all data were entered in Qualtrics survey software. The data were then downloaded in a Microsoft Excel spreadsheet in preparation for the data analysis with SPSS.

For analysis and interpretation, the quantitative survey data were downloaded into SPSS Version 23. The survey included 429 variables included in 87 survey questions. All 429 variables and respective codes were manually verified and cleaned to identify any respondent-related errors (Singleton & Straits, 2005). All data from the 520 survey responses and 429 variables were carefully examined for errors and abnormalities. These were dealt with in order to have a reliable dataset to work with in SPSS. Open-ended questions or “other” options requiring a qualitative response were post-coded when appropriate. The main statistical analyses applied were descriptive statistics and inferential

statistics, the chi-square. The descriptive statistics presented the quantitative data in a manageable form through percentages, means and frequencies or counts (Babbie, 2013). These statistics summarised a set of observations such as how many recreationists used which digital devices or the importance of using performance data. The main inferential statistical tool used in the survey analysis was the chi-square, which uses cross-tabulations to compare observed results versus expected results. The chi-square is a test of statistical significance "based on a comparison of the observed cell frequencies with the cell frequencies one would expect if there were no relationships between the variables" (Singleton and Straits, 2020, p. 523). The statistical tools described above where considered the most appropriate for the quantitative data set stemming from the survey.

4.3 Qualitative approach: In-depth semi-structured interviews

Once the data collection was initiated with the implementation of the survey, the methodological plan was to proceed to the development and implementation of the qualitative tool, the interview. The following section outlines the goal and development of the interview guide, the interviewee selection process, and the qualitative data analysis plan.

4.3.1 Developing the interview guides

The interview data supported all three research questions of the study as identified in Table 4.1, but particularly supported Research Objective 3: "In the context of a peri-urban setting, identify and critically evaluate the variables that influence outdoor recreationists' engagement with digital technology including implications for management practices." Qualitative research approaches rely on the quality of description and use data that are non-numerical and produced via narrative or stories of the social experience (Abbott & McKinney, 2013; Babbie, 2004, Wellington & Szczerbinski, 2007). "Rather than quantifying large samples of people or units, qualitative designs rely on great details in reporting human processes" (Abbott & McKinney, 2013, p. 36). The interview allowed for a one-on-one discussion with individual recreationists, members of recreation groups, and recreation managers. An in-depth and semi-structured interview approach was adopted for the study. The in-depth nature of the interview allowed for enough time to discuss the topic from a deep and holistic perspective, with each interview planned to be approximately 1 hour. The semi-structured interview sits between the structured and unstructured interview and allows for some flexibility for both the interviewee and interviewer. This method "enables the interviewer to have more latitude to probe beyond the answers and thus enter into a dialogue with the interviewee" (May, 2011, p. 135). The semi-structured interview provided flexibility and included the opportunity for unplanned conversation about the topic. This type of interview that sits between the structured and unstructured has the ability to provide some structure while also being flexible (Kumar, 2016).

Singleton and Straits (2005) mentioned that semi-structured interviews permit freedom and require questions to be developed ahead of time to achieve the research objectives.

Interview guides were carefully developed with the guidance of three main sources: (a) content of secondary published data in the form of academic literature and/or popular culture, (b) the research objectives, and (c) preliminary content from the survey. Three interview guides were developed (Appendix G), each targeting a different group. The first one targeted recreationists, including walkers, runners, bikers, and rock climbers. The second one targeted members of recreational groups or associations, and the third one targeted recreation managers. The three interview guides contained 14–20 questions each and allowed for different perspectives to be heard and reported on.

Introductory questions established rapport with the interviewee and obtained general background on the interviewee such as their recreation practices and their use of technological devices in general and while recreating. “The success of an interview depends on establishing rapport with the participants. This means that the interview time will need to include time to establish a relationship, as well as trust and respect” (Jennings, 2005, p. 107). Included in the interview guide was a main set of questions specific to the research topic with the last two questions geared towards future practices and recommendations. Each question was carefully developed with the intention of avoiding errors such as double-barrelled questions, leading questions, restrictive questions and two-in-one questions (Wellington & Szczerbinski, 2007). The first interviewee of every group was used as a pilot-interview to test if the sequence of questions flowed with ease and if the questions were well understood by research participants. Minor adjustments were made as a result of the pilot interviews.

4.3.2 Interview research participants recruitment process

Interviewees were recruited differently in the three groups (recreationists, groups and associations, recreation managers). Overall, 40 interviews were completed and recorded, including 30 recreationists, five group or association members, and five recreation managers. Each interview was recorded and was approximately 1 hour in length. Wellington and Szczerbinski (2007) indicated the main advantages of recording the interviews are to preserve the natural language of the interviewee and to allow the interviewer to concentrate and focus on the interview and interviewee.

Interviews with recreationists

Recreationists were recruited using the survey instrument described in section 4.2. At the end of the survey, research participants could indicate their willingness to be interviewed for the research by completing a form with their contact information. Purposive sampling was used to select recreationists to participate in the interviews where an attempt was made to match participants’

demographic information to the demographic information of survey research participants. For example, 40% of females answered the survey which resulted in an initial goal of wanting to interview 40% (*n =12*) females in our total of 30 interviews. Since the survey and interviews overlapped, the demographic data matching was monitored throughout the data collection. The demographic characteristics that were similar between the interview participants and survey research participants included gender and age along with the outdoor recreation activity undertaken. This demographic information match resulted in a purposive sample in which "sometimes it is appropriate to select a sample on the basis of knowledge of a population" (Babbie, 2005, p. 183). Table 4.11 compares the demographic characteristics of interview versus the survey participants along with comments on how well both samples matched. Interviews with recreationists took between 33 and 125 minutes. The interviewed recreationists varied in their technology use while recreating and in their personal lives, in general from no use at all to high use.

Table 4.11 Recreationist's demographics – Interview and survey participants

	Interview participants		Survey participants		Comments
Activity					The primary activity is the activity which participants did most of the time. Many reported practicing more than one activity. Proportionately more mountain bikers agreed to be interviewed than any other groups.
Walker	8	(26.5%)	13	(45%)	
Runner	3	(10%)	3	(10%)	
Mountain Biker	14	(46%)	10	(32%)	
Rock Climber	4	(13%)	3	(10%)	
Total:	30		30		
Gender					The gender percentage between the interview research participants and the survey research participants matched well
Female	11	(36.5%)	12	(40%)	
Male	19	(63.5%)	18	(60%)	
Total:	30		30		
Age					The age groups percentage between the interview research participants and the survey research participants matched well.
13–24	9	(30%)	7	(23%)	
25–29	2	(6.5%)	3	(10%)	
30–39	7	(23.5%)	6	(20%)	
40–49	6	(20%)	6	(20%)	
50–59	4	(13%)	5	(16.6%)	
60–69	0	(0%)	2	(6.5%)	
70–79	1	(3.5%)	0	(0%)	
80–84	1	(3.5%)	1	(3.5%)	
85+	0	(0%)	0	(0%)	
Total:	30		30		

Interviews with members of recreation groups and recreation managers

Convenience and snowball sampling methods were used for the interviews with members of defined recreation groups (or associations) and recreation managers. Snowball sampling is often used in research in which interviewees are asked to suggest additional individuals to be interviewed (Babbie, 2004). Research participants in these groups were recruited out of recommendations from others or through personal connections. Table 4.12 identifies who participated in the interviews from recreational groups (or associations) and recreation management organisations. These interviews took between 46 and 84 minutes.

Table 4.12 Interview participants (recreation groups and recreation managers)

No.	Interviewee role
1	Personal Trainer from Private Fitness Training Business
2	Post-secondary Educator in post-secondary in Christchurch
3	Youth Leader for Scout Group in Christchurch
4	Tramping Club Member in Christchurch
5	Mountain Biking Club Member in Christchurch
6	Recreation Manager from Non-Profit Land Management
7	Recreation Manager for Department of Conservation
8	Recreation Manager for Department of Conservation
9	Recreation Manager for Christchurch City Council
10	Recreation Manager for Christchurch City

All interview participants were recruited first via email or phone and asked if they would be interested in participating in a research interview. At this time, if the person agreed, a more detailed email was sent describing the interview procedures with an attached consent form. All interviews were scheduled at an agreed date and time in a quiet public space to facilitate the recording of information. At the beginning of the interview, the interviewer repeated the interview process, collected the consent form, and verbally obtained consent for the interview to be recorded (written consent was also given through the signed consent form). The interviewee was reminded that she or he had the option to terminate the interview at any time and that all data were confidential and anonymous. The interviewer, throughout the session, respected general guiding interview principles such as listen more than talk, ask for elaboration, try not to interrupt, follow the interview guide, and be genuine (Siedman, 2006).

4.3.3 Interview data and data analysis

All 40 interviews were transcribed verbatim from the initial recordings. The researcher transcribed half of the interviews and a certified professional transcriber completed the other half. The researcher reviewed all interviews transcribed by the professional transcriber by reading the transcripts and listening back through some of the audio to clarify information as needed. For analysis and interpretation, the qualitative interview data were coded and analysed with NVivo (Version 12). As with the quantitative data, a software programme was used to analyse the data and to facilitate the process of organising the information into themes that made sense and related back to the aim and research objectives. NVivo is a data sorting system; the software supports the researcher in organising the data by themes emerging from the words expressed by the interview participants through a process called coding. This aided in "classifying or categorizing individual pieces of data – coupled with some kind of retrieval system" (Babbie, 2004, p. 376). The in-text coding of NVivo (Version 12) was used for open coding, which is the act of initial classification and labelling of information (Babbie, 2013). This process generated 13 main parent nodes as displayed in Table 4.13 along with sub-themed nodes (or child nodes). In total, the qualitative data generated 845 references divided amongst the 13 main parent nodes.

Table 4.13 NVivo12 Nodes and Child Nodes

No.	Parent nodes and child nodes	References main nodes (n)
1	Reasons for recreating in the Port Hills Child nodes: Away from busy life (9), convenience (4), health and fitness (25), learning new skills (1), socialising (5), training for competition (8), views (3), dog walking (6), view wildlife (1), misc. (3)	65
2	Technology use in general	27
3	Technology carried and used	41
4	Technology reasons for carrying and/or using Child nodes: Access information (16), communication (31), Fitness data (85), motivation to exercise (9), music (46), photo (33), safety (85), social media and sharing (8), misc. (8)	321
5	Technology and the extension of the self (i.e.: level of cyborgness)	5
6	Technology and relationship to experience Child nodes: Balance (10), distraction (32), enhance (13), risky behaviour (5), safety (s), social (7), relationship to environment (38), tech and traditional knowledge (6), misc. (14)	127
7	Technology used by others	19
8	Technology used in group of recreationists	12
9	What can happen to technology while recreating	32

10	Technology in wilderness settings Child nodes: Emergency (15), photos (2), problems with tech (5), route finding (6), misc. (9)	37
11	Ideas around technology peri-urban settings Child nodes: ideas related to children/youth (37), communication with recreationists (2), ID plants and wildlife (4), misc. (14)	61
12	Management and technology Child nodes: Education (3), Involved in fitness data (3), Not their responsibility (2), have updates info online (16), inform recreationists how to connect on track signs (11), access to wireless signal in Port Hills (16), misc. (24)	75
13	Miscellaneous	23
	Total	845

Note. The number in parenthesis represents the number of references attached to each child node.

The content of the nodes formed the basis for the qualitative analysis. It also supported, complemented, and was integrated with quantitative analysis.

4.4 Ethical considerations

In research, ethical considerations are important as "ethical considerations underlie many decisions about research methods" (Singleton & Straits, 2005, p. 515). In the broad sense, ethics usually refers to the moral principles or guidelines for conduct held by individuals, groups, as well as professions (Wellington & Szczerbinski, 2007). As a group of professionals, the academic research community is responsible for acting ethically when performing research. With the role of social sciences in examining social life, human subjects are involved; as a result, managing ethics around issues such as consent, voluntary participation, confidentiality and analysis and reporting of the data is imperative (Babbie, 2004).

The Lincoln University Human Ethics Committee (HEC) granted permission for the researcher to proceed with the inquiry (Appendix H). The Lincoln University HEC approved the inclusion of research participants of 13 years of age and older. For participants between the ages of 13-18 years, HEC approved the following: these participants were to be recruited in open public spaces, in the presence of the main investigator and a research assistant when possible, and only recruited when recreating with others.

All research participants were given a research information sheet and asked to consent prior to completing the survey or being interviewed (Appendices I and J). For survey participants, consent was given electronically, whereas interviewees physically signed the consent form. The consent clearly explained ethical issues such as the nature of the project, the voluntary nature of the

participation in the research, the ability to withdraw from the study at any time, and the preservation of anonymity and confidentiality. The researcher stored survey and interview data electronically on a password-protected computer.

4.5 Research design limitations and researcher positionality

All research designs and methods contain limitations. One issue often discussed in the literature was the generalisability of results to the wider population (Babbie, 2010; Booma, Ling, & Wilkinson, 2012; Creswell & Creswell, 2018; Singleton & Straits, 2010). Since the survey sample was not a true probability sample and limited to the Port Hills area, the possibility of generalising to the overall community of recreationists in the peri-urban area was not possible. This non-probability sample was managed as best as it could through the sample parameters explained earlier. In surveys, certain individuals, when recruited, may be more inclined to want to complete the survey. For example, Singleton and Straits (2005) argued, "Highly educated respondents are more likely to cooperate than poorly educated respondents. Also, those who felt most strongly about the topics or issues of a study are more likely to respond" (p. 145). While completing a survey or an interview, respondents' responses are reflective of that specific moment in time. Answers are influenced by how a respondent felt and on what happened that day or during a specific recreation experience. This can affect data reliability. Reliability can be managed through standardisation (Singleton & Straits, 2005). The approach for survey recruitment was standardised and all intercepted recreationists were offered to complete the survey in the same manner. Interviewees were asked questions in a standard order and manner. Although the semi-structured interviews allowed for some deviation during the conversations, the flow of questions was respected. The pilot studies for both the survey and interview addressed validity issues in that unclear or misunderstood questions were identified and corrected. Validity refers to the concept of making sure that what is intended to be measured is in actuality captured and analysed (Babbie, 2004; Singleton & Straits, 2005).

One aspect of research that cannot be ignored is the researcher's positionality. "Within positionality theory, it is acknowledged that people have multiple overlapping identities. Thus, people make meaning from various aspects of their identity" (Kezar, 2002, p. 96). In writing about positionality and biases through the research process, Bourke (2014) noted, "It is reasonable to expect that the researcher's beliefs, political stance, cultural background (gender, race, class, socio-economic status, educational background) are important variables that may affect the research process" (p. 2). In the context of this inquiry, the researcher needed to recognise her own background as a white, educated, middle-class woman and mother when recruiting and interacting with research participants to avoid, for example, recruiting research participants that looked similar to her. The researcher's own personal values around technology use and the value of recreation and nature in

society did not always match those of research participants, and this was something that she needed to be aware of and make a conscientious effort to not let it affect the communication and bias the information collected. Conversely, when the researcher's values and opinions matched the respondents' perspectives, she was aware of the importance of remaining neutral in order to not influence a response that respondents may have felt she wanted to hear. Wellington & Szczerbinski (2007) challenged the concept of neutrality and proposed that an alternative is to "acknowledge the effect of the researcher and accept the impossibility of a completely neutral stance" (p. 52). The same authors argued reflexivity is an important concept in managing biases and neutrality. As researchers, it is important to reflect on our biases and on how they may impact our behaviours during the research and in our interactions with research participants. In order to remain neutral throughout the research process, the researcher regularly reflected with research notes and with the research supervisory team and was aware of her position and how it could bias the process. The issue of positionality and reflexivity was discussed with research assistants throughout the survey data collection process.

4.6 Conclusion and presentation of findings in this thesis

The explanatory sequential mixed methods approach adopted for the data collection and analysis resulted in the qualitative data further explaining and supporting the quantitative data (Creswell, 2013). The quantitative descriptive data collected through the intercept survey assisted in the understanding of who uses digital devices while recreating in a peri-urban area, what digital devices are used, and for what purposes. On the other hand, the semi-structured in-depth interviews allowed the researcher to obtain rich data on the topic and to ask questions such as the role of recreation managers in connecting users to technology. The findings are reviewed and discussed in the next three chapters. Chapter 5 presents Port Hills recreationists and their engagement with digital technology, Chapter 6 explores the digital technology-mediated outdoor recreation experiences in the Port-Hills, while Chapter 7 discusses the intersecting worlds of digital technology-mediated outdoor recreation experiences and management practices. In the results chapters, to maintain participant anonymity and confidentiality, participants were assigned a number and were identified by their activity, organisation and/or position in the organisation. For recreationists, numbers range from Recreationist #1 through to Recreationist #30 and the activity code include Mountain Biker, Rock Climber, Runner and Walker. For recreation managers, numbers range from #1 to #5 and codes include DOC, Non-Profit Trust and Port Hills Ranger. For members of recreation groups, numbers range from #1 to #5 and codes includes Fitness Leader and Youth Leader, The final chapter of the thesis, Chapter 8, offers a concluding discussion.

Chapter 5

Port Hills Outdoor Recreationists and Digital Engagement

This chapter presents data on the demographic characteristics of Port Hills recreationists as well as the outdoor recreation activities undertaken and their characteristics, the reasons for recreating, and the digital devices carried and used. It gives an overview of which digital devices were carried and used most frequently by which recreationists along with the most popular types of use such as listening to music, taking photos and communicating with others. The chapter also presents the reported limitations of the digital devices along with the findings describing the reasons for Port Hills recreationists for not carrying any digital devices. In describing Port Hills' recreationists and the digital devices that are carried and used along with the technology limitations, the chapter addresses the first research objective underpinning this study.

5.1 Demographic characteristics of Port Hills recreationists and activities

The demographic variables in the survey focused on gender, age, ethnicity, and place of residence. In addition, survey participants were asked about their activity characteristics in Port Hills, including how often they visited the area, which sections of the area they were recreating in, who they were recreating with and for how long, and the main reasons for visiting the Port Hills on the day of the survey (see Table 5.1).

Of the 498 survey respondents who indicated a gender, the slight majority were male (60%), and two thirds (67.7%) were between 18–50 years of age, which is a relatively consistent finding within recreation research in New Zealand and elsewhere (Dignan & Cessford, 2009; Outdoor Foundation, 2017; Sport New Zealand, 2018). While the overall gender ratio of Port Hills recreationists was relatively even, there were marked differences at the level of specific activity. For instance, the majority of mountain bikers (84.0%) were men, while women (56.1%) dominated slightly among walkers. Mountain biking was also the most reported activity amongst all men (45.5%) and walking the most practised activity amongst all women (60.0%). Most rock climbers (80.4%) were under the age of 30 years and 90% of recreationists over the age of 60 were walkers. Nearly two thirds (64%) of those 13–17 years of age were in the Port Hills for mountain biking. For the total sample, most respondents were residents in the Christchurch area (84.7%), and the main ethnicity was New Zealand European[11] (81.8%). Residency and ethnicity numbers were consistent with what was

[11] New Zealand Europeans are New Zealanders of European descent, and one of the top-level ethic group used by Statistics New Zealand as a national classification standard for ethnicity.

reported in the 2004 Port Hills strategy document (CCC. 2004). The lack of ethnic diversity of Port Hills recreationists supports findings of other research on the relationship between outdoor recreation and/or recreation participation and ethnicity and is also consistent with the Christchurch demographic data reported by Statistics New Zealand (2013) at 86.9% European (Dignan & Cessford, 2009; Field et al., 2013; Lindell, 2014; Outdoor Foundation, 2017). One third of rock climbers had travelled to the Port Hills from outside the Christchurch area with the highest percentage of first-time visits to the Port Hills. All rock climbers reported recreating with others, with over two thirds visiting with four or five friends.

Table 5.1 Port Hills survey participants: demographics and activity characteristics by activity

	Details	All	Walkers	Runners	Mountain bikers	Rock climbers	Others
Main activity		100% (*n* = 519)	43.4% (*n* = 225)	10.6% (*n* = 55)	33.3% (*n* = 173)	9.8% (*n* = 51)	2.9% (*n* = 15)
Demographics							
Gender (*n* = 498)	Male	60.0% (*n* = 299)	43.9% (*n* = 94)	56.4% (*n* = 31)	84.0% (*n* = 136)	58.8% (*n* = 30)	46.7% (*n* = 7)
	Female	40.0% (*n* = 199)	56.1% (*n* = 120)	43.6% (*n* = 24)	16% (*n* = 26)	41.2% (*n* = 21)	53.3% (*n* = 8)
Age (*n* = 516)	13–17	4.8% (*n* = 25)	1.8% (*n* = 4)	5.5% (*n* = 3)	9.2% (*n* = 16)	1.9% (*n* = 1)	6.6% (*n* = 1)
	18–29	26.7% (*n* = 139)	21.3% (*n* = 48)	30.9% (*n* = 17)	17.9% (*n* = 31)	80.4% (*n* = 41)	13.3% (*n*–2)
	30–39	20.5% (*n* = 107)	16.0% (*n* = 36)	25.5% (*n* = 14)	26.5% (*n* = 46)	15.7% (*n* = 8)	20.0% (*n* = 3)
	40–49	20.5% (*n* = 107)	19.6% (*n* = 44)	18.1% (*n* = 10)	26.5% (*n* = 46)	0.0% (*n* = 0)	40.0% (*n* = 6)
	50–59	17.3% (*n* = 90)	22.2% (*n* = 50)	16.4% (*n* = 9)	17.3% (*n* = 30)	0.0% (*n* = 0)	6.6% (*n* = 1)
	60+	9.2% (*n* = 48)	19.1% (*n* = 43)	3.6% (*n* = 2)	1.2% (*n*– = 2)	0.0% (*n* = 0)	13.3% (*n* = 2)
Ethnicity (*n* = 510)	NZ-European	81.8% (*n* = 431)	76.5% (*n* = 173)	80.7% (*n* = 46)	89.2% (*n* = 157)	79.2% (*n* = 42)	80.0% (*n* = 12)
	Māori	2.3% (*n* = 12)	0.9% (*n* = 2)	7.1% (*n* = 4)	2.8% (*n* = 5)	1.9% (*n* = 1)	0.0% (*n* = 0)
	Others	15.9% (*n* = 84)	22.5% (*n* = 51)	12.3% (*n* = 7)	8.0% (*n* = 14)	18.9% (*n* = 10)	20.0% (*n* = 3)
Place of residence (*n* = 517)	Christchurch	84.7% (*n* = 438)	85.7% (*n* = 192)	88.8% (*n* = 48)	87.8% (*n* = 151)	64.7% (*n* = 33)	86.7%(*n* = 13)
	Canterbury	10.3% (*n* = 53)	6.7% (*n* = 15)	7.4% (*n* = 4)	10.5% (*n* = 18)	29.4% (*n* = 15)	6.7% (*n* = 1)
	Others	5.0% (*n* = 26)	7.6% (*n* = 17)	3.7% (*n* = 2)	1.7% (*n* = 3)	5.9% (*n* = 3)	6.7% (*n* = 1)

Activity characteristics							
Number of times (X) in Port Hills	1+ week	65.4% (*n* = 340)	55.2% (*n* = 126)	83.5% (*n* = 46)	82.1% (*n* = 142)	29.4% (*n* = 15)	15.7%(*n* = 10)
	1+ month	19.6% (*n* = 102)	21.9% (*n* = 50)	7.3% (*n* = 4)	13.9% (*n* = 24)	43.1% (*n* = 22)	13.3% (*n* = 2)
	Few X year	8.5% (*n* = 44)	11.8% (*n* = 27)	7.3% (*n* = 4)	2.9% (*n* = 5)	11.8% (*n* = 6)	13.3% (*n* = 2)
	First time	6.5% (*n* = 34)	10.0% (*n* = 22)	1.8% (*n* = 1)	1.1% (*n* = 2)	15.7% (*n* = 8)	6.6% (*n* = 1)
Area Port Hills recreating in	Eastern	27.7% (*n* = 144)	39% (*n* = 89)	34.4% (*n* = 21)	6.8% (*n* = 13)	37.2% (*n* = 19)	13.3% (*n* = 2)
	Central	56.2% (*n* = 291)	35.9% (*n* = 82)	47.5% (*n* = 29)	76.8% (*n* = 146)	54.9% (*n* = 28)	40.0% (*n* = 6)
	South West	19.6% (*n* = 102)	23.2% (*n* = 53)	16.4% (*n* = 10)	15.8% (*n* = 30)	3.9% (*n* = 2)	46.6% (*n* = 7)
	Not sure	1.5% (*n* = 8)	1.8% (*n* = 4)	1.6% (*n* = 1)	0.5% (*n* = 1)	3.9% (*n* = 2)	0.0% (*n* = 0)
		Note: Some recreating in more than one area					
Recreating with	Own	40.0% (*n* = 208)	45.3 (*n* = 102)	61.8% (*n* = 34)	37.6% (*n* = 65)	0.0% (*n* = 0)	46.6% (*n* = 7)
	Family	18.1% (*n* = 94)	26.6% (*n* = 60)	20.0% (*n* = 11)	9.8% (*n* = 17)	1.9% (*n* = 1)	33.3% (*n* = 5)
	Friends	36.0% (*n* = 187)	25.7% (*n* = 58)	16.4% (*n* = 9)	47.4% (*n* = 82)	70.6% (*n* = 36)	13.3% (*n* = 2)
	F/F	3.5% (*n* = 18)	2.2% (*n* = 5)	1.8% (*n* = 1)	4.0% (*n* = 7)	7.8% (*n* = 4)	6.6% (*n* = 1)
	Club	2.3% (*n* = 12)	0.0% (*n* = 0)	0.0% (*n* = 0)	1.6% (*n* = 2)	19.6% (*n* = 10)	0.0% (*n* = 0)
Number of individuals recreating with	Alone	40.0% (*n* = 207)	44.9% (*n* = 101)	61.8% (*n* = 34)	37.4% (*n* = 64)	0.0% (*n* = 0)	40.0% (*n* = 6)
	2–3	41.9% (*n* = 217)	45.8% (*n* = 103)	34.5% (*n* = 19)	45.0% (*n* = 77)	25.5% (*n* = 13)	46.6% (*n* = 7)
	4–5	10.8% (*n* = 56)	6.7% (*n* = 15)	3.6% (*n* = 2)	9.4% (*n* = 16)	43.1% (*n* = 22)	6.6% (*n* = 1)
	6+	7.2 (*n* = 37)	2.6% (*n* = 6)	0.0% (*n* = 0)	8.2% (*n* = 14)	31.4% (*n* = 16)	6.6% (*n* = 1)
Dogs	Yes	17.2% (*n* = 89)	33.0% (*n* = 74)	9.3% (*n* = 5)	4.0% (*n* = 7)	0% (*n* = 0)	13.3% (*n* = 2)
		Note: Percentage represents the number of recreationists who said yes to recreating with a dog					
Length of activity	Less 1 hr	16.4% (*n* = 85)	24.5% (*n* = 55)	38.2% (*n* = 21)	3.5% (*n* = 6)	0.0% (*n* = 0)	20.0% (*n* = 3)
	1+ hr–3 hrs	60.8% (*n* = 315)	62.0% (*n* = 139)	54.5% (*n* = 30)	73.4% (*n* = 127)	21.6% (*n* = 11)	53.3% (*n* = 8)
	3+ to 5 hrs	18.9% (*n* = 98)	12.5% (*n* = 28)	5.5% (*n* = 3)	21.4% (*n* = 37)	51.0% (*n* = 26)	26.7% (*n* = 4)
	5+ hrs	3.9 (*n* = 20)	0.9% (*n* = 2)	1.8% (*n* = 1)	1.7% (*n* = 3)	27.4% (*n* = 14)	0.0% (*n* = 0)

The “other” user group recreated more in the Southwestern area of the Port Hills, which can possibly be attributed to the popularity of Halswell Quarry for activities that were reported among “others” such as dog walking, horseback riding, and planting. Table 5.2 includes the key findings of Port Hills recreationists by demographic data and by activity characteristics.

Table 5.2 Overview of Port Hills recreationists’ demographic data and activity characteristics

	Demographic data Key findings	Activity participation characteristics Key findings
All	• 60/40 male/female ratio • Majority between the ages of 18–50 (68%) • Majority New Zealand European (82%) • Majority from the Christchurch area (85%)	• Visit the Port Hills weekly (65%) • Visit the Central area of the Port Hills (56%) • 40% solo recreationists and 60% non-solo recreationists • Either alone (40%) or recreating with friends (36%) • Recreating with up to 3 others (42%) • Majority recreate between 1 to 3 hours (61%)
Walkers	• Slightly more females (56.1%) • Activity with the most 60 years old and above (19%) • Majority New Zealand European (76%) • Highest other ethnicities (23%) • Majority from Christchurch area (86%)	• Slightly more than half visit weekly (55%) • Recreate with dog(s) most frequently (33%) • Recreate between 1 to 3 hours more frequently (62%)
Runners	• Slightly more males (56%) • Majority between 18–40 years old (75%) • Majority New Zealand European (81%) and highest Māori representation (7%) • Majority from Christchurch area (89%)	• Visits Port Hills weekly (84%) • Recreate on their own (solo) more frequently (62%) • Recreate one hour or less more frequently (38%)
Mountain bikers	• Much more males (84%) • Activity with the most youth under 17 (9%) • 49 years old and below (80%) with limited 60 years old and above (1%) • Majority NZ European (80%) • Majority from Christchurch area (89%)	• Visit Port Hills on a weekly basis (84%) • More visits to the Central area of the Port Hills (77%) • Recreate with friends (47%) and up to 3 others (45%) • Recreate between 1 to 3 hours most frequently (73%)

	Demographic data Key findings	Activity participation characteristics Key findings
Rock climbers	• Slightly more males (59%) • All below 40 years of age (100%) • Majority NZ European (79%) • Highest activity group that came from outside Christchurch to recreate (35%) • Majority from Christchurch area (65%)	• None recreate with a dog (0%) • Highest activity group to visit Port Hills for the first time (16%) • Recreate with friends the most (71%) and with the highest number of friends (4+ friends; 75%) • Recreate between 3 hours or more frequently (78%)
Others (e.g.: Geocache, road bike, dog park)	• Slightly more females (53%) • Majority NZ European (80%) although above 20% other ethnicities • Majority from Christchurch area (87%)	• Tends to recreate more in South –Western area than other groups (47%) • Tends to recreate more with family than other activity groups (33.3%)

Nearly two thirds of respondents (65.4%) recreated in the Port Hills at least once per week with the most visited area of the Port Hills being the Central section. Of the respondents, 40% recreated on their own while 48% recreated with one to two others with the remaining 12% with three or more others. These findings varied from previous research that reported a much smaller number of solo recreationists with the bulk of research participants recreating with two to four others (Lindell, 2014; Wray, 2009). Runners tended to recreate the most on their own at 62%. Of the climber respondents, 70% practised their activity with friends and 19.6% with members of a climbing club. In total, 60% of survey participants recreated in the Port Hills between 1 to 3 hours, except for close to 80% of rock climbers who stayed longer than 3+ hours per visit.

The study was designed to ensure that the demographic data and activity participation characteristics of interviewed recreationists aligned with the surveyed research participants. All recreationists who were interviewed recreated in the Port Hills and the majority participated in the survey (n = 24). In both the quantitative and qualitative data collection, recreationists were asked about their reasons for visiting the Port Hills. Their responses gave a broader understanding of research participants' motivations for recreating in the Port Hills.

5.2 Reasons for outdoor recreating in the Port Hills

Recreationists were asked about their reasons for recreating at the time of the survey. The question included a 7-point Likert scale from "strongly disagree" to "strongly agree" with a middle neutral point. Participants' reasons are summarised in Figure 5.1.

On a maximum score of 7, the overall top five mean scores for motivations were for health and exercise (6.33), to view scenery (5.52), to relax (5.50), to experience nature (5.34), and to challenge self (5.31). The lowest five motivations were to compete against others (2.23), to meet new people (2.23), to see a new place (3.16), to learn new skills (3.35), and to be away from people (3.42). These main reasons are comparable to data reported by other researchers with health and exercise, relaxing, and experiencing nature and views typically the top motivations for visiting peri-urban type areas, although not necessarily in the same order (Manning, 2011; Pigram & Jenkins, 2006; Plummer, 2009; Sefton & Mummery, 1995). Chan, Yuen, Duan, and Marafa (2018) found similar reasons for visiting peri-urban parks in Hong Kong; however, "to relax mentally" was a top priority and "to enhance health" rated lower down on the list compared to the Port Hills. An Active NZ report rated physical well-being as the top reason for adults to engage in sports and recreation and fun as the top reason for youth to engage in sports and recreation (Sport New Zealand, 2018). Being with family and friends was not rated highly overall (4.47), presumably due to 40% of recreationists recreating alone. This reason rates much higher (6.92) when completing the analysis with non-solo recreationists only. This latter result emphasised the importance of in-group social interaction in many recreationists' experience in the Port Hills.

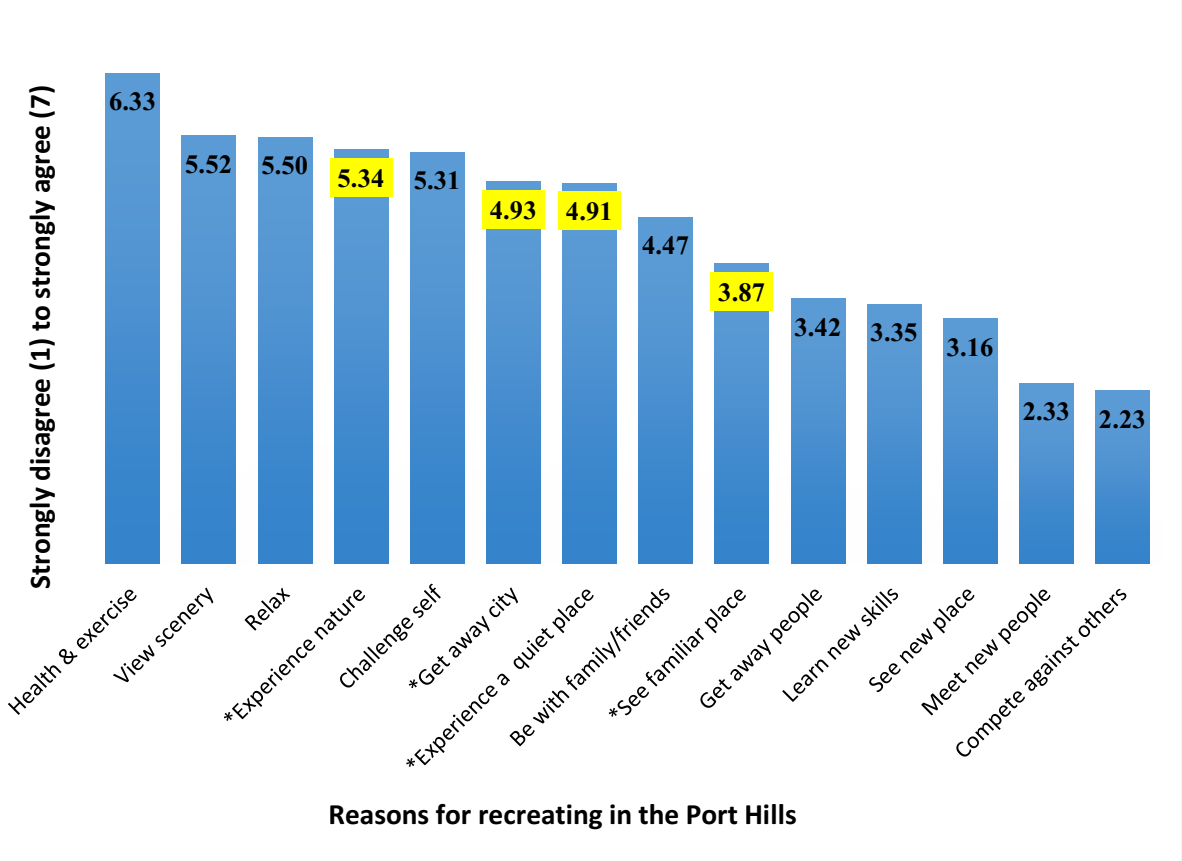

Figure 5.1 Reasons for recreating in the Port Hills

Note. *The yellow results are significant at $p \leq .05$ between activity groups (i.e., walkers, runners, mountain bikers, rock climbers), explained further below.

Although Port Hills recreationists agreed (4.93) that getting away from the city was a reason for visiting the area, they agreed less (3.86) that getting away from people was a reason for visiting the Port Hills. The negative perceptions of crowding and the search for solitude, as reported in other research (Manning, 1985; Wiley, 2005; Zuckerman, 2013) may not be as prevalent in peri-urban settings (Manning, 2011), or may not be as prevalent in the Christchurch area which is not an overcrowded city. The results of this research are supportive of the intent underpinning the use of the ROS and literature reporting that participation, attitudes, preferences, and motivations may vary depending on the activity itself and on the setting within which the activity takes place (Booth & Peebles, 1995; Manning, 2011; Newsome, 2013; Pigram & Jenkins, 2006; Plummer, 2009).

Respondents' reasons for recreating in the Port Hills varied by user groups, as shown in Figure 5.1, with the five reasons that showed significant differences amongst the various activity groups tagged with an asterisk. Walkers (80.5%) and climbers (88%), for example, were more likely than other recreationists (70.8%) to visit the Port Hills to experience nature and wildlife ($\chi^2 = 16.7$, *df*8, $p \leq .05$). Walkers (71.6%) and runners (78%) reported being in the Port Hills to be in a quiet place more than other user groups (57.3%; $\chi^2 = 16.1$, *df*8, $p \leq .05$). Runners (45%) were more inclined to recreate to get away from people than other activity groups (35.8%; $\chi^2 = 17.9$, *df*8, $p \leq .05$), which is not surprising given that 61.8% of runners practised their activity solo. Only 10% of rock climbers, who recreated in the Port Hills on a less frequent basis than other users, reported visiting the Port Hills to "see a familiar place" compared to 42% of mountain bikers ($\chi^2 = 22.7$, *df*8, $p \leq .01$). Across the sample only 6.5% of recreationists were visiting the Port Hills for the first time explaining why "seeing a new place" was not an important reason for recreating in the Port Hills. Women (83.2%) were more likely than men (72.7%) to recreated in the Port Hills to experience nature ($\chi^2 = 6.5$, *df*2, $p \leq .05$). Women (72.1%) were also more likely than men (61.7%) to recreated in the Port Hills to be in a quiet place ($\chi^2 = 6.5$, *df*2, $p \leq .05$).

More detail about reasons for recreating came through the interviews. For example, a walker mentioned that the Port Hills are "actually way better exercise than I thought it was going to be, like it's that sustained length of time at a fast pace on the hills that is actually really good for my fitness" (Recreationist #15, Walker), while a rock climber emphasised that recreating in the Port Hills "is a good way to unplug for sure" (Recreationist #5, Rock Climber). Some recreationists used the Port Hills as a place to train for competitions or to prepare for longer activities located in more remote wilderness areas. For example, a rock climber mentioned using the Port Hills as training grounds for a larger climb: "The Port Hills are good training grounds if you want to climb something bigger like Mt Cook. So these are the main reasons I go" (Recreationist #5, Rock Climber). Recreationists using peri-urban areas in preparation to recreate in remote settings is a finding consistent with research

reported elsewhere (Ewert, 1998; Ewert & Hood, 1995). Participants reported the convenient location, access, and well-developed recreation areas (i.e., tracks and crags) as features that made it easy for individuals to recreate in the Port Hills. “That is why I live in the Bowenvale Valley, one minute up the road is the mountain bike tracks, that’s why we moved there” (Recreationist #14, Mountain Biker).

Having examined recreationists’ reasons for visiting the Port Hills, the next section investigates the use of digital technology. Section 5.4 begins with a description and analysis of the devices carried by recreationists.

5.3 Engagement with digital devices

The majority of research participants carried one or more digital devices while recreating in the Port Hills. Many of them, but not all, used their devices during their activity. The following section reports on the overall engagement of recreationists with digital technology whether carrying it only or carrying and using it.

5.3.1 Digital devices carried by Port Hills recreationists

In total, 87% of respondents carried at least one digital device while recreating in the Port Hills. The four most commonly reported devices were smartphones (68.7%), basic phones (11.2%), digital watches (11.2%), and digital cameras (6.2%). Respondents with devices (*n* = 452) carried between one and five separate devices, an average of 1.4 devices each. Most commonly across the sample, recreationists reported carrying one (58.3%) or two (22.1%) devices. It is worth noting that two recreationists carried five digital devices and six recreationists carried four digital devices. In addition, 68 out of 520 recreationists did not carry any digital devices.

Table 5.3 identifies the breakdown of the digital devices in order of most carried. Corroborating the survey data, one interviewed Port Hills Ranger said that while working he noticed many digital devices used by recreationists. A recreationist speaking to what devices he was carrying while in the Port Hills mentioned, “my phone is pretty much the only electronic device I have, so it’s everything” (Recreationist #24, Mountain Biker). This quotation supports findings presented later in the chapter on the versatility and high use of the smartphone.

Table 5.3 Digital devices carried by Port Hills recreationists

Digital devices	*n*	% per *N* = 520
Smartphone	357	68.7
Basic phone	58	11.2
Digital watch	58	11.2
Digital camera	32	6.2
Cycle computer	28	5.4
Global positioning system (GPS)	27	5.2
Heart rate monitor	18	3.5
Digital music player	16	3.1
Other	16	3.1
iPod	13	2.5
Point-of-view camera	13	2.5
Tablet	3	0.6
	n = 639 devices carried	
Recreationists carrying digital device(s)	452	86.9

Similarly, another mountain biker mentioned using his phone for a multitude of things, such as taking photos, negating the need to carry a separate camera as he used to do:

> *So I used to carry a camera and I carry a phone now. I carry a phone because I've got a reasonable camera on my iPhone and that's good enough for taking a few snaps. I don't upload them generally when I'm out on the field. Some of the places I would ride aren't connected, so I don't see that, … and I see a lot of value in grabbing stuff onto the device and then being able to take it back to my Wi-Fi zone and do it all from there, which is pretty cool, but certainly the single device thing, bringing everything into one device has been really useful. (Recreationist #17, Mountain Biker)*

The two last quotations above suggest the range of smartphone uses explain its popularity and why it was the most carried device by Port Hills recreationists.

Further analysis of these findings revealed that devices were carried differently by recreationists based on the specific outdoor activity, the demographic variables, and the characteristics of the activity. Table 5.4 provides a summary of recreationists who were most likely and least likely to carry devices based on demographic data and activity participation characteristics. Items included in Table 5.4 were significant at the $p \leq .05$ level through a chi-square, and are further examined in the text. In the categories of other devices, iPods and Tablets are excluded from Table 5.4, with no items standing out largely due to the small number of recreationists carrying these two devices. Building on the information presented in Table 5.4, Table 5.5 includes information on the digital devices used by the type of activity performed in the Port Hills at the time of the survey.

Table 5.4 Overview of who carried which digital devices in the Port Hills

Devices	Carried (*n* = 520)	More likely to carry devices Key findings (Demographics & activity characteristics)	Less likely to carry devices Key findings (Demographics & activity characteristics)
Smartphone	68.7% (*n* = 357)	• Men • Mountain bikers • Non-solo recreationist	• Women • Runners • Recreating less than 1 hour
Basic phone	11.2% (*n* = 58)	• Men • Non-solo recreationist	• Women • Recreating less than 1 hour
Digital watch	11.2% (*n* = 58)	• Runners • 30-49 year olds • Non-solo recreationist	• Walkers • Rock climbers
Digital camera	6.2% (*n* = 32)	• Walkers • Rock climbers • Non-solo recreationist • First time visitors to the Port Hills • 3+ hours in the Port Hills	• Runners
Cycle computer	5.4% (*n* = 28)	• Men • Mountain bikers • Recreating in the Port Hills daily to a few times per week	• All except mountain bikers
GPS	5.2% (*n* = 27)	• Runners • Mountain bikers • Solo recreationists	• Rock climbers
Heart rate monitor	3.5% (*n* = 18)	• Runners • Mountain bikers	• Rock climbers
Digital music player	3.1% (*n* = 16)	• Runners • Solo recreationists	• Mountain bikers
POV Camera	2.5% (*n* = 13)	• Only men • Mountain bikers • Rock climbers • Younger recreationists • Non-solo recreationist	• Walkers • Runners
		More likely to carry no devices Key findings (Demographics & activity characteristics)	Less likely to carry no devices Key findings (Demographics & activity characteristics)
No devices	13.1% (*n* = 68)	• Women • Runners • Recreating less than 1 hour	• Mountain bikers

Few previous studies have reported on outdoor recreationists' possession and use of mobile phones (Lindell, 2014; Martin & Blackwell, 2016; Mason et al., 2013; Outdoor Foundation, 2013). Industry research from a national survey done by the Outdoor Foundation from Colorado (Outdoor Foundation, 2013) reported that 26% of research participants used mobile phones during their outdoor recreation activity in all settings in comparison with 82.3% in this study. Martin and Blackwell (2016) reported that 29% of their research participants carried a smartphone with them when visiting a remote setting in comparison with 68.7% in this research.

In their research completed in a remote setting, Mason et al. (2013) reported 90.3% of their research participants carried some form of communication devices including a mobile phone, a PLB, or both which is slightly about this research at 87% which included various devices. The Outdoor Foundation (2013) reported that no technology was used by 51.4% of research participants, while Mason et al. (2013) reported that number at 9.7% in comparison to 13.1% in this study.

As shown in Table 5.5, compared with other activity groups, runners were more likely to recreate without a digital device (27.5%; $\chi^2 = 15.4$, *df*4, $p \leq .01$) and overall were less likely to carry smartphones (45.4%; $\chi^2 = 54.3$, *df*4, $p \leq .001$). However, runners were more likely to carry digital watches (20%) and digital music devices (14.5%; $\chi^2 = 10.9$, *df*4, $p \leq .05$; $\chi^2 = 29.2$, *df*4, $p \leq .001$).

Table 5.5 Digital devices carried by activity in Port Hills (%)

Digital devices	Overall (*N* = 520)	Walkers (*n* = 225)	Runners (*n* = 55)	Mountain bikers (*n* = 173)	Rock climbers (*n* = 51)	Others (*n* = 15)
*Smartphone	68.7	65.8	32.7	81.5	74.5	73.3
Basic phone	11.2	13.8	12.7	8.7	9.8	0.0
*Digital watch	11.2	8.0	20.0	14.5	7.8	0.0
*Digital camera	6.2	9.8	0.0	2.3	9.8	6.6
Cycle computer	5.4	0.0	0.0	15.6	0.0	6.6
*GPS	5.2	1.3	9.1	9.2	0.0	20.0
Heart rate	3.5	2.2	3.6	4.6	0.0	20.0
*Digital music player	3.1	2.2	14.5	0.6	2.0	6.6
Others	3.1	4.0	1.8	2.3	3.9	0.0
iPod	2.5	3.1	3.6	1.2	3.9	0.0
*POV camera	2.5	0.4	0.0	5.2	5.9	0.0
Tablet	0.6	0.9	0.0	0.6	0.0	0.0
*No devices	13.1	14.7	27.3	7.5	9.8	13.3

Note. * Significant at $p \leq .05$ between activity groups and/or demographic data and/or activity participation characteristics.

To explain why runners were not carrying as many digital devices, runners reported, “I forgot my phone armband” (Recreationist #229, Runner) and “no pockets, no needs” (Recreationist #27, Runner). These comments speak to the minimalist approach to running and to the awkwardness of carrying items while running. Walkers (9.8%) and rock climbers (9.8%) were more likely to carry digital cameras, and mountain bikers (5.2%) and rock climbers (5.9%) carried significantly more POV cameras ($\chi^2 = 14.302$, *df*4, $p \leq .01$; $\chi^2 = 13.247$, *df*4, $p \leq .01$). A rock climber indicated having more space to carry things when climbing was conducive to bringing a camera in comparison with not bringing a camera while mountain biking because of the space restriction: “Climbing, in general, you have got a bigger bag, and when I am biking I only carry a small bag which the camera does not really fit into” (Recreationist #5, Rock Climber). Finally, there was a significant difference in the number of GPS devices carried with the largest number being carried by the user group others (20%) and by runners and mountain bikers (9% each; $\chi^2 = 23.71$, *df*4, $p \leq .001$).

Women (72.8%) were less likely than men (82.2%) to carry a phone, smart or basic, a difference found to be statistically significant ($\chi^2 = 6.175$, *df*1, $p \leq .05$). This could be partly explained by more women running and fewer runners carrying phones and more men mountain biking and a higher percentage of mountain bikers carrying phones. With cycle computers carried only by mountain bikers and more mountain bikers being men, significantly more men (85.2%) than women (14.8%) carried cycle computers ($\chi^2 = 7.523$, *df*1, $p \leq .01$). Only men carried POV cameras, resulting in a significant difference ($\chi^2 = 8.884$, *df*1, $p \leq .01$). Finally, women (46.5%) were more likely than men (53.5%) to recreate without digital devices ($\chi^2 = 5.418$, *df*1, $p \leq .05$). Earlier research from the Outdoor Foundation (2013) reported 50% for women and 53% for men recreated with no technology.

When looking at devices carried by recreationists in different age categories, few differences were statistically significant. However, younger recreationists (13–18 years old) were found to carry more POV cameras (16%) thank all other age groups ($\chi^2 = 27.842$, *df*5, $p \leq .001$) and those 30–49 years old were found to wear digital watches (16.4%) more than any other age groups ($\chi^2 = 11.519$, *df*5, $p \leq .05$). Solo recreationists tended to carry more GPS (8.6%) than non-solo recreationists (2.8%; $\chi^2 = 8.43$, *df*1, $p \leq .005$). They also tended to carry more digital music players (5.3%) than non-solo recreationists (1.6%; $\chi^2 = 5.586$, *df*1, $p \leq .01$) than non-solo recreationists. One recreationist mentioned variation in his use of devices when solo and non-solo recreating: “Usually, if I’m by myself, I would take my phone, but usually if I’m going climbing or tramping in a group I would just usually leave my phone behind. I don’t carry a camera or anything like that” (Recreationist #23, Rock Climber). This quote was not contradictory to the quantitative data showing significantly more non-solo recreationists (83%) carrying phones that solo-recreationists (75%; $\chi^2 = 4.972$, df1, $p \leq .01$).

An analysis of visit frequency and length of recreation activity time revealed some differences. For example, significantly more recreationists visiting the Port Hills for the first time carried digital cameras (29.4%) than recreationists who visited more frequently (4.5%; $\chi^2 = 40.473$, *df*3, $p \leq .001$). A young runner had this to say about taking his camera when going to new places:

> *I have taken my phone to take photos when I've gone to a new place that I haven't been before and I've thought, "Oh, I'd like to take photos," but usually I wouldn't take photos like in the Port Hills because I go there every day, so it's not … so I only take it in a novel place. But I'm not big on photography or anything anyway. (Recreationist #28, Runner)*

An older walker agreed with novelty being a factor with the use of his GPS: "I use a GPS, normally only the first time somewhere. So, I might measure distance if I'm doing something new, but then again, more times I do something new" (Recreationist #25, Walker). For some, being in a new place influenced the choice to carry and use technology.

Although used by few recreationists, results revealed that cycle computers were significantly more popular with recreationists who visited the Port Hills daily or a few times per week than with recreationists who visited less frequently ($\chi^2 = 14.619$, *df*3, $p \leq .01$). This could be attributed to 82.1% mountain bikers who were the only ones using cycle computers frequenting the Port Hills on a weekly basis and, therefore, using this device often. Interestingly, recreationists who spent less than 1 hour in the Port Hills were less likely to carry mobile phones, basic or smart (58.8%) than recreationists who spent more than one hour on the Port Hills (83.8%; $\chi^2 = 31.461$, *df*3, $p \leq .001$). Finally, results showed that significantly more recreationists who were in the Port Hills for less than 1 hour did not have any technology with them (28.1%) than recreationists who were in the Port Hills for more than 1 hour (9.9%; $\chi^2 = 22.119$, *df*3, $p \leq .001$). These recreationists were more predominantly runners and then walkers. These findings can be loosely compared due to the different settings with the work of Mason, Sunner and Williams (2013), who found that hikers in remote settings were less likely to be well prepared for short duration trips. A Port Hills mountain biker, when referring to the length of his ride, said,

> *I do not take my phone to the Port Hills. I leave it at home. Generally, I tend to be gone from the house for a short time. There is more pressure all the time to have it but I tend to think to myself, well this is where I am and I will look at it when I get back, and I do look at it when I get back. (Recreationist #9, Mountain Biker)*

Another mountain biker living close by the Port Hills felt that he could not be bothered with some of the technology when having a window of opportunity to go biking:

> *I can't be farting around with headphones and bits and pieces, a lot of the time I've got 1 hour, get on the bike and ride, and we live reasonably close to the Port Hills, so I can just go, and if there's an opportunity, I'm gone. I'm out of there. (Recreationist #17, Mountain Biker)*

Recreationists spending 3 hours or more in the Port Hills were more likely to carry a digital camera (16.6%) over recreationists who spent less than 3 hours in the Port Hills who were less likely to carry a digital camera (3.2%; $\chi^2 = 14.556$, *df*3, $p \leq .05$). This result possibly linked to the activity of rock climbing with a high number of climbers carrying smartphones and cameras and with 78% of rock climbers spending more than 3 hours rock climbing. While carrying and using their devices, research participants mentioned limitations with the digital devices preventing them from possibly using the devices in a useful and effective manner. These ideas around digital device limitations, which were articulated in open comments as part of the survey and in the answers to interview questions, are presented in section 5.5 of this chapter.

With the mobile phone (basic or smart) being by far the most carried and used device, research participants were asked about their reasons for carrying phones with them, with the results in Table 5.6, which presents data for both smartphones and basic phones combined. Across the total sample, phones were more likely to be carried to ensure safety (81%) and for being accessible to family and friends (76.6%) than for being accessible for work (16.9%), except for research participants who were recreating for less than 1 hour, who were more inclined to be accessible for work (32%).

Interview data revealed that safety encompassed participants' concerns of risk of injury, bike mechanical failure, personal safety, and natural disaster emergencies. The topic of safety emerged as an important theme in the research and is discussed in greater depth in Chapter 6.

Significant differences existed between activity types with mountain bikers more likely to carry a phone than other activity groups for safety reasons ($\chi^2 = 20.117$, df4, $p \leq .001$). 90.7% of mountain bikers carrying a mobile phone reported doing so for safety reasons compared to 73.6% for walkers, 61.1% for runners, 81% for rock climbers and 63% for others. The reasons for more mountain bikers carrying cell phones for safety, may have been because of the risk of mechanical and equipment failure and tyre puncture. Non-solo recreationists who were recreating with family and friends were less likely to carry a phone to connect with others (39.2%) as opposed to recreationists who were recreating on their own (74.8%).

Table 5.6 Reasons for carrying mobile phone (basic and smart)

	Safety	Access to family & friends	Access to work
By activity: (Research participants carrying phones)			
All (*n* = 415)	81.0% (*n* = 336)	76.6% (*n* = 318)	16.9% (*n* = 70)
Walkers (*n* = 179) Runners (*n* = 25) Mountain Bikers (*n* = 156) Rock Climbers (*n* = 43) Others (*n* = 11)	74.9% (*n* = 134) 72.0% (*n* = 18) 91.6% (*n* = 143) 79.1% (*n* = 34) 63.6% (*n* = 7)	81.0% (*n* = 145) 64.0% (*n* = 16) 77.6% (*n* = 121) 62.8% (*n* = 27) 72.7% (*n* = 8)	19.6% (*n* = 35) 4.0% (*n* = 1) 18.6% (*n* = 29) 11.6% (*n* = 5) 0.0% (*n* = 0)
By demographic and characteristic of activity: (Research participants carrying phones)			
Men (*n* = 246) Women (*n* = 147)	80.0% (*n* = 197) 83.0% (*n* = 122)	74.8% (*n* = 184) 82.3% (*n* = 121)	19.9% (*n* = 49) 12.2% (*n* = 18)
Solo recreationist (*n* = 155) Non-solo recreationists (*n*= 260)	73.5% (*n* = 114) 85.3% (*n* = 222)	74.8% (*n* = 116) 39.2% (*n* = 102)	23.9% (*n* = 37) 12.7% 9 (*n* = 33)
Age 13-17 (*n* = 21) 18-29 (*n* = 111) 30-39 (*n* = 89) 40-49 (*n* = 90) 50-59 (*n* = 66) 60+ 9 (*n* = 34)	 90.5% (*n* = 19) 69.4% (*n* = 77) 79.8% (*n* = 71) 85.6% (*n* = 77) 88.3% (*n* = 55) 70.6% (*n* = 24)	 90.5% (*n* = 19) 71.2% (*n* = 79) 71.9% (*n* = 64) 80.0% (*n* = 72) 81.1% (*n* = 54) 76.5% (*n* = 26)	 9.5% (*n* = 2) 7.2% (*n* = 8) 16.9% (*n* = 15) 24.4% (*n* = 22) 21.2% (*n* = 14) 20.9% (*n* = 7)
Areas of the Port Hills Eastern (*n* = 105) Central (*n* = 245) South Western (*n* = 80)	 78.1% (*n* = 82) 84.1% (*n* = 206) 73.8% (*n* = 59)	 74.2% (*n* = 78) 75.5% (*n* = 185) 81.3% (*n* = 65)	 13.3% (*n* = 14) 14.7% (*n* = 36) 23.8% (*n* = 19)
Numbers of times in Port Hills 1+ per week (*n* = 261) 1+ per month (*n* = 84) Few times year (*n* = 39) First time (*n* = 31)	 83.5% (*n* = 218) 77.4% (*n* = 65) 76.9% (*n* = 30) 74.2% (*n* = 23)	 77.8% (*n* = 203) 71.4% (*n* = 60) 84.6% (*n* = 33) 71.0% (*n* = 22)	 22.6% (*n* = 59) 7.4% (*n* = 6) 10.3% (*n* = 4) 3.2% (*n* = 1)
Length of activity Less than one hour (*n* = 50) 1+ hour to 3 hours (*n* = 259) 3+ to 5 hours (*n* = 89) 5+ hours (*n* = 17)	 66.0% (*n* = 33) 95.4% (*n* = 247) 82.0% (*n* = 73) 76.5% (*n* = 13)	 86.0% (*n* = 43) 76.4% (*n* = 198) 76.4% (*n* = 68) 52.9% (*n* = 9)	 32.0% (*n* = 16) 15.8% (*n* = 41) 12.4% (*n* = 11) 11.8% (*n* = 2)

Recreationists who were recreating in the Port Hills for less than 1 hour in comparison to recreationists who were in the Port Hills for a longer period of time were less likely to carry a phone for safety (65%; $\chi^2 = 7.872$, df3, $p \leq .05$), more likely to carry a phone to communicate with family and friends (86%; $\chi^2 = 10.056$, df3, $p \leq .01$), and more likely to communicate with work (32%; $\chi^2 = 7.157$, df3, $p \leq .05$). Although carrying a phone to stay in communication with work was the less selected

option for most, four groups were more likely to do so. One quarter of solo recreationists (*n* = 155), one quarter of age group spanning 40–49 years (*n* = 90), one quarter of recreationists who visit the Port Hills more often, and one third of recreationists who recreated for less than 1 hour carried a phone to communicate with work. Previous studies found that less than 50% of recreationists brought a mobile device with them during their activity, although the research was conducted in a more remote setting and no distinctions were made between the activity characteristics (Lindell, 2014; Martin & Blackwell, 2016).

5.3.2 Digital devices used by Port Hills recreationists

Recognising that being in possession of a digital device may not mean the device was actually utilised, the survey asked respondents about both circumstances. The vast majority (83%) of recreationists who carried a device also used it during their visit to the Port Hills. For example, POV cameras carried were used 100% of the time, whereas smartphones carried were used 82.3% of the time. Each device varied in types of use capabilities from the POV camera that is typically strictly used for taking photos and/or making videos to the smartphones that can accomplish many tasks. Devices that had specialised use were used more often. Among the minority of recreationists who did not engage with the digital devices they carried, there were different reasons for not doing so. Some reported carrying a device just in case it was needed, while others wanted to disconnect from digital technology while recreating. One recreationist indicated, *"Maybe I would answer a call but no, I wouldn't text, and usually I've just got my phone on silent. It's really just sitting in my pocket doing nothing" (Recreationist #23, Rock Climber).*

Figure 5.2 summarises the percentage of recreationists who used the devices they were carrying referred to as the usage rate. For example, of the 357 recreationists who carried a smartphone, 294 reported using the device on the day of the intercept survey. This equates to a usage rate of 82.3%. The devices with the highest usage rates were the POV camera (100%), digital watch (98.3%), GPS (96.3%), digital camera (90.6%), iPod (84.6%), and smartphone (82.3%).

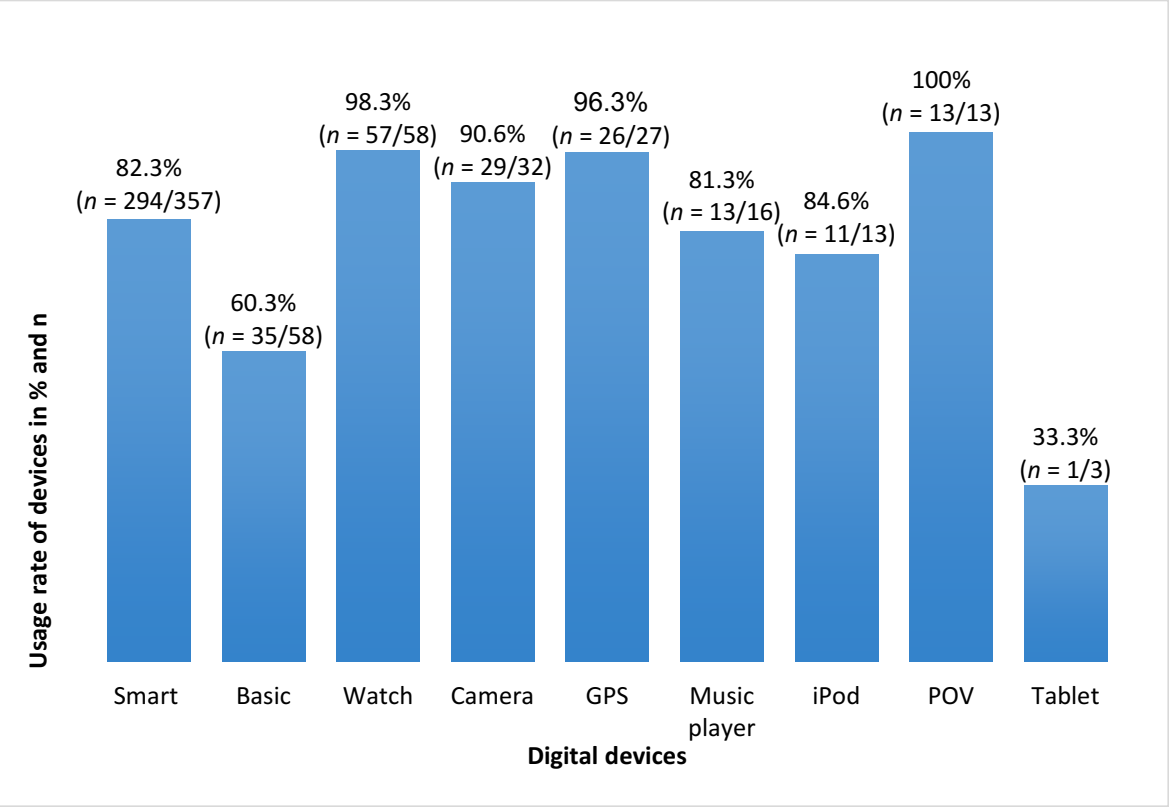

Figure 5.2 Usage rates of devices by Port Hills recreationists (%)

The cycle computer and the heart rate monitor usage were not included in the Figure 5.2, as the questions from the survey were limited and prevented an assessment of how many cycle computers and heart rate monitors had been used during the outdoor activity[12]. Of the recreationists, 28 carried cycle computers and 16 carried heart rate monitors for a total of 44 devices. Excluding cycle computers and heart rate monitors, a total of 577 devices were carried, and 479 devices were used for a usage rate of 83%.

For each device used during the outdoor activity, research participants were asked to provide specific details on how the technology was used. Although the options for types of use varied according to each device, there were repeated options depending on the devices. For example, it is possible to take photos from a smartphone, a digital camera, a POV sports action camera, an iPod, and a tablet. If a recreationist took a picture, regardless of the device, he or she was directed to a question asking for detail about what the intent was with the picture (or pictures) taken.

Across the sample, the most common types of use of digital devices were for communication (i.e., calling, texting, emailing, and social media posting or messaging) and for checking the time.

[12] In the survey, questions for cycle computers and heart rate monitor were limited when it came to the types of use. For cycle computers only heart rate, power and elevation profile was asked if used while this device is capable of much more uses. It was unfortunately not possible to assess if heart rate monitors had been used or not.

Naturally, these overall reported uses reflected the ubiquity of particular devices carried by recreationists. Hence, the multifunctional smartphone, carried by 68.7% of all respondents, featured prominently among the reported uses.

Overall, 1,051 uses were reported across 14 types of use. Examples of specific uses or device features asked about in the research included using the smartphone to text or record activity or fitness data or using the digital camera to take a photo. The survey data calculated one use per feature. For example, if participants reported using their phone for texting, it was calculated as one use whether they texted once, twice, or more times. Recreationists were not asked how many times they texted or how many posts they made or how many photos they took. Table 5.7 provides details of the types of use reported by recreationists in per cent and in frequency. Across the sample, of the recreationists who carried devices (*n* = 452), those registered, on average, 2.3 device uses. The most common types of use across all digital devices were communicating (i.e., text, call, email, or social media; *n* = 276), checking the time (*n* = 259), taking photos and videos (*n* = 114), and collecting activity/fitness data (*n* = 112).

Table 5.7 Number of types of uses per digital device

Device types of uses	Smart (*n* = 294)	Basic (*n* = 35)	Watch (*n* = 57)	Camera (*n* = 29)	*Cycle (*n* = ?)	GPS (*n* = 26)	**HRM (*n* = ?)	DMP (*n* = 13)	iPod (*n* = 11)	POV (*n* = 13)	Tablet (*n* = 1)	Total
1. Call/text	48.6% (*n* = 143)	60.0% (*n* = 21)									0.0% (*n* = 0)	*n* = 164
2. Access email/social	14.3% (*n* = 42)								0.0% (*n* = 0)		0.0% (*n* = 0)	*n* = 42
3. Post social network sites	10.2% (*n* = 30)								0.0% (*n* = 0)		0.0% (*n* = 0)	*n* = 30
4. Message in app	13.3% (*n* = 39)								9.1% (*n* = 1)		0.0% (*n* = 0)	*n* = 40
5. Music	19.7% (*n* = 58)							100% (*n* = 13)	54.5% (*n* = 6)		0.0% (*n* = 0)	*n* = 77
6. Radio/news/pod	4.1% (*n* = 12)							0.0% (*n* = 0)	9.1% (*n* = 1)		0.0% (*n* = 0)	*n* = 13
7. Photos	48.0% (*n* = 141)			96.5% (*n* = 28)					27.2% (*n* = 3)	53.8% (*n* = 7)	100% (*n* = 1)	*n* = 180
8. Videos	6.8% (*n* = 20)			3.4% (*n* = 1)					9.1% (*n* = 1)	92.3% (*n* = 12)	0.0% (*n* = 0)	*n* = 34
9. Activity/Fitness data	27.2% (*n* = 80)				*(*n* = 7)	92.3% (*n* = 24)			9.1% (*n* = 1)		0.0% (*n* = 0)	*n* = 112
10. Internet for info	19.4% (*n* = 57)								18.2% (*n* = 2)		0.0% (*n* = 0)	*n* = 59

Device types of uses	Smart (*n* = 294)	Basic (*n* = 35)	Watch (*n* = 57)	Camera (*n* = 29)	*Cycle (*n* = ?)	GPS (*n* = 26)	**HRM (*n* = ?)	DMP (*n* = 13)	iPod (*n* = 11)	POV (*n* = 13)	Tablet (*n* = 1)	Total
11. Geocache	2.0% (*n* = 6)					7.7% (*n* = 2)			0.0% (*n* = 0)		0.0% (*n* = 0)	*n* = 8
12. Time	59.5% (*n* = 175)	71.4% (*n* = 25)	96.4% (*n* = 55)						36.4% (*n* = 4)		0.0% (*n* = 0)	*n* = 259
13. Access maps						26.9% (*n* = 7)			0.0% (*n* = 0)			*n* = 7
14. Others	2.7% (*n* = 8)	0.0% (*n* = 0)	29.2% (*n* = 17)			0.0% (*n* = 0)			9.1% (*n* = 1)		0.0%	*n* = 26
Total	*n* = 811	*n* = 46	*n* = 72	*n* = 29	*n* = 7	*n* = 33	N/A	*n* = 13	*n* = 20	*n* = 19	*n* = 1	*N* = 1051
Av. uses per recreationist using a device (*n* = 452)												2.3
Av. uses per devices carried (*n* = 639)	2.3	0.8	1.2	1.0	.25	1.2	N/A	0.8	1.5	1.5	.33	1.6
Av. uses per devices used (*n* = 479)	2.8	1.4	1.3	1	N/A	1.2	N/A	1	2	1.5	1	2.2

Note. DMP = Digital Music Player; GPS = Global Positioning System; HRM = Heart Rate Monitor; POV = Point of View.

*Cycle computer: No % included as responses related to heart rate, power and elevation profile only. Cycle computers may have been used for other uses not asked on the survey. **HRM = Carriers of the devices were not specifically asked if they used the device during their activity.

Smartphones were reported to have the most types of use (*n* = 811), experiencing a rate of 2.3 uses per smartphone carried (*n* = 357). The most commonly reported uses for the smartphones were communication (i.e., text, call, email, or social media; *n* = 254), checking the time (*n* = 175), taking photos and making videos (*n* = 161), and collecting activity and fitness data via an application (*n* = 80), listening to music, radio, news, or podcasts (*n* = 70), and searching the Internet for information (*n* = 57).

Figure 5.3 shows the number of recreationists and the numbers of smartphone types of use applied. For example, 92 recreationists used their smartphones for two types of use, which could have been for taking photos and texting, while two recreationists used the phones for 10 types of use. This information is relevant, as it indicates the amount of engagement recreationists had with their mobile phones.

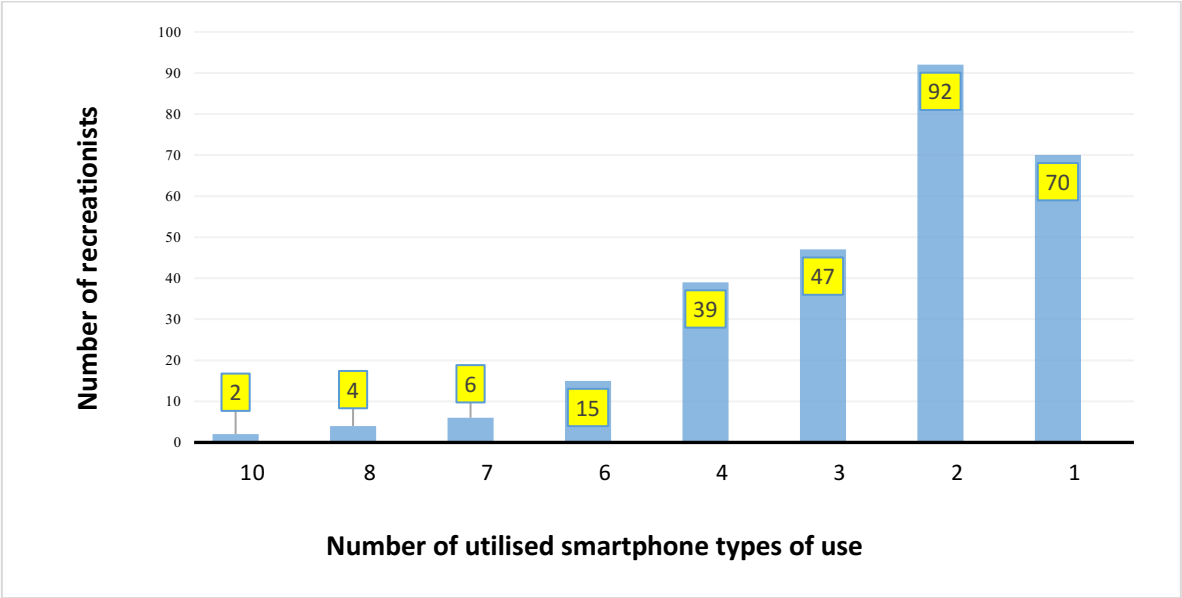

Figure 5.3 Recreationists by number of utilised smartphone types of uses.

An important use of digital devices as reported above in Table 5.7 was time. The following section of this expands on the concept of time.

5.4 The importance of monitoring time

Many recreationists reported using a digital device to check the time. Time, as a type of use, was utilised 259 times, making it, across all devices, the second most important use after communicating by text, call, email, or social media. Woodward (2013), in writing within the sports context,

emphasised the importance of time in the measurement of embodied practices. With outdoor recreation being a highly embodied experience, it makes sense that time surfaced as important in digital technology use (Allen-Collinson & Leledaki, 2014).

When examining the time, almost all recreationists who reported using a watch looked at the time, two thirds of recreationists who reported using a mobile phone (smart and basic) looked at the time, and just over one third of reported iPod users looked at the time. Mountain bikers (55.5%) and rock climbers (56.9%) were more likely than other groups to look at the time. The younger recreationists, 13–18 years of age (64%), were more likely to be looking at the time, whereas the recreationists of 50–59 years of age (36.6%) and 60+ years (31.5%) were less likely to look at the time. With over two thirds of recreationists over 60+ years of age visiting the Port Hills either daily or on a weekly basis, looking at the time did not appear as important. Plummer (2009) reported that as recreationists age they tend to seek familiar leisure forms, possibly explaining that with the familiarity of the terrain and the area, looking at the time may have been less of a practice.

Other types of digital device uses are discussed further in Chapter 6, as the data available for other uses offered more breadth and depth than the reporting of time. Although, independent of types of digital devices usage, outdoor recreationists reported on the digital devices limitations that possibly affected what devices to carry and use.

5.5 Limitations of digital devices while recreating in the Port Hills

From the qualitative interview data, research participants reported on challenges or limitations of the technological devices while recreating in the Port Hills. Recreationists were asked what prevented them from carrying digital devices or if their devices ever lacked functional capacity. The main limitations of the digital devices in the Port Hills revolved around battery life, reliability of mobile connection, inconsistency of fitness data collected, and breakage or losing devices. Illustrating her findings on the limitations of digital devices and on the over-reliance on the devices, Pohl (2006) wrote, “If we run out of batteries or the device breaks, we are unable to fix it” (p. 155). The idea of the mobile phone using battery power to run applications, take photos or videos, or listen to music was a repeated theme in the discussions with recreationists. In the open comment of the survey one respondent mentioned, “Battery life is the biggest limitation I find to using smartphone apps, especially those using GPS” (Recreationist #143, Mountain Biker). There seemed to be a concern over

using battery life and jeopardising safety (i.e., the ability to use the phone to communicate in case of emergency). A walker mentioned:

> *I use the smartphone for things like mapping and measuring the distances, elevations and stuff. This chews up your batteries as you are GPSing. So I use the Nano because I am not using the smartphone's battery. If the phone is flat and you break your leg, you are stuffed, aren't you? (Recreationist #4, Walker)*

This is where some recreationists needed to negotiate what functions of the phone to use or not in order to have enough battery life in case of emergencies:

> *I know if I use my phone I might get distracted and start playing music on it or something like that and I don't want to do that plus it could also run the battery down for when I need it so just try to keep my phone for emergencies. (Recreationist #30, Walker)*

For some, the battery issue required adaptation methods. For example, an experienced mountain biker suggested taking a different device to minimise the use of the phone battery to ensure that his phone could be used for safety reasons in case something happens:

> *Yeah, won't use the phone because it sucks if the battery goes flat too quick, so I'll take a separate camera. I'd take the phone principally to get me home back safely, that's the main thing, saves carrying an EPIRB [Emergency Position-Indicating Radio Beacon] in the Port Hills, which seems a bit over the top. (Recreationist #14, Mountain Biker)*

Several participants noted the unreliability of the wireless connection as a limitation for using phones in the Port Hills:

> *Sometimes the battery fails or indeed the reception isn't always any good if you're on some parts. For instance, when you're walking out to Battery Point, there are parts there where you couldn't get the signal well. Right out to the end at Godley Head. (Recreationist #11, Walker)*

A personal trainer who works with clients on the Port Hills mentioned carrying a PLB on the Port Hills due to the unreliable wireless connection and the fact that she needs to provide a safe environment for her clients:

> *I guess one thing I always take, especially when I'm out with clients, is my mobile phone. In case something goes wrong, I have to have that as emergency backup. The other thing, if I'm out where there's no phone*

> *reception, I'll also take the personal locator beacon with me, just again for safety. (Recreation Group #1, Personal Trainer)*

In addition, research participants noted the inconsistencies between various phones and applications collecting similar fitness data as a technology limitation. One participant in particular had compared the information collected on one bike ride:

> *What I noticed with my friends is we all have different phones and apps so the last time we did it, we came back and we had totally different results on all of them. It was so funny. So, the reason we did it was to see how inaccurate our phones are compared to each other. We found that more exciting than actually comparing average times, etc. It was just the inconsistencies between them all which we found really funny. (Recreationist #6, Mountain Biker)*

One recreation manager mentioned that, although a communication device provides a feeling of safety, the mobile signal is not always reliable and communication with others may not work when needed: "I find the cell phone maybe a false sense of security because even on Spine of the Lizard[13] you run in and out of reception" (Recreation Manager #4, Non-Profit). Carrying a digital device for safety reasons and this idea of false sense of security was a recurring theme in the study, which is discussed further in Chapter 6.

A few recreationists were concerned about losing a phone or falling and breaking their devices: "You could land on it in the pack and bust it" (Recreationist #14, Mountain Biker). However, none reported breaking a phone or losing a phone and only one reported finding a phone on a track while walking. In addition to the concern about phone limitations, a portion of recreationists did not have technology with them during their activity. The following section reports on the reasons why.

5.6 Recreating in the Port Hills without technology

In total, 68 survey respondents (13%) reported having no digital devices with them. Of the identified activity groups, runners (27.3%) were the most likely to be visiting without digital technology, followed by walkers (14.5%), rock climbers (9.8%), and mountain bikers (7.5%). Women (17.6%) were slightly more inclined than men (10.4%) to recreate without a device. Of the 68 research participants who recreated with no digital technology, more than half were recreating with others who possibly were carrying digital devices. A study in a remote wilderness area in the United States reported that

[13] Te Ara Pātaka [previously known as The Spine of the Lizard] is a track located adjacent to the Port Hills on the Banks Peninsula which is very popular with hikers.

29% of wilderness visitors did not carry digital communication technology with them (Martin & Blackwell, 2016) compared to 13% in this research.

Recreationists offered a variety of reasons for not carrying a device with them, including those who decided not to bring their devices with them (66.2%), had other reasons than the options offered on the survey (22.1%), forgot to bring their devices (7.4%), and did not own an electronic device (7.4%). Other reasons were categorised in three main themes, recreationists (a) wanted to spend time with family and friends without interruption; (b) wanted to enjoy nature in the moment, relax, and disconnect; and (c) had no room or proper equipment to carry a device. One survey respondent who wished to spend time with family indicated that she wanted "time out with my husband" (Recreationist #193, Walker). Similarly, another participant who wished to enjoy the moment wrote, "I wanted to be free of anything electrical and enjoy a nature walk" (Recreationist #46, Walker).

Recreationists who decided not to bring their digital devices were asked why they did not carry a device. The majority stated that they wanted to spend time without their digital devices (68.9%). One participant stated, "For me it is my time where I disconnect. It has been a conscious decision to leave the phone behind" (Recreationist #9, Mountain Biker). The same recreationist felt that with the number of individuals recreating in the Port Hills, she could ask to borrow someone's phone if needed in case of emergency:

> *Probably if I really needed to I would ask someone else if they had their phone, which is really mean because I am willing to use someone else's. But I am talking about 111. I am not talking about a flat tyre. If I get a flat tyre, I have to walk. Well, actually I carry a spare tube. (Recreationist #9, Mountain Biker)*

The perception of feeling safe on the Port Hills due to its popularity and proximity to the city was mentioned often in the study. Some recreationists commented on taking a device when recreating on their own versus recreating in a group. One runner mentioned, "No, we do not use any devices when we go out in the group. I only use the device for my own personal use outside of the running group" (Recreationist #3, Runner). Supporting this idea, a mountain biker added, "Usually take my phone for safety, but I was with group, so, no, didn't need to today" (Recreationist #298, Mountain Biker). The topic of safety is explored in greater depth in Section 6.4.1 in Chapter 6.

During the interviews, many participants had mixed feelings about the use of technology. However, when speaking about safety issues or the need to stay in touch with family members, such as their children or parents, recreationists did not appear as conflicted. A teenager mountain biker reported:

> *It's good to be in contact with people but sometimes it is nice not to be in contact. I sometimes stay in the Port Hills until 7 p.m. and my mum is like, 'Come home.' And if I did not have my phone, I would not know that she wants me to come home. (Recreationist #26, Mountain Biker)*

This concept of mixed feelings about technology use and about less conflicted emotions when dealing with concerns over safety has been reported in the literature in the past. In his early research on the relationship between technology and outdoor recreation in wilderness protected areas, Shultis (2001) described the relationship as "uneasy" (p. 1). He wrote, "Recreationists and recreation managers will both be attracted and repelled by the recreation technology that affects the outdoor experience and recreation management in both a positive and negative manner" (Shultis, 2001, p. 1). In more recent research, Shultis (2015) found that the "technology embedded within all types of recreation equipment are almost completely empowering and positive for users, principally by providing increased comfort, safety and access" (p. 195). Similar themes emerged in this study.

5.7 Chapter summary

This chapter provided an overview of Port Hills recreationists along with the outdoor recreation activity characteristics and the reasons for visiting the Port Hills. This is the first comprehensive Port Hills user data that has been collected since 2004. Additionally, the chapter identified the digital devices carried and used by recreationists while recreating with an emphasis on the importance of monitoring time, the challenges encountered while carrying these devices, and participants' reasons for recreating without digital devices. Most recreationists carried one or more digital devices with the most popular device being the mobile phone (basic and smart), with the main reason for carrying a phone being safety and being in communication with family and friends. A small minority of recreationists did not carry technology for different reasons that were personal, technical, or related to the activity or the length of the activity. As a whole, there were differences in the devices carried and used by recreationists, which were found by demographic variables such as gender or age or by the nature of the activity itself. Supporting previous research using the concept of cyborg (Butryn, 2003), Port Hills recreationists can possibly be considered cyborgs as a result of digital device engagement. The level of engagement with digital technology was high with over 87% of recreationists engaging with technology on a total of 639 devices carried. Port Hills recreationists

expressed concerns over their digital devices' limitations such as battery life and the reliability of the mobile connection in the Port Hills, which was an issue affecting safety. These were valid concerns that may be important to bring to the attention of the Port Hills recreation managers who could explore solutions such as digital devices charging stations and support for a better mobile network.

Chapter 6 builds on the information above by elaborating on the specific types of use of the digital devices and reports findings related to types of digital technology uses around self-logging and quantification, digital auditory experiences and communication devices, and the need to stay connected.

Chapter 6

Digital Technology-Mediated Outdoor Recreation Experiences in the Port Hills

This chapter provides further analysis of the digital devices used by Port Hills recreationists and on the impact of their devices on the outdoor recreation experience. The chapter describes the ways in which the devices were used during the outdoor recreation activity and how, for many, this resulted in a digitally mediated outdoor recreation experience. The exploration of the digitally mediated outdoor experience is categorised into three themes that emerged from the data: (a) self-logging and quantification of the outdoor recreation experience; (b) digital auditory experiences in nature; and (c) communication and connection. In comparing the uses of the digital devices within each theme by activity groups, demographic data, and activity characteristics, and by identifying ways in which digital technologies impact users' experiences, the chapter addresses key dimensions of the research questions underpinning this study. This chapter integrates both quantitative and qualitative data to develop the three themes of the chapter.

6.1 Self-logging and quantification of outdoor recreation experiences

Globally, there appears to be a growing trend of gathering information to log experiences and to measure or quantify the self (Gilmore, 2016; Millington, 2016; Young, 2012). From taking digital photos of meals, monitoring sleep, to measuring the daily number of steps taken, people are increasingly becoming participants in a digital data society (Hintz, Dencik, & Wahl-Jorgensen, 2018; Millington, 2016; Young, 2012). Visual imaging in the form of photos and videos historically has been an important part of visiting nature as a way for individuals to record what they are seeing but also as a form of proof of their experience (Garlick, 2002; Garrod, 2009). With technological progress in cameras and video cameras becoming smaller, portable, wearable, and integrated in smartphones, recording and sharing experiences has become faster and more convenient (Delwiche & Henderson, 2013; Sellen et al., 2007). As well as recording experiences visually via photos and videos, the recent increase in fitness performance tracking applications, along with the rapid adoption of wireless-enabled wearable devices such as the 'Fitbit' measuring people's every step and more, means individuals are collecting vast amounts of fitness-related data to support their fitness goals (Gilmore, 2016). It may be that the role of collecting data in outdoor recreation activities is impacting the

experience just like it has been reported to do so in sport in general. Kerr, Rosin, and Cooper (2019) identified, “an emphasis on the active role of metrics as an external influence that changes the performance, organisation and experience of sport” (p. 100).

Adding to the trend of self-quantification is the notion of online participatory cultures or prosumption embedded in our digital lives and social media practices that contribute to creating a form of collective knowledge (Delwiche & Henderson, 2013; Millington, 2016). Recreationists have the ability to partake in the participatory culture by sharing photos and videos (e.g., Facebook, n.d.; Instagram, n.d.; YouTube, n.d.) and/or comparing activity and fitness data with others (e.g., Map My Ride, n.d.; Runtastic, n.d.; Strava, n.d.). With these actions, recreationists are creating collective knowledge such as what a specific area looks like or how long it should take to run or bike a specific track.

In the current study, information was collected about recreationists’ practices around taking photos and videos and around collecting performance data. Performance information included data collected on the activity itself such as distance, speed, and time, as well as fitness data, which included measures such as heart rate. Many Port Hills recreationists self-logged through photos and videos and quantified their activities through the gathering of performance data. Some groups behaved differently when it came to taking photos, making videos, and collecting data. For example, taking photos and videos through a POV camera was more likely to be done by male mountain bikers as well as by younger recreationists and performance quantification was more likely to be collected by runners and mountain bikers.

Table 6.1 summarises the main highlights of self-logging and quantification of the outdoor recreation experience through photos and videos as well as performance data by identifying who was more likely and less likely to self-log and quantify and what were recreationists more likely and less likely to do with that information.

Table 6.1 Self-logging (photos and videos) and quantification (performance data) while recreating in the Port Hills

Self-logging	More likely to self-log via photos/videos		Less likely to self-log via photos/images	
Self-logging visually Photos and videos *Note: 36.0% of sample took photos and/or videos*	Photos • Climbers, Walkers, bikers, others • 39 and under years of age • Men POVs • Women with digital camera • 1st visit to the Port Hills • Download on computer • Leave on device and show others	Videos • Bikers, climbers • Men with POVs • 29 and under years of age • 13-17 years of age • Download on computer • Leave on device and show others	Photos • Runners, bikers • Print • Enter contest • Edit	Videos • Walkers, runners, others No 60+ years of age • Enter contest
Quantification	More likely to quantify performance data and ways of getting/using the information		Less likely to quantify performance data and ways of getting/using the information	
Quantification Performance data *Note: 21.5% of sample collected data*	• Runners, mountain bikers, others • Men • 30–59 years of age • Collected by recreationists using smartphones through applications • Use the application Strava to collect data • Consider distance, elevation and overall time as important • Download GPS and HRM data on computer • Compare data with personal data using smartphones applications		• Walkers, rock climbers • Women • No 13–17 years of age • Use the applications Run Keeper and Runtastic (n.d.) to collect data • Consider minimum speed, cadence and calorie expenditure as unimportant • Download smartphone and CC data on computer • To compare personal data with other users	

Note. GPS = Global Positioning System; HRM = Heart Rate Monitor; POV = Point of View.

6.1.1 Self-logging outdoor recreation experiences with digital photos and videos

Survey respondents were asked if they used their electronic devices to take photos or make videos. The combined photo and video features were used 214 times and were the most used feature after

communication and checking the time. Although the survey did not specifically ask how many photos were taken or how many videos were made, participants were asked, “While recreating in the Port Hills today, did you use [device] to take photos or make videos?” Survey respondents who took photos and/or made videos were asked what they did or intended to do with them. More specifically, recreationists were asked how likely they were to download, edit, print (i.e., for photos only), share, or do nothing with their photos and/or videos.

Across the entire sample (*N* = 520), 36% of recreationists either took photos and/or made videos. Of the 214 reported uses, recreationists registered taking photos on smartphones, digital cameras, iPods, and POV 180 times and making videos on the same devices 34 times. Of the 214 uses, 25 recreationists took both photos and made videos. The most commonly used digital devices to take photos or make a video were by recreationists carrying smartphones (*n* = 121), digital cameras (*n* = 29), POV cameras (*n* = 19), iPods (*n* = 3), and one tablet (*n* = 1) for photography only.

Findings revealed a significant difference between activities and the use of the smartphone photo feature (χ^2 = 15.797, df4,p ≤ .005) with rock climbers (57.9%) more likely to report using the photo feature, followed by runners (50%), walkers (44.6%), others (36.3%), and finally mountain bikers (27.7%). The higher percentage of rock climbers taking photos could be attributed to the fact that rock climbers frequent the Port Hills less often that most groups, more come from the Canterbury region versus the Christchurch area, and they spend more time in the Port Hills during a specific activity which typically includes more downtime. Men and women were close equals when it came to taking photos. Although all of those who took photos via POV cameras were men (*n* = 7) and the majority teenagers, and 79% (*n* = 73) who took photos via digital camera were women. Recreationists aged 39 years and under (63%) reported a greater use of photos than those aged over 40 years (37%). Recreationists visiting the Port Hills for the first time were more inclined to take photos than those who frequented the Port Hills often.

Respondents from all activity groups made videos except for runners. The two prominent groups who reported making videos the most were rock climbers with 15.5% (*n* = 8 out of 51 rock climbers) and mountain bikers with 11.6% (*n* = 20 out of 173 mountain bikers). Out of the 34 uses of the video feature, 20 (58.8%) were mountain bikers in comparison to eight (23.6%) climbers, five (14.7%) runners, and one (2.9%) other. The data show that more men than women took videos to a ratio of 5:3. Recreationists aged 39 and under (80%) reported a greater use of videos than recreationists over 40 years of age (20%). Close to half of the 13-17 years of age participants recorded videos while

recreating on the Port Hills. This is consistent with Chalfen's (2014) findings around youths "taking the lead in finding and developing applications" (Chalfen, 2014, p.300) for the use of the POVs. No one over 60 years of age created a video.

Recreationists were asked about their anticipated use of photos taken and videos made during their visit to the Port Hills (Figure 6.1). In order of importance, across all five devices capable of taking photos and videos (i.e., smartphone, camera, iPod, POV, and tablet), recreationists were more likely to either "leave photos/videos on their devices to show others," to "download the photos/videos on a computer," and "to share" on social media (more so for photos than videos).

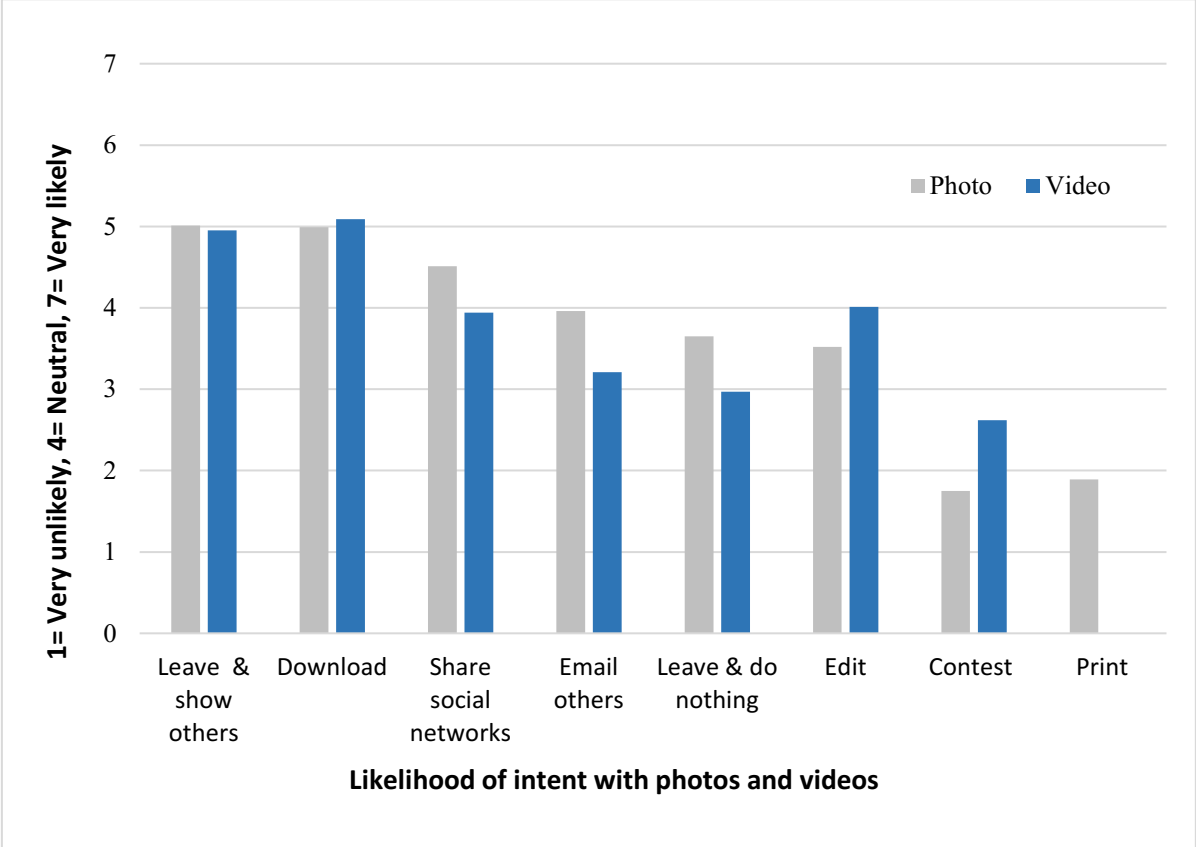

Figure 6.1 Anticipated use of photos and videos

One recreationist downloaded photos to keep track of what he had done: "I normally just put them on my computer. I don't really use them for much. It's just nice to keep a record" (Recreationist #30, Walker). Another participant mentioned, "Yeah, so definitely, like when I'm biking with [my daughter] I'll do a lot of videoing… I'll just do videoing of [my daughter] and show her later" (Recreationists #18, Mountain Biker). How photos and videos are managed along with other data such as fitness information relates to the idea of life-logging and/or self-tracking described by Young

(2012). Self-logging, as an organised system, "relies on the idea that technology will allow us to capture everything that ever happened to us, to record every event we ever experienced and to save every bit of information we have ever touched" (Sellen et al., 2007, p. 81). In this study, research participants did not seem to have a clear organised system for the self-tracking data collected. The lack of emphasis of self-logging systems is consistent with the motivations of the participants in the study. One of the main reasons to self log is to allow people to be competitive with themselves or others, but the motivations of the participants in this study revealed very little interest in competition with others.

In general, recreationists were unlikely to print their photos, enter a photo or video contest, or edit the images. The exception to editing was for users of POV and digital cameras who were more likely to edit their photos and videos than the photos and videos produced on the other devices. The POV and digital cameras are devices developed for a specific type of use and probably offer better image and video quality. Recreationists who took photos and videos on a POV and/or digital camera were less likely to leave the photos on the device and do nothing with them was consistent with the POV and digital camera users who were "slightly likely' to "moderately likely" to download photos and videos on a computer.

Taking photos and filming videos for some recreationists affected their experience in the Port Hills. During the interviews, recreationists had the opportunity to reflect on their digital device usage while outdoor recreating and on the impact of the use on their recreational experience. Some recreationists mentioned that taking photos and videos prevented them from being in the moment and enjoying their environment. For them, an authentic experience versus a mediated experience was important. A mountain, biker, when thinking about how technology can conflict with the experience, talked about taking the time to take in the views instead of taking a photo: "I think, if anything, the conflict would arise perhaps with the cameras and taking photographs, so sometimes you actually need to stop and look at the view as opposed to trying to get the photo of it" (Recreationist #14, Mountain Biker). A walker explained the impact of standing behind a piece of technology and the outdoor recreation experience:

> *I do find that cameras can come between you and the experience. It's nice sometimes just to appreciate it and not to have to take a photo. Because you don't connect with the scene in front of you in quite the same way when you're behind a piece of technology trying to get it perfect. (Recreationist #15, Walker)*

These findings seem to have common ground with Garlick's (2002) research, which was undertaken in the tourism context. Garlick argued the camera mediated the tourism experience and detached the tourists from the actual situation. In support of Garlick's work, one recreationist in the current study who carried a phone mentioned making a deliberate decision to not take a photo to savour the moment: "Sometimes I don't get my phone out of my pocket and take a photo because I just want to enjoy the moment and bugger it. Be at one with the experience. It's all very zen" (Recreationist #17, Mountain Biker).

In addition to Garlick's (2002) argument that the act of taking a photo conflicts with fully experiencing the moment, a few recreationists alluded to risks associated with taking a photo or a video. For example, a rock climber expressed concern over individuals taking risks when being filmed:

> *I worry that some people go out to do an activity more to record it than to experience it. And I guess, things like GoPros have accelerated my way of thinking towards that…. Have you heard of Kodak Courage where … that was a saying photographer would use when people would do dumb stuff in front of camera to try to get a good shot. I guess now it is GoPro Courage, where people might take higher risk as a means to get a cool video to show their friends. In fact, I think that probably quite often does happen out there. I am sure it is more a male thing versus a female thing in regards to showing off and trying to one up each other, things like that with friends or whatever. (Recreationists #5, Rock Climber)*

The comment above aligns with the work of Jain and Mavani (2017) who reported an increase in self-portrait deaths especially amongst the youngest age group of less than 25 years. In addition, previous wilderness technology research that found a relationship between technology and safety in which the technology leads recreationists to adopt riskier behaviours either by having a reduced perception of risk or by wanting to do something above their skill levels for a photo or for a video (Martin & Blackwell, 2016; Martin & Pope, 2012; Shultis, 2015; Wick, 2016). While self-logging their experiences through taking photos and making videos, Port Hills recreationists also collected performance data to quantify their experience.

6.1.2 Quantification of outdoor recreation experiences through collecting data

Survey respondents were asked if they used their digital devices to collect performance data with an application downloaded on a mobile phone or through a digital device, such as a cycle computer or a GPS. The data collected were used to self-quantify or measure recreationists' performances related to their outdoor activities. The performance data could be either activity focused (i.e., speed,

distance, pace, elevation profile) or fitness focused (i.e., heart rate, calorie expenditure, power). In order to gain a deeper understanding of the level of engagement with the performance data collected, recreationists were asked which application, if any, was used to collect the data, how important the data collected was, and what they did or intended to do with the data. When relevant in the interviews, recreationists were asked about the impact of collecting performance data on their outdoor recreation experience.

Of those recreating in the Port Hills (*N* = 520), 21.5% collected performance data. As reported in Table 5.7, data were collected 112 times across all devices. The most commonly used digital devices to collect performance data were smartphones (*n* = 80), GPSs (*n* = 24), cycle computers (*n* = 7), and an iPod (*n* = 1). The cycle computers, GPSs, and heart rate monitors (HRMs) were mounted on bike handlebars, worn on the body, or carried as a separate device. For the GPSs, the majority were in the format of a watch or mounted to the bars of the mountain bike. Out of 28 GPSs, only two were reported as handheld GPSs.

The activity groups who reported collecting performance data most frequently were mountain bikers (45.1%), others (23.6%), runners (23.6%), walkers (7.1%), and rock climbers (2.0%). Men (31%) were more likely than women (10.6%) to collect performance data. These results support what was reported in the online version of Canadian *Running* magazine in which the Strava (n.d.) application was much more popular with men with 637 million uploads than women with 149 million uploads (Francis, 2018). More men were also mountain bikers which is the group who reported collected data more frequently.

Recreationists between 30–59 years of age (77.5%) reported greater use of performance data applications than other age groups. In this study, no youth (13–17 years of age) collected performance data. A male mountain biker in his early 20s indicated using performance applications to collect data but also more specific training applications to help him with the structure of his bike rides:

> *I use my phone a lot for my training in terms of applications on my phone to help me with the training. I have an interval trainer which you can fully customise into times, lengths and everything really. It's called Seconds Pro. (Recreationist #20, Mountain Biker)*

In a study by Williams (2012), on cycling applications such as Strava, it was found that over half of research participants were using this technology to track their performance. As shown in Figure 6.2,

over half (56.4%) of recreationists engaging with performance data applications reported using Strava (n.d.).

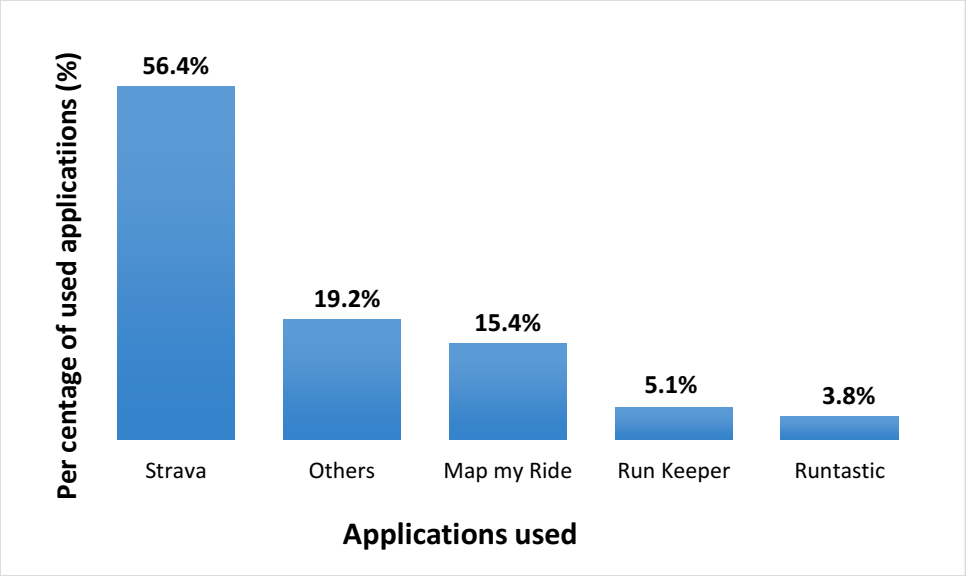

Figure 6.2 Applications to collect performance data on the Port Hills (*n* = 81).

Recreationists were asked about the importance of the activity or fitness data measures obtained through their devices on a 7-point Likert scale (see Tables 6.2 and 6.3). Table 6.2 shows which types of performance data were collected during the activity. Most important to recreationists was heart rate (6.38), distance (5.87), overall time (5.69), and elevation profile (5.40). These findings were supported by a runner who used a GPS watch: “Pretty much I would say three things that are more important with the watch, is the length of time, the distance, and the elevation” (Recreationist #28, Runner).

Fitness performance data around cadence, heart rate, power, and calorie expenditure resulted in very low reported usage in the research. For digital devices capable of measuring heart rate (i.e., GPS, cycle computer, and HRM), participants found the heart rate data to be moderately to very important (6.38) and power, measured by GPS only in the study, was also moderately to very important (6.25). Overall and across the devices, participants found collecting activity performance data on minimum speed to be unimportant (2.88).

Table 6.2 Importance of performance data by devices

Performance Data	Smartphone (*n* = 80)	IPod (*n* = 1)	GPS (*n* = 24)	CC (*n* = 28)	HRM (*n* = 12)	Mean across all devices
Average speed	4.56	5.00	4.65	3.89	4.67	4.40
Max speed	4.05	6.00	4.00	4.18	4.00	4.08
Min speed	3.01	2.00	3.12	2.27	3.00	2.88
Distance	6.01	6.00	5.65	5.56	6.00	5.87
Pace	4.34	5.00	4.48	3.23	4.25	4.14
Elevation profile	5.25	7.00	5.38	6.57 (*n* = 7)	5.67	5.40
Overall time	5.72	5.00	5.65	5.52	5.92	5.69
Cadence	_	_	6.00 (*n* = 3)	3.22	3.42	3.47
Heart rate	_	_	6.63 (*n* = 8)	5.50 (*n* = 4)	6.47 (*n* = 17)	6.38
Power	_	_	6.25 (*n* = 4)	_	_	6.25
Calorie exp.	_	_	3.50 (*n* = 8)	3.75 (*n* = 4)	4.00 (*n* = 17)	3.82

Note. * The *n* for these variables was below the overall n for the digital devices.

Question: How unimportant/important to you are each of the following activity data collected through your device [while recreating in the Port Hills today]?

1 = Unimportant, 2 = Moderately Unimportant, 3 = Slightly Unimportant, 4 = Neutral, 5 = Slightly Important, 6 = Moderately Important, 7 = Very Important.

Further analysis by activity user groups was completed for recreationists using smartphones to collect performance data (see Table 6.3). The three user groups collecting performance data with the smartphones were walkers, runners, and mountain bikers. On a Likert scale of 1 to 7 (with 1 being unimportant and 7 being very important), the most important data reported by the three groups carrying smartphones (*n* = 80) was distance (6.08) and overall activity time (5.78). In addition, runners were more likely to find average speed (6.13), pace (5.63), and elevation profile (5.75) as moderately to very important.

Table 6.3 Importance of performance data by activity – smartphone users only

Performance Data	Walkers (*n* = 16)	Runners (*n* = 10)	Mountain Bikers (*n* = 54)	Mean Across All Devices
Average speed	4.27	6.13	4.47	4.61
Maximum speed	3.53	3.50	4.35	4.09
Min speed	3.53	3.13	2.88	3.04
Distance	6.00	6.50	6.04	6.08
Pace	4.33	5.63	4.20	4.38
Elevation profile	4.47	5.75	5.47	4.49
Overall time	5.40	6.63	5.77	5.78

Note. Q: How unimportant/important to you are each of the following activity data collected through your device while recreating in the Port Hills today?

1 = Unimportant, 2 = Moderately Unimportant, 3 = Slightly Unimportant, 4 = Neutral, 5 = Slightly Important, 6 = Moderately Important, 7 = Very Important.

Recreationists were asked how they intended to use their performance data (see Table 6.4). Responses were coded for recreationists carrying smartphones, GPSs, cycle computers, and HRMs.[14] In general, recreationists were unlikely to download, compare, or integrate the data collected with all means reported below 4.82. Although there were some reported differences by digital devices for some variables, recreationists carrying GPSs and HRMs were most likely to download the information collected by their device onto a computer, while recreationists carrying smartphones were more likely to compare data with some of their previous personal data.

While collecting activity and fitness data was a source of motivation for some, for others it seemed like a distraction to the experience of exercising in the Port Hills. When discussing fitness performance applications and data produced by the application, one mountain biker said,

> *I can't really see any point in that. I just think you should really be there just to enjoy and challenge yourself not to boast about how far you've ridden or anything like that. That's just my personal opinion on that. (Recreationist #18, Mountain Biker)*

[14] The one recreationist using an iPod to collect performance data did not complete the question about what she or he intended to do with the data.

Table 6.4 Intentions with performance data by digital device

	Smartphone (*n* = 80)	GPS (*n* = 24)	CC (*n* = 28)	HRM (*n* = 17)	Mean across all devices
Download data on a computer	3.50	5.23	2.46	5.25	3.81
Compare data with personal data	5.46	4.69	3.29	4.65	4.82
Compare data with others	3.82	3.00	1.71	2.82	3.16
Integrate data with other software	3.86	4.35	2.43	3.76	3.45
Do nothing with data	2.86	2.65	4.07	2.47	3.01

Note. Q: With the activity data collected through your device that you carried while recreating in the Port Hills today, how likely is it that you will…
1 = Very Unlikely, 2 = Moderately Unlikely, 3 = Slightly Unlikely, 4 = Neutral, 5 = Slightly Likely, 6 = Moderately Likely, 7 = Very Likely.

These findings corroborate with Wheaton's (2004) ideas. This author suggested that lifestyle sports such as mountain biking embody alternative values like anti-competitiveness, anti-regulation, and personal freedom (Wheaton, 2004).

Similarly, another mountain biker in his late teens emphasised the main reason for being on his bike was for fun and enjoyment, rather than tracking ride data:

> *Going back to what I was saying at the beginning, for me it is more fun. If I go for a ride, I will usually push myself, but I am not motivated "scientifically"—I just push myself because I feel like it and until I am satisfied on how much I have pushed. (Recreationist #2, Mountain Biker)*

For another recreationist, the idea of collecting performance data during an activity prevented them from connecting to the environment and increased the possibility of missing out on things like what the weather is doing and/or what type of terrain the recreationist is on:

> *I find that it's kind of disconnecting from place to look at Strava because with the statistics with time, distance, elevation, and those kind of things, you don't really know what the weather was like or how technical it was, you don't really know so you don't really have a sense of the place. (Recreationist #28, Runner)*

By contrast, some recreationists found using a digital device to collect performance to be a positive addition. For example, one walker suggested that gathering information about the walk made for a more interesting experience:

> *It is more fun, the app is easy to use and not that hiking is competitive but out of curiosity you just spend 3 hours walking the hills, it is good to know how far you've climbed. I think that makes it better, it enhances the experience. (Recreationist #4, Walker)*

The above quotation aligned with the recent fitness-boom and its data-intensiveness. Millington (2016) argued fitness has become data-intensive and that fitness "track-everything/anytime imperative has arrived in combination with data aggregation platforms" (Millington, 2016, p. 1190). The platforms alluded to include apps such as Strava (n.d.), which transform performance data into a usable format such as activity time that can be compared with personal previous data or against other recreationists' data who use similar platforms. A research participant reported on the popularity of checking mobile phones at the top of Rapaki Track, a common location for recreationists to look at their performance data.

> *I've seen technology generally with individuals or pairs using it for certain reasons, timing, pacing etc. etc. You would have seen it as soon as you get to the top of Rapaki in that there's probably about a third of the people either pull their phone out and check how they did. (Recreationist #16, Mountain biker).*

In addition to making the experience more quantifiable and possibly more interesting, a fitness leader mentioned using an iPad to film her clients while running to analyse their stride to provide immediate feedback on their running:

> *I do have an iPad, and when I'm doing running technique sessions with people. I use the iPad to video them and then they get instant feedback, so I'll get them to run, take the video, and then I'll say, "Right, come over here, look at this." We'll go through what's going on, and I can say look you're over-striding or whatever, and I can draw upon it and use Coach's Eye, which is a really neat little programme, and they just see it straight away, and I can say, "Right, you need to think about holding yourself up a bit … use your core muscles, where's your glutes," you know, so just take them through some stuff there and just with that instant feedback, then like, "Oh yeah, cool." Before iPads came out I just used a digital camera but because of the screen on those it's quite small, it gave them something, but it was nowhere near as good as the iPad, so that's been really useful for me. (Recreation Group #1, Fitness Leader)*

The practice of technology being integrated in the sport training arena is not new. Kerr (2010) reported on this in her research on New Zealand gymnasts working with coaches who utilise video footage to provide immediate feedback on performance. In addition, Butryn (2003) identifies video analysis as a common form of technology used to assess sport performance.

Some Port Hills recreationists saw value in collecting performance data using technology: “Definitely, if I was training competitively for an event, I would use the fitness advantages of technology more to record pace and timing and that kind of thing” (Recreationist #15, Walker). This point of view aligns strongly with that of competitive athletes, but as Wheaton (2004) points out, participants in lifestyle sports often reject this perspective. The contrasting views on the value of data suggests that the Port Hills caters for both competitive and non-competitive recreationalists. Some recreationists discussed how recording information about the features of a run over time could make recreationists more familiar with their surroundings, resulting in a greater connection to the environment and experience:

> *You develop a kind of vision of the landscape where you’re looking at the features and thinking ‘hum’ that’s probably about 400 m height over a few kilometres and thinking ‘oh yeah, that’d be nice to run’ so then you probably start seeing it in that way so I think it gives you a different perspective of the environment. (Recreationist #28, Runner)*

Self-logging through activity and fitness performance data and photos and videos was an important part of being in the Port Hills. It enhanced the enjoyment of the outdoor recreation experience for some recreationists, while it detracted from the enjoyment for others. Likewise, sound, specifically music, was a significant part of the experience for many Port Hills recreationists.

6.2 Digital auditory outdoor recreation experiences in nature

Bull (2001) emphasised that the auditory experience provided by a device (or tool, as he called it), such as the Walkman, gave individuals control over their social space, time, and interpersonal behaviour. This study’s findings supported Bull’s work in that some Port Hill recreationists reported listening to music increased their motivation to exercise and their sense of control over their recreation space. Although some participants expressed being more motivated and in control of their space, others were also conflicted about listening to music. The conflict came from the fact that listening to music blocked out the outside sounds, which decreased recreationists’ connection with the environment. In their research on soundscape in outdoor spaces Li et al. (2018) reported the recreationists appreciated and expected natural sounds when outdoors and expected to connect with the environment via these sounds. The theme of soundscape in nature settings is part of a larger body of literature looking at the negative effects of noise pollution and the benefits of natural noise in the overall outdoor experience (Marin et al., 2011; Merchan et al., 2014; Miller, 2008). A recent report from the New Zealand Parliamentary Commissioner for the Environment (2021)

identified that a loss of wilderness and natural quiet, as a result of increased activity within parks, can impact the visitor's experience in a negative way.

Port Hills recreationists reported that the digital sounds associated with mobile phone notifications were a distracting part of their outdoor experience. As a form of sound, participants reported phone notifications disrupted their activities, with some recreationists feeling conflicted around the appropriate time to pause the activity to look at the mobile phone notifications. In the next section of the chapter, the role of digital auditory experiences in the Port Hills is explored.

6.2.1 Digital sound: Music, radio, news, podcasts

Research participants were asked if they listened to music or other audio such as radio, news, or podcasts during their outdoor activity on the Port Hills. Recreationists reported audio listening 90 times with 77 uses of music and 13 uses of radio, news, or podcast. Across the entire sample (*N* = 520), 17.3% of recreationists reported listening to a digital audio during their activity, through smartphones (*n* = 70), digital music players (*n* = 13), and the iPod (*n* = 7). Table 6.5 includes an overview of the digital audio experience, indicating who was more or less likely to listen to audio, what the more or less likely impacts were, and what the more or less likely way to select the audio (i.e., music) was.

Table 6.5 Digital auditory experiences while recreating in the Port Hills

Digital Sound	More likely to audio listen	Less likely to audio listen
Music, radio, news, podcasts *Note: 17.3% of sample listened to digital audio*	• Runners and others • Solo recreationists • 18–49 years of age • Increase motivation and enjoyment of activity • Make recreationists feel in their own world • Choose music by shuffle, playlist, that match the intensity of activity or that match mood	• Walkers, mountain bikers, rock climbers • Non-solo recreationists • 13–17 years of age • 50+ years of age • Connect to the environment • Choose music that suits the landscape

Runners (43.6 %) were more likely to report using audio, followed by others (20.0%), mountain bikers (15.0%), walkers (13.7%), and rock climbers (11.8%). Male and female recreationists listened to audio equally; although, results showed that a higher number of solo recreationists (26.0%) than non-solo recreationists (11.5%) listened to some form of audio. Recreationists 18–49 years of age (85.5%)

reported more audio listening than younger recreationists between 13–17 years of age or recreationists over 50 years of age (14.5%). The low number of 13–17 years of age who reported listening to music may be explained by this group recreating with others (mostly friends) and choosing not to listen to any form of audio while with their friends. Only one out of 25 of that age group recreated solo during the data collection.

Recreationists who listened to music were asked about the importance of listening to music and about how they selected the music while outdoor recreating in the Port Hills. Table 6.6 reports on the effect of music on the recreation experience using a Likert scale of 1 to 7, with 1 being strongly disagree with the statement and 7 being strongly agree with the statements. Across all three devices and on average, music listeners agreed that music increased their enjoyment of the activity (5.86), made them feel in their own world (5.36), and increased their motivation to exercise (5.49). Music listeners were less likely to agree that the music connected them to the environment (3.45).

Table 6.6 Reported effects of music on the recreation experience

Survey responses	Smartphone (*n* = 58)	iPod (*n* = 6)	Music player (*n* = 13)	Mean across all devices
The music increased my motivation to exercise	5.34	6.50	5.62	5.49
The music relaxed me	4.84	5.50	4.69	4.90
The music made me feel in my own world	5.28	5.50	5.46	5.36
The music increased my enjoyment of the activity	5.78	6.50	5.92	5.86
The music connected me to the environment	3.59	3.33	2.92	3.45

Note. Q: Thinking about the device music that you listened to while recreating in the Port Hills today, to what extent do you agree/disagree with the following statements… 1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = neutral, 5 = somewhat agree, 6 = agree, 7 = strongly disagree.

The idea that music could add to the experience through increasing enjoyment for some recreationists was captured by the comments of a mountain biker who reported feeling in a world of his own when listening to music:

> *I listen to music when I am by myself, because I want to zone out and just enjoy it. I do not know where the time goes when I am going by myself. I*

> *just enjoy it, and I have the music playing loud, and I do not care about anything else. (Recreationist #6, Mountain Biker)*

This finding aligned with research on iPods in the context of urban culture and commuting, as Bull (2005) found that iPod users experienced a sense of autonomy and disconnection from what was happening around them while in the between space of commuting to and from work. Music listeners were asked how their music was selected with yes or no questions offering them various section possibilities (see Table 6.7).

Table 6.7 Music selection

Survey responses	Per cent of respondents
I selected the music with the shuffle feature	51.9%
I selected the music via a playlist	57.1%
I selected music to match the intensity of my activity	51.9%
I selected the music to match my mood	58.4%
I selected the music to match the landscape in which I recreated	16.9%

Note. Across the 3 devices (smartphone, iPod and music digital player), recreationists who answered "Yes" to having selected music in the following ways while recreating in the Port Hills (*n* = 77).

Over half of recreationists who listened to music were more likely to choose their music either by chance (i.e., shuffle), by playlists, by intensity of activity, or to match their mood. They were least likely to choose music that matched the landscape. A runner confirmed having a selection of playlists depending on her mood on a specific day: "I have a couple of playlists. I have a running slow playlist and I have a running fast playlist. And I choose depending on how I feel that day and where I am running" (Recreationist #3, Runner). Although less likely to choose music that suited the landscape, some interviewed recreationists mentioned choosing music that matched the intensity of their activity, which more often than not related to the landscape.

> *For downhill [biking] for sure, because the terrain is more gnarly, I will play songs that get me more pumped up, so I guess it is a mix of how I feel and what type or ride, therefore, terrain I am on. If I was going up Rapaki, I would listen to peaceful songs and songs that detach me so that I can focus on the music and on the rhythm and go … and motivate me at the same time. (Recreationist #20, Mountain Biker)*

As recreationists went through easier to more challenging terrain, and recreated in various terrain features during one outdoor activity, some listened to music and other forms of audio on and off,

"*there are times where I will shut it down and put it away on a particularly beautiful spot that I have never been or where I am concentrating because it is a little dangerous or whatever. (Recreationist #4, Walker).* As noted in the last quote, terrain features were one aspect of risk considered by Port Hills recreationists when carrying and using digital technology. In addition, listening to music to increase motivation on a long and exposed climb such as on the Rapaki or the Bridal Path Tracks was mentioned a few times throughout the research.

The next section of this chapter examines the sounds of phone notifications which were identified by some research participants as a distraction to the activity. Loria (2018) reported that the average individual receives between 65 to 85 notifications per day, and these disrupt the person's attention, causing distraction.

6.2.2 Digital sound: Phone notifications

A digital sound that was brought up by the interviewees was the beeping or buzzing sound made by incoming phone notifications. The notification alerts the smartphone device owner of a voice mail, text message, email, post, and so forth. Unlike listening to music, radio, news, or podcasts, which is a conscious decision and personal choice, recreationists did not have control over receiving mobile notifications. The sounds made by notifications disrupted the activity with recreationists having to decide when and where to look at the mobile notifications. This finding is consistent with the work of Kushley et al. (2016) and Fitz et al. (2019) who found that phone notifications contributed to high levels of disruption and inattention. To adjust, recreationists either mentioned putting their phone on silent mode or waiting for an opportune moment to pay attention to the mobile notifications:

> *I will put my phone on silent because if I hear the text come in and even if I do not answer, it will be on the back of my mind that I got a text and I do not want that to linger over me. Usually, I will not check my phone until the end of my ride. Just because my ride is my escape, and I do not want to be bothered. (Recreationist #21, Mountain Biker)*

When asked why he put his phone on "silent" mode, a male runner said, "Because otherwise it intrudes, and I like to keep some distance and an illusion of control" (Recreationist #25, Runner). For this recreationist, the idea of not being in contact digitally gave him a sense of control over his time practising his activity. A climber mentioned that receiving calls while climbing did not feel as important as it would on a day-to-day basis:

> *But at the same time if my phone rings, I might answer it but if I hear my phone go "beep" for a text message, I may not look at it straight away. Calls and messages become less significant during the activities then they would in normal life. (Recreationists #5, Rock Climber)*

The above comment is interesting in that it stipulates that a digital related behaviour during an outdoor activity is different from what it would be in a normal day to day schedule perhaps providing some sense of disconnect. In addition to phone notifications disrupting the outdoor activity, recreationists had varying opinions about listening to audio with headphones. Some reported listening to audio being a distraction to the experience, disconnecting them from the natural environment and being detrimental to safety, while others supported the idea of audio listening enhancing the experience by increasing motivation.

6.2.3 Digital sound and the outdoor recreation experience

Some interview participants recognised that listening to audio was a form of distraction from the experience of recreating outdoors. The distraction from experience happened in two distinctive ways. First, it was an issue of safety, as listening to music or other forms of digital sounds that distracted participants from the activity could potentially lead to accidents and injuries or could create a sense of familiarity and reduce risk perception. Second, listening to audio diluted the connection to the natural sounds, resulting in a diminished experience.

Some walkers, runners, and mountain bikers mentioned that listening to music was a hazard that prevented them from hearing external sounds or focusing on the undulating terrain, possibly leading to unsafe practices. External sounds came from other recreationists, or from the equipment (i.e., the mountain bike) or from wildlife. A Port Hills female walker articulated, "For me it would almost be a safety issue. I like to know who's behind me, if a bike is coming. Especially as a woman, I think, I like to be aware of my environment" (Recreationist #12, Walker). When mentioning wearing only one earbud to hear others on the trail, a runner said, "On the track, if a runner comes by I need to hear them if they want to pass by me. I need to be more alert" (Recreationist #3, Runner). A teenage downhill mountain biker spoke about leaving the music behind to be able to focus on the sounds of others on the track and/or sounds coming from his equipment:

> *The music kind of distracts you when you are riding your bike. You cannot hear the sounds on the trail. Like, if someone is coming behind you, you won't know. Or like if something is happening to your bike, you won't know and might crash. (Recreationist #26, Mountain Biker)*

In addition to audio listening preventing recreationists from hearing others and paying attention to the sound of their equipment, a runner, when talking about running in a group after sunset, mentioned the need to be focused on the track features in the dark. This runner did not listen to music by fear of losing her footing, "Absolutely not. No one has music in the group. It is too fast. You have to be on to it. It is also dark. It is pitch black, so you have to focus on your footing" (Recreationist #3, Runner).

Another runner, although agreeing to music being a motivation, did not listen to music because of fearing an accident with a mountain biker and also fearing the possibility of being swooped by a Magpie[15], which does happen in the Port Hills and around Christchurch:

> *I think it [music] is motivating but the other reason I don't use it is because of, especially in a place like the Port Hills often I might be, like on the Bowenvale Traverse, there's a lot of mountain bikes. If someone is coming from behind me and I need to move out of the way for them, I mean, I'm not going to hear them. There's other things. I start getting worried about magpies towards October. I always think if I have the headphones on I'm not going to hear them, and it's going to come and hit me on the head or something. (Recreationist #28, Runner)*

In addition to safety around external sounds and to focus on the terrain was the first reason that recreationists were cautious about listening to audio, some recreationists felt that listening to music along with general use of some digital devices reduces risk perception.

Some recreationists found the use of digital technology resulted in an experience perceived as familiar, safer, and less risky. The idea of listening to music reduced risk perception due to the feeling that it felt like being in one's day to day setting as if listening to music at home. When asked about how digital technology affected his recreation experience, a Port Hills recreationist mentioned that the use of digital devices in natural spaces changed his perception of the environment by making the experience feel less risky and more like home:

> *I mean, it's just another part of that process where technology slowly starts to sanitise the wilderness, I guess. Whether it's actually taking away from it*

[15] The Australian magpie is a bird well-known for their propensity for attacking people by dive-bombing during the breeding season. http://www.nzbirdsonline.org.nz/species/australian-magpie

> *or that's just what we think at the moment because it's different, I don't know. (Recreationist #24, Mountain Biker)*

When asked when he meant by sanitise, the mountain biker said, "It makes it feel safer, like you have your GPS there, if you have your cell phone with music, it makes the environment feel more familiar, even though it isn't necessarily" (Recreationist #24, Mountain Biker). Another participant supported this idea by discussing the impact of using technology, particularly relating to the subjects of music and safety, on the feeling of being outside and on the connection to nature:

> *When I am climbing outdoors with a group of people where you have lots of technology, it just feels more and more like an indoor experience. It does not feel so much like you are climbing a crag, and it takes the adventure out of it. I think that this normalising is what makes you feel like safety isn't such an issue. It is just like the music playing in an indoor place. It becomes very relaxed, and does take away from that more intangible part of the outdoor experience that provides you with a disconnect to nature. (Recreationist #29, Rock Climber)*

When rock climbing is performed in the open outdoor environment such as in the Port Hills, climbers are exposed to a different and a higher set of risks, as opposed to rock climbing in the control environment of an indoor rock-climbing gym setting. The use of music and other digital devices was reported by some research participants as decreasing the perceived risks by making the activity feel less risky as though, for example, it was performed in the controlled and familiar setting of an indoor rock-climbing gym. In support of this idea, Dickson (2004) questioned how the use of technology made the outdoor activity more predictable and feel less adventurous. It may be that when considering how to educate recreationists about the risk associated with outdoor activities, managers should consider the impact of technology and how some digital technology uses have been reported to reduce the perceived risk associated with outdoor activities.

Another concern reported was that listening to audio prevented recreationists from connecting to the natural sounds in their environment, which in turn, impacted their outdoor experiences. As reported in Table 6.6, research participants agreed that music enabled them to feel they were in their own world. In the interviews, several participants agreed. A mountain biker stated, "You want to be connected to the natural environment. Yeah. I'd prefer that more, I don't feel the need for the music" (Recreationists #14, Mountain Biker). Similarly, a walker said, "If you're not wearing headphones and you're not listening to music, then you do get a different connection with nature for sure" (Recreationist #15, Walker). Another climber noted, "I do love music, but when I'm in nature I

just like to be able to have a clear head and not be distracted by anything but my own thoughts really" (Recreationists #23, Rock Climber).

Supporting the notion of a potential disconnection from the environment, Young (2012) discussed the concept of displacement and disembodiment, noting, "Digital technology takes us out of being where we are" (p. 85). There is some evidence of this with the above recreationists, as they indicated that listening to music took them out of nature and away from their experience of walking, running, or mountain biking. The comments of a runner, referring to his listening to David Bowie's "Heroes" song, further illustrated the concept of displacement and disembodiment: "It's got a lot of noise in it, so it's perfect when you're wanting to push up the pace of your run. It takes you away from what your body is actually doing" (Recreationists #13, Runner). To prevent disembodiment, a recreationist who frequently walked in the Port Hills alone explained that it was important to be present while out walking and therefore did not listen to music:

> *But in actual fact when I am out walking, I do not really want to talk or listen to music. I have discovered I really just want to take in where I am and what I am doing. I think music would prevent me from doing this. (Recreationist #1, Walker)*

As a contrasting point of view, while some recreationists found audio listening a distraction, others found it motivating. This perspective was supported by the quantitative data, as research participants were more likely to agree that music increased motivation to exercise and increased enjoyment of the activity. A runner agreed that listening to music enhanced the experience of running in the Port Hills:

> *You just feel so good when you listen to music that you love, it just keeps me going as well. Say, I did not want to go for a run and I was like, "Hum! I really do not want to go," and I am making myself go, the music always makes it better. It motivates me. (Recreationist #3, Runner)*

When discussing the use of music when mountain biking, a recreationist believed the music helped with the monotony of the ride: "It is to help with the boredom and to make the experience more enjoyable" (Recreationist #5, Mountain Biker). The boredom was at times associated with particular tracks and although there may be a sense of disconnection to the environment, it also helped with focusing on the activity:

> *For the "brainless" hikes, it [music] does disconnect me because … for example, walking from the bottom of Huntsbury Spur all the way to the top*

> *is quite a long way and it is a relentless uphill. And in the end, I need to be disconnected from it. I am not one of these people that needs to focus on his activity. It gets a bit boring because it is a long way. (Recreationist #4, Walker)*

A walker who enjoyed listening to audiobooks listened to e-books on track sections he found least interesting:

> *But as soon as I get to the top and the views start widening out and I get to the point where I can have a view or look back to the city and it looks awesome, then I will turn it off. After a couple of hours, of course, I am getting tired by then, so as you get back down again and the views go away, then I will switch back to the book. Just to make it more fun on the way back. (Recreationist #4, Walker)*

Some recreationists reported listening to audio on more familiar ground and felt less of a need to focus on the terrain. A seasoned Port Hills walker felt that choosing to listening to music was a good choice: *"It doesn't distract me on the Port Hills because I know those views well and I just live with them and if I'm in a new area I think [being disconnected] would be relevant (Recreationist #11, Walker).*

Listening to audio was an important part of the Port Hills experience and, for some, enhanced outdoor recreation, while others felt unsafe and indicated it impeded the enjoyment of the experience. Likewise, carrying and using communication devices such as mobile phones was integral to the Port Hills outdoor recreation experience. Communication devices kept recreationists connected in the eventuality of emergencies, if they needed to connect with family, friends, or work colleagues, and enabled them to access information such as maps, track status, or weather, if needed.

6.3 Communication devices and staying connected while recreating in the Port Hills

While recreating in the Port Hills, recreationists justified carrying and using their devices to stay connected for various reasons but primarily for safety (mobile phones), for communication (mobile phones and iPods) with others, and to access information (smartphones and GPSs). The mobile phone and iPod are two-way communication devices with the capability of managing a verbal or text conversation and engaging with social media, while the GPS is a one-way communication device. The devices, particularly mobile phones, were carried and used as tools to communicate, and to access and obtain information, which seemed useful to the outdoor recreation experience.

Table 6.8 Main three reasons for using mobile phones while recreating in the Port Hills (safety, social, accessing information)

Reasons for using phones	More likely to		Less likely to	
Safety *Note: 81% of phones carried for safety (as reported in Table 5.6)*	Many recreationists reported various safety concerns in the Port Hills <u>Mobile phones were carried for safety by:</u> • All groups but more so by mountain bikers • 13–17 years of age • Frequent visitors to Port Hills		<u>Mobile phones were carried less for safety by:</u> • 60+ years of age • Less than 1 hour in Port Hills	
Social *Note: 31.5% of sample called/texted and 21.5% emailed and/or used social media*	Calling/texting • Rock climbers • 13-17 years of age • Non-solo recreationists • Less frequent in Port Hills • 3+ hours	Email & Social Media • Others, walkers, bikers and rock climbers • Non-solo recreationists • 13-29 years of age • 1st time in Port Hills	Calling/texting • Walkers, runners • 60+ years of age • Solo recreationists • Daily, weekly, month in Port Hills • Less than 3 hrs	Email & Social Media • Runners • Solo-recreationists • 60+ years of age • Daily, weekly, monthly in Port Hills
Accessing information *Note: 14.2% of sample accessed information*	• Rock climbers, others, mountain bikers, runners • Slightly more men • 18-49 years of age • Non-solo recreationists • 1st time visit • 3+ hours in Port Hills		• Walkers • Slightly less women • Younger (13–17 years of age) and older recreationists (50+ years of age) • Solo recreationists • Frequent visitors • Less than 3 hours in Port Hills	

Note. Recreationists and activity characteristics more/less likely to communicate for safety, social and to access information.

At times, the use of mobile phones was not reported in the context of making the experience better or worse; it was just part of the activity and part of a recreationist's self as it would be in day-to-day life. This is relatable to Poslad's (2009) work on ubiquitous computing where digital technologies are reported to play a consistent role in individuals' daily lives. Participants carrying mobile phones as they would in their day-to-day life, also links to the work of Pigram and Jenkins (2006) who reported that peri-urban recreation areas are places where recreationists extended their urban lifestyle.

Dickson (2004) acknowledged the reluctance among some outdoor recreationists to disconnect from technology: “Not only has this technology impacted upon people's expectations of being kept safe, it has also impacted upon people's expectations of being in constant contact with the world they have departed from for the day or more” (p. 51).

Table 6.8 summarises the information on communication and which recreationists were more or less likely to use mobile phones for safety, for social reasons, and to access information. The following final section of Chapter 6 expands on the information included in Table 6.8 and presents findings around the idea of staying connected by elaborating on issues of safety, social connection, and information access.

6.3.1 Staying connected for safety

Safety was the most often reported reason for carrying a mobile phone in the Port Hills. As reported earlier (see Table 5.6), 81% of recreationists who carried a mobile phone did so for reasons related to safety. While all activity user groups reported carrying mobile phones for safety, mountain bikers reported the highest percentage at 91.6%. Recreationists mentioned carrying a mobile phone and communicating due to the risk of injury, personal safety, and to equipment failure including bike tube punctures. In addition, stories from interviewed recreationists included carrying communication devices because of the Christchurch 2011 earthquakes and the fear of an earthquake happening again during their outdoor activities. This was not surprising in light of the peri-urban site chosen for this study. In support, many previous outdoor recreation studies identified communication devices as important for safety (Martin, 2016; Martin & Blackwell, 2016; Shultis, 2015; Lindell, 2014, Martin & Pope, 2012). One female runner said she carried her phone for “safety around communication, suddenly the ground is shaking and there has been an earthquake, you want to know that everything is OK back home” (Recreationist #3, Runner). The Port Hills were affected by the earthquakes with rock falls and landslides leading to road and recreation area closures, most of which were reopened by July 2014 (Cairns, 2014). For Christchurch area residents, the experience of the earthquakes resulted in increased anxiety over safety and staying in touch, although the same runner as above expanded by saying, “It has eased off a little bit since it [the earthquakes] happened. That anxiety of leaving the phone behind was greater closer to when the earthquakes happened” (Recreationist #3, Runner). A few recreationists were wary of the reliability of mobile phone networks in the eventuality of another natural disaster such as an earthquake and saw carrying a mobile phone for safety as creating a “false sense of security”:

> *The funny thing is when the earthquakes happen all cell phone towers were down, so you cannot actually communicate with anyone. I mean it takes about 20 times to maybe get a connection. So it is almost a false sense of security. In all fairness, things have gotten better with more backups but when it hits, everyone will be on their cell phone and the networks will be congested. You cannot rely on it. You might be able to get a text through but it depends on how bad the earthquake is and where it is located. (Recreationist #6, Mountain Biker)*

This "false sense of security" is an apparent theme in past research on technology use in remote settings where recreationists were found to rely heavily on their digital devices to save them from hazardous situations (Martin & Pope, 2012; Zuckerman, 2013). Zuckerman (2013) indicated that according to the US National Parks Conservation Association, an expansion of the cellular reception may compromise safety by giving park users a false sense of security in an environment that is vulnerable to weather changes and extreme terrain features.

A Port Hill walker discussed being more aware of rock falls since the earthquakes and also mentioned the limitations on the phone networks during earthquakes:

> *Apart from the 22nd of February [the date of the major Christchurch earthquake], no one has been hurt by any rock falls since then, but people can still get injured and still get hurt. I never thought about rock falls before the earthquakes. If something happens and you are stuck on the PHs [Port Hills] and you cannot walk back down to the city because the roads are blocked or whatever, not that the cell phone system would work. (Recreationist #4, Walker)*

Another worry for recreationists was the fear of getting injured on the Port Hills. A recreationist discussed how her past experience had taught her to carry a phone:

> *The phone is just for safety. I had a knee replacement and the damage to the knee actually occurred while I was walking, and I did not have my phone with me on that occasion, and I remember thinking, "How stupid. I should have brought my phone with me." So I think from that incident, I have consciously taken my phone just in case something happens. (Recreationist #1, Walker)*

When asked the reasons for carrying a phone during an interview, a female recreationist said, "Safety. I have had a couple of falls when I have been out, which have required me to use my phone" (Recreationist #3, Runner). This recreationist told the story of hurting her ankle while on a walk with her baby in a front carrier:

> *I was out on the Harry Ell track when my son was about 2 months old, and was carrying him in a front pack. It was just him and I. I thought it would be a good idea to go up for a walk up Harry Ell. As I was walking back down, I fell and twisted my ankle. I could not get up or anything like that. Luckily, the track is quite a popular track, with a few people. So we had to call for emergency and the fire truck came, and eight burley men hopped off. Because I was on the track, there were not any roads, so they had to park at the top of the track and walk down with a stretcher, and then they had to stretch me down the track. Because of the earthquakes, the track had been closed at the top they had to winch me on the stretcher off the track and into the waiting ambulance. So that was one time I had to use my phone. (Recreationist #3, Runner)*

Similarly, a mountain biker was more inclined to carry a phone when riding on her own and recalled incidents when her partner had to be rescued after bike accidents:

> *I'll carry the phone, particularly if I am out on my own. Especially mountain biking, you can have a decent fall then it is good to know … especially if you are up on the hills one evening when there is hardly anyone out to be able to find someone if you are really stuck. My husband has had some pretty nasty falls and has had to be rescued. (Recreationist #2, Mountain Biker)*

When discussing forgetting her phone when biking, the same recreationist said,

> *Yes, and you suddenly feel really … it is quite strange not to have it … almost vulnerable. I do not feel as I can do as long of a ride or may be take as much risk. It does not feel quite right not having my phone with me, which is weird. (Recreationist #2, Mountain Biker)*

This mountain biker linked carrying her cell phone to taking risks while bike riding and adopting a more conservative behaviour when riding without the phone. Several recreationists reported adapting behaviour when asked about using other safety measures beyond the mobile phone. A younger mountain biker discussed track selection and said, "If I'm riding alone, I wouldn't go out of cell phone range by myself" (Recreationist #19, Mountain Biker). While another, who was in favour of not carrying a phone, adapted her activity and behaviour as a way to improve safety:

> *I must say that if I was running, biking or running in the dark through the winter and there was a problem, I would actually bike more carefully if I am on my own. I am less likely to take risks. So my behaviour probably changes a little, like I will not choose to run through the reserve that is not well lit at 5:30 a.m. in the morning. So, I will change my behaviour rather than carry the phone. (Recreationist #9, Mountain Biker)*

Other than their communication devices, recreationists reported sparsely on other methods used to stay safe on the Port Hills. The other safety precautions participants reported and relied on included telling someone where they were going, carrying a whistle, carrying first aid equipment and/or bike repair equipment, adapting the activity and route as the examples above, and, with the Port Hills being a busy place, knowing that someone will come along and help out if needed. The most frequently reported method, other than carrying a mobile phone, was used by many solo-recreationists who made sure they told someone where they were in case of an accident:

> *Yes, it's mainly my wife…. She'll know that if I'm not home and my bike's not there I am out biking. She knows where my track is, and I'll tell her where it is and what time I should be back. (Recreationist #16, Mountain Biker)*

Another recreationist also mentioned telling someone but also emphasised the "self-responsibility" that one must take in order to be safe: "I tell whoever is home how long I will be, especially when I go on my own. I mostly choose to run with someone else, but there is certainly an amount of self-responsibility" (Recreationists #8, Runner). Another research participant indicated not worrying about other safety measures than carrying a mobile phone when recreating in the Port Hills versus recreating in more remote areas:

> *Yeah just around the Port Hills and that sort of recreation, guess close to town area, no, not really [talking about safety methods other than carrying a phone]. If I was going a longer trip in the mountains, yeah I'd probably give someone my intentions. (Recreationist #24, Mountain Biker)*

Some recreationists mentioned that they felt safe in the Port Hills due to its urban proximity where either the mobile phone would connect them to emergency services or other recreationists would help if needed.

Staying connected for safety reasons was one of the most repeated themes of this research. The topic was also linked to staying connected socially, as recreationists associated safety with being able to contact someone in case of emergency. Beyond safety, recreationists reported communicating with others via communication devices for various reasons.

6.3.2 Staying socially connected

Carrying a phone was important for many recreationists who wanted or needed to stay connected to family, friends or others. One recreationist, who discussed forgetting her phone, was adamant that she would go back and get it: "I will go back for my phone. I need to be in contact" (Recreationist #2,

Runner). For this recreationist and others, the reasons for being socially connected may have been numerous; for safety as seen above, to organise a meeting, have a chat with a family member, collect performance data, and to share an experience with others. For example, a recreationist who used a phone for safety, was also using it for communication involving logistics:

> *Safety and also … somebody might want to get hold of me, like my kids. Quite often, particularly at the Port Hills, I'll drop my partner off somewhere and she'll run and we'll meet. I'm walking and we'll meet, so I'll drop her off in Sumner and she'll run the Captain Thomas track and I do the Godley Head track and we meet, so we both carry a cell phone in case we don't meet because I've got the car and she hasn't. (Recreationist #12, Walker)*

Some recreationists carried their phones to coordinate a meeting time with friends who they were expected to recreate with. One young recreationist commented on safety and on communicating to coordinate meeting times: "We use the phone for safety and to communicate with our friends to organise to meet" (Recreationist #27, Mountain Biker). Some of the ideas presented in the quotations above relate to the work of Campbell & Park (2008) and the concepts of micro- and hyper-coordination communication. Recreationists are communicating via mobile phones to organise logistics during an activity (micro-coordination) and/or checking in with family members by chat or text (hyper-coordination). One recreationist used his phone for micro-coordination and explained,

> *For me a ride in the Port Hills happens quite regularly and it's not an intrepid thing. It's kind of more of a daily life thing. I'm far more likely to take a phone call from work or from kids or from family or whatever if I'm at the Port Hills because I'm up there for 1 to 2 hours, 2.5 hours at the outer, I might be calling a mate who is up there as well and going to try and hook up, be able to do a ride, and so on, so I find it very convenient to have cell phone coverage up there. (Recreationist #17, Mountain Biker)*

In the survey, research participants were asked if they used their electronic devices to call or text someone, to access email or social media sites, to post on a social media, or to send messages in a messaging application site during their activity. Across the sample, recreationists reported 276 instances of using a communication device to call, text, email, view, or post on social media and to send messages.

Of these 276 instances, calling and texting use via mobile phones (smart and basic) was reported 164 times over the course of the survey data collection period. Across the entire sample (N = 520), 31.5% of recreationists reported calling or texting. A total of 40% of those recreationists using a smartphone reported calling or texting someone, while 36% of recreationists using a basic phone

reported the same. Table 6.9 offers a summary of those recreationists more and less likely to call or text on the Port Hills.

The activity group who reported calling or texting the most were rock climbers (49%), followed by mountain bikers (35.8%), walkers (29.3%), others (20%), and, finally, runners (14.5%). Runners preferring to call and text less was not surprising due to the nature of the activity and runners constantly moving and having limited space to carry a device in comparison to rock climbers, who have more frequent downtime and more space to store a device. For example, one rock climber explained, "When maybe you've just finished a climb and you're not belaying for anyone, so you'll just go and sit down and probably check your phone just out of habit I suppose" (Recreationist #23, Rock Climber).

Table 6.9 Likelihood of calling or texting during the Port Hills outdoor activity

Demographic and activity characteristics	More likely to call/text	Less likely to call/text
Activity	• Rock climbers, mountain bikers	• Walkers, runners, others
Age	• 13–17 years of age • 39 years of age or below	• 60+ years of age • Above 40 years of age
Solo/ non-solo	• Non-solo recreationist	• Solo recreationist
Frequency of visits to Port Hills	• Less frequently (few times per year) • 1st time	• Daily, weekly & monthly visits
Length time recreating	• 3–5 hours • 5+ hours	• Less than 1 hour • 1–3 hours

Note: Men (31.9%) and women (31.4%) carrying phones had similar calling/texting uses.

The concept of habitual use of the mobile phone as reported by this rock climber is reported in the literature in the context of communicating to micro-coordinate day-to-day activities (Campbell & Russo, 2003). Caronia (2005) defined these moments as "no-when times" (p. 97) or "stand-by moments" (p. 97), when "the actor is simply waiting for someone who is coming or for something to happen. It is fascinating to notice how some communication technologies have given sense to these meaningful times and places" (p. 97). The author gave examples of these stand-by moments such as waiting for the bus, walking to get somewhere, and on the street waiting for someone. Isaacs et al. (2019) called stand-by times mobile microwaiting moments where mobile users are more receptive to receiving content and engaging with their communication device. While outdoor recreating, stand-by or microwaiting moments may happen at a view-point after a hard walk or run up, at a

track junction when waiting for friends to catch up, or in a mountain bike shuttle van or between climbs; at these times, habitual use of the mobile phone occurred. In addition to the rock climbing example above, there was evidence of stand-by moments at the top of the Rapaki Track. The Rapaki Track view-point (Figure 6.3) was a popular destination for recreationists and for digitally focused microwaiting moments. Through the researcher's observations during the data-collection process, it was a well-liked area for digital device use, as many recreationists would either take photos, look at their performance data, call or text, engage with social media, or check the time. On a wintery windy and cold Sunday afternoon, 60 recreationists were counted at the top of the Rapaki Track between 12 p.m. and 1 p.m., where the majority would stop for a few minutes to catch their breath, wait for other group members, and drink water while also checking digital devices and taking photos.

Figure 6.3 View top of Rapaki Track in Port Hills overlooking Diamond Harbour on Banks Peninsula (Christchurch City Council, n.d.-c).

Men and women reported calling and texting equally. Non-solo recreationists (36.9%) reported more use of calling and texting than solo recreationists (24.0%), which contradicts the qualitative data in which recreationists reported that they would be less likely to use their mobile phone when recreating with others. Perhaps non-solo recreationists called and texted to micro-coordinate, which participants perceived as more acceptable than calling and texting to hyper-coordinate. Recreationists 39 years of age and under (73.2%) reported a greater use of the calling and texting than those 40 years of age and over (26.2%). The younger group (13 to 17 years of age) were more likely to call and text (56.0%) in comparison to 60+ years of age (14.6%), which was less likely to call

and text during their activity. Recreationists who recreated in the Port Hills a few times per year (40.9%) or who were recreating in the Port Hills for the first time (41.2%) reported calling and texting more than recreationists who visited the Port Hills on a daily, weekly, or monthly basis. Also, recreationists who recreated for longer periods of time (3 hours or more) reported calling and texting more often than those who recreated for shorter periods of time (under 3 hours).

During the interviews, some recreationists discussed calling or texting during their activity. One recreationist, who typically recreated on her own, mentioned calling her daughter while recreating, as this was an opportune time for the person she wanted to call:

> *Well, one reason was that while I am walking it is often a good opportunity. I do not do it as much now, but I used to, to catch up with people.… I used to ring one of my children while I was walking because they were free. (Recreationist #1, Walker)*

The quotation above is one example of a hyper-coordinated communication, as the recreationist mentioned catching up with her daughter and having a longer conversation during the outdoor recreation experience. In comparison to micro-coordination communication, hyper-coordination communication was not reported frequently in the data. There was an overall sense that recreationists were not wanting to disrupt their activity by using the phone for longer conversations. Micro-coordination communication was reported frequently by recreationists who were organising meeting times with others either for the activity or after the activity or quickly touching base with a family member during their activity. Micro-coordination also occurred for younger recreationists who needed to stay in touch with parents or caregivers. In their research on the examination of the use of mobile phones by youth, Pain et al. (2005) reported the mobile phone allowed young people to feel safer but also allowed for a greater spatial range and an increased ability to negotiate with their parents on the whereabouts. For example, it was possible for youth to call their parents and ask to be home later than previously organised (Pain et al., 2005). Recreationists also used their phones to access email or social media or to post on social media.

Accessing email messages, social media sites, and posting and messaging was reported 112 times over the course of the data collection. This was achieved with smartphones with the exception of one message sent with the iPod. Across the sample (N = 520), 21.5% of recreationists reported emailing and/or using social media sites either to read posts, post or send, or message. Table 6.10 offers a summary of those recreationists more and less likely to use email or social media sites.

The activity group who reported calling and texting the most were others (26.6%), followed by rock climbers (23.5%), walkers (23.1%), mountain bikers (22.0 %), and finally runners (9.1%). As in calling and texting, non-solo-recreationists (24.7%) reported emailing and the use of social media more frequently than solo recreationists (16.3%). Recreationists under 29 years of age (28.7%), and more so the younger recreationists 13–17 years of age (44.0%), reported a higher use of email and social media than recreationists over 30 years of age. Research on teenage communication and instant messaging support the popularity of this form of communication for youth (Boneva, Quinn, Kraut, Kiesler, & Shklovski, 2012; Ito & Okabe, 2012). Between email and social media uses, the messaging feature of social media was reported as being used within the 29 years of age and younger age groups.

Table 6.10 Likelihood of emailing or using social media during the Port Hills outdoor activity

Demographic and activity characteristics	More likely to email or use social media networks	Less likely to email or use social media networks
Activity type	• Others, rock climbers, walkers and mountain bikers	• Runners
Age	• 13-17 years of age • 13-29 years of age for messaging via an application	• 40+ years of age
Solo/non-solo	• Non-solo recreationists	• Solo recreationists
Frequency of visits to Port Hills	• 1st time in the Port Hills	• Daily, weekly and monthly
Length time recreating	• 3 to 5 hours	• Less than 60 minutes

Note. Men (20.4%) and women (18.6%) carrying smartphones had similar email and social media uses. “Calling and texting” included the following actions: accessed email, accessed social media sites to lurk, posted on social media, and sent a message via an application.

Recreationists 40 years of age and older (9.9%) were the least likely to use email and social media during the recreation activity. Recreationists who were visiting the Port Hills for the first time (61.8%) reported a much greater use of email and social media than recreationists who had visited the Port Hills before. Some recreationists who visited the Port Hills frequently did mention that the familiarity of terrain impacted their digital devices, and recreationists visiting the Port Hills for the first time reported using the photo feature more often than those who visited the Port Hills more frequently.

Perhaps they were also more inclined to post their photos on social media, explaining the higher engagement with email and social media.

A small number of recreationists (5.8%), who were walkers, runners, and mountain bikers, posted on social media during the activity or shortly after the activity. One mountain biker in the 13–17 age group mentioned posting videos between mountain bike tracks: "Sometimes between runs we will make an edit and put it on right away. Being on social media makes you known, people see that you are out there" (Recreationist #27, Mountain Biker). Another mountain biker from the same age group added using a few devices to interact with social media and a GoPro (i.e., POV) camera to make a film to study a track:

> *Sometimes we head to the Port Hills. I use my iPod and cell phone to do some videos and we will put them on Facebook and Instagram. I will also use my GoPro to figure out a track and then might put this on Facebook and maybe on YouTube. (Recreationist #27, Mountain Biker)*

For this mountain biker, filming with a POV camera not only resulted in the possibility of connection via social media but also allowed the user to study the features of a track to provide a better biking experience. The mountain biker used the camera to support his activity. In accordance with the above quote, Chalfen (2014) articulated that POV cameras enabled the recording of what the recreationist sees while undertaking a difficult and challenging activity, allowing the user to review the recording.

Some recreationists distinguish using a communication device whether recreating alone or with others. "If I was by myself I might have a texting conversation or ring somebody up, if I was doing it socially I wouldn't unless I was expecting something. Most of my time I have my phone on silent" (Recreationist #25, Walker). For this recreationist, recreating with others in a social environment minimised the need to use a communication device. This was also highlighted by a younger mountain biker who indicated that the conversations you have with others while recreating are part of the outdoor activity and that engaging with digital technology, in this case listening to music, would create an uncomfortable social environment:

> *It would be weird to listen to music when we ride together, we just would not do that. The reason I do not in a big group is that we are always chatting to each other when we are biking so music defeats that purpose. (Recreationists #20, Mountain Biker)*

This supports the work of Dwyer, Kushley, and Dunn (2018) who found that smartphone use could destabilise the enjoyment and satisfaction of face-to-face interactions. In addition to using digital devices to stay socially connected with their day-to-day life while recreating, Port Hills' recreationists used digital devices to access activity relevant information prior to or during their recreation activity. This is the focus of the section below.

6.3.3 Staying connected to access information

Across the sample (*N* = 520), 14.2% of recreationists reported using digital devices to access information while recreating on the Port Hills. There were 74 reported instances of accessing information on a device by 14.2% of research participants. This included accessing the Internet to get information, for geocaching, and for accessing maps. The devices used to access information were the smartphone, GPS, and the iPod. Out of the 74 uses, 59 were to access the Internet by smartphone (*n* = 57) and by iPod (*n* = 2), eight uses were for geocaching by smartphone (*n* = 6) and GPS (*n* = 2) and to access maps by GPS (*n* = 7).

The activity group who reported accessing information the most were rock climbers (27.5%), followed by others (20.0%), mountain bikers (15.6%), walkers (12.4%), and finally runners (1.8%). The data are consistent with rock climbers and mountain bikers who reported calling and texting more frequently, with runners constantly moving and having limited space for their devices, as well as with rock climbers having more frequent and focused down time.

Men (12.7%) reported looking for information slightly more often than women (9.4%). Recreationists aged 18–39 years (83.8%) reported a greater use of information seeking than younger (13–17 years) recreationists and those over 40 years of age (16.2%). Recreationists who visited the Port Hills for the first time (26.5%) reported looking up information online more than those who visited the Port Hills frequently. In addition, recreationists who were recreating for 5 hours or more reported looking for information more often (30.0%) than recreationists who were recreating for shorter periods of time. For example, only 9.4% of those who recreated for less than 1 hour looked for information online.

There were no follow ups to these uses in the survey; however, from interview responses, recreationists were mostly looking for information on their smartphone to inquire about the weather, about a track status or climbing crags, or to look at maps for route findings or for geocaching. This use of information seeking is consistent with the work of Hinze et al. (2010) who identified that the type of query is related to the location and activity performed by mobile phone

users. One rock climber mentioned, "I know that lots of people use the climbing NZ website when they are climbing in the Port Hills. This is to get their climbing information such as route maps" (Recreationist #10, Rock Climber). When using her phone to access track information, a mountain biker felt that her experience of mountain biking was better and safer:

> *Technology is an important thing, especially if most people use it for safety. Even for checking the rides, people get frustrated if they have the wrong information. It definitely enhances the experience in this case. (Recreationist #2, Mountain Biker)*

Recreationists reported using the track status website page managed by Port Hills' rangers to keep recreationists informed of which tracks are closed and open. One recreationist mentioned accessing track information through the City of Christchurch Council website:

> *I used websites quite a bit, if we are going to do a run like on the packhorse track or something, you want to make sure that it is open and that is not lambing season. Have a look at the website and make sure that this is open. I have checked the website before, it says that it is open and then you get to the track and there is a closed sign. Just a bit annoying. (Recreationist #3, Runner)*

Recreationists expected accurate information on track status on the website. When asked about the discrepancy of information of track status online and in the field, a Port Hills ranger mentioned that the website information was most likely accurate. There was sometimes a delay in a Port Hills Ranger physically changing the sign from closed to open or vice-versa once it has been updated on the track status page (N. Singleton, personal communication, January 4, 2015).

6.4 Chapter summary

Port Hills' recreationists used their digital devices for various reasons and in different ways. The three main themes emerging from the data included audio listening (mostly music), self-logging and quantification of the outdoor experience, and the need to be digitally connected for safety, communication, and information. Within the three themes and, in the carrying and use of digital devices, there were some differences with specific user groups.

Mountain bikers, for example, were more concerned than other recreationists about safety, possibly due to equipment failure; rock climbers were more likely to call or text, probably because of the climbing environment and the more frequent and organised pauses in the activity; and first-time visitors to the Port Hills were more likely to use email and social media than recreationists who had

visited before. Runners were less likely to carry phones and, therefore, communicated less, although runners were more likely to use music and/or collect performance data. Younger recreationists (13 - 17 years of age) reported higher use of social media use and higher use of making videos.

Digital technology usage impacted the experience in a positive manner for some, while for others it was more of a distraction from the experience and the environment. For example, this was evident in the dichotomy of listening to audio, with recreationists feeling motivated while listening to music and others feeling unsafe, disliking not hearing the external natural sounds, and preferring to socialise with others versus listening to music. Recreationists reported adapting the use of music and listening to music on certain portions of tracks with a lesser view or on a more exposed long climb, or during day-time versus night-time or when recreating solo versus when recreating with others. It seemed that when choosing to carry or use certain digital devices, recreationists were fulfilling the goals they were looking to accomplish during their activity.

The following chapter focuses on the role of recreation managers as related to the use of digital devices by recreationists. In addition to the discussion about the intersection of technology engagement and managerial practices, a short section on digital devices in peri-urban versus remote settings is presented.

Chapter 7

Digital Technology Use in Outdoor Recreation and Implications on Management Practices

This chapter explores the relationship between the usage of digital technology in peri-urban outdoor recreation and management practices. This is particularly relevant in light of the fact the majority of Port Hills recreationists engage with digital devices. To examine the digital technology use and management practices, the interviewer gathered data from recreation managers, members of outdoor recreation groups, and Port Hills' recreationists. Five managers of three land management agencies were interviewed about their outdoor recreation management practices and were asked about digital technology practices in relation to managing the outdoor recreation experience. The groups represented included DOC, the CCC, and an outdoor recreation focused non-profit trust based in the Canterbury region that owned and managed land accessible to recreationists.

The chapter is divided in two sections. The first section of the chapter discusses findings related to the mediated digital outdoor recreation experience and management practices. This section discusses digital technology engagement initiatives implemented by recreation managers of various settings, the idea of digital device use policies, and recreationists' perceptions on how recreation managers responded (or not) to recreationists' technology usage. The second section of the chapter reports on the differences between digital devices carried and used in peri-urban settings versus remote settings. These two topics address key features of the study's third research question, which included a relationship between technology engagement and implications for management practices. In its entirety, this research objective was to identify and critically evaluate the variables that influence outdoor recreationists' engagement with digital technology including implications for management practices.

7.1 Technology-mediated outdoor recreation experiences and management

In the study of outdoor recreation, the role played by recreation managers in planning and delivery is important to take into consideration. Recreation managers are responsible for developing and implementing recreation management strategies and their perspectives, in addition to the

perspectives of recreationists, assist in better understanding the significance of technology use in outdoor recreation. Managers of outdoor recreation settings operate in dynamic environments that are subject to external socio-cultural, political, economic, environmental, and technological pressures (Manning, 2011; Pigram & Jenkins, 2006). This is certainly the case for recreation managers responsible for public recreation and conservation areas of the Port Hills. With the urban growth and the diversification of the nearby Christchurch population, the impact of recent natural hazards including earthquakes and fires, the establishment of new commercial recreation facilities (e.g., Christchurch Adventure Park), and the acquisition of more public designated land, the Port Hills appear to be in a constant state of flux (Fletcher, 2018).

Furthermore, a change in recreation behaviours such as an increase in mountain bike participation and a boom in the fitness industry have resulted in an increased use of technology by recreationists (CCC, 2004; Millington, 2016), leading recreation managers to possibly rethink the outdoor recreation experience they want to facilitate for recreationists. The following section examines managers' relationship to outdoor recreation management practices in various settings including the Port Hills. Specifically, this study looked at the ways in which recreationists' digital technology use was considered in management practices and embedded, or not, in the development of initiatives aimed at engaging users of outdoor recreation.

7.1.1 Recreation managers' perspectives on digital technology use

In discussing change to outdoor recreation management and delivery, a recreation manager from DOC said: "Change is inevitable and there will always be a reaction from the user groups" (Recreation Manager #1, DOC). From his perspective, use of digital technology by recreationists was not an issue that received overt attention, he more described technology use as the evolution of a change that has existed in outdoor recreation for a very long time. The same manager elaborated on changes that have been taking place with outdoor recreation equipment over the last 100 years that have "fundamentally changed or enabled groups of people to engage in the outdoors in a way that they had never before" (Recreation Manager #1, DOC). The manager's statement aligned with Ewert and Shultis (1999), who discussed how changes in transportation, communication, comfort, safety, and information sectors have impacted outdoor experiences, and more recently the work of Martin (2017), who discussed the impacts of digital devices and applications on outdoor recreation.

In the interviews, managers mentioned that rather than being challenged by recreationists' technology use, the current issue was in responding to the demographic changes of the New Zealand population and staying relevant to the changing needs of current and new outdoor recreationists. One manager mentioned the changing population and the importance of "having a network that is adapting and evolving to changing needs and expectations of users" (Recreation Manager #1, DOC). One psychographic change of relevance to outdoor recreation managers is the concept of 'digital natives', used as a term to describe individuals born after 1980 by Palfrey and Gasser (2008). Digital natives' computing literacy skills have developed since a very young age where digital devices and applications have been a steady part of their lives. Although outdoor recreation managers interviewed identified youth as a group they would like to engage through technology, the same could be said about a wider group of outdoor recreationists who fall into the digital native demographic range.

The same recreation manager as above mentioned that his organisation needed to stay technologically relevant with younger park users as the use of digital technology was "far more normalised" (Recreation Manager #1, DOC) amongst this age demographic. This perspective aligns with the work of Boneva et al. (2012), who emphasised the importance for youth in staying socially connected with others via digital technology. However, nothing in the Port Hills research indicated that recreation managers were engaging youth through digital technology.

One goal for DOC is to increase participation in outdoor recreation by connecting New Zealanders to nature and conservation areas. This was articulated in one of DOC's strategic goals aiming to have "90% of New Zealanders' lives [are] enriched through connection to our nature and heritage" (DOC, 2019). For DOC, the main groups targeted for engagement were youth but also urbanites and new immigrants to New Zealand.

> *So we definitely talk all the time in the recreation area about certain trends that we have in New Zealand: How do we engage our youth? How do we engage other cultures? How do we break down constraints with people participating in recreation? (Recreation Manager #3, DOC)*

In relation to "other cultures", the demographic data from this study showed that 81.7% of Port Hill recreationists were from New Zealand European descent which demonstrated the lack of diversity in outdoor recreation experiences in the Port Hills context. This data was consistent with the Christchurch population. The lack of ethnic diversity in outdoor recreation participation is not unique

and has been reported in the literature (Booth & Lynch, 2010; Cordell & Super, 2000; Dwyer, 1993; Ghimire et al., 2014; Lee et al., 2001; Lee et al., 2005; Manning, 2011).

Along growing urbanisation and urban demographic shifts predicted in all urban centres (Ritzer, 2015) including cities such as Christchurch, there is an increasing challenge for recreation managers to ensure public participation in the conservation areas it manages. For DOC recreation managers, this is a challenge because a significant number of managed areas along with their assets (e.g., cabins, day shelters, and parking lots) are in remote places that are difficult to access and away from urban populations. The increased numbers of individuals living in urban centres will put additional pressures on all local urban and peri-urban park managers, including New Zealand managers, to rethink how outdoor recreation experiences are delivered.

DOC managers expressed a concern regarding the dispersal of assets concentrated in non-urban areas away from where people live:

> *We've got more urbanised populations and we've got a population that from basically Hamilton north is half the country, yet the bulk of the public conservation land is from Hamilton south. We talk all the time— "how do we address those demographic changes to New Zealand society"—and we look at anything that will move some of those barriers and get more people engaged. I mean our goal is to increase participation. (Recreation Manager #3, DOC)*

In discussing ways to make outdoor recreation more accessible, an example provided by recreation managers was the technological initiative Google Trekker (n.d.) that made it possible for recreationists to view a track from their home prior to making a decision to visit or not. Google Trekker, is one initiative where technology and outdoor recreation merge prior to, during and after the experience depending on when recreationists access the technology.

7.1.2 Digital technology initiatives in New Zealand and in the Port Hills

As a whole, managers interviewed in the Port Hills study had mixed responses regarding the usefulness of digitally driven initiatives on the impact of outdoor recreation participation and on the outdoor recreation experience. Some managers did describe established digital technology initiatives as positive examples of how technology can be embedded in the delivery of outdoor recreation. The various initiatives had different goals from making outdoor recreation more accessible to providing education for preservation and conservation to passing on information on weather and track status.

Google Trekker (n.d.) as mentioned above was highlighted in some responses. Google Trekker, a Google Maps initiative has been used for the mapping of New Zealand's Great Walks. This technology aims to break down barriers and increase access, enabling individuals to view a virtual tour of the walk at any time.

> *I like going to a place and not knowing what I'm walking into, but for some people knowing ahead of time removes an important barrier to their participation, and we're really all about removing barriers, so we've used the Google stuff. You know, Google has done our Great Walks, so you could do the virtual tour on the Great Walks. (Recreation Manager #3, DOC)*

At the time of the interviews, the project between DOC and Google Maps documented how seven of the 10 New Zealand Great Walks had been mapped (DOC, 2015).

Gimple's (2014) research looking at parks visitors' experiences found limited relationships between personal technology use and how much a visitor enjoyed their outdoor recreation experience, nor did the author reveal that technology increased park visitations (Gimple, 2014). The same study reported, "The more education a person has and the older they are, the less likely they are to use technology while recreating outdoors" (Gimple, 2014, p. 9). Some managers interviewed in this study were also not convinced that investing in recreation initiatives involving digital technology would affect the experience and increase participation. One manager identified an information or research gap regarding individuals who do not visit conservation areas and wondered if digital technology programming would attract them:

> *What we don't have is information that drills in further and says what information or technology is missing that will help you participate whether you are a new immigrant to New Zealand or just coming as a refugee, what would help you get engaged in the New Zealand lifestyle? We know a lot about who is recreating, but we don't know a lot about people who aren't recreating, so we've got a massive information gap. (Recreation Manager #1, DOC)*

Furthermore, when discussing attracting more youth into nature and integrating digital technology into the outdoor recreation experience, one DOC manager said,

> *We don't want to lose a generation because we weren't on the ball to IT possibilities, but by the same token we do also hope that when people are out there recreating they have a moment to look up from their iPhone and actually have a look around. So it's a dilemma. It's a real dilemma, and at the end of the day, the solution will look something like this. There will be some places where it's really good and useful and there will be other places*

> *that we just leave alone. That's what the solution will look like. (Recreation Manager #3, DOC)*

A previously discussed, digital technology use by recreationists seems easier and more accessible in peri-urban areas due to proximity of urban centres as opposed to its use in more remote natural settings. When discussing ideas on technology in the Port Hills, one recreationist mentioned, "You could expect more technology giving you information about your environment in the Port Hills but you wouldn't really be that keen in Arthur's Pass [National Park] or somewhere where you are a bit more remote" (Recreationist #15, Walker). A Port Hills recreation manager argued that even within the Port Hills, recreationists looked for different experiences and to fulfil different motivations from each of their outdoor recreation activities:

> *On Rapaki Track [Port Hills], for example, you find that a lot of people would be listening to music or doing some work, emailing or doing something, or taking a call, whereas people who are out on more remote tracks like the Crater Rim and some of the more technical mountain bike tracks, I think they will be a different type of person and a different mind, and not engage with technology as much. (Recreation Manager #2, Port Hills Ranger)*

This manager's comment is consistent with the experiences of recreationists, some of whom specifically mentioned the Rapaki Track as a place where they would be more inclined to listen to music because of the long, exposed, a gradual climb, and/or inclined to collect performance data on the track's Strava (n.d.) segments.[16]

During the interviews, Port Hills' recreation managers acknowledged the financial pressures which local authorities often operate under impacting the implementation of new outdoor recreation related initiatives within areas such as the Port Hills. As a result, any new ideas on digital technology engagement with recreationists may not be a top priority. For example, a City Council Recreation Manager alluded to the Parks Department having challenges with updating parks information on their official "Rec and Sport" web pages due to a lack of human resources and expertise in that area: "The problem is we do not have anybody in the organisation whose role is to look after parks information on the website" (Recreation Manager #5, CCC).

[16] A Strava (n.d.) segment is a section of a track or route that has been created by a Strava user. Each segment must have a start point, an end point, and a sequence of locations in between. A Port Hills recreationist reported over 10 Strava segments on the Rapaki Track in the Port Hills.

When asked about future initiatives or policies around digital technology use, a Port Hills ranger said,

> *The [financial] climate is not that great at the moment. With the rebuild going on and funding being cut, it's [digital technology initiatives] not seen as a priority, but it's definitely something to tuck away for the future, something I'd like to see happen. (Recreation Manager #2, Port Hills Ranger)*

Managers identified potential in collaborative initiatives that could take advantage of digital technology advancements to enhance recreation experiences in the Port Hills. When discussing opportunities to create a programme using digital technology focused on environmental education for children and youth, a Port Hills recreation manager indicated, "Let's get Sport NZ and DOC and the council working together and come up with one programme that meets everyone's needs instead of three separate programmes" (Recreation Manager #3, CCC). The concept of partnerships is not new and has been reported by Shultis and Hvenegaard (2016) when discussing the long-term trend of declining budgets in urban parks. As a result, "parks managers looked to new funding partnerships, to reduce costs, and considered the involvement of community groups and not-for-profit organizations" (Shultis & Hvenegaard, 2016, p. 16). Evidence of partnership initiatives using technology were reported in the interviews. The Google Trekker (n.d.) example presented above was one collaborative initiative along with the Great Walk Abel Tasman's Janszoon Project and the Christchurch Gondola webcams. The Janszoon Project has developed an Abel Tasman Virtual Visitor Centre application to communicate information and engage recreationists to restore and preserve Abel Tasman's wildlife. The project involves the three main partners: The Abel Tasman Birdson Trust, DOC, and iwi-Ngāti Tama, Ngāti Rārua and Te Ātiawa. Another digital technology example mentioned by Port Hills' recreation managers was the installation of two fixed digital webcams at the top of the Christchurch Gondola. One camera faces the Summit Road to the East and the other faces the Summit Road to the West. The webcams provide recreationists with visual information about the Christchurch Gondola upper area and real-time view of weather conditions. The webcams installed and managed by the Summit Road Society indicated a partnership between the CCC Parks Department, the Summit Road Society, and the Christchurch Gondola (CCC, 2017). The Christchurch Gondola is located close to the Bridal Path Track on Mount Cavendish (Eastern Section of the Port Hills).

When recreation managers were further asked if they were currently developing and implementing digital technology initiatives and/or specific programmes to engage recreationists, a common answer

was to mention the information provided on the website. For example, the Port Hills track status page lets recreationists know which tracks are open or closed on a daily basis, and it seems to work well as a communication tool. Managers identified the ability to communicate information quickly as important to satisfy users' need for accurate information.

> *Well, a good example of that is me pushing that track status page years ago, that was a quantum leap to actually communicate with mountain bikers before they got their bike out and it's been proven to be quite successful so I've always been keen on that aspect of it and so I would love to see our organisation using digital technology more to communicate. (Recreation Manager #2, Port Hills Ranger)*

The same manager met with some resistance when approaching the idea of QR code[17] to communicate up-to-date information about tracks that could possibly change over time and was asked to produce printed brochures of the Port Hills instead:

> *QR codes to get track information, I really like the sound of that, but I've mentioned that to some of my managers, but here I am, once again, I've been asked to update our brochure because there's a feeling that still, handheld brochures are the way to go for some people, which I kind of see as being relevant. But the big advantage of going to digital technology for communicating, especially on track information when you know what tracks are and what's available, is things change, and we've learnt obviously through the earthquakes recently that our recreational environment can change hugely that we're not locked in hard copies. (Recreation Manager #2, Port Hills Ranger)*

Research related to interpretation in nature-based settings revealed visitors using new media technology reported benefits to their park experience and delivering interpretive information via digital technology may be more appealing than printed content (Wolf, Stricker, & Hagenloh, 2013). When accessing digital information, visitors preferred less text and more photos as well as downloading an audio digital tour on their own personal digital device, which allowed them more control over how and when to listen to the audio (Wolf et al., 2013). In the current study, recreationists reported using personal devices to play music or to access information (e.g., track information and weather information) as a way to have control over their recreation experience and

[17] QR (or quick response) codes are scanned by an application installed on smartphones and, once scanned, contain information readable by the users. For example, QR codes could be used by recreation managers to convey information about a specific track or interpretive information to users.

to increase their enjoyment of the activity, with several participants noting in particular their enjoyment of listening to music while recreating.

When discussing the development and implementation of applications to use on personal digital devices during the outdoor activity, one recreation manager questioned the purpose of the technology: “What is the value proposition for managers in engaging with information technology and how much value does that add to the quality of people’s experiences?” (Recreation Manager #3, DOC). Along the same line, Wolf et al. (2013) concluded the types of media used to communicate information should be done purposely and accommodate the wide range of ages and interests of park users.

In addition to talking about their organisation and what they were doing with digital technology engagement, a recurring theme in the interviews were ideas around digital technology use policies, etiquette, and self-regulation. Managers’ discussion on the implementation of digital technologies use policies and digital technology use etiquette tended to reside in the context of user conflict.

7.1.3 Regulating recreationists’ use of digital technology

Social and technological change have long been associated with increased potential for conflict in outdoor recreation settings (Booth & Lynch, 2010; Manning, 2011; Pigram & Jenkins, 2006; Plummer, 2009). Conflict in outdoor recreation can happen when one person, or a group of people, experience or perceive an interference of goals, as the result of another person’s or group’s actions (Ewert, Dieser, & Voight, 1999; Wray, Espiner, & Perkins, 2010). The introduction of new technologies into settings where there are established uses is a common basis for conflict to arise. Recent research on technology usage in remote areas addressed the possibility that technology usage can be positive when considering elements of comfort, safety, and accessibility and even taking photographs, but the authors also acknowledged that communication-related devices or other devices producing unnatural sounds risk leading to user conflict (Lindell, 2014; Shultis, 2015).

When asked about the real and/or perceived impact of other recreationists using technology on their experience, some recreationists discussed how others using digital devices interfered with their experiences. The majority of digital devices referred to when discussing impact on others were communication devices and music devices. As one recreationist said, “I think that cameras are okay, obviously, but like respect other people. Don’t play music. Don’t talk on your cell phone or whatever” (Recreationist #30, Walker).

Recreation managers were asked if they should be involved in the how and when recreationists ought to use their digital devices or if recreationists themselves should choose when to use their devices appropriately (i.e., to self-regulate) depending on the situation. For example, should mountain bikers be discouraged from listening to music, or should there be a policy on the use of POV cameras as they can be intrusive to other recreationists' experiences, or should recreation managers install clear signage where cell phone can be used either because of a stronger and more reliable signal or because of socio-cultural reasons. Most recreation managers did not agree with developing guidelines, rules and/or policies around technology usage. One manager said that regardless of what happens in the future, "there will be some places where it's [technology] really good and useful and there will be other places that we just leave alone" (Recreation Manager #3, DOC). Another manager, in referring to recreationists deciding for themselves when to use their technology, mentioned, "It's going to be up to recreationists how they engage with technology" (Recreation Manager #1, DOC). In the cases in which digital technology was used inappropriately, some recreation managers and recreationists indicated that recreationists would communicate between each other:

> *Where people are genuinely going to see nature on nature's terms and someone ended up there carrying some sort of device that had their wireless music playing and they bumped across another person, I'd expect that other person to pretty swiftly made it clear that that wasn't the kind of thing that they expected to find out there. Recreation groups are quite good at managing some of that through social norms. (Recreation Manager #3, DOC)*

However, one could debate that as use grows and users become more diverse, there is potential for multiple social norms not of all which will necessarily be compatible. The pervasiveness of mobile technology has allowed mobile technology to invade public spaces with some individuals finding behaviours of mobile phone use in these public spaces rude and annoying especially due to different issues such as hearing one side of the conversation or loudness (Forma & Kalpowitz, 2012; Monk et al., 2004). Phone manufacturers keep improving the technology to reduce the annoyance while public spaces like trains and airplanes keep increasing mobile phone accessibility, possibly making the individuals inhabiting these spaces more and more tolerant of the pervasive technology (Brendan and Bennet, 2014; Monk et al., 2004). Perhaps a greater access and acceptance will be seen in peri-urban outdoor recreation settings in the future as in urban public spaces including during transportation and commutes that are filled with microwaiting moments. But for now, a leader of a

hiking recreation group, when asked about others using electronic devices in the outdoors, responded,

> *I would react to people playing music or talking on the phone. I wouldn't straight away off the bat go "stop it," but if it would go on for more than a little bit, I would probably say, "Hey, this is not really appropriate," and then we might have a discussion, and I don't know what would happen, but I would rather have that than a sign banning something, because where are you going to stop? It's a lot of signs. (Recreation Group #5, Youth Leader)*

In this research, one recreation manager for a non-profit trust argued strongly for a digital technology use policy in closed and controlled settings such as in a hut where recreationists stay overnight. The manager, who found recreationists' self-regulation around communication and music devices use ineffective, believed the development and implementation of technology use policy in hut settings could be more effective. Her apprehension about digital device usage in a hut setting was around diminishing the social value that is embedded in the hut experience, particularly in relation to playing digital music for everyone to hear and in hut users talking on their phones. There was mention that when a hut user needs to intervene and ask another user to turn their music off, it can generate social discontent and conflict.

> *It creates a situation of considerable tension for everybody because imagine you're the person who has gone over and told someone, "Would you please turn off your music." I mean, your heart rate, your stress rate increases, everything. You're going to spend the rest of that evening at the hut going well, "I just had to tell him to turn it off. Argh!" And if you're the person who's had someone tell you off, you're going to have that feeling like the headmaster told me off kind of thing. (Manager #4, Non-Profit Trust)*

The same manager also mentioned that in order to avoid conflicting situations, policies could be helpful: "Should there be something encouraging people to perhaps be courteous of others and use their cell phones outside rather than inside the hut?" (Recreationist #4, Non-Profit Trust). This manager compared digital device use with smoking and having dogs in huts:

> *There are typically clear notices that say "no smoking" and very clear notices that say "no dogs," so I don't see why we shouldn't have equally clear notices saying "no cell phones" in the hut, "no music" in the hut, and then everyone is clear about where they stand, so I think it's much better to have clear rules than to rely on fuzzy feel good etiquette stuff. (Manager #4, Non-Profit Trust)*

These ideas are similar to some previous research conducted in the context of youth camps emphasising the benefits for camp managers for having a clear communication device use policy that also happen to match the camp's mission, values, and goals (Thurber & Durkin, 2008). The authors argued that having a policy sets expectations and helps parents and/or caregivers in deciding which camps to register their children. Others, in discussing the increasing use of digital technology in nature and the growing digital use in remote settings, recommended recreation managers should articulate the type of visitor experience they want to provide and how the technology fits into that experience (Carlson, Shultis, & VanHorn, 2016; Martin, 2017; Wick, 2016; Wiley, 2005).

Wick (2016), in writing about new technologies such as PLBs, motorised paragliders, drones, and social media, which have emerged in a California wilderness park, identified the challenges of wilderness agencies in keeping up, particularly in the development and implementation of policies as a result of increased usage of the new technology. For example, there seems to be an increase in digital device use to contact Search and Rescue services for non-emergencies, which can be positive and negative (Carlson et al., 2016; Kaufman, 2010; Wick, 2016). This trend is positive in that more recreationists have the opportunity to be in contact when in trouble and can be found more quickly due to more accurate GPS locations. It is negative in that devices may be over-relied upon instead of common sense or instead of being well prepared to be outdoors. An example of negative impact on a Search and Rescue team was reported in the Grand Canyon National Park (Arizona, USA), where a group of recreationists worried about their water supplies activated their PLBs three times (Kaufman, 2010).

A digital technology policy that has been implemented in some protected areas is a recreation and/or commercial drone policy (DOC, n.d.-b; Wick, 2016). One recreation manager recommended being proactive and articulating guidelines around technology use:

> *I think that it's going to be of interest to all hut users who feel conflict about what should the etiquette be [around phone use] so I think it might help develop an outdoor rec etiquette. To acknowledge an issue is really important, not to sweep it under the carpet and to go, this is a real issue so how are we going to handle it. (Recreation Manager #4, Non-Profit Trust)*

For all recreation managers except one, digital technology use by recreationists was not something that was on their "radar" with regard to policy development, either because of their positive attitudes toward digital technology use or because of limited funds to develop any new initiatives to support (or not) the use of digital devices. However, as one manager noted, if different policies were

to be developed and implemented in certain parks and protected areas, recreationists "will choose from a limited range of sites that meets expectations, if on their own or with friends of similar ages they'll choose a place that meets interests and expectations" (Recreation Manager #1, DOC). For example, if a hut has a "no inside use of mobile phone policy," recreationists who need to communicate with family members while away may choose to avoid this hut or only use their phone outside of the hut.

Recreation managers of the Port Hills and other recreational land managers may need to reflect on their role in regulating digital device usage amongst various users and settings. This reflection can lead them to ask how they can engage (or disengage) recreationists with digital technology as a result of the type of outdoor experiences they want to support based on recreation demand. There may be situations in which developing and implementing regulations around digital technology use would be appropriate and other instances when it would not.

7.1.4 Recreationists' perspectives on how Port Hills managers can respond to digital technology use

When asked about recreation managers' responsibilities towards the role of technology usage by users, recreationists appeared unsure of what the role of recreation managers would be. Although, when accessing information via their devices, recreationists expressed a need to have accurate, relevant, and timely information to help them be better prepared and consequently provide a more positive recreation experience. In the Port Hills, for example, this could include information about which tracks were open and closed or information about what is happening in the Port Hills on a daily basis. Although some of this information was available online, recreationists indicated that easily accessible, accurate, and timely information was important and not always available. There were, at times, discrepancies between the information accessible online and the status of a track.

Recreationists also expressed that it would be helpful to have online spaces where they could report back to managers on issues such as debris on tracks. This relates to the concept of online participatory cultures and the building of collective knowledge as individuals post their own information and personal opinions on open online platforms (Delwiche & Henderson, 2013). This topic did not surface in the manager interviews, and when prompted about this, they did not have much to say other than having limited resources to develop online participatory culture.

When discussing the use of electronic technology for collecting activity or fitness data, some recreationists had suggestions for recreation managers. For example, they asked for timing systems to be installed on predetermined tracks for recreationists to time themselves, and suggested for recreation managers be involved in determining the Strava (n.d.) segments on the Rapaki Track. One mountain biker complained that there were too many Strava (n.d.) segments, which made it confusing: "Rapaki has 10 different segments because so many people have actually set up segments" (Recreationist #2, Mountain Biker). Recreationists also suggested collecting data through technology to help managers understand Port Hills' users mobility and gather additional information, which could be useful for planning purposes. A Port Hills Ranger mentioned that the main way to collect data on track usage was through trail counters. Due to limited access to trail counters, only a certain number were installed on Port Hills' tracks. At the time of the study, four track counters were installed in the Port Hills.

When it came to safety, recreationists reported that carrying mobile technology was necessary, although the responsibility was in the hands of the recreationists, not the recreation managers. One recreationist stated, "People should probably accept that there are places that have good [mobile phone] coverage and some have bad coverage" (Recreationist #7, Walker). Another participant advised, "If you feel unsafe, perhaps you should run in areas where you know you have cell phone coverage" (Recreationists #8, Runner).

When discussing cell phone towers, interviewed research participants appeared open to the idea of installing additional cell phone towers in the Port Hills: "There's power poles at the end of Godley Head [furthest Eastern point in the Port Hills]. They could put one on a power pole and nobody would notice" (Recreationist #12, Walker). When discussing the Port Hills area around Governors Bay, on the harbour side of the Port Hills, a recreationist thought that it would be good to address the mobile phone reception "gaps*":* "I know there's certainly a few gaps, so, yeah, it'd be nice to install a few smaller towers. They don't have to be very big" (Recreationists #14, Mountain Biker).

A runner considered the Port Hills setting as urban and saw no problems with modifying the environment to accommodate mobile technology. The participant stated, "The Port Hills are urban anyway. We're not detracting from the environment if we have the odd cell phone tower" (Recreationist #22, Runner). This point of view aligned with other findings from the study, as research participants were using their devices in the Port Hills as they would in the urban city,

treating both settings similarly with regard to technology engagement. By contrast, another recreationist expressed reluctance:

> *This is my view of the outdoors being as is, natural. So, I would be perhaps disappointed if I felt that they [recreation managers] went to extra lengths or spent their money to make us that more connected. For me, that is making a non-urban environment more urban somehow. (Recreationist #9, Mountain Biker)*

This recreationist appeared to value the current natural feel of the Port Hills and questioned modifying the environment any further by installing more mobile phone towers. An increased modified environment may make the Port Hills too urban.

A rock climber who seemed reluctant for recreation managers to promote technology use in the Port Hills reflected on the importance of connecting to nature as a priority.

> *Does it become a feeding chain, where you have to attract people to the Port Hills with technology, you have to attract people to Arthur's Pass with technology… I am hoping that technology is only a stepping stone to a place where people will connect themselves to nature. (Recreationists #29, Rock Climber)*

These two recreationists asserted keeping the connection to nature while outdoor recreating as important and that digital technology could threaten this connection. The extent to which recreationists' connections to nature might be impacted should be taken into consideration by recreation managers when developing and implementing technology-driven initiatives.

Participants expressed varied opinions on the topic of more or less technology use being facilitated by recreation managers, with some recreationists stating that the Port Hills felt like an urban setting; therefore, technology use was not out of place. By contrast, others expressed the Port Hills should feel more natural and be a place where technology usage should not be encouraged by recreation managers. For some, using digital devices during the outdoor activity resulted in a sense of familiarity and comfort, which diminished the individual's perceived risk of the activity.

7.2 Digital devices in peri-urban areas versus remote settings

Martin (2007) indicated visitors to remote areas have been found to rely on digital devices and that the added safety benefits of using the devices can be viewed as positive. Furthermore, outdoor recreation research on digital technology use in remote settings reveals that "attitudes and

perceptions of technology are almost certainly not unidimensional for many people—the same visitor could be pleased about an increase in safety and comfort, but at the same time be concerned about impacts to some elements of the wilderness experience" (Martin, 2017, p. 99).

In the current study, interview participants were asked about which technological devices they used, or thought would be used by others, in remote natural settings compared with peri-urban settings. In general, participants perceived greater and wider digital technology use in the peri-urban setting. For example, one participant stated, "I see a lot more people using technology in an environment like the Port Hills than I do see in the foothills of the Southern Alps or even further in" (Recreation Manager 2, Port Hills Ranger).

Although there were a variety of digital devices identified as devices used in remote settings (e.g., avalanche beacons, e-readers, satellite phones, mountain radios, spots), the digital devices facilitating communication with Search and Rescue teams or allowing recreationists to access mapping information appeared more popular. Most participants named PLBs, emergency position indicating radio beacons (EPIRBs), and GPSs. Various authors who have researched these technologies (and more) and reported on their use, also questioned the changes brought by the devices to the outdoor experience (Carlson et al., 2016; Ewert & Shultis, 1999; Martin, 2017; Pohl, 2006; Shultis, 2001, 2015; Wiley, 2005). Examples include Martin (2017), who emphasised the change brought by the digital devices such as mobile phones, GPSs and PLBs on the nature of modern recreation, and Shultis (2015) who discussed the empowering notion of digital devices usage on comfort, safety, and access. A research participant who regularly undertook solo wilderness adventures mentioned carrying different devices in more remote areas:

> *I always carry a GPS when I'm in the bush because I do a lot of solo stuff so I'm generally on my own, and I'll carry a locator beacon as well so that if anything happened then I've got that back up. (Recreationist #23, Mountain Biker)*

The use of a GPS seemed useful for route findings and prevented recreationists from getting lost: "I think for the more backcountry rides maybe more GPS for route finding. It could help you out in a sticky situation if you get lost, which could happen fairly easily" (Recreationist #2, Mountain Biker).

A rock climber who also mountain biked claimed using too many electronics in remote areas was a way to "bypass" skill and experience:

> *Well, in remote areas you may not have the reception to use the service. When you use something like your smartphone for safety and go on a four-day, tramp and it goes flat after the first day.... Then you are using untested technology as a means to bypass skill and experience. An EPIRB is not going to go flat, but you only get one use, where a smartphone has more uses. So I guess there is that risk of getting [injured or lost]… If you do make things too much electronically based and you are in environments that actually do not like those kinds of electronics, you might be heading for disaster. (Recreationist #5, Rock Climber)*

Both PLBs and EPIRBs are devices used to alert Search and Rescue. Both work by transmitting a coded message via satellite. Some PLBs and EPIRBs have built in GPS, which enable them to emit an accurate location when initialised. Both devices work in the same way but vary in size, transition time, and registration process. The GPS facilitates route finding and can be a stand-alone device or integrated into a mobile phone.

Other recreationists commented that traditional wayfinding skills such as map reading, and using a compass, have become less common due to the use of digital devices. Participants indicated the use of a GPS, or other mapping applications or the download of maps on a digital device overshadowed recreationists' abilities to know how to use a topographic map and a compass:

> *GPSs are quite common instead of a compass and a map. But you should still know how to use a compass and map, as it is a useful skill. A lot of people bring along their smartphone and there are a couple of apps that you can get topo[graphical] maps [on], which are pretty good, but if you drop your phone in the river or run out of battery it is not good and can lead to trouble. (Recreationist #10, Rock Climber)*

A recreationist recalled a time when her GPS failed and she had to rely on her knowledge of topographic map reading and compass operating to navigate through fog:

> *There's lots of people that just rely on their GPS, and on the last tramp I went on I just had some crappy old batteries in it and it died part way through and it started playing up because it didn't have enough power, and we were in fog and couldn't see where we were, and if you were just relying on a GPS and it died on you, you would be in serious trouble, but, I mean, we had topographical maps with us so we could work out where we were with our compass. (Recreationists #30, Walker)*

Martin and Pope (2012), in their research on technology, found that inexperienced recreationists tended to use devices to compensate for their lack of wilderness skills such as topographical map reading skills. In their early research on the use of technology on backcountry recreation, Ewert and

Shultis (1999) wrote, “Traditional wayfinding skills (e.g., map and compass, celestial navigation) and knowledge of animal behaviour may be disappearing from the backcountry scene” (p.3). There is a tendency to use technological devices that quickly solve people’s problems and an overreliance on technology, which places the responsibility to the technology rather than onto the individual (Dickson, 2004; Pohl, 2006; Pope, 2010).

In this study, PLBs, EPIRBs and GPSs were reported as sometimes being carried and used by Port Hills’ leaders of recreational groups due to their responsibility of looking after individuals or clients for education purposes. For example, a scout leader described,

> *I take portable GPS units so that I can teach the navigation to the kids but also so that they know where they are at all times. With Cubs and Keas, you’re generally not going too far off the trail, but they often have a real interest in it as well and [love] learning how to track a route and follow a trail on a GPS and plot it all. (Recreational Group #3, Scout Leader)*

Another participant mentioned a walking club had a rule about communication devices and making the appropriate decision on the device to take depending on mobile phone reception reliability:

> *The club rules say that on the Port Hills every group should have either a cell phone or a locator beacon with them for emergency things. I mean, I’m a little averse to cell phones. So, I would take a locator beacon, but along the front here generally reception is OK to take cell phones, and that’s the big problem is reception. (Recreational Group #2, Guide Walking Club)*

In general, Port Hills recreationists’ perceptions were that devices used in remote settings were more specific (e.g., PLBs and GPSs) and were used more for communication purposes with Search and Rescue services and for route finding as opposed to the more versatile mobile phone carried in peri-urban settings. In the Port Hills, although communication devices such as mobile phones were used for safety they were also used to communicate and for other reasons such as listening to music, collecting performance data, taking photos, and so forth, as presented in previous chapters.

7.3 Chapter summary

This chapter presented results examining the use of digital technology and the implications for managerial practices. The interviews with managers revealed mixed responses about their roles in facilitating the use of digital devices. It appeared that they had yet to fully consider the impact of the use of digital technology on recreationists’ experiences. Other than being aware of some initiatives such as technology-driven education programmes developed and implemented within or outside

their organisations, managers did not deem recreationists' use of technology to be a priority needing attention other than doing a better job at maintaining accurate information on their websites and finding ways of engaging youth via technology. The one manager (from the non-profit trust) felt strongly about being proactive to avoid future use conflict and the erosion of the social values associated with outdoor activities. This participant had recommended to the organisation's Board to include a digital technology policy at the hut managed by the Trust. In general, recreationists had mixed opinions about the responsibility of recreation managers towards their digital technology usage.

Overall, research participants acknowledged the engagement with digital devices varied between the peri-urban and remote settings with more specific communication devices such as PLBs and GPSs used in the remote settings. The smart phone being the most popular device carried in the peri-urban setting is also a very popular device used in urban life extending recreationists daily digital lives into the outdoors. This finding, among others, is further explored in the concluding discussion Chapter 8 below.

Chapter 8

Concluding Discussion

Over 20 years ago, Ewert and Shultis (1999) highlighted the emerging impacts of various technologies on backcountry recreation. At the time, the authors established that communication technologies such as emergency beacons and digital phones, along with technological innovations improving access and transportation, access to information, perception of safety, and comfort were key factors influencing increases in participation in backcountry recreation. When writing about the influences of technology on remote wilderness experiences and management, Martin (2017) indicated digital devices and their applications influence and impact the very nature of contemporary outdoor recreation. More recently, Amerson, Rose, Lepp and Dustin (2020) added that regardless of how one feel about the appropriateness of smartphone use in outdoor recreation, the technology is here to stay with more technological advances in the future. In the current study, digitally mediated experiences via the use of digital devices were frequent where the majority of recreationists carried one or more digital devices for various reasons. These reasons included communicating and safety offering similarities to what was reported 20 years ago by Ewert and Shultis and more recently by Martin.

This concluding discussion critically reflects on the way digital technology use is embedded in the current peri-urban outdoor recreation experience and the ways in which it impacts how and why individuals recreate outdoors. The chapter starts with a summary of the research findings in relation to the research questions. This is followed by the presentation of a typology categorising digital technology use in peri-urban outdoor recreation. The typology represents the significance of outdoor recreationists' digital engagement in peri-urban settings. The approach of categorising digital technology use is unique and is characterised through four groupings of digital technology engagement that emerged from the research. Finally, this chapter addresses the contribution of the findings to academic knowledge and recommends ideas for future research.

8.1 Research findings and relationship to research objectives

This section summarises the main research findings from Chapters 5, 6 and 7 by connecting to the themes of the three research objectives. The first objective was to explore the contextual nature of digital technology engagement in outdoor recreation; what devices were used and carried and for

what purposes. This objective in describing the context of digital technology engagement provided a foundation for understanding the significance of digital technology from outdoor recreationists' perspectives. The second objective explored the relationship between digital technology engagement and various Port Hills user groups to further understand digital technology use and its impact on individuals' outdoor recreation experiences. The third objective identified and evaluated variables that influenced recreationists' engagement with technology while also evaluating some of the implications for management practices.

8.1.1 Embeddedness of digital technology in the peri-urban outdoor recreation experience

In researching the context around digital technology engagement in the peri-urban outdoor recreation setting, results showed that technology was embedded in the outdoor recreation experience, with the majority of research participants carrying one or more digital devices during their Port Hills visits. The embeddedness of technology into the human experience was also reported in previous studies by Butryn (2003) in the context of elite athletes, and by Ryan (2002) in the context of individuals recreating in remote settings. Although the technological contexts were different, both authors agreed on technology being entrenched in the human experience as it was in the Port Hills study.

The first research objective sought to identify which digital devices were carried and used by outdoor recreationists in the peri-urban setting of the Port Hills of Christchurch. This objective was primarily addressed in the quantitative data collection and supported by the qualitative data. Findings showed the main type of device carried and used by Port Hill recreationists was the mobile phone and that people's reasons for carrying this device were mainly for safety and to communicate with family and friends. In general, the carrying of mobile phones was higher in this study than in previous outdoor recreation and technology research (Lindell, 2014; Martin & Blackwell, 2016; Outdoor Foundation, 2013). This is possibly due to the peri-urban setting of the Port Hills study as opposed to other studies. Interviewees seemed more inclined to justify carrying communication devices just in case of another earthquake. In addition, the majority of outdoor recreation and digital technology research until now have taken place in more remote settings. A study by Mason et al. (2013) and another by Amerson, Rose, Lepp and Dustin (2020) conducted in a remote recreation setting with hikers who were out for longer periods of time than Port Hills recreationists reported a higher number of recreationists carrying communication devices, particularly GPSs, either as stand-alone devices or

embedded in a mobile phone. Based upon past research, and in alignment with the findings of this study, the setting and characteristics of the outdoor activity such as length of time impacted the amount and type of devices carried by recreationists. Overall, recreationists' behaviour of carrying phones in the Port Hills aligned with technology use and digital culture research carried out in urban settings where devices such as mobile phones are part of day-to-day life and integral to individuals' social networks and identities (Bjørner, 2016; Campbell & Park, 2008; Caronia, 2005; Pain et al., 2005).

In the Port Hills research, communication devices, particularly mobile phones, were used for safety purposes. Previous research demonstrated the importance of digital devices for safety, mobile phones used for safety in urban settings, and other communication devices such as GPSs and PLBs in more remote settings (Campbell & Russo, 2003; Kumar & Prakash, 2016; Lindell, 2014; Pain et al., 2005; Pope, 2010; Shultis, 2015). Research participants stressed the importance of being able to contact family and friends or emergency services if needed.

Furthermore, Port Hills recreationists carried devices to communicate with others as they would in their lives when not recreating in the Port Hills. This idea of carrying a phone to communicate with family and friends was prevalent in the urban digital culture literature (Bjørner, 2016; Campbell & Park, 2008; Caronia, 2005; Ling & Yttri, 2002; Pain et al., 2005), illustrating a relationship between technology engagement in day-to-day urban life and when outdoor recreating in the Port Hills. In her research on mobile technology in outdoor recreation, Lindell (2014) discussed carrying a phone out of habit, whether the device was used or not, a finding confirmed in this study with Port Hills recreationists mentioning that they must have their phone with them as they always do in case something happens or in the eventuality of wanting to communicate with others by phone during the activity. In contrast to the Port Hills, the more remote setting of Lindell's research did not provide a stable phone reception and networks; therefore, Lindell's research participants did not use their phones as much as participants from the Port Hills research.

The Port Hills research revealed the importance of micro-waiting moments, such as when recreationists paused their activities at places such as the top of the Rapaki Track, creating a predictable point in time when the use of digital devices was heightened. These in-between or micro-waiting moments also happened with rock climbers who were more likely to use social media and access information as a result of the pace of rock climbing, which includes natural breaks throughout the activity. This aligns with the work of Isaacs et al. (2010) who found that participants initiated

waiting moments, at times in the middle of activities such as exercising, to allow time to catch up on messages and notifications. Such moments have not been identified in any previous outdoor recreation literature, confirming the continuation of habitual urban behaviours in a peri-urban area, which are also facilitated by the higher levels of connectivity not found in more remote areas.

Across all digital devices, not solely mobile phones, the main purposes of use in order of prevalence were for communicating through calling or texting, checking the time, taking photos and videos, collecting performance data, listening to audio, and accessing information. One of the least reported mobile device uses was posting on social media especially amongst runners and recreationists over the age of 40 as opposed to younger recreationists or recreationists visiting the Port Hills for the first time. Lopez-Fernandez et al.'s (2017) findings around the high use of social media use amongst European young adults in day-to-day life had some alignment with younger Port Hills recreationists who also used social media to a greater extent than other age groups but not to the same level identified in the Lopez-Fernandez et al.'s findings. The difference of social media use between research participants in the Port Hills research and in Lopez-Fernandez et al.'s research may be as a result of the outdoor recreation context and setting. While it is possible individuals may be less inclined to participate in social media activities with their devices while in outdoor recreation settings, this cannot be definitely asserted based on the results of this study, as the Port Hills research inquired about posting on social media and did not clearly ask about the specific act of only looking at social media which could have been limiting.

In general, existing research in outdoor recreation and technology have not reported specific details of technology use, although some research grounded in more remote settings report on digital technology use centred on the themes of communication, safety, and accessing information (Martin and Blackwell, 2016; Shultis, 2015). Moving away from these themes, Lindell (2014) and Amerson et al. (2020) reported that taking pictures was an important reason for carrying a phone while recreating outdoors, a finding that is similar to this study with almost half of Port Hills recreationists taking photos or recording a video. As for collecting performance data, recreationists in the Port Hills sought health and fitness benefits as the most prevalent reason for recreating in the Port Hills, which is consistent with overall reasons for outdoor recreation in the literature. Authors have argued that self-quantification via fitness application data is increasing and augmenting human-technology interactivity (Millington, 2016; Young, 2012). Millington (2016) discussed a fitness boom in which fitness is consumed while activity or fitness data are produced. The author argued that fitness with

its collection of data is becoming more of a commodity than an experience. The large number of Port Hill recreationists collecting fitness data in this study could possibly emphasise the utilitarian function of devices. Perhaps, for some recreationists, utilising digital devices makes the outdoor recreation activity more of an instant commodity by quantifying the experience through measures such as average and maximum speeds, distances, and overall time spent recreating. The main use of the activity and fitness data for recreationists who collected data seemed to be for comparison of personal data from one outdoor recreation activity to another. The collection of activity and fitness data during the outdoor recreation activity appears to be an under researched topic in the outdoor recreation literature, and, in general, its impact on the outdoor recreation experience is not well known.

Digital auditory experiences were prominent in the research in various ways. While some recreationists reported listening to music to motivate themselves or to break the monotony of their activity, others indicated being distracted by the sounds of phone notifications and had a preference for no digital sounds. The latter group of recreationists reported that digital sounds such as music were a distraction because the sounds created an unsafe environment by blocking the noise made by other recreationists or by altering the experience of connecting to nature . The views of these recreationists align with Li et al. (2018), who suggested recreation managers take actions to preserve natural sounds to improve visitors' experiences, as their research participants preferred natural sounds to human made sounds such as cars or airplanes. Li et al.'s research used a virtual environment to collect data and did not distinguish between various outdoor recreations settings. In the urban culture literature, Bull (2001, 2005, 2013) researched the impact of music and digital devices, such as the iPod, and found individuals managed their experiences and social spaces through music. This was also found in this study, with some recreationists managing their experiences through the use of music to motivate them to get through a stretch of track that was unexciting and arduous, such at the Rapaki Track. The music supported their activity by making it more fun, exciting, and dynamic. Recreationists found phone notification sounds to be a source of distraction, as they interrupted their outdoor activities. Recent research on digital culture supported these findings and also emphasised the negative impact of constantly receiving phone notifications on health and wellness (Kushlev et al., 2016; Fitz et al., 2019).

One main finding of this research was that not all digital devices carried were used; one out of five recreationists carried a digital device (or several devices) that they did not use. It appeared as if some

recreationists wanted the reassurance of knowing that they could use their devices just in case it was needed or in case of an emergency. Most research on outdoor recreation and technology does not report on such details giving the impression that all technology that is carried is used. This is an important distinction that was also made in Lindell's (2014) research that reported close to half of the sample did not use their phones during their activities, which was a higher number than in this study. A variable for both studies was the mobile signal, which appeared weaker in Lindell's setting and more consistent in the Port Hills. Lindell's research participants may have not had the opportunity to use their devices as much as Port Hills recreationists.

8.1.2 Digital technology engagement details: What? Who? When?

The second objective, "To compare and contrast the use of digital technology between outdoor recreation user groups in a peri-urban setting," was primarily addressed using the quantitative data, with the qualitative data supporting these findings. Chapter 6 of this dissertation mainly focused on addressing this research objective. In a broad sense, this section of Chapter 8 reflects on what the digital devices were used for, by whom, and when. For the purpose of presenting the findings in a coherent manner, the digital devices usage were categorised in three broad themes of self-logging and quantification of the outdoor experience, digital auditory experiences, and communication and connection when making comparisons between demographic data, activity characteristics, and activity groups.

Findings revealed that various user groups, whether analysed by outdoor recreation activity, activity characteristics, and/or user demographics, experienced digital technology differently when recreating. In general, the majority of research participants, regardless of the activity, carried a device for safety, with significantly more mountain bikers carrying a mobile phone for safety. This was consistent with literature on digital technology and outdoor recreation in remote settings, including the work of Ewert and Shultis (1999), who identified a relationship between the use of technology and safety. Some of this study's research participants, although conflicted about the use of technology while recreating in general, appeared less conflicted about the use of technology for safety purposes. Blackwell (2015) also noted this positive emphasis regarding the use of technology in outdoor recreation for safety. Blackwell found remote area recreationists were able to enjoy their experience more with less concern when carrying a personal locator device. One issue discussed in the literature relates to the overreliance on digital devices, the false sense of security, and the lack of traditional wayfinding knowledge in the eventuality of an emergency (Borrie, 1998; de Souza e Silva

& Frith, 2012; Martin & Pope, 2012; Pain et al., 2005; Pope, 2010; Shultis, 2015; Wiley, 2005; Wray, 2009). In this research, participants shared their concerns over devices not working or failing; however, recreationists also noted, with the Port Hills being a well-used area, other recreationists would be able to assist and use their devices and help if needed. In a sense, this transferred part of the safety responsibility to a third party.

Within the theme of self-logging and quantification of experiences, some groups of recreationists were more likely than others to take photos or record videos and to use a fitness application to collect various types of data. Some differences surfaced based on activity, gender, age, and frequency of visits to the Port Hills. For example, recreationists who were visiting the Port Hills for the first time were significantly more likely to take photos. Rock climbers were significantly more likely to take photos and make videos, while mountain bikers and runners were more likely to quantify their experience through a fitness application. Such differences are consistent with the practicalities and goals of participating in each activity, in easily allowing or preventing regular stops, or in evaluating the results of a run or ride. In previous research, taking pictures was reported as the more prominent reason for bringing a mobile device while recreating, although there was no distinction between user groups (Lindell, 2014). The Port Hills research was unique as it captured details on self-logging and quantification of experiences by user groups and by activity.

Within the theme of digital auditory experiences there were also some variations between recreationists. Runners and solo recreationists were significantly more likely to listen to music than recreationists participating in other activities. Listening to audio, such as music, motivated runners and increased the enjoyment of activity and recreationists who were less likely to listen to music such as mountain bikers preferred the connection to the environment, stating the importance of awareness of sounds for safety purposes. It appeared that recreationists who listened to music or other forms of audio were drawn to being in their own world and feeling a sense of control and empowerment by listening to some form of audio, which stood in contrast with recreationists who were less likely to want to listen to music or other form of audio. The latter were more inclined to listen to their surrounding environment, whether for the pleasure of natural sounds or for sounds alerting them to a possible equipment failure or to other recreationists being close to them. In their research, Li et al. (2018) reported participants had clear preferences for natural sounds over sounds produced by humans, which was also reported by a few Port Hills recreationists. This was also aligned with a recent report from the New Zealand Parliamentary Commissioner for the Environment

(2021) who wrote that the loss of the natural quietness is an issue impacting the experience when increased numbers of individuals visit a park.

It is possible that the Port Hills recreationists who did listen to music expected human-made noises such as car noises as a result of recreating in a peri-urban setting. The findings of Port Hills recreationists who listened to audio to have more control over their outdoor experience is consistent with Bull's (2005) work on the iPod in urban culture, in which listening to music provided a sense of control and empowerment. This is particularly interesting given that outdoor recreation research has emphasised the importance of the connection to the environment as providing a range of benefits, so it was an unexpected finding that recreationalists would experience benefits from disconnecting from that environment.

Within the theme of communication and connection most recreationists carried a device for safety, to communicate, to access information needed during the activity such as the track status or weather. Various groups used these device features differently. Carrying a communication device for safety was more prevalent amongst mountain bikers, recreationists between the ages of 13–17 years, and frequent visitors to the Port Hills, and less prevalent amongst recreationists 60 years of age and older and recreationists who were in the Port Hills for less than one hour. Lindell (2014), in studying the role of technology use outdoors, reported age was not a significant factor in technology use, a finding contradicted here where there was significantly more use by younger than older participants. Research participants recreating for less than one hour carried significantly less technology than their counterparts who recreated for longer lengths of time. Supporting the more recent outdoor recreation research (Lindell, 2014; Shultis, 2015), this research found carrying digital devices for safety purposes was part of the outdoor recreation experience and was generally accepted as a reasonable approach.

In relation to utilising devices for communication, participant groups varied in their patterns of usage. Rock climbers and mountain bikers were the two user groups who most frequently used the communicating features of their mobile phones along with younger recreationists and recreationists who visited the Port Hills for the first time. In addition, recreationists who were recreating with one or more people, and recreationists who were in the Port Hills between 3 to 5 hours were more prone to communicate via their phones than those who were recreating for shorter periods of times, particularly for people who recreated under 1 hour. Lindell (2014) found the more recreationists in a

group, the less texting seemed to occur, whereas the Port Hills research found non-solo recreationists tended to use their devices more for communication purposes.

8.1.3 Digital technology engagement influencers

The third and last research objective had a greater focus on the variables that influenced outdoor recreationists' engagement with digital technology and on the possible implications for management practice. This objective was mainly substantiated by the qualitative data and by the content of Chapter 7, which discussed digital technology use and implications on management practices. It emerged that the activity and its characteristics, the setting itself, and personal preferences and experience variables each played a role in engagement with technology. This undeniably resembles the ASEB components presented in the Chapter 2 of this thesis. This engagement with technology can be categorised into four main groupings, including the absence of technology engagement and engagement for reassurance, support, or dependency purposes. Each of these is conceptualised in a typology presented in the following section.

8.2 Typology of digital technology engagement in the peri-urban outdoor recreation experience

The overall aim of this research was to study the significance of digital technology from outdoor recreation users' perspectives in the content of a peri-urban setting. This resulted in the creation of a typology with digital technology engagement classified into four groupings: absence of technology, technology for reassurance, technology for support, and technology dependency (Figure 8.1).

	Absence of technology	Technology for Reassurance	Technology for Support	Technology Dependency
Level of technology engagement	Absence of digital technology during the outdoor recreation activity.	Low engagement with digital technology during the outdoor recreation activity. Devices are carried but not used.	Intermittent engagement with digital technology during the outdoor recreation activity.	Consistent engagement with digital technology during the outdoor recreation activity.
Perception of use of technology	Digital devices are not perceived as a valuable contributor to the activity.	Digital devices are perceived to provide safety. The devices are carried just in case.	Digital devices are perceived to provide safety. They can be used as a source of motivation, to connect for micro-coordination purposes, and to access information.	Digital devices are perceived to provide safety and can be used as a source of motivation, for micro and hyper-coordination purposes, to access information and to collect fitness data.

Figure 8.1 Typology of digital technology engagement in the peri-urban outdoor recreation experience.

The typology of digital technology engagement shows how Port Hills individuals interact with digital technology while recreating. Throughout the research, recreationists indicated the degree to which influences impacted their engagement with technology. These influences can be categorised into three variables: Activity, features of the peri-urban setting, and personal preferences and experiences. These three influencing variables impacted the nature of technology engagement, and how recreationists engaged with technology differently as a result of the blend of individual elements of the influencing variables. For example, a mountain biker might be more likely to carry a communication device as reassurance in case of a tyre puncture due to the nature of the equipment used in the biking activity, whereas a recreationist who experienced a previous personal injury while outdoor recreating may wish to carry a communication device for reassurance.

The typology of digital technology engagement is important to the understanding of how outdoor recreation is changing and evolving and how people today are experiencing outdoor recreation. The majority of Port-Hills recreationists sought an experience to increase their health and fitness, to provide access to nature, to view scenery and to relax while experiencing nature, and challenge

themselves, and the majority did so with the support of digital technology. Being aware of the level of technology engagement and the influencing variables can assist recreation managers in making decisions around the provision of outdoor recreation experiences. The typology gives recreation managers insight on the type of experiences sought and how they can manage communication with recreationists especially when it comes to safety issues.

The typology of digital technology engagement in peri-urban outdoor recreation aims to conceptualise recreationists' use of digital technology, which in turn increases people's understanding of the contemporary outdoor enthusiast. The groupings included in the typology of digital technology engagement are explained in the subsections that follow.

8.2.1 Digital technology absence

In a minority of cases, digital technology was absent and did not contribute to the recreationists' outdoor experience. At the absence of technology level, digital devices are not perceived as a valuable contributor to the activity. Consistent with the work of Lindell (2014), a small number of recreationists in the current study did not carry digital technology. Lindell's research did not provide details as to why research participants did not carry a phone. In this research, recreationists reported multiple reasons for not carrying digital technology from preferring an outdoor recreation experience with no digital devices as a way to escape the digital space to reducing day-to-day stresses and engaging in meaningful social interactions with other recreationists. These findings confirm that some of the traditional reasons for outdoor recreating remain important for these recreationists (Driver, 1998a; Manning, 2011). The findings also emphasised the value of socialising and interacting with others in person when recreating (Haas et al., 1980; Ibrahim & Cordes, 2002; Manning, 2011; Plummer 2009).

Other recreationists' reasons to recreate with no digital technology were temporary and related to the unreliability of the technology (i.e., not working, loss, out of battery). Unreliable technology did not seem as much of an issue in the peri-urban setting such as the Port Hills in comparison with remote settings due to the perception that someone would be there to help in case of an emergency in the peri-urban settings. In the remote setting, Pohl (2006) reported a problem that the high reliance on a device such as the GPS can become a significant safety issue if the device breaks or runs out of battery. In a setting like the Port Hills, the impact of recreating without a device that is broken and unreliable appeared less than in a remote setting due to elements such as proximity to the urban

setting, familiarity with setting, multiple access points and high number of recreationists in certain parts of the Port Hills. In some cases, technology was not carried out of practicality such as a device being awkward to carry or the recreationist was with someone else who was carrying a device. Runners reported that digital devices were awkward to carry more than other activity groups, which can explain the growth of products designed to more easily carry technology when walking or running such as arm bands. Although Millington (2016) discussed progress in wearable fitness technology and the increased connection between human and technology, there appeared to be a small group of recreationists, particularly runners, who preferred not to carry and use technology. In Butryn and Masucci's (2009) terms, this suggests evidence that the theorised cyborg, as identified in studies such as Millington's (2016), is not always apparent through the voices of participants. Instead, participants at times deliberately resisted an increasingly technologised existence, or were aware of the limitations of technology. This is of particular relevance in the outdoor recreation environment as it raises the possibility that recreationists may ensure that traditional values of outdoor recreation remain intact despite our increasingly technologised lives.

8.2.2 Digital technology for reassurance

For some research participants, technology acted as a form of reassurance for the outdoor recreation experience. This occurred when recreationists experienced a low level of engagement with digital technology by carrying but not using their digital devices. At the technology for reassurance level, digital devices are perceived to provide safety, and are carried just in case needed. In the current study, a minority of recreationists (17%) who carried a digital device did not use them during the activity. Lindell (2014) found similar results in that mobile phones carried by outdoor recreationists were not always used; however, Lindell's findings reported a higher number of devices that were carried and not used than in this study. The variation between Lindell's findings and the findings in this study can be partially attributed to the setting. Lindell's work was done in a remote setting with limited mobile phone network accessibility, which was not the case in the peri-urban setting of the Port Hills.

Port Hills recreationists who engaged with digital technology for reassurance often mentioned carrying their devices for safety in case of an earthquake, bringing a time and place dimension to the decision to carry a device or not. For many research participants, the Christchurch earthquakes impacted their perception of safety in the Port Hills (Young, 2013). Other reasons for carrying devices in case of an emergency included the need to reach family members for possible injuries, tyre

punctures, and so forth. The reliance on the mobile phone for safety is consistent with technology-focused outdoor recreation research and urban mobile communication research, which emphasises the need for carrying a phone to feel safe (Campbell & Russo, 2003; Lindell, 2014; Ling & Yttri, 2002; Martin, 2017; Shultis, 2015). Campbell and Russo's (2003) research conducted in an urban setting found mobile phone adoption was influenced by the social need to interact with family and friends and also by safety concerns. Shultis (2015) found digital devices were relied upon and empowering when it came to safety issues in remote settings. The importance of wanting to remain safe was equally as important in the Port Hills peri-urban setting. Although the devices used to manage safety concerns were different, recreationists in the peri-urban setting primarily relied on the mobile phone as opposed to a more specific device such as a personal locator beacon, which tend to be used in remote settings.

Carrying a digital device, such as a mobile phone, in order to stay connected to others while recreating may be related to a phenomenon identified as nomophobia, a fear of being disconnected (Rodriguez-Garcia, Moreno-Guerrerro, & Lopez-Belmonte, 2020). In the interviews, when asked if they would go back and get their phones if they had forgotten it, most research participants said yes within reasonable distance of their starting point. There was a sense of nomophobia in this research, as some research participants wanted to have the ability to connect with friends and family at all times. This was the advantage of recreating in the Port Hills; staying digitally connected was possible. This contrasts with the literature on technology in remote settings, where it is understandable that disconnection is seen as a positive goal and part of disconnecting and getting away from the busyness of life. As such, it could be that recreationists in that setting would be less likely to experience nomophobia. Regardless of the reasons for Port Hills recreationists to engage with digital technology, carrying a mobile phone in case of an emergency raised discomfort amongst some recreationists who mentioned, during the interviews, that mobile reception may not be reliable during a natural disaster or when needed. This idea supported Mason et al.'s (2013) work, in which hikers knowingly carried mobile phones in remote settings with unreliable mobile reception. The results also aligned with the idea of false sense of security provided by digital technology in remote outdoor recreation settings (Borrie & Roggenbuck, 1998; Martin & Pope, 2012; Pope, 2010; Wray, 2009). As opposed to results from remote settings, many Port Hills recreationists admitted to this false sense of security and mentioned that they could most likely flag someone down if their devices malfunctioned in an emergency. This again speaks to the difference between the peri-urban and the remote, with it being unlikely that there would be someone else to flag down in a remote setting.

The way participants admitted their false sense of security speaks again to nomophobia, with participants not really being able to articulate why exactly they felt such a strong need to carry their device, given their awareness that they did not actually need it for safety reasons.

The next two levels of digital engagement discussed in the following sections are support and dependency. In contrast to recreationists using technology as reassurance (digital devices carried and not used), at the support and dependency levels, digital devices were used more consistently. The majority of research participants (82.3%) used the device they were carrying, with the POV, the digital camera, and the watch having the highest carry-use ratio. Recreationists who utilised smartphones used on average three features, with the highest features being checking the time, calling or texting, and taking photos. When the experience became supported by technology, digital devices were used intermittently as opposed to when the experience was dependent on technology, in which case the devices were used on a more continual basis.

8.2.3 Digital technology for support

For some recreationists, technology acted as a support to the outdoor recreation experience when digital devices were used on an intermittent basis and not just carried. At the technology for support level, digital devices are perceived to provide safety. They can also be used to enhance the experience for purposes such as calling or texting for micro-coordination, for audio listening to increase motivation on a specific track portion, to access information such as weather, and to take photos at a viewpoint. Recreationists using digital technology as support were more reliant on the technology than recreationists who used it for reassurance, and less reliant on technology than recreationists who depended on it throughout the activity.

At the support level, recreationists could have used one or more devices and used their smartphones for one or more types of use, although the use was temporary and purposeful. For example, across the sample, in the current study, 76.6% of recreationists carried mobile phones to access family and friends, with close to 40% either calling or texting during their activities. Although the content or length of the communication was not reported in the survey data, interviewed recreationists reported mainly using their mobile phones for micro-coordination to organise meeting times, to touch base with family or friends, or to coordinate daily activities such as a mother calling her son to give him directions about how to cook a pizza in the oven. Surprisingly unique to outdoor recreation in the peri-urban setting, communication for micro-coordinating paralleled communication

behaviours found in urban mobile communication studies (Campbell & Russo, 2003; Ling & Yttri, 2002), thereby extending digital social norms beyond the urban into the peri-urban. In their research, Ling and Yttri (2002) emphasised micro-coordination as a vital dimension of transportation in urban settings. An example given by the authors was when individuals called each other to confirm the location of a meeting place. This happened in the Port Hills with recreationists reporting carrying their phones to confirm a meeting place, emphasising the role of mobile phones to support the experience. In the Port-Hills, recreationists would also use their phones for micro-coordination for safety purposes such as contacting emergency services if they, or someone else, was injured or for calling a family member to come and get them when their equipment failed.

The connection to digital devices while recreating is embedded in most settings, whether recreating in urban, peri-urban, or remote environments. What differs is which devices are used and for what purposes. From the Port-Hills research and other research, using devices to micro-coordinate with friends and family appeared more prominent in both urban and peri-urban settings, but less important in remote settings, where technology was primarily found to be used for safety purposes and to take pictures (Amerson et al., 2020; Lindell, 2014). In the technology as support category, recreationists were purposeful in their use of digital devices and able to fulfil some of main reasons to recreate such as viewing scenery, relaxing, and experiencing nature by using the technology intermittently on an as-needed basis. A unique example of using technology as a support came from a Port Hills running coach using the video function on a tablet to coach clients on running techniques on specific track features. In this instance, the use of technology supported skill development of the athletes in the peri-urban setting through immediate visual feedback.

Recreationists also used digital music as support on certain portions of a track to motivate them throughout the activity or used their communication devices to research information and check on the status of specific tracks by accessing the Port Hills track status webpage. Accessing information from sites such as the track status webpage supports the notion that the use of mobile devices is contextual and depends on location and activity, as also reported by Hinz, Chang, and Nichols (2010). The authors reported that users of mobile phones tend to search for information on their phones that is pertinent to their location, conversation, and activity. This was the case in the Port Hills when recreationists reported using their phones to search for track or weather information to assist them in making decisions about their activity such as which tracks were open. Using digital devices for

support at specific times during the activity possibly indicated that recreationists were able to have moments of disconnection from their digital devices during their outdoor activities.

Taking photos is another example of a type of digital device usage that supported the experience and more likely than not involved using devices intermittently during the entire activity. Taking photos just like micro-coordination or searching for information are all good examples of using technology as a form of support during possible stand-by moments or micro-waiting moments, which were reported most often by rock-climbers. Caronia's (2005) concept of stand-by moments amplified how technology gave meaning to time and place; this was certainly true of the viewpoint on top of Rapaki Track, which was observed as a popular place to stand-by and wait while using technology.

Some recreationists reported that taking photos was distracting at times, preventing a connection to the environment, which was listed as important reasons for recreating in the Port Hills. Although taking photos in the Port Hills was frequently done, it was not the most popular feature, as opposed to what was reported to be the most important use in the remote setting of Lindell's (2014) research. This could be explained with recreationists who frequented the Port Hills, often for short periods of time, and were not inclined to interrupt their activity by taking photos as they were familiar with the setting. This was an interesting finding in light of some recreationists identifying that they were comfortable disconnecting from the environment when listening to music on unchallenging and less attractive terrain to increase motivation. The difference may have been the terrain features, for example, disconnecting from the environment when accessing beautiful scenery created a sense of discomfort for some as opposed to disconnecting from the environment on a section of track that is less appealing.

Overall, recreationists who use technology as support were those who engaged in purposeful use of technology as a mechanism for enhancing their recreation experiences. This is in contrast to recreationists who used technology as reassurance; these individuals carried devices but found it beneficial to not engage with them. Recreationists who engaged with technology for support were more reliant on their devices than recreationists who engaged for reassurance but less reliant on technology than recreationists who were dependent on the use of technology during their activity.

8.2.4 Digital technology dependency

Some recreationists were highly reliant on and consistently engaged with their digital devices during their recreation activity. These recreationists appeared to deliberately choose to connect with their

technology due to the benefits they experienced from using the devices. At the level of technology dependency, digital devices are perceived to provide safety and can be used as a source of motivation, to make videos, for micro and hyper coordination, to access information and to collect fitness data. For these recreationists, with the use of digital devices being consistent and highly integrated in the outdoor recreation experience, there were fewer opportunities for digital disconnect during activity.

Runners, although carrying less technology overall, were the most likely to be dependent on music, utilising selected playlists that suited their moods and the intensity of their activity. Findings from Bull's (2005) research on the iPod culture of mobile listening in the urban setting emphasised how music device users inhabit and control the spaces within which they move by being dependent or at the mercy of a digital device to do so. Recreationists who depend on their devices to listen to music do so to control the experience, to increase the enjoyment of the activity, to make them feel in their own world, and to build-up their motivation during the outdoor recreation activity. Potentially, this sense of control may produce empowerment for recreationalists, which may have been particularly important at the time of the study given the recent natural disasters which were very much out of the control of individuals.

The literature on digital devices in remote outdoor recreation settings did not include music or any other form of audio listening except for a recent study by Amerson et al (2020) who found that thru-hiker on the Pacific Crest Trail used their smartphone for music . It is also worth noting that the nature of music immersion into the activity impacted the connection to the environment and prevented some recreationists from being aware of natural noises or of other trail users. This was reported by few Port Hills recreationists as a reason for not listening to music or other forms of audio. The existence of opposing views on the value of music reflect Butryn and Masucci's (2009) argument that athletes vary in their comfort with cyborgification, in being an extreme example of how the very same use of technology can be perceived as either enhancing the recreation experience or detracting from it.

Another form of dependency related to recreationists who collected performance data during their activity, which was reported by over 20% of those surveyed. Mountain bikers and men reported collecting data more often than other recreationists with Strava (n.d.) being the most popular mobile application. The literature on Strava indicates that the application, popular amongst cyclists, is used during the outdoor activity to monitor performance, and some recreationists use the application as a

way to compete against other Strava users (Vanderbilt, 2013; Williams, 2012). Millington's (2014, 2016) work on fitness phone applications emphasises the use of mobile applications as a means to achieve health and fitness goals firstly through data digitization and quantifying the self and secondly as a way to be connected to other recreationists through the public display of individual fitness data. For Port Hill recreationists, competing against others was the least important reason to partake in their activity, with health and fitness being the most important reason. Consequently, the reliance and dependence on fitness applications for Port Hill recreationists was based on their personal use and accomplishments of health and fitness goals rather than being connected to others or for competing against others. Collecting activity and fitness data was a source of motivation for some recreationists who used fitness applications, one recreationist said she was scientifically motivated to push herself to improve her performance. This idea of evidencing success through metrics is highlighted in the work of Kerr, Rosin and Cooper (2019) in the sport performance context where data and metrics are often used as a way to measure success of performance. Although the Port Hills research is within the context of outdoor recreation versus high performance sport, the collection of activity and fitness data showed evidence that recreationists were looking to achieve goals, improve performance, and increase motivation and collecting data helped them do that.

A last example of digital dependency during the outdoor activity related to the use of digital POV cameras, which were carried and used by a small minority of Port Hill recreationists, most frequently by mountain bikers and rock climbers, by men only, and by younger recreationists between the ages of 13–18 years. Younger downhill mountain bikers who were interviewed mentioned using a POV camera to record their activity, and then editing the video content and posting on social media while in a vehicle during their ride back up to the start of the track. The use of the POV, like the use of a fitness application, was typically continuous during the activity and impacted the behaviour of the users; for example, mountain bikers may select a particular track or feature of a track to film on or select a track based on a Strava segment where they want to capture activity data on. The POV wearable technology allowed users to record a moment in their lives that is unique and offered recreationists a way to monitor and record themselves or others while engaging in something unusual, difficult, and possibly even risky (Chalfen, 2014). Vannini and Stewart (2017) wrote about the role of POV videos in stimulating a sense of place while also providing inspiration and knowledge about a particular destination. This was relevant to the study findings, as Port Hills recreationists used the video function to review particular features of a track and relate this back to their overall performance.

The typology of digital technology engagement in the peri-urban outdoor recreation experience clearly indicates that recreationists engage with digital technology in different ways during an activity. From the data gathered, particularly from the qualitative interviews, it was clear that recreationists' decisions to engage, or not, with technology was purposeful and meaningful to their desired experiences. Multiple factors were linked to the decision to engage with digital technology, and these can be grouped into three main influencers: the activity itself, the peri-urban setting and recreationists' personal preferences and experiences.

8.3 Influence of activity, the setting, and personal variables on recreationists' levels of digital technology engagement

This section examines the factors impacting recreationists' decisions to engage with digital technology. The influences that act independently or together include the activity itself, the setting, and personal preferences and experiences. The activity and setting influences are aligned with components of the ASEB framework, which emphasises the significance of these components in the outdoor recreation experience. The ASEB framework suggests that recreationists engage in activities in specific settings in order to realise experiences that are valued (Driver & Brown, 1978; Manning, 2011; McCool, 2006). The Port Hills study, with its focus on technology engagement, contributes to the ASEB framework in light of its relationship to technology which was not explicit in the model. The three influences, activity, settings, and personal preferences and experiences along with their link to the typology of technology engagement are explained in the sections that follow.

8.3.1 Activity

The first variable influencing the level of digital technology engagement relates to the outdoor type of activity, which for this research mainly included walking, running, mountain biking, and rock climbing. Port Hills recreationists identified a relationship between the outdoor recreation activity and digital technology involvement. When analysed further, a relationship existed between different components of the activity, including the nature of the type of activity, the characteristics of the activities, the equipment, the perception of safety relating to the activity and equipment, the perceived benefits provided by the activity, and fitness or performance applications available for the activity (Table 8.1).

Table 8.1 Components of activity variable influencing digital technology engagement

Components of activity variable influencing digital technology engagement	
1. Type of activity	Hiking, running, mountain biking, and rock climbing.
2. Characteristics of activity	Where the activity is taking place (i.e., on a track, at a rock-climbing crag), the time and length of the activity, who the activity is done with, and the frequency of visits to an area.
3. Equipment	Equipment required for the activity such as a mountain bike or light weight gear for running.
4. Safety needs	Safety needs can differ depending on the type of activity.
5. Reasons for recreating	The reasons for recreating can vary by activity.
6. Data and fitness applications	Some fitness applications are designed for specific activity.

Depending on the types and characteristics of the outdoor activities undertaken, recreationists' engagement with digital devices varied and resulted in varying experiences. A recreationist may choose to engage with different devices and features when walking, running, mountain biking, or rock climbing. Runners were less likely to carry mobile phones but more likely to wear watches and digital music devices. Walkers and rock climbers were more likely to carry digital cameras and had a tendency to take more photos than other recreationists. This may be explained by Port Hills rock climbers' ability to carry more due to the nature of the activity, which tends to be longer, have more micro-waiting moments, and engage more people. Mountain bikers and rock climbers engaged more significantly with POV cameras than other recreationists.

Characteristics of the outdoor recreation activity included where the activity was completed, with whom, the length of the activity, and recreationists' frequency of visits to an area. Solo recreationists and runners significantly carried more digital music players while more recreationists who visited the Port Hills for the first time carried digital cameras. Recreationists who were in the Port Hills for less than 1 hour were more likely to carry no technology. Recreationists who recreated for more than 5 hours reported searching for digital information more often than those who recreated for shorter periods of time. Recreationists who recreated for more than 3 hours had a tendency to engage more with digital cameras than those who recreated for shorter periods of time, perhaps because they had more time to make it to a viewpoint.

The required equipment for the activity was a component reported to impact digital technology engagement. In the qualitative interviews, mountain bikers reported carrying mobile phones in case

equipment failure such as punctures. In addition, cycle computers were only carried by mountain bikers due to the design of the devices only being useful to mountain bikers.

Throughout the research, recreationists indicated an important reason for carrying a mobile phone was for safety, which is consistent with research focused on technology and outdoor recreation. The engagement with digital technology for safety needs based on the activity. For example, more mountain bikers significantly carried a mobile phone for safety. Many mountain bikers commented on the higher risk of colliding with other Port Hills users or because of equipment failures. The literature on crowding and conflict supports this finding in areas where there is a perceived risk of accidents between different users (Cessford, 2003; Manning, 1985, 2011; Stankey & Manning, 1986). On a side note, the mobile phone was the main tool to mitigate risk with recreationists reporting other traditional methods, such as carrying a whistle or leaving a trip plan behind, as less popular. For some, the use of digital devices in the peri-urban outdoor recreation setting resulted in the perception that the activity itself was less risky. One recreationist used the term 'sanitisation' to describe the idea that the use of technology can lessen people's perceptions of risks by giving the impression that the activity is less risky due to the heightened perception of familiarity, like being at home or in an indoor facility such as a climbing gym. In that sense, the use of technology may prevent recreationists from escaping their daily lives, a finding also reported in Shultis's (2015) research and in Amerson et al. (2020).

Almost half of mountain bikers in the research collected performance data, with distance, elevation profile, and overall time being the most important information collected. This could explain the high percentage of mountain bikers carrying and using mobile phones, which may be due to the popularity of the mobile phone application Strava (n.d.), which targets bikers (Brown, 2014; Vanderbilt, 2013) or perhaps due to the growing trend of fitness applications in general (Millington, 2014, 2016). Though a unique aspect of Strava is the way it allows bikers to compare their performances with others, suggesting an interest in competition from some bikers that differs from the anti-competitive orientation that has been identified as dominating many 'lifestyle' sports (Wheaton, 2004). Recreationists who collected fitness and activity data mostly through a smartphone depended on the technology to give them information on their individual performance, with the goal of evaluating their own performance, and not so much to compete with others.

In addition to being influenced by the activity itself, the levels of technology engagement were influenced by the social, physical, and management dimensions of the peri-urban setting in which the activity takes place.

8.3.2 Setting (social, physical, and management)

The second variable impacting recreationists' digital technology engagement is the setting and its social, physical topographies, and management practice dimensions. The study findings showed that the setting variable played an important role in recreationists engaging with technology at different levels of the typology. To understand the relationship between setting and technology engagement, the technology lens is applied to the social, physical, and management dimensions of the setting.

Table 8.2 Components of setting variable influencing digital technology engagement

Components of setting	Description
1. Social	
- Area use	Popularity of setting with Christchurch area residents and tourists.
- Online participatory culture	The ability for recreationists to report Port Hills live issues online, and to participate in the creation of a collective intelligence around Port Hills content and issues.
- Expansion of social network	The social network is expanded to include not only those who are physically present in the setting but to those who are not physically present.
- Popularity of tracks and viewpoints	Tracks can become more popular through Strava segments and viewpoints more popular through photos.
2. Physical	
- Terrain features	Specific track design, viewpoints and natural places conducive to micro-waiting moments.
3. Management	
- Dissemination of information	How information on track status in the Port Hills is updated and disseminated.
- Infrastructure and overall support	The infrastructure that assists in the reliable use of digital devices and the overall support from recreation managers. Not all areas in the Port Hills had supportive infrastructure.
- Education programmes	Education programming involving digital technology engagement.

The technology lens adds to the ASEB framework and the way that settings are used to facilitate experiences. The various components of the social, physical feature and management dimensions that surfaced in the data include area use, online participatory culture, terrain features, dissemination of information, infrastructure support, and education programmes (Table 8.2).

The diversity of the Port Hills setting through its tracks, location, ease of access, and visibility from Christchurch make the area a popular destination for Christchurch residents and/or tourism destination for recreationists looking for a peri-urban outdoor recreation experience. As a result of the popularity of the setting, many recreationists living in the Christchurch area did not venture far from their digital urban habits while in the Port Hills. However, some research participants recognised that the Port Hills was an area used by many recreationists and reported that they relied on other recreationists carrying their digital devices to help out if something was to happen (i.e., injury or bike puncture). As noted earlier, this suggests a potential shift of responsibility, to a collective responsibility rather than individual. This is particularly interesting given that in terms of social trends, it has been argued that Western society is becoming increasingly individualistic and that individualised technologies like the mobile phone are key contributors to this phenomenon (Beer and Burrows, 2007). Yet in this study, the sentiment of relying on the outdoor recreation community for help was expressed. The ability for recreationists to connect to recreation managers via technology to report live issues found on tracks was suggested by interviewed recreationists. It was not a service offered at the time by the Christchurch City Council. During the interviews, recreationists indicated that having an online platform to report existing track issues such as tree or rock falls or more general information about a specific area could be a good way to communicate with other users and with recreation managers. This could lead to a participatory culture creating collective intelligence or knowledge about an area (Delwiche & Henderson, 2013). As an example of a user-driven and participatory online site, rock climbers reported looking at information about specific Port Hills climbs and crags on social media user sites such as Climb NZ (n.d.). The Christchurch City Council was not involved with the Climb NZ website.

Through technology use, the social setting was expanded beyond recreationists who were physically present in the setting to others who may have not been physically present. This was made evident with recreationists who micro-coordinated with family, friends and co-workers while recreating. Finally, the use of fitness applications such as Strava or taking photos possibly increased the popularity of a track or viewpoint resulting in recreation managers having to manage certain areas of

the setting differently. For example, the Rapaki Track was popular for Strava segments potentially increasing the amount of mountain bikers using this track to improve their Strava results. Another example was the top of the Rapaki Track that was observed as a popular destination and place to take photos by many recreationists, this resulted in a very busy viewpoint. On a nice sunny Saturday, it was not unusual to see above 60 recreationists per hour at the top of the Rapaki Track, this impacted the area, and created possible conflict between users and motor vehicles driving on the Summit Road. It is also worth noting that further technology implication of Strava and photos possibly resulted in the sharing of Strava data and images online expanding the social network and exposing more recreationists to these areas. In addition, the digital information sharing capacity provided by platforms such as Strava may have the potential to be very useful to existing planning frameworks such as the ROS framework. The capacity of Strava to produce heat maps, "which draws more than 220 billion data points can do a lot. For one, it provides a detailed picture of where people run and bike, information that previously could only be assumed" (Brown, 2014, p.1). With heat maps, recreation managers of peri-urban can visualise where walkers, bikers and runners are recreating, on what day and at what time. Although limited to Strava users, this information could be one data point for recreation planning.

The physical terrain of the setting along with the built features impacted the level of digital technology engagement. In the Port Hills, recreationists reported their likelihood of listening to music was greater when they were on tracks that they deemed to be uninteresting or monotonous as a way to increase motivation and enjoyment. Recreationists relied on music to change their mood and to better inhabit and control the space they were recreating in. These concepts were very prominent in Bull's (2001, 2005) research on iPod use in urban culture, which suggests that it is an individual's relationship with that space (e.g. as monotonous or boring) that influences how they interact with music. At the same time, the physical features of the space such as viewpoints were important for determining how individuals felt about different spaces, and how they engaged with digital technology.

Recreationists reported being more inclined to use devices to take photos or videos when reaching a viewpoint such as the one at the top of the Rapaki Track. Mountain bike tracks, which are specifically built and designed terrain features, stimulated the use of POV cameras that were carried and used by more mountain bikers. For some mountain bikers using POV cameras there was a dependency on the technology. This was also the case when digital technology was used at the top of tracks such as

the Rapaki Track, which offered an opportunity for a micro-waiting moment to engage with technology. At the same time, the physical terrain features were sometimes prohibitive to digital technology use in the Port Hills with areas that did not have reliable access to mobile networks. This finding was coherent with McBride (2003) who reported that physical landscapes provided a barrier to mobile use.

From a management dimension, the way that information about a particular recreation area is disseminated impacts recreationists' decisions to carry and use a digital device to support the activity. In the Port Hills, recreationists reported checking the track status page during their outdoor activity. The track status page informs recreationists of which tracks are open or closed. Recreationists would use their smartphone to check the track status page as an example of a situation where engagement with digital technology supported the outdoor recreation experience. Updating the track status page and facilitating up-to-date mapping information or general information about an area are all examples of managerial practices that can lead recreationists to engage with their digital devices while recreating.

The extent of technology support available in the setting also impacts technology engagement. Although recreation managers do not have control over the installation of cell phone towers, they can work in partnership with telecommunication agencies to find appropriate space for towers should agencies wish to extend their networks into protected areas. Port Hills managers appeared to support the use of mobile phones in case of emergencies, with most Port Hills signs including a phone number to reach the Port Hills ranger on duty and/or a reminder to call 111 in case of emergency. The Port Hills areas such as the tip of the Eastern section and the Godley Head Track that did not have reliable access to cellular phone reception created discomfort for recreationists who could not use their technology for either reassurance or support. The installation of webcams by recreation managers or stakeholders groups can result in some engagement by recreationists with their digital devices, although this engagement is more likely to occur prior to the activity when recreationists look at the webcams to get a sense of the live weather. In addition, recreation managers can be responsible for establishing policies that guide the recreationists' engagement with digital devices. An example which was given by DOC managers during the interviews is DOC's drone policy, which requires drone operators who want to fly their drone over DOC managed areas to apply for a permit and obtain permission prior to doing so. The policy set by recreation managers can have an impact on the types of digital devices recreationists will choose to carry and use while recreating.

Recreationists would not be able to use a drone without proper permission on DOC-managed lands. In general, recreation managers who were interviewed seemed reluctant to be involved in setting policy around technology use, except for one manager who thought that it may be a good idea to limit technology use in a hut environment.

Another management component influencing digital technology engagement is education programming, comprising of initiatives involving technology, such as the Janszoon project on the Abel Tasman Track, which several recreation managers mentioned when interviewed. The Abel Tasman Track located at the northern end of the South Island, 500 km away from Port Hills, was used as an example where education programming using technology is well established. When recreation managers develop and implement technology-based initiatives, it can entice recreationists to engage with the technology possibly at a support or dependency level depending on the use of devices and for what purposes. DOC managers mentioned that using technology was a good option when seeking to increase youth engagement with the outdoors. This finding is consistent with the message of Cardozo Moreira (2017), who suggested using mobile phone applications to increase engagement of youth with nature, and with Suarez and Dudley (2012), who discussed using the activity of geocaching to do the same. It is also consistent with the work of

In addition to being influenced by the activity and the setting, the level of technology engagement is influenced by personal preferences and experiences. The following section presents the last of three variables impacting technology engagement.

8.3.3 Personal preferences and experiences

The third and final variable influencing technology engagement centres on elements of personal preferences and experiences, which were raised by research participants in the surveys and interviews. Personal preferences related to the ongoing relationship with digital technology outside of the outdoor recreation setting. When interviewed, recreationists were asked about their overall technology engagement and, in general, the technology engagement in their day-to-day lives matched their technology engagement during the outdoor recreation activity. The devices used may have been different or the devices used for different purposes; however, recreationists who used digital technology in their day-to-day lives were also inclined to use digital technology while recreating. Personal experiences referred to their skill levels, their familiarity with the setting, and with past injuries or accidents.

The components of the personal preferences and experiences influencing variables that surfaced in the data are presented in Table 8.3 in the following order: accidents and injuries, anticipated benefits, daily concerns and responsibility, experiences with Port Hills natural disasters, familiarity of area, relationship with digital technology, and skills and experiences. Adopting a technology lens to the research of outdoor recreation experiences, the personal preferences and experiences influencing variables, while absent from the ASEB framework, is integral to the engagement of outdoor recreationists with digital technology.

Anticipated benefits resulting from a Port Hills activity impacted the use of technology engagement. This was evident in interviewees' top reasons for recreating, which included health and fitness, with the high numbers of runners and mountain bikers dependent on fitness applications and with the growing popularity of fitness applications as reported by Millington (2014, 2016). Another example is the long-standing social benefit obtained through recreating with others and its relationship to digital technology use, which was prominent in the research. Interviewed recreationists appeared mindful of not using or minimising their use of digital technology when with others.

Table 8.3 Components of personal preferences and experiences variable influencing digital technology engagement

Components	Description
1. Accidents and injuries	Influence of past accidents and injury on engagement with digital technology.
2. Anticipated benefits	What the recreationist anticipates benefiting from the activity or their reasons to recreate.
3. Daily concerns and responsibilities	Daily concerns and responsibilities which need to be considered during the outdoor recreation activity.
4. Experiences with natural disasters	Experiences from the Christchurch earthquakes (2010-2011) had an impact on the perception of safety while recreating.
5. Familiarity of area	The familiarity of the recreationists with an area of the Port Hills.
6. Relationship with digital technology	The relationship with technology outside of the recreation activity in day-to-day life can impact technology engagement.
7. Skills and experiences	A recreationist's skills and experiences with an activity.

This supports the findings of Dwyer, Kushlev, and Dunn (2018), who found that the use of mobile phones undermined the enjoyment of face-to-face social interactions in a local café setting with friends and family. Using digital technology for listening to music was less common when recreating

with others, and some recreationists reported that listening to music while recreating would defeat the social benefits of recreating with others.

Daily concerns can influence recreationists' level of engagement with digital technology, particularly when it comes to communication devices. This was possibly related to nomophobia and the perceived inability to disconnect, and linked to the idea that digital devices are becoming an extension of the self and are needed to function on a daily basis. Poslad (2011) also reported that mobiles phones are a necessity for people's daily living. The majority of recreationists who were visiting the Port Hills lived in the urban city area of Christchurch where lifestyles are tied to their digital devices and technology is becoming an extension of the self (Bull, 2005; de Souza e Silva & Frith, 2012; Syed & Nurullah, 2011; Young, 2012). Examples included recreationists who needed to micro-coordinate with their school-age children and recreationists who needed to be in communication with colleagues at work. One third of recreationists who carried a mobile phone while recreating in the Port Hills for less than 1 hour indicated their reason was to stay in contact with work, which possibly indicates that these recreationists were fitting exercise into their workday. Some interviewed recreationists were grateful for the proximity of the Port Hills and for the accessible mobile networks, as it provided them with the opportunity to recreate while being easily accessible to their family members, particularly for children if needed. Being available to communicate and micro-coordinate activities from the Port Hills provided minimum interruptions in their day-to-day activities and gave recreationists a sense of control over and freedom over their time, which was possible because of the proximity of the peri-urban setting.

From a personal experience perspective, concerns associated with natural disasters which have historically impacted the Port Hills and the Christchurch areas influenced people's engagement with technology. Many recreationists who experienced the Christchurch earthquakes mentioned carrying a mobile phone in case of a similar adverse event. Interviewed recreationists mentioned that if another earthquake were to happen while they were in the Port Hills, they would be able to communicate with family and friends, although also recognising that phone networks might not work or may be overloaded. The reassuring need to use technology was driven by the possibility of micro-coordinating during an earthquake if something happened to a family member or to the recreationist while in the Port Hills.

Recreationists' familiarity with the area and the terrain was reported to influence their engagement and use of digital technology. In particular, the data showed that recreationists who were on their

first visit to the Port Hills were significantly more likely to engage with a digital camera at the support or dependent level on the typology. Also recreationists who recreated in the Port Hills for less than 1 hour were significantly less likely to carry or use digital technology, putting them in the technology absence on the typology.

Personal relationship to technology influenced the use of technology during the outdoor recreation activity; this was apparent in the qualitative data in response to questions asked about their use of digital technology in their day-to-day lives. Not surprisingly, recreationists who were reluctant to engage with technology in their personal lives were also reluctant to engage with digital technology during their outdoor recreation activities, whereas frequent users of technology tended to be more inclined to engage with technology. Pigram and Jenkins (2006) mentioned that peri-urban areas were places where recreationists extended their urban lifestyle, and this finding is supported by Port Hills recreationists who used digital technology in their day-to-day lives by extending this engagement while recreating on the Port Hill. Furthermore Dickson's (2004) idea that some outdoor recreationists had a difficult time disconnecting from technology due to expectations of being kept safe and the need to be in constant contact with their day-to-day world also related to Port Hills recreationists who mentioned safety as important and who noted the importance of micro-coordinating while recreating. For the 17% of recreationists who carried technology for reassurance without using their devices, there may have been a sense of deliberate disconnection to their devices knowing they could access their devices just in case. Only one of the recreationists interviewed did not own a mobile phone or other devices other than a computer for work and, therefore, consistently did not carry digital technology while recreating.

Skills and experiences with a particular activity was a component impacting recreationists' engagement with technology that varied. There were a few examples throughout the qualitative data of recreationists who utilised performance data applications for training in specific sport, with the most favoured applications being Strava (n.d.), primarily used by mountain bikers. Runners tended to use heart rate monitors to measure performance. Another example included a fitness trainer who mentioned taking videos of clients as a way to improve running skills or biking skills on a specific section of track. The data collected either through Strava, a heart rate monitor, or video related directly to skills development and experiences of recreationists, and are examples of technology dependency in the typology of digital technology engagement with the devices used consistently. Millington (2016) argued fitness being tracked everywhere and being data-intensive

may also hold true in outdoor recreation, with some experiences being easily measured due to the availability of fitness applications on mobile phones.

The following section expands on the relationship between the typology of digital technology engagement in the peri-urban outdoor recreation experience and the influencing variables and their components. Each peri-urban recreationist who engaged with digital technology in case of emergencies, for reassurance, or in a more dependent way did so because of different motives related the activity undertaken, to a dimension of the setting or because of some personal preferences or experiences with technology. In this research, recreationists surveyed in the Port Hills were clear in their reasons for recreating, which included health and exercise, viewing scenery, relaxing, experiencing nature, and to be challenged. These reasons can be seen as the benefits sought by recreationists and highly influenced how technology engagement assisted recreationists in fulfilling these reasons.

8.4 Relationship between digital engagement and the influencing variables of activity, setting, and personal preferences and experiences

As expressed at the start of this chapter, engaging with digital technology while recreating is multifaceted and encompasses several influencing variables and components. With research results showing that 472 recreationists engaged with digital devices by carrying between one and five separate devices, resulting in an average of 1.4 devices per person, the multifaceted nature of technology engagement is not surprising. The influencing variables connected to the typology of digital engagement assist in determining if recreationists engage with technology for reassurance, support, or dependency and why some recreationists do not engage with technology. Table 8.4 presents some of the relationships between the typology and the influencing variables and their components in further assisting the information presented in the sections above.

Table 8.4 connects digital technology engagement included in the typology to the influencing variables by providing specific examples that were selected from the research data. The typology and influencing variables emerged from the quantitative data and from what recreationists talked about in the qualitative interviews.

Table 8.4 Examples of outdoor recreation digital technology engagement typology and variables influencing engagement matrix

Engagement influencing variables	Examples			
	Absence of Technology	**Technology for Reassurance**	**Technology for Support**	**Technology Dependency**
Activity	Characteristics: The activity is shorter than 1 hour Equipment: Carrying digital technology is not practical for the activity	Characteristics: The activity is complete solo. Equipment: Greater chance of equipment failure. Safety: Feeling safe important/carrying devices in case of emergency	Equipment: Actual equipment failure or injury. Reasons for activity: Viewing scenery leads to taking a photo	Mobile apps: Apps used for a specific activity (e.g., Strava, n.d., for mountain biking) Equipment: A camera can be mounted on a piece of equipment
Setting (social, physical, management)	Social/area use: Popular area with recreationists who can assist in case of an emergency Management /infrastructure: Mobile phone networks not available in part of setting	Social/online participatory: Ability to report live track issues and engage with recreation managers Management /infrastructure: Mobile phone networks available in part of setting	Physical/features: Terrain feature requires motivation through the use of music and also allows for micro-waiting moments Management /information: Access to updates on track status	Physical/ features: Setting includes Strava segments and tracks that are conducive to POV videos
Personal experiences & preferences	Relationship with technology: No or limited engagement with technology in personal life	Accidents and injuries: Previous experiences with injury from an activity performed in a similar setting	Daily concerns and responsibilities: Need to connect with family/friends /work during the activity (micro-coordination)	Skills and experiences: Wanting to improve skills via quantifying the experience of filming the activity

8.5 Implications and significance of research

As a form of leisure, outdoor recreation has been examined through many disciplines and recognised as important in the shaping of human–environment relationships (Manning, 2011; Plummer, 2009). In New Zealand, the outdoor recreation experience and the relationship recreationists have with the environment is unique and has shaped the socio-cultural fabric and identity of the country, placing a

priority on its public recreation spaces (Devlin, 1995; Devlin et al., 1995; Sport New Zealand, 2009). Recreation managers such as DOC and local authorities are important stakeholders for managing recreation and ensuring recreation opportunities across New Zealand in consideration of external environmental changes such as socio-cultural and technological trends. Recently, trends such as growing urbanisation, change in demographics, and people's embracing of digital technology have the potential to impact and change leisure and outdoor recreation participation and experiences, both globally and in New Zealand.

Some researchers have identified that we live in a post-human era, in which individuals are inseparable from their digital devices and are optimally enhanced by digital technology, and this is affecting how outdoor recreation is experienced in all settings (Butryn, 2003; Ryan, 2002). With research on technology use in outdoor recreation mainly focused on remote outdoor recreation experience, and recently on communication devices (Amerson et al., 2020; Ewert & Shultis, 1999; Holden, 2002; Lindell, 2014; Martin, 2017; Martin & Blackwell, 2016; Martin & Pope, 2012; Pohl, 2006; Shultis, 2001, 2012, 2015), this study broadens the existing scholarship by expanding into the peri-urban recreation setting. Researching technology engagement in remote outdoor recreation settings fills a research need but is limited to recreationists who take part in outdoor recreation activities delivered in this unique setting. Equally important are recreationists who recreate in peri-urban areas who are seeking a different type of outdoor recreation experience that suits their urban lifestyles and need to recreate (Pigram & Jenkins, 2006).

The majority of recreationists who were visiting the Port Hills lived in the urban city area of Christchurch, where, similar to other urban centres, lifestyles are intimately tied to digital devices and technology is considered an extension of the self (Bull, 2005; de Souza e Silva & Frith, 2012; Syed & Nurullah, 2011; Young, 2012). Progress in mobile communication devices and in wearable digital devices technology combined with reliable access to mobile networks supported Port Hills recreationists' engagement with their technology during the activity, particularly with their mobile phones. The ubiquitous and versatile nature of the mobile phone made it possible for recreationists to extend their urban phone usage into the peri-urban recreation area. The findings showed that the majority of Port Hills recreationists carried and used digital devices to stay safe but also for reasons such as self-logging and quantifying the experience, listening to audio for motivation, and communicating with others for micro-coordinating as well as for staying connected to obtain information. The findings also revealed that recreationists, based on the activity, the characteristics

of the activity, and the demographic data, engaged with technology differently in statistically significant ways.

A critical analysis of digital technology engagement in outdoor recreation resulted in the development of a typology. The typology of digital technology engagement in the peri-outdoor outdoor recreation experience considers the integration of digital technology in outdoor recreation by going beyond the descriptive of what devices are being carried and used for. In 1999, Ewert and Shultis developed a typology of technological impacts on backcountry recreation, which included digital and non-digital technologies. The Port Hills research adds to the important work of Ewert and Shultis with the emergence of a new typology focused on digital technology engagement and experiences. The new typology provides a deep and comprehensive understanding of the role played by digital technology in peri-urban outdoor recreation, which has not been done before.

Elements of the typology, particularly of the influencing variables, add to the recreation demand hierarchy or ASEB framework (Driver & Brown, 1978; Manning, 2011; McCool, 2006). The framework states that outdoor recreationists engage in outdoor recreation activities, such as walking, running, mountain biking, and rock climbing, in particular settings that result in experiences that are valued and derive benefits. Using a digital technology lens when applying the framework adds a new perspective to understanding outdoor recreation experiences. The technology lens adds a layer of complexity to the still relevant ASEB framework in recognising that the ASEB elements can be influenced by digital technology engagement. For example, a peri-urban recreationist looking for a safe experience will carry a communication device or for a runner who wants some health or performance benefits from a running activity will collect fitness date.

The typology's influencing variables developed in this research recognise the relationship between digital technology, activity and setting, and their impacts on outdoor recreation experiences. Another example illustrating this is how music motivated recreationists as seen in some of the comments. In addition to digital technology's relationship to activity and setting, the research added the dimension of personal preferences toward technology and how experiences can impact technology engagement on the impact of the experience. This new variable was influential in the decision to engage, or not, with technology, and in turn impacted the outdoor recreation experience similarly to activity and setting.

The typology and the influencing variables are part of a continued discussion on the role of technology in outdoor recreation and are part of an emerging conversation on the pervasive nature of digital technology in outdoor recreation experiences. In particular, the typology and influencing variables uncover implications specific to peri-urban outdoor experiences and how these experiences can be managed. Amerson et al. (2020) wrote that smartphone usage in outdoor recreation is here to stay and that recreation managers should take advantage of this to educate users and enhance the outdoor recreation experience. Managers can also work with the technology to support their planning efforts and frameworks such as the ROS. The Port Hills study recognised that peri-urban recreation managers need to be aware of the new normal with the majority of recreationists recreating with one or more digital devices. Managers should connect with recreationists to facilitate a better user experience. For example, more specifically in a setting such as the Port Hills, this may create opportunities such as developing and implementing online participatory initiatives, increasing the reliability of mobile phone infrastructures, and aligning initiatives with mobile applications like Strava.

8.6 Future outdoor recreation and digital technology research recommendations

This research is unique in that it is one of very few outdoor recreation studies that considered the relationship of digital technology use in a peri-urban recreation setting. With the pre-pandemic prediction of 70% (closer to 86% in developed countries such as New Zealand) of the world's population expected to live in urban centres by 2050 (Ritzer, 2015) and the increased pressure placed on urban and peri-urban areas and recreation, outdoor recreation research in this setting is of utmost importance and still requires further inquiry.

The mixed-methods research methodology adopted in this study proved to be valuable in gaining a baseline understanding of digitally mediated outdoor recreation experiences in peri-urban recreation that can now be explored further in many ways. In order to build on the knowledge, the typology of digital technology engagement in the peri-urban outdoor recreation experience and the activity, setting and personal experiences and preference influencing variables could be researched further. Any particular theme in the typology and in the influencing variables could be further researched or applied in other settings such as urban or remote settings. More work needs to be done on how recreation managers are adapting to the fact that the majority of recreationists are digitally connected while recreating and what this means for managing recreation. It is also important to take

into consideration the small minority of recreationists for whom technology is absent. However, will this remain the case?

It would be interesting to further research recreationists who are dependent on technology and how this impacts their overall well-being in light of recent research that identified digital technology addiction is detrimental to healthy lifestyle and can lead to mental health disorders (Dwyer, Kushlev, & Dunn, 2018; Groarke, 2014; Rodrigues Garcia et al., 2020). Furthermore, research on the application and relevance of the levels of digital technology engagement with other outdoor recreation activities performed in particular settings such as the lifestyle sports of skateboarding or snowboarding or in water-based activities would be valuable in further understanding of the relationship between experiences and digital technology.

8.7 Overall summary

Digital technology usage has impacted the way individuals interact and communicate with each other given the pervasiveness of digital devices integrated in many aspects of people's lives. The portability of digital devices, the versatility of mobile phones, and the embeddedness of digital devices in people's day-to-day lives are contributing to the notion that digital technology is becoming an extension of the self and entrenched in the human experience (Bull, 2005; Butryn, 2003; de Souza e Silva & Frith, 2012; Ryan, 2002; Syed & Nurullah, 2011; Young, 2012). Gere's (2008) notion that technology is constantly changing people and the way they relate to their environment was also true in the Port Hills with the majority of recreationists using digital technology during their activity for purposes such as staying safe, communicating, quantifying, motivating, and searching for information. The Port Hills proved to be a great setting to conduct the study with recreationists integrating technology in their outdoor recreation activity as they would in their day-to-day lives. The resulting typology of digital technology engagement might possibly be applicable to other outdoor recreation settings. Its applicability would have to be tested through further research.

For the majority of outdoor recreationists in this study, digital technology was an important contributor to their experience of the peri-urban Port Hills setting. It was common for Port Hills recreationists to extend their digital devices usage into the peri-urban recreation area as a result of accessible mobile networks in the majority of the Port Hills and due to recreationists who perceived that a digital disconnect was not necessary during their time recreating in a peri-urban area.

Aside from the minority of Port Hills recreationists for whom digital technology was absent during the outdoor recreation activity, digitally mediated practices were integral to the peri-urban outdoor recreation experience. Recreationists engaged in various ways with their devices, with many continuing their digital usage as they would in their daily lives for things such as increasing their perception of safety, micro-coordinating with family and friends, searching for track or weather information, or listening to music to increase motivation. In addition, recreationists use digital technology to record their activity either through photos, videos, or through some form of activity or fitness data quantification, mainly by using a mobile application or less frequently a more specific device like a GPS or heart rate monitor. The findings showed that digital technology acted in different ways and resulted in varied forms of digital technology engagement categorised into a typology. This new typology of technology engagement expands Ewert and Shultis's (1999) typology of technological impacts on backcountry recreation and some of its concepts of safety and communication technologies. In the new technology engagement typology, a low engagement with the digital devices reassured recreationists in increasing their perceptions of feeling safe or in their perceptions of needing to stay connected to family members and friends while recreating to facilitate micro-coordination. An intermittent engagement with technology supported recreationists with devices being used off and on during the activity, while a more consistent engagement with technology made recreationists dependent on their devices in the undertaking of the activity. The activity itself, the setting, and a recreationist's personal preferences with digital technology and outdoor recreation experiences influenced engagement.

The typology of digital technology engagement contributes to the outdoor recreation literature by furthering understanding of the relationship between leisure, nature, setting, and outdoor recreation participation in the context of digital cultures and peri-urban settings. Furthermore, the different engagement and influencing variables can assist recreation managers located in peri-urban settings, to better understand recreationists' outdoor recreation behaviours and experiences, and perhaps develop and implement creative ways to connect and educate recreationists through their digital device usage. For example, this could be to develop and implement digital technology initiatives to support safe outdoor activities, to assist recreationists in achieving the benefits of recreating outdoors, and to provide up to date information about a setting that may be useful in the context of their outdoor activity.

The importance of activity and setting in creating outdoor recreation experiences is a fundamental concept discussed in the recreation demand hierarchy or ASEB framework (Driver & Brown, 1978; Manning, 2011; McCool, 2006), and up until now there has been sparse research examining the contribution of digital technology to these experiences, especially in the peri-urban setting. Learning about Port Hills recreationists' behaviours with digital technology through the digital technology engagement practices and the influencing variables addressed a gap in the outdoor recreation literature. Furthermore, the Port Hills research sets out to deepen scholarly understanding of contemporary outdoor recreation and of the new role played by digital technology use on the outdoor recreation experience while also guiding recreation managers to better comprehend how outdoor recreation is digitally experienced and consumed.

The research findings show the significance of outdoor recreationists' digital technology engagement in peri-urban settings to be varied as presented in the typology and influenced by activity, setting and personal factors. Engagement with technology increases perception of safety while keeping the majority of recreationists connected to their daily urban lives and responsibilities. The engagement also supports the reasons for recreating in the Port Hills such as the desire for health and exercise and to view scenery. While the findings expand our understanding of the how and why recreationists engage with technology and affirm the embeddedness of technology in the peri-urban outdoor recreation experience, they also give us and recreation managers a critical insight to the realities of peri-urban outdoor recreation in the 21st century.

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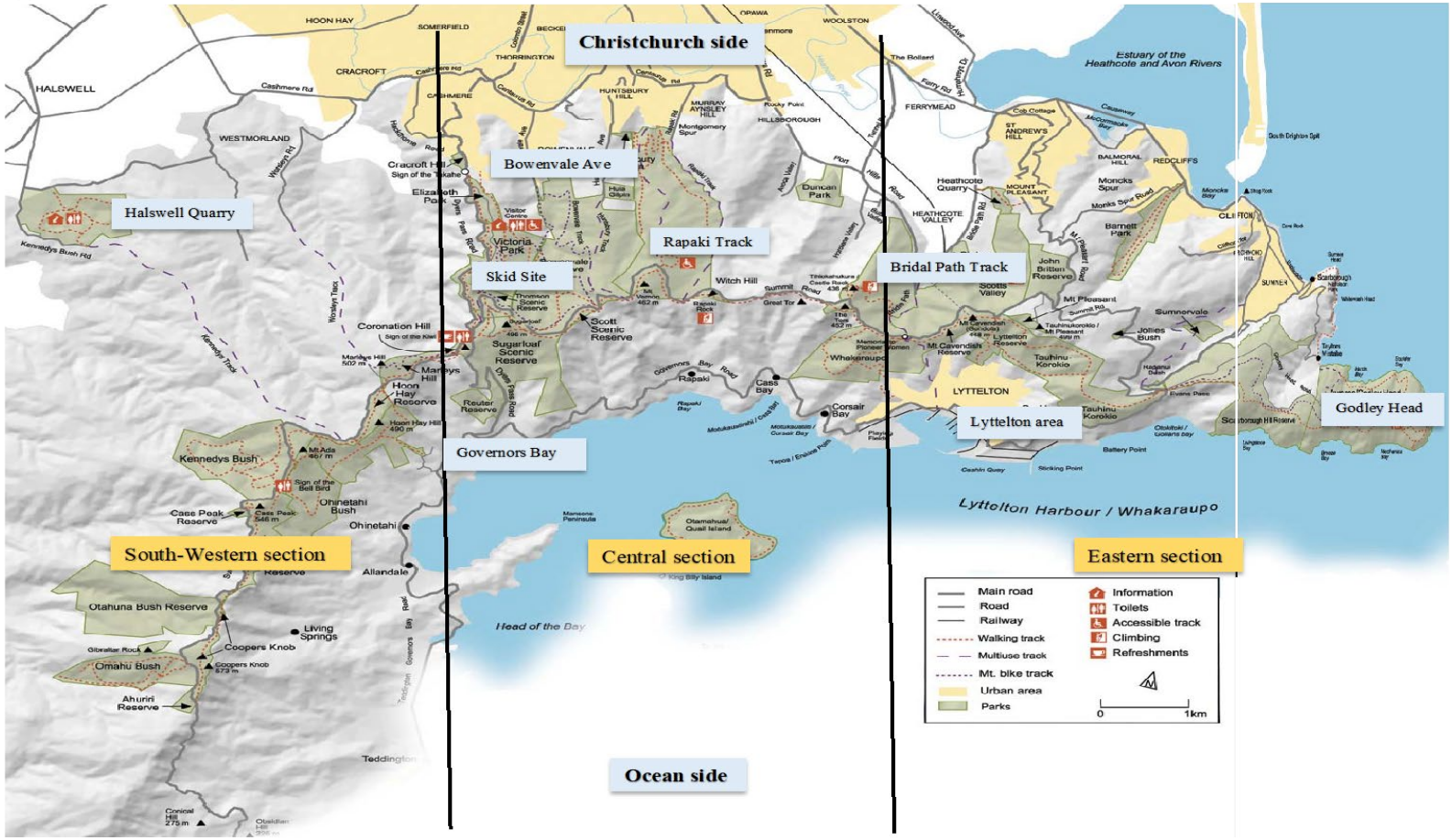
Appendix A

Port Hills Map

Appendix 1 Port Hills Map



Appendix B

Port Hills Parks and Reserves Status

Port Hills Parks and Reserves	Area (ha)	Status	Ownership	Manager
Ahuiri Reserve	6.8	Scenic	Crown	CCC
Barnett Park	40.4	Recreation	CCC	CCC
Bowenvale Park	236.1	Recreation	CCC	CCC
Buckley's Bay*	9.4	Scenic	Crown	DOC/CCC
Cass Peak Reserve	3.4	Scenic	Crown	CCC
Castle Rock	88.9	Scenic	CCC	CCC
Coopers Knob	21.5	Scenic	Crown	CCC
Coronation Hill Historic Reserve	2.2	Historic	Crown	CCC
Douglas Scenic Reserve	1.9	Scenic	CCC	CCC
Elizabeth Park	16.3	Recreation	CCC	CCC
Godley Head Farm Park*	292.6	Reserve	Crown	DOC/CCC
Heathcote Quarry Reserve	6.7	Recreation	CCC	CCC
Hoon Hay Reserve	16.5	Scenic	Crown/CCC	CCC
Huia Gilpin Reserve	8.0	Recreation	CCC	CCC
John Britten Reserve	35.2	Freehold	CCC	CCC/John Britten Trust
Jollies Bush	1.3	Scenic	Crown	CCC
Kennedys Bush	137.2	Scenic	Crown/CCC	CCC
Linda Woods Reserve**	233	Freehold	Summit Rd Society	Summit Rd Society
Littleton 101*	28.8	Scenic	Crown	DOC
Marleys Hill	20	Recreation	CCC	CCC
Mount Cavendish Reserve	25.7	Scenic	Crown	CCC
Mount Pleasant reserve	5.6	Scenic	Crown	CCC
Mount Vernon Park	223.8	Freehold	PHS Park Trust	PHs Park Trust
Ohinetahi Bush	138	Freehold	Summit Rd Society	Summit Rd Society
Omahu Bush	106	Freehold. QEII	Gama Foundation	Gama Foundation
Orongmai Reserve	52.8	Scenic	CCC	CCC
Otahuna Bush Reserve	120.9	Scenic	CCC/Selwyn DC	CCC
Pionner Women's Memorial	0.017	Historic	CCC	CCC
Rapanui Bush	1.0	Scenic	CCC	CCC
Reuter Reserve	21.8	Scenic	CCC	CCC
Scarborough Hill Reserve	217.8	Recreation	CCC	CCC
Scott Reserve	7.3	Recreation	CCC	CCC
Scotts Valley	126.9	Recreation	CCC	CCC
Sugarloaf reserve	112.5	Scenic	Crown	CCC
Summit Lookout Reserve	0.1	Freehold	CCC	CCC
Tauhinu-Korokio*	120.0	Scenic	Crown	DOC

Thomson Park	26.5	Scenic	Crown	CCC
Tors Scenic Reserve	5.5	Scenic	Crown	CCC
Victoria Park	72.7	Recreation	CCC	CCC
Whakaraupo	86	Freehold	Banks Pen DC	Banks Pen DC
Witch Hill Reserve	4.8	Scenic	Crown	CCC

*The Department of Conservation and the City of Christchurch operate under a Memorandum of Understanding for joint management and biodiversity issues on these reserves.

** The Linda Woods Reserve (formerly known as the Tussock Hill Farm) was purchased by the Summit Road Society in 2018 and is the most recent added Port Hills protected area.

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Appendix C

Survey

Q1 You are invited to participate in a project entitled: The significance of electronic technologies in users' experiences of outdoor recreation in peri-urban settings. This PhD research explores the use of electronic technologies by outdoor recreationists. I am interested in why the technologies are used (or not used), how the technologies impact the experiences and the relationships to the setting, and what implications exist for land managers. Participation in this research project requires you to: i) Complete a survey (5 to 10 minutes) about your experience with electronic technologies during your outdoor recreation activity or as soon as possible after your activity by the end of the day. ii) Provide your consent prior to starting the electronic survey by ticking the box. You can withdraw from the survey at any time by pressing the "X" on the top right corner of the tablet screen or by exiting the browser of the device that you are using. The results of the project may be published, but you may be assured of your anonymity in this investigation: the identity of any participant will not be made public, or made known to any person other than the researcher. To ensure anonymity and confidentiality the following steps will be taken: Your name and contact details will not be collected as part of the survey; No individual identifying information will be presented in public; If you wish to participate in a research interview at a later time, your name and e-mail address will be collected on a separate list which will be kept in a locked and secured device accessible by the principal investigator only. The project is being carried out by: Name of principal investigator: Caroline Dépatie, PhD Candidate. Contact details: caroline.depatie@lincolnuni.ac.nz, mobile: 021 083 83515 I will be pleased to discuss any concerns you have about your participation in the project. Name and contact details of co-supervisors: Dr. Stephen Espiner 64 3 423 0485, Dr. Emma J. Stewart 64 3 423 0500, Dr. Roslyn Kerr 64 3 423 0491 Permission to administer this survey has been granted by the Port Hills Park Ranger Services and by the Lincoln University Human Ethics Committee.

Q2 The purpose of this survey is to learn about how electronic technologies are used (or not used) in the outdoor recreation experiences of various Port Hills user groups. The survey will take 5 to 10 minutes to complete and must be answered during your activity or as soon as possible after your activity by the end of the day. If you have any questions regarding this research please contact the principal investigator: caroline.depatie@lincolnuni.ac.nz

- ❍ I consent to completing the survey and understand that I may stop answering questions at any time by pressing the "X" in the upper right corner of the tablet screen or by exiting the web browser on the device that I am using (1)

Q3 Which answer below best represents how often you visit the Port Hills for outdoor recreation? (Tick one answer)

- ❍ Daily (1)
- ❍ Several times a week (2)
- ❍ Once a week (3)
- ❍ Several times a month (4)
- ❍ Once per month (5)
- ❍ Once every 2-3 months (6)
- ❍ Once or twice per year (7)
- ❍ This is my first time (8)

❍ Other, please specify: (9) _____

Q4 What was the main recreational activity you did in the Port Hills today? (Tick one answer)

❍ Walking (1)
❍ Running (2)
❍ Mountain biking (3)
❍ Rock climbing (4)
❍ Geocaching (5)
❍ Multi sports, please specify which sports: (6) _____
❍ Other, please specify: (7) _____

Answer If What was the main recreational activity you did in the Port Hills today? (Tick one answer) Mountain biking Is Selected

Q5 What style of mountain biking did you engage in while recreating in the Port Hills today? (Tick one answer)

❍ Cross-country (1)
❍ Downhill (2)
❍ Freeride (3)
❍ Enduro (mixed cross country and downhill) (4)
❍ I am not sure what type of mountain biking I engaged in today (5)

Q6 In which Port Hills area(s) were you recreating today? (Tick ALL that apply)

❑ Eastern section (including the Bridle Path, Taylor's Mistake and Godley Head/Awaroa area) (1)
❑ Central section (including the Rapaki Track, Bowenvale Track, Victoria Park area, Sign of the Kiwi area, Worsley Track and Flying Nun Track (2)
❑ South-Western section (including Kennedy's Bush Track, Halswell Quarry and the Sign of the Bellbird area) (3)
❑ I am not sure which area(s) of the Port Hills I recreated in today (4)

Q7 Which of the following best represents who you recreated with in the Port Hills today? (Tick one answer)

❍ I was on my own (1)
❍ Family members (2)
❍ Friends (3)
❍ Friends and family members (4)
❍ Members of a recreational club (eg. Halswell Walking Group) (5)

Q8 How many people, including yourself, did you recreate with in the Port Hills today? (Tick one answer)

❍ 1 (1)
❍ 2 (2)
❍ 3 (3)

- ❍ 4 (4)
- ❍ 5 (5)
- ❍ 6+ (6)

Q9 Did you bring a dog(s) with you on your Port Hills activity today? (Tick Yes or No)

- ❍ Yes (1)
- ❍ No (2)

Q10 What will be or, has been, your total recreation time in the Port Hills today? (Tick one answer)

- ❍ Less than 30 minutes (1)
- ❍ 30 to 59 minutes (2)
- ❍ 1 hour + (3
- ❍ 2 hours + (4)
- ❍ 3 hours + (5)
- ❍ 4 hours + (6)
- ❍ 5 hours + (7)
- ❍ 6 hours + (8)
- ❍ 7 hours + (9)
- ❍ 8 hours + (10)

Q11 People engage in outdoor recreation for various reasons. Using the list of possible reasons, and a 7-point scale, please indicate the extent to which you disagree or agree that this is a reason behind your recreation visit to the Port Hills today. (1=Strongly disagree, 2=Disagree, 3=Somewhat disagree, 4=Neither agree nor disagree, 5=Somewhat agree, 6=Agree, 7=Strongly agree) I am recreating in the Port Hills today....

	Strongly disagree (1) (1)	(2) (2)	(3) (3)	Neither agree nor disagree (4) (4)	(5) (5)	(6) (6)	Strongly agree (7) (7)
To see a new place (1)	❍	❍	❍	❍	❍	❍	❍
To meet new people (2)	❍	❍	❍	❍	❍	❍	❍
To get away from the city (3)	❍	❍	❍	❍	❍	❍	❍
To experience nature/wildlife (4)	❍	❍	❍	❍	❍	❍	❍
To view scenery (5)	❍	❍	❍	❍	❍	❍	❍

To be with friends/family (6)	❍	❍	❍	❍	❍	❍	❍
To challenge myself (7)	❍	❍	❍	❍	❍	❍	❍
To relax (8)	❍	❍	❍	❍	❍	❍	❍
To compete against others (9)	❍	❍	❍	❍	❍	❍	❍
To get away from people (10)	❍	❍	❍	❍	❍	❍	❍
For health and exercise (12)	❍	❍	❍	❍	❍	❍	❍
To see a familiar place (13)	❍	❍	❍	❍	❍	❍	❍
To experience a quiet place (14)	❍	❍	❍	❍	❍	❍	❍
To learn new skills (16)	❍	❍	❍	❍	❍	❍	❍
Other, please specify: (18)	❍	❍	❍	❍	❍	❍	❍

Q12 Thank you for sharing general information about your Port Hills visit. The next set of questions asks about your use (if any) of electronic technologies during today's visit. Were you carrying any of the following electronic device(s) while recreating in the Port Hills today? (Tick ALL that apply)

- ❑ Basic mobile phone (1)
- ❑ Smart phone (2)
- ❑ iPod touch (3)
- ❑ Tablet (eg. iPad, iPad mini, Surface) (4)
- ❑ Digital music player (eg. iPod shuffle or nano and other MP3 players) (5)
- ❑ Point-of-view (POV) sports action camera (eg. GoPro) (6)
- ❑ Digital camera for photos and/or videos (eg. DSLR, compact, video camera) (7)
- ❑ Global Positioning System (GPS) (eg. Garmin, Magellan) (8)
- ❑ Cycle computer (9)
- ❑ Heart rate monitor (10)
- ❑ Digital watch (11)
- ❑ Other(s), please specify: (12) _____
- ❑ I did not have an electronic device with me (13)

Q13 In general, how often do you carry each of the following device(s) with you during your outdoor recreation activities? (For each device, place the slider at the point on the scale which best represents how often you carry each device while recreating. If you NEVER carry the device, leave the slider at "0". 0 = never carry the device when recreating to 100 = always carry the device when recreating)

_____ Basic mobile phone (1)
_____ Smart phone (2)
_____ iPod touch (3)
_____ Tablet (eg. iPad, iPad mini, Surface) (4)
_____ Digital music player (eg. iPod shuffle or nano and other MP3 players) (5)
_____ POV sports action camera (eg. GoPro) (6)
_____ Digital camera for photos and/or videos (eg. DSLR, compact, video) (7)
_____ GPS (eg. Garmin, Magellan) (8)
_____ Cycle computer (9)
_____ Heart rate monitor (10)
_____ Digital watch (11)

Answer If Thank you for sharing general information about your Port Hills visit. The next set of questions asks about your use of electronic technologies during today's visit. Were you carrying any... Basic mobile phone Is Selected

Q14 Please indicate which (if any) of the following explain your reasons for carrying a basic mobile phone while recreating in the Port Hills today: (For each reason tick Yes or No) I am carrying a basic mobile phone today...

	Yes (1)	No (2)
For safety reasons (1)	❍	❍
To be accessible to family/friends (2)	❍	❍
To be accessible for work (3)	❍	❍

Answer If Thank you for sharing general information about your Port Hills visit. The next set of questions asks about your use of electronic technologies during today's visit. Were you carrying any... Basic mobile phone Is Selected

Q15 Did you use a basic mobile phone while recreating in the Port Hills today to: (For each action tick Yes or No)

	Yes (1)	No (2)
Call or text someone (1)	❍	❍
Check the time (2)	❍	❍
Other, please specify: (3)	❍	❍

Answer If Thank you for sharing general information about your Port Hills visit. The next set of questions asks about your use of electronic technologies during today's visit. Were you carrying any... Smart phone Is Selected

Q16 Please indicate which (if any) of the following explain your reasons for carrying a smart phone while recreating in the Port Hills today: (For each reason tick Yes or No) I am carrying a smart phone today...

	Yes (1)	No (2)
For safety reasons (1)	❍	❍
To be accessible to family/friends (2)	❍	❍
To be accessible for work (3)	❍	❍

Answer If Thank you for sharing general information about your Port Hills visit. The next set of questions asks about your use (if any) of electronic technologies during today's visit. Were you carr... Smart phone Is Selected

Q17 While recreating in the Port Hills today, did you use a smart phone to: (For each action tick Yes or No)

	Yes (1)	No (2)
Call or text message someone (1)	❍	❍
Access e-mail and/or social network sites such as Facebook, Twitter and Instagram (2)	❍	❍
Post on sites such as Facebook, Twitter and Instagram (3)	❍	❍
Send messages in a messenger app such as Kik, WhatsApp and Snapchat (4)	❍	❍
Listen to music (5)	❍	❍
Listen to the radio, the news and/or podcasts (6)	❍	❍
Take photos (7)	❍	❍
Make videos (8)	❍	❍
Collect data such as speed and time with an app like Strava (9)	❍	❍
Access the internet to obtain information (eg. weather, track status, maps) about the area where you were recreating (10)	❍	❍
Geocache (11)	❍	❍

Check the time (12)	❍	❍
Other, please specify: (13)	❍	❍

Answer If While recreating in the Port Hills today, did you use a smart phone to: (For each action tick Yes or No) Post on sites such as Facebook, Twitter and Instagram? - Yes Is Selected

Q18 With the smart phone you carried today, which of the following social network site(s) did you post on during, or immediately after your Port Hills outdoor activity? (Tick ALL that apply)

- ❑ Facebook (1)
- ❑ Twitter (2)
- ❑ Instagram (3)
- ❑ Tumblr (4)
- ❑ Flickr (5)
- ❑ Other, please specify: (6) _____

Answer If While recreating in the Port Hills today, did you use a smart phone to: (For each action tick Yes or No) Send messages in a messenger app such as Kik, WhatsApp and Snapchat? - Yes Is Selected

Q19 With the smart phone you carried today, which of the following messenger app(s) did you send messages with during your Port Hills outdoor activity? (Tick ALL that apply)

- ❑ Kik (1)
- ❑ WhatsApp (2)
- ❑ HeyTell (3)
- ❑ Snapchat (4)
- ❑ Facebook (messenger) (5)
- ❑ Other, please specify: (6) _____

Answer If While recreating in the Port Hills today, did you use a smart phone to: (For each action tick Yes or No) Listen to music - Yes Is Selected

Q20 Thinking about the smart phone music that you listened to while recreating in the Port Hills today, to what extent do you disagree or agree with the following statements. (1=Strongly disagree, 2=Disagree, 3=Somewhat disagree, 4=Neither agree nor disagree, 5=Somewhat agree, 6=Agree, 7=Strongly agree)

	Strongly disagree (1) (1)	(2) (2)	(3) (3)	Neither agree nor disagree (4) (4)	(5) (5)	(6) (6)	Strongly agree (7) (7)
The music increased my motivation to exercise (1)	❍	❍	❍	❍	❍	❍	❍

The music relaxed me (2)	❍	❍	❍	❍	❍	❍	❍
The music made me feel "in my own world" (3)	❍	❍	❍	❍	❍	❍	❍
The music increased my enjoyment of the activity (4)	❍	❍	❍	❍	❍	❍	❍
The music connected me to the environment where the activity took place (5)	❍	❍	❍	❍	❍	❍	❍

Answer If While recreating in the Port Hills today, did you use a smart phone to: (For each action tick Yes or No) Listen to music? - Yes Is Selected

Q21 How did you select the smart phone music while recreating in the Port Hills today? (For each reason tick Yes or No)

	Yes (1)	No (2)
I selected the music with the shuffle feature (1)	❍	❍
I selected the music via a "play list(s)" (2)	❍	❍
I selected music to match the intensity of my activity (3)	❍	❍
I selected music to match my mood (4)	❍	❍
I selected music to match the landscape in which I recreated (5)	❍	❍
Other, please specify: (6)	❍	❍

Answer If While recreating in the Port Hills today, did you use a smart phone to: (For each action tick Yes or No) Take photos? - Yes Is Selected

Q22 With the photos you took on the smart phone that you carried while recreating in the Port Hills today, how unlikely or likely is it that you will: (1= Very unlikely, 2= Moderately unlikely, 3= Slightly unlikely, 4= Neutral, 5= Slightly likely, 6= Moderately likely, 7= Very likely)

	Very unlikely (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very likely (7) (7)
Download photos on a computer (1)	❍	❍	❍	❍	❍	❍	❍
Edit photos (eg. cropping) on a computer or a portable electronic device (2)	❍	❍	❍	❍	❍	❍	❍
Share the photos on a blog and/or on sites such as Facebook, Instagram and Snapchat (3)	❍	❍	❍	❍	❍	❍	❍
Send photos to family/friends via e-mail (4)	❍	❍	❍	❍	❍	❍	❍
Submit photos to "photo of the day" or other contest(s) (5)	❍	❍	❍	❍	❍	❍	❍
Print photos (6)	❍	❍	❍	❍	❍	❍	❍
Leave photos on the smart phone to show others (7)	❍	❍	❍	❍	❍	❍	❍
Leave photos on the smart phone and do	❍	❍	❍	❍	❍	❍	❍

nothing with them (8)							

Answer If While recreating in the Port Hills today, did you use a smart phone to: (For each action tick Yes or No) Make videos? - Yes Is Selected

Q23 With the video(s) you made on the smart phone that you carried while recreating in the Port Hills today, how unlikely or likely is it that you will: (1= Very unlikely, 2= Moderately unlikely, 3= Slightly unlikely, 4= Neutral, 5= Slightly likely, 6= Moderately likely, 7= Very likely)

	Very unlikely (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very likely (7) (7)
Download video(s) on a computer (1)	❍	❍	❍	❍	❍	❍	❍
Edit video(s) on a computer or a portable electronic device (2)	❍	❍	❍	❍	❍	❍	❍
Share video(s) on a blog and/or on sites such as Facebook, YouTube, Instagram and Snapchat (3)	❍	❍	❍	❍	❍	❍	❍
Send video(s) to family/friends via e-mail (4)	❍	❍	❍	❍	❍	❍	❍
Submit video(s) to "video of the day" or other contest(s) (5)	❍	❍	❍	❍	❍	❍	❍
Leave video(s) on the smart phone to show others (6)	❍	❍	❍	❍	❍	❍	❍
Leave video(s) on the smart phone and do nothing with them (7)	❍	❍	❍	❍	❍	❍	❍

Answer If While recreating in the Port Hills today, did you use a smart phone to: (For each action tick Yes or No) Collect data such as speed and time with an app like Strava? - Yes Is Selected

Q24 What smart phone app(s) did you use to collect your activity data while recreating in the Port Hills today? (For each app tick Yes or No)

	Yes (1)	No (2)
Map my Ride (1)	❍	❍
Run Keeper (2)	❍	❍

Strava (3)	❍	❍
Other, please specify: (4)	❍	❍

Answer If While recreating in the Port Hills today, did you use a smart phone to: (For each action tick Yes or No) Collect data such as speed and time with an app like Strava? - Yes Is Selected

Q25 How unimportant or important to you are each of the following activity data collected through the smart phone app(s) while recreating in the Port Hills today? (1= Very unimportant, 2= Moderately unimportant, 3= Slightly unimportant, 4= Neutral, 5= Slightly important, 6= Moderately important, 7= Very important)

	Very unimportant (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very important (7) (7)
Average speed (1)	❍	❍	❍	❍	❍	❍	❍
Maximum speed (2)	❍	❍	❍	❍	❍	❍	❍
Minimum speed (3)	❍	❍	❍	❍	❍	❍	❍
Distance (4)	❍	❍	❍	❍	❍	❍	❍
Pace (8)	❍	❍	❍	❍	❍	❍	❍
Elevation profile (5)	❍	❍	❍	❍	❍	❍	❍
Time (6)	❍	❍	❍	❍	❍	❍	❍

Answer If While recreating in the Port Hills today, did you use a smart phone to: (For each action tick Yes or No) Collect data such as speed and time with an app like Strava? - Yes Is Selected

Q26 With the activity data that you collected through the smart phone app(s) you used while recreating in the Port Hills today, how unlikely or likely is it that you will: (1= Very unlikely, 2= Moderately unlikely, 3= Slightly unlikely, 4= Neutral, 5= Slightly likely, 6= Moderately likely, 7= Very likely)

	Very unlikely (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very likely (7) (7)
Download the data on a computer (1)	❍	❍	❍	❍	❍	❍	❍
Compare the data with your personal data (2)	❍	❍	❍	❍	❍	❍	❍
Compare the data with other people's data (3)	❍	❍	❍	❍	❍	❍	❍
Integrate the data with other software or apps	❍	❍	❍	❍	❍	❍	❍

such as Strava, Map my Ride and/or, Google map (4)							
Do nothing with the data collected on the smart phone (5)	❍	❍	❍	❍	❍	❍	❍

Answer If Were you carrying any of the following electronic devices while recreating in the Port Hills today? (Tick all that apply) iPod Is Selected

Q27 Please indicate which (if any) of the following explain your reasons for carrying an iPod while recreating in the Port Hills today: (For each reason tick Yes or No) I am carrying an iPod today...

	Yes (1)	No (2)
For safety reasons (1)	❍	❍
To be accessible to family/friends (2)	❍	❍
To be accessible for work (3)	❍	❍

Answer If Thank you for sharing general information about your Port Hills visit. The next set of questions asks about your use of electronic technologies during today's visit. Were you carrying any... iPod Is Selected

Q28 While recreating in the Port Hills today, did you use an iPod to: (For each action tick Yes or No)

	Yes (1)	No (2)
Access e-mail and/or social network sites such as Facebook, Twitter and Instagram (1)	❍	❍
Post on sites such as Facebook, Twitter and Instagram (2)	❍	❍
Send messages in a messenger app such as Kik, WhatsApp and Snapchat (3)	❍	❍
Listen to music (4)	❍	❍
Listen to the radio, the news and/or podcasts (5)	❍	❍
Take photos (6)	❍	❍
Make videos (7)	❍	❍
Collect data such as speed and time with an app like Strava (8)	❍	❍

Access the internet to obtain information (eg. weather, track status, maps) about the area where you were recreating (9)	❍	❍
Geocache (10)	❍	❍
Check the time (11)	❍	❍
Other, please specify: (12)	❍	❍

Answer If While recreating in the Port Hills today, did you use an iPod to: (For each action tick Yes or No) Post on sites such as Facebook, Twitter and Instagram - Yes Is Selected

Q29 With the iPod you carried today, which of the following social network site(s) did you post on during, or immediately after your Port Hills outdoor activity? (Tick ALL that apply)

- ❑ Facebook (1)
- ❑ Twitter (2)
- ❑ Instagram (3)
- ❑ Tumblr (4)
- ❑ Flickr (5)
- ❑ Other, please specify: (6) _____

Answer If While recreating in the Port Hills today, did you use an iPod to: (For each action tick Yes or No) Send messages in a messenger app such as Kik, WhatsApp and Snapchat - Yes Is Selected

Q30 With the iPod you carried today, which of the following messenger app(s) did you send messages with during your Port Hills outdoor activity? (Tick ALL that apply)

- ❑ Kik (1)
- ❑ WhatsApp (2)
- ❑ HeyTell (3)
- ❑ Snapchat (4)
- ❑ Facebook (messenger) (5)
- ❑ Other, please specify: (6) _____

Answer If While recreating in the Port Hills today, did you use an iPod to: (For each action tick Yes or No) Listen to music - Yes Is Selected

Q31 Thinking about the iPod music that you listened to while recreating in the Port Hills today, to what extent do you disagree or agree with the following statements. (1=Strongly disagree, 2=Disagree, 3=Somewhat disagree, 4=Neither agree nor disagree, 5=Somewhat agree, 6=Agree, 7=Strongly agree)

	Strongly disagree (1) (1)	(2) (2)	(3) (3)	Neither agree nor disagree (4) (4)	(5) (5)	(6) (6)	Strongly agree (7) (7)

The music increased my motivation to exercise (1)	❍	❍	❍	❍	❍	❍	❍
The music relaxed me (2)	❍	❍	❍	❍	❍	❍	❍
The music made me feel "in my own world" (3)	❍	❍	❍	❍	❍	❍	❍
The music increased my enjoyment of the activity (5)	❍	❍	❍	❍	❍	❍	❍
The music connected me to the environment where the activity took place (6)	❍	❍	❍	❍	❍	❍	❍

Answer If While recreating in the Port Hills today, did you use an iPod to: (For each action tick Yes or No) Listen to music - Yes Is Selected

Q32 How did you select the iPod music while recreating in the Port Hills today? (For each reason tick Yes or No)

	Yes (1)	No (2)
I selected the music with the shuffle feature (1)	❍	❍
I selected the music via a "play list(s)" (2)	❍	❍
I selected music to match the intensity of my activity (3)	❍	❍
I selected music to match my mood (4)	❍	❍

I selected music to match the landscape in which I recreated (5)	❍	❍
Other, please specify: (6)	❍	❍

Answer If While recreating in the Port Hills today, did you use an iPod to: (For each action tick Yes or No) Take photos - Yes Is Selected

Q33 With the photos you took on the iPod that you carried while recreating in the Port Hills today, how unlikely or likely is it that you will: (1= Very unlikely, 2= Moderately unlikely, 3= Slightly unlikely, 4= Neutral, 5= Slightly likely, 6= Moderately likely, 7= Very likely)

	Very unlikely (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very likely (7) (7)
Download photos on a computer (1)	❍	❍	❍	❍	❍	❍	❍
Edit photos (eg. cropping) on a computer or a portable electronic device (2)	❍	❍	❍	❍	❍	❍	❍
Share the photos on a blog and/or on sites such as Facebook, Instagram and Snapchat (3)	❍	❍	❍	❍	❍	❍	❍
Send photos to family/friends via e-mail (4)	❍	❍	❍	❍	❍	❍	❍
Submit photos to "photo of the day" or other contest(s) (5)	❍	❍	❍	❍	❍	❍	❍
Print photos (9)	❍	❍	❍	❍	❍	❍	❍

Leave photos on the iPod to show others (6)	❍	❍	❍	❍	❍	❍	❍
Leave photos on the iPod and do nothing with them (7)	❍	❍	❍	❍	❍	❍	❍

Answer If While recreating in the Port Hills today, did you use an iPod to: (For each action tick Yes or No) Make videos - Yes Is Selected

Q34 With the video(s) you made on the iPod that you carried while recreating in the Port Hills today, how unlikely or likely is it that you will: (1= Very unlikely, 2= Moderately unlikely, 3= Slightly unlikely, 4= Neutral, 5= Slightly likely, 6= Moderately likely, 7= Very likely)

	Very unlikely (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very likely (7) (7)
Download video(s) on a computer (1)	❍	❍	❍	❍	❍	❍	❍
Edit video(s) on a computer or a portable electronic device (2)	❍	❍	❍	❍	❍	❍	❍
Share video(s) on a blog and/or on sites such as Facebook, YouTube, Instagram and Snapchat (3)	❍	❍	❍	❍	❍	❍	❍
Send video(s) to family/friends via e-mail (4)	❍	❍	❍	❍	❍	❍	❍
Submit video(s) to "video of the	❍	❍	❍	❍	❍	❍	❍

day" or other contest(s) (5)							
Leave video(s) on the iPod to show others (6)	❍	❍	❍	❍	❍	❍	❍
Leave video(s) on the iPod and do nothing with them (7)	❍	❍	❍	❍	❍	❍	❍

Answer If While recreating in the Port Hills today, did you use an iPod to: (For each action tick Yes or No) Collect data such as speed and time with an app like Strava - Yes Is Selected

Q35 What iPod app(s) did you use to collect your activity data while recreating in the Port Hills today? (For each app tick Yes or No)

	Yes (1)	No (2)
Map my Ride (1)	❍	❍
Run Keeper (2)	❍	❍
Strava (3)	❍	❍
Other, please specify: (4)	❍	❍

Answer If While recreating in the Port Hills today, did you use an iPod to: (For each action tick Yes or No) Collect data such as speed and time with an app like Strava - Yes Is Selected

Q36 How unimportant or important to you are each of the following activity data collected through the iPod app(s) while recreating in the Port Hills today? (1= Very unimportant, 2= Moderately unimportant, 3= Slightly unimportant, 4= Neutral, 5= Slightly important, 6= Moderately important, 7 = Very important)

	Very unimportant (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very important (7) (7)
Average speed (1)	❍	❍	❍	❍	❍	❍	❍
Maximum speed (2)	❍	❍	❍	❍	❍	❍	❍
Minimum speed (3)	❍	❍	❍	❍	❍	❍	❍
Distance (4)	❍	❍	❍	❍	❍	❍	❍

Pace (8)	❍	❍	❍	❍	❍	❍	❍
Elevation profile (5)	❍	❍	❍	❍	❍	❍	❍
Time (6)	❍	❍	❍	❍	❍	❍	❍

Answer If While recreating in the Port Hills today, did you use an iPod to: (For each action tick Yes or No) Collect data such as speed and time with an app like Strava - Yes Is Selected

Q37 With the activity data that you collected through the iPod app(s) you used while recreating in the Port Hills today, how unlikely or likely is it that you will: (1= Very unlikely, 2= Moderately unlikely, 3= Slightly unlikely, 4= Neutral, 5= Slightly likely, 6= Moderately likely, 7= Very likely)

	Very unlikely (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very likely (7) (7)
Download the data on a computer (1)	❍	❍	❍	❍	❍	❍	❍
Compare the data with your personal data (2)	❍	❍	❍	❍	❍	❍	❍
Compare the data with other people's data (3)	❍	❍	❍	❍	❍	❍	❍
Integrate the data with other software or apps such as Strava, Map my Ride and/or, Google map (4)	❍	❍	❍	❍	❍	❍	❍
Do nothing with the data collected on the iPod (5)	❍	❍	❍	❍	❍	❍	❍

Answer If Were you carrying any of the following electronic devices while recreating in the Port Hills today? (Tick all that apply) Tablet (eg. iPad, iPad mini, Surface) Is Selected

Q38 Please indicate which (if any) of the following explain your reasons for carrying a tablet while recreating in the Port Hills today: (For each reason tick Yes or No) I am carrying a tablet today...

	Yes (1)	No (2)
For safety reasons (1)	❍	❍
To be accessible to family/friends (2)	❍	❍
To be accessible for work (3)	❍	❍

Answer If Thank you for sharing general information about your Port Hills visit. The next set of questions asks about your use of electronic technologies during today's visit. Were you carrying any... Tablet (eg. iPad, iPad mini, Surface) Is Selected

Q39 While recreating in the Port Hills today, did you use a tablet to: (For each action tick Yes or No)

	Yes (1)	No (2)
Call or text message someone (1)	❍	❍
Access e-mail and/or social network sites such as Facebook, Twitter and Instagram (2)	❍	❍
Post on sites such as Facebook, Twitter and Instagram (3)	❍	❍
Send messages in a messenger app such as Kik, WhatsApp and Snapchat (4)	❍	❍
Listen to music (5)	❍	❍
Listen to the radio, the news and/or podcasts (6)	❍	❍
Take photos (7)	❍	❍
Make videos (8)	❍	❍
Collect data such as speed and time with an app like Strava (9)	❍	❍
Access the internet to obtain information (eg. weather, track status, maps) about the area where you were recreating (10)	❍	❍
Geocache (11)	❍	❍
Check the time (12)	❍	❍
Other, please specify: (13)	❍	❍

Answer If While recreating in the Port Hills today, did you use a tablet to: (For each action tick Yes or No) Post on sites such as Facebook, Twitter and Instagram - Yes Is Selected

Q40 With the tablet you carried today, which of the following social network site(s) did you post on during, or immediately after your Port Hills outdoor activity? (Tick ALL that apply)

- ❑ Facebook (1)
- ❑ Twitter (2)
- ❑ Instagram (3)

- ❑ Tumblr (4)
- ❑ Flickr (5)
- ❑ Other, please specify: (6) _____

Answer If While recreating in the Port Hills today, did you use a tablet to: (For each action tick Yes or No) Send messages in a messenger app such as Kik, WhatsApp and Snapchat - Yes Is Selected

Q41 With the tablet you carried today, which of the following messenger app(s) did you send messages with during your Port Hills outdoor activity? (Tick ALL that apply)

- ❑ Kik (1)
- ❑ WhatsApp (2)
- ❑ HeyTell (3)
- ❑ Snapchat (4)
- ❑ Facebook (messenger) (5)
- ❑ Other, please specify: (6) _____

Answer If While recreating in the Port Hills today, did you use a tablet to: (For each action tick Yes or No) Listen to music - Yes Is Selected

Q42 Thinking about the tablet music that you listened to while recreating in the Port Hills today, to what extent do you disagree or agree with the following statements. (1=Strongly disagree, 2=Disagree, 3=Somewhat disagree, 4=Neither agree nor disagree, 5=Somewhat agree, 6=Agree, 7=Strongly agree)

	Strongly disagree (1) (1)	(2) (2)	(3) (3)	Neither agree nor disagree (4) (4)	(5) (5)	(6) (6)	Strongly agree (7) (7)
The music increased my motivation to exercise (1)	❍	❍	❍	❍	❍	❍	❍
The music relaxed me (2)	❍	❍	❍	❍	❍	❍	❍
The music made me feel "in my own world" (3)	❍	❍	❍	❍	❍	❍	❍
The music increased my enjoyment of the activity (5)	❍	❍	❍	❍	❍	❍	❍

The music connected me to the environment where the activity took place (6)	❍	❍	❍	❍	❍	❍	❍

Answer If While recreating in the Port Hills today, did you use a tablet to: (For each action tick Yes or No) Listen to music - Yes Is Selected

Q43 How did you select the tablet music while recreating in the Port Hills today? (For each reason tick Yes or No)

	Yes (1)	No (2)
I selected the music with the shuffle feature (1)	❍	❍
I selected the music via a "play list(s)" (2)	❍	❍
I selected music to match the intensity of my activity (3)	❍	❍
I selected music to match my mood (4)	❍	❍
I selected music to match the landscape in which I recreated (5)	❍	❍
Other, please specify: (6)	❍	❍

Answer If While recreating in the Port Hills today, did you use a tablet to: (For each action tick Yes or No) Take photos - Yes Is Selected

Q44 With the photos you took on the tablet that you carried while recreating in the Port Hills today, how unlikely or likely is it that you will: (1= Very unlikely, 2= Moderately unlikely, 3= Slightly unlikely, 4= Neutral, 5= Slightly likely, 6= Moderately likely, 7= Very likely)

	Very unlikely (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very likely (7) (7)
Download photos on a computer (1)	❍	❍	❍	❍	❍	❍	❍
Edit photos (eg. cropping) on a	❍	❍	❍	❍	❍	❍	❍

computer or a portable electronic device (2)							
Share the photos on a blog and/or on sites such as Facebook, Instagram and Snapchat (3)	❍	❍	❍	❍	❍	❍	❍
Send photos to family/friends via e-mail (4)	❍	❍	❍	❍	❍	❍	❍
Submit photos to "photo of the day" or other contest(s) (5)	❍	❍	❍	❍	❍	❍	❍
Print photos (6)	❍	❍	❍	❍	❍	❍	❍
Leave photos on the tablet to show others (7)	❍	❍	❍	❍	❍	❍	❍
Leave photos on the tablet and do nothing with them (8)	❍	❍	❍	❍	❍	❍	❍

Answer If While recreating in the Port Hills today, did you use a tablet to: (For each action tick Yes or No) Make videos - Yes Is Selected

Q45 With the video(s) you made on the tablet that you carried while recreating in the Port Hills today, how unlikely or likely is it that you will: (1= Very unlikely, 2= Moderately unlikely, 3= Slightly unlikely, 4= Neutral, 5= Slightly likely, 6= Moderately likely, 7= Very likely)

	Very unlikely (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very likely (7) (7)
Download video(s) on a computer (1)	❍	❍	❍	❍	❍	❍	❍

Edit video(s) on a computer or a portable electronic device (2)	❍	❍	❍	❍	❍	❍	❍
Share video(s) on a blog and/or on sites such as Facebook, YouTube, Instagram and Snapchat (3)	❍	❍	❍	❍	❍	❍	❍
Send video(s) to family/friends via e-mail (4)	❍	❍	❍	❍	❍	❍	❍
Submit video(s) to "video of the day" or other contest(s) (5)	❍	❍	❍	❍	❍	❍	❍
Leave video(s) on the tablet to show others (6)	❍	❍	❍	❍	❍	❍	❍
Leave video(s) on the tablet and do nothing with them (7)	❍	❍	❍	❍	❍	❍	❍

Answer If While recreating in the Port Hills today, did you use a tablet to: (For each action tick Yes or No) Collect data such as speed and time with an app like Strava - Yes Is Selected

Q46 What tablet app(s) did you use to collect your activity data while recreating in the Port Hills today? (For each app tick Yes or No)

	Yes (1)	No (2)
Map my Ride (1)	❍	❍
Run Keeper (2)	❍	❍

Strava (3)	❍	❍
Other, please specify: (4)	❍	❍

Answer If While recreating in the Port Hills today, did you use a tablet to: (For each action tick Yes or No) Collect data such as speed and time with an app like Strava - Yes Is Selected

Q47 How unimportant or important to you are each of the following activity data collected through the tablet app(s) while recreating in the Port Hills today? (1= Very unimportant, 2= Moderately unimportant, 3= Slightly unimportant, 4= Neutral, 5= Slightly important, 6= Moderately important, 7= Very important)

	Very unimportant (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very important (7) (7)
Average speed (1)	❍	❍	❍	❍	❍	❍	❍
Maximum speed (2)	❍	❍	❍	❍	❍	❍	❍
Minimum speed (3)	❍	❍	❍	❍	❍	❍	❍
Distance (4)	❍	❍	❍	❍	❍	❍	❍
Pace (5)	❍	❍	❍	❍	❍	❍	❍
Elevation profile (6)	❍	❍	❍	❍	❍	❍	❍
Time (7)	❍	❍	❍	❍	❍	❍	❍

Answer If While recreating in the Port Hills today, did you use a tablet to: (For each action tick Yes or No) Collect data such as speed and time with an app like Strava - Yes Is Selected

Q48 With the activity data that you collected through the tablet app(s) you used while recreating in the Port Hills today, how unlikely or likely is it that you will: (1= Very unlikely, 2= Moderately unlikely, 3= Slightly unlikely, 4= Neutral, 5= Slightly likely, 6= Moderately likely, 7= Very likely)

	Very unlikely (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very likely (7) (7)
Download the data on a computer (1)	❍	❍	❍	❍	❍	❍	❍
Compare the data	❍	❍	❍	❍	❍	❍	❍

with your personal data (2)							
Compare the data with other people's data (3)	❍	❍	❍	❍	❍	❍	❍
Integrate the data with other software or apps such as Strava, Map my Ride and/or, Google map (4)	❍	❍	❍	❍	❍	❍	❍
Do nothing with the data collected on the tablet (5)	❍	❍	❍	❍	❍	❍	❍

Answer If Were you carrying any of the following electronic devices while recreating in the Port Hills today? (Tick all that apply) Digital music player (eg. MP3 player) Is Selected

Q49 While recreating in the Port Hills today, did you use a digital music player to: (For each action tick Yes or No)

	Yes (1)	No (2)
Listen to music (2)	❍	❍
Listen to the radio (1)	❍	❍

Answer If While recreating in the Port Hills today, did you use a digital music player to: For each action tick Yes or No) Listen to music - Yes Is Selected

Q50 Thinking about the digital music player music that you listened to while recreating in the Port Hills today, to what extent do you disagree or agree with the following statements. (1=Strongly disagree, 2=Disagree, 3=Somewhat disagree, 4=Neither agree or disagree, 5=Somewhat agree, 6=Agree, 7=Strongly agree)

	Strongly disagree (1) (1)	(2) (2)	(3) (3)	Neither agree nor disagree (4) (4)	(5) (5)	(6) (6)	Strongly agree (7) (7)
The music increased my motivation to exercise (1)	❍	❍	❍	❍	❍	❍	❍
The music relaxed me (2)	❍	❍	❍	❍	❍	❍	❍
The music made me feel "in my own world" (3)	❍	❍	❍	❍	❍	❍	❍
The music increased my enjoyment of the activity (4)	❍	❍	❍	❍	❍	❍	❍
The music connected me to the environment where the activity took place (5)	❍	❍	❍	❍	❍	❍	❍

Answer If While recreating in the Port Hills today, did you use a digital music player to: (For each action tick Yes or No) Listen to music - Yes Is Selected

Q51 How did you select the music from your digital player while recreating in the Port Hills today? (For each reason tick Yes or No)

	Yes (1)	No (2)
I selected the music with the shuffle feature (1)	❍	❍
I selected the music via a "play list(s)" (2)	❍	❍
I selected music to match the intensity of my activity (3)	❍	❍

I selected music to match my mood (4)	❍	❍
I selected music to match the landscape in which I recreated (5)	❍	❍
Other, please specify: (6)	❍	❍

Answer If Thank you for sharing general information about your Port Hills visit. The next set of questions asks about your use of electronic technologies during today's visit. Were you carrying a... Point-of-view (POV) sports action camera (eg. GoPro) Is Selected

Q52 While recreating in the Port Hills today did you use a POV sports action camera to: (For each action tick Yes or No)

	Yes (1)	No (2)
Take photos (1)	❍	❍
Make videos (2)	❍	❍

Answer If While recreating in the Port Hills today did you use a POV sports action camera to: (For each action tick Yes or No) Take photos - Yes Is Selected

Q53 With the photos you took on the POV sports action camera that you carried while recreating in the Port Hills today, how unlikely or likely is it that you will: (1= Very unlikely, 2= Moderately unlikely, 3= Slightly unlikely, 4= Neutral, 5= Slightly likely, 6= Moderately likely, 7= Very likely)

	Very unlikely (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very likely (7) (7)
Download photos on a computer (1)	❍	❍	❍	❍	❍	❍	❍
Edit photos (eg. cropping) on a computer or a portable electronic device (2)	❍	❍	❍	❍	❍	❍	❍
Share the photos on a blog and/or on sites such as Facebook, Instagram	❍	❍	❍	❍	❍	❍	❍

and Snapchat (3)							
Send photos to family/friends via e-mail (4)	❍	❍	❍	❍	❍	❍	❍
Print photos (5)	❍	❍	❍	❍	❍	❍	❍
Submit photos to "photo of the day" or other contest(s) (6)	❍	❍	❍	❍	❍	❍	❍
Leave photos on the POV camera memory card and do nothing with them (7)	❍	❍	❍	❍	❍	❍	❍

Answer If Please indicate which of the following best explain your reasons for carrying a POV sports action camera while recreating in the Port Hills today ? (For each reason tick Yes or No) To take videos - Yes Is Selected

Q54 With the video(s) you made on the POV sports action camera that you carried while recreating in the Port Hills today, how unlikely or likely is it that you will: (1= Very unlikely, 2= Moderately unlikely, 3= Slightly unlikely, 4= Neutral, 5= Slightly likely, 6= Moderately likely, 7= Very likely)

	Very unlikely (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very likely (7) (7)
Download video(s) on a computer (1)	❍	❍	❍	❍	❍	❍	❍
Edit video(s) on a computer or a portable electronic device (2)	❍	❍	❍	❍	❍	❍	❍
Share video(s) on a blog and/or on sites such as Facebook,	❍	❍	❍	❍	❍	❍	❍

YouTube, Instagram and Snapchat (3)							
Send video(s) to family/friends via e-mail (4)	❍	❍	❍	❍	❍	❍	❍
Submit video(s) to "video of the day" or other contest(s) (5)	❍	❍	❍	❍	❍	❍	❍
Leave video(s) on the POV camera memory card and do nothing with them (6)	❍	❍	❍	❍	❍	❍	❍

Answer If Were you carrying any of the following electronic devices while recreating in the Port Hills today? (Tick all that apply) Digital camera for photos and/or videos (eg. SLR, compact, video camera) Is Selected

Q55 While recreating in the Port Hills today did you use a digital camera to: (For each action tick Yes or No)

	Yes (1)	No (2)
Take photos (1)	❍	❍
Make videos (2)	❍	❍

Answer If Please indicate which of the following best explain your reasons for carrying a digital camera while recreating in the Port Hills today ? (For each reason tick Yes or No) To take photos - Yes Is Selected

Q56 With the photos you took on the digital camera that you carried while recreating in the Port Hills today, how unlikely or likely is it that you will: (1= Very unlikely, 2= Moderately unlikely, 3= Slightly unlikely, 4= Neutral, 5= Slightly likely, 6= Moderately likely, 7= Very likely)

	Very unlikely (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very likely (7) (7)

Download photos on a computer (1)	❍	❍	❍	❍	❍	❍	❍
Edit photos (eg. cropping) on a computer or a portable electronic device (2)	❍	❍	❍	❍	❍	❍	❍
Share the photos on a blog and/or on sites such as Facebook, Instagram and Snapchat (3)	❍	❍	❍	❍	❍	❍	❍
Send photos to family/friends via e-mail (4)	❍	❍	❍	❍	❍	❍	❍
Print photos (5)	❍	❍	❍	❍	❍	❍	❍
Submit photos to "photo of the day" or other contest(s) (6)	❍	❍	❍	❍	❍	❍	❍
Leave photos on the digital camera memory card and do nothing with them (7)	❍	❍	❍	❍	❍	❍	❍

Answer If Please indicate which, if any, of the following explain your reasons for carrying a digital camera while recreating in the Port Hills today ? (For each reason tick Yes or No) I am carrying... To take videos - Yes Is Selected

Q57 With the video(s) you made on the digital camera that you carried while recreating in the Port Hills today, how unlikely or likely is it that you will: (1= Very unlikely, 2= Moderately unlikely, 3= Slightly unlikely, 4= Neutral, 5= Slightly likely, 6= Moderately likely, 7= Very likely)

	Very unlikely (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very likely (7) (7)
Download video(s) on a computer (1)	❍	❍	❍	❍	❍	❍	❍
Edit video(s) on a computer or a portable electronic device (2)	❍	❍	❍	❍	❍	❍	❍
Share video(s) on a blog and/or on sites such as Facebook, YouTube, Instagram and Snapchat (3)	❍	❍	❍	❍	❍	❍	❍
Send video(s) to family/friends via e-mail (4)	❍	❍	❍	❍	❍	❍	❍
Submit video(s) to "video of the day" or other contest(s) (5)	❍	❍	❍	❍	❍	❍	❍
Leave video(s) on the digital camera memory card and do nothing with them (6)	❍	❍	❍	❍	❍	❍	❍

Answer If Were you carrying any of the following electronic devices while recreating in the Port Hills today? (Tick all that apply) Global Positioning System (GPS) (eg. Garmin, Magellan) Is Selected

Q58 What type of GPS did you use while recreating in the Port Hills today? (Tick one answer)

- ❍ Handheld (1)
- ❍ A wrist watch (2)

❍ Bar mounted (3)
❍ Other format, please specify: (4) _____

Answer If Were you carrying any of the following electronic devices while recreating in the Port Hills today? (Tick all that apply) Global Positioning System (GPS) (eg. Garmin, Magellan) Is Selected

Q59 While recreating in the Port Hills today did you use a GPS to: (For each action tick Yes or No)

	Yes (1)	No (2)
Access maps of the area where I recreated (1)	❍	❍
Record activity data such as speed and elevation (2)	❍	❍
Geocache (3)	❍	❍
Other, please specify: (4)	❍	❍

Answer If Were you carrying any of the following electronic devices while recreating in the Port Hills today? (Tick all that apply) Global Positioning System (GPS) (eg. Garmin, Magellan) Is Selected

Q60 Did you measure any of the following activity data through the GPS you used while recreating in the Port Hills today? (For each measure tick Yes, No or I do not know)

	Yes (1)	No (2)	I do not know (3)
Heart rate features (1)	❍	❍	❍
Cadence (2)	❍	❍	❍
Power (watts) (3)	❍	❍	❍

Answer If Were you carrying any of the following electronic devices while recreating in the Port Hills today? (Tick all that apply) Global Positioning System (GPS) (eg. Garmin, Magellan) Is Selected

Q61 How unimportant or important to you are each of the following activity data collected through the GPS you used while recreating in the Port Hills today? (1= Very unimportant, 2= Moderately unimportant, 3= Slightly unimportant, 4= Neutral, 5= Slightly important, 6= Moderately important, 7= Very important)

	Very unimportant (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very important (7) (7)
Average speed (1)	❍	❍	❍	❍	❍	❍	❍
Maximum speed (2)	❍	❍	❍	❍	❍	❍	❍
Minimum speed (3)	❍	❍	❍	❍	❍	❍	❍

Distance (4)	❍	❍	❍	❍	❍	❍	❍
Pace (5)	❍	❍	❍	❍	❍	❍	❍
Elevation profile (6)	❍	❍	❍	❍	❍	❍	❍
Time (7)	❍	❍	❍	❍	❍	❍	❍

Answer If Did you measure any of the following activity data through the GPS you used while recreating in the Port Hills today? (For each measure tick Yes, No or I do not know) Heart rate monitor - Yes Is Selected

Q62 How unimportant or important to you are each of the following heart rate data collected through the GPS you used while recreating in the Port Hills today? (1= Very unimportant, 2= Moderately unimportant, 3= Slightly unimportant, 4= Neutral, 5= Slightly important, 6= Moderately important, 7= Very important)

	Very unimportant (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very important (7) (7)
Heart rate (1)	❍	❍	❍	❍	❍	❍	❍
Calorie expenditure (2)	❍	❍	❍	❍	❍	❍	❍

Answer If Did you measure any of the following activity data through the GPS you used while recreating in the Port Hills today? (For each measure tick Yes, No or I do not know) Cadence - Yes Is Selected

Q63 How unimportant or important to you is the cadence data collected through the GPS you used while recreating in the Port Hills today? (1= Very unimportant, 2= Moderately unimportant, 3= Slightly unimportant, 4= Neutral, 5= Slightly important, 6= Moderately important, 7= Very important)

	Very unimportant (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very important (7) (7)
Cadence (1)	❍	❍	❍	❍	❍	❍	❍

Answer If Did you measure any of the following activity data through the GPS you used while recreating in the Port Hills today? (For each measure tick Yes, No or I do not know) Power (watts) - Yes Is Selected

Q64 How unimportant or important to you is the power (watts) data collected through the GPS you used while recreating in the Port Hills today? (1= Very unimportant, 2= Moderately unimportant, 3= Slightly unimportant, 4= Neutral, 5= Slightly important, 6= Moderately important, 7= Very important)

	Very unimportant (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very important (7) (7)
Power (watts) (1)	❍	❍	❍	❍	❍	❍	❍

Answer If Were you carrying any of the following electronic devices while recreating in the Port Hills today? (Tick all that apply) Global Positioning System (GPS) (eg. Garmin, Magellan) Is Selected

Q65 With the activity data that you collected through the GPS you used while recreating in the Port Hills today, how unlikely or likely is it that you will: (1= Very unlikely, 2= Moderately unlikely, 3= Slightly unlikely, 4= Neutral, 5= Slightly likely, 6= Moderately likely, 7= Very likely)

	Very unlikely (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very likely (7) (7)
Download the data on a computer (1)	❍	❍	❍	❍	❍	❍	❍
Compare the data with your personal data (2)	❍	❍	❍	❍	❍	❍	❍
Compare the data with other people's data (3)	❍	❍	❍	❍	❍	❍	❍
Integrate the data with other software or apps such as Strava, Map my Ride, Google map	❍	❍	❍	❍	❍	❍	❍

and/or Garmin Connect (4) Do nothing with the data collected on the GPS (5)	❍	❍	❍	❍	❍	❍	❍

Answer If Were you carrying any of the following electronic devices while recreating in the Port Hills today? (Tick all that apply) Cycle computer Is Selected

Q66 How unimportant or important to you are each of the following activity data features collected through the cycle computer while recreating in the Port Hills today? (1= Very unimportant, 2= Moderately unimportance, 3= Slightly unimportant, 4= Neutral, 5= Slightly important, 6= Moderately important, 7= Very important)

	Very unimportant (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very important (7) (7)
Average speed (1)	❍	❍	❍	❍	❍	❍	❍
Maximum speed (2)	❍	❍	❍	❍	❍	❍	❍
Minimum speed (3)	❍	❍	❍	❍	❍	❍	❍
Distance (4)	❍	❍	❍	❍	❍	❍	❍
Pace (6)	❍	❍	❍	❍	❍	❍	❍
Time (7)	❍	❍	❍	❍	❍	❍	❍
Cadence (8)	❍	❍	❍	❍	❍	❍	❍

Answer If Were you carrying any of the following electronic devices while recreating in the Port Hills today? (Tick all that apply) Cycle computer Is Selected

Q67 Did you measure any of the following activity data through the cycle computer you used while recreating in the Port Hills today? (For each measure tick Yes, No or I do not know)

	Yes (1)	No (2)	I do not know (3)
Heart rate features (1)	❍	❍	❍

Power (watts) (2)	❍	❍	❍
Elevation profile (3)	❍	❍	❍

Answer If Did you measure any of the following activity data through the cycle computer you used while recreating in the Port Hills today? (For each measure tick Yes, No or I do not know) Heart rate features - Yes Is Selected

Q68 How unimportant or important to you are each of the following heart rate data collected through the cycle computer you used while recreating in the Port Hills today? (1= Very unimportant, 2= Moderately unimportance, 3= Slightly unimportant, 4= Neutral, 5= Slightly important, 6= Moderately important, 7= Very important)

	Very unimportant (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very important (7) (7)
Heart rate (1)	❍	❍	❍	❍	❍	❍	❍
Calorie expenditure (2)	❍	❍	❍	❍	❍	❍	❍

Answer If Did you measure any of the following activity data through the cycle computer you used while recreating in the Port Hills today? (For each measure tick Yes, No or I do not know) Power (watts) - Yes Is Selected

Q69 How unimportant or important to you is the power (watts) data collected through the cycle computer you used while recreating in the Port Hills today? (1= Very unimportant, 2= Moderately unimportance, 3= Slightly unimportant, 4= Neutral, 5= Slightly important, 6= Moderately important, 7= Very important)

	Very unimportant (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very important (7) (7)
Power (watts) (1)	❍	❍	❍	❍	❍	❍	❍

Answer If Did you measure any of the following activity data through the cycle computer you used while recreating in the Port Hills today? (For each measure tick Yes, No or I do not know) Elevation profile - Yes Is Selected

Q70 How unimportant or important to you is the elevation profile activity data collected through the cycle computer you used while recreating in the Port Hills today? (1= Very unimportant, 2=

Moderately unimportance, 3= Slightly unimportant, 4= Neutral, 5= Slightly important, 6= Moderately important, 7= Very important)

	Very unimportant (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very important (7) (7)
Elevation profile (1)	❍	❍	❍	❍	❍	❍	❍

Answer If Were you carrying any of the following electronic devices while recreating in the Port Hills today? (Tick all that apply) Cycle computer Is Selected

Q71 With the activity data that you collected through the cycle computer you used while recreating in the Port Hills today, how unlikely or likely is it that you will: (1= Very unlikely, 2= Moderately unlikely, 3= Slightly unlikely, 4= Neutral, 5= Slightly likely, 6= Moderately likely, 7= Very likely)

	Very unlikely (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very likely (7) (7)
Download the data on a computer (1)	❍	❍	❍	❍	❍	❍	❍
Compare the data with your personal data (2)	❍	❍	❍	❍	❍	❍	❍
Compare the data with other people's data (3)	❍	❍	❍	❍	❍	❍	❍
Integrate the data with other software or apps such as Strava, Map my Ride, Google map and/or Garmin	❍	❍	❍	❍	❍	❍	❍

Connect (4) Do nothing with the data collected on the cycle computer (5)	❍	❍	❍	❍	❍	❍	❍

Answer If Were you carrying any of the following electronic devices while recreating in the Port Hills today? (Tick all that apply) Heart rate monitor Is Selected

Q72 What activity data features are included in the heart rate monitor that you wore while recreating in the Port Hills today? (Tick one answer)

- ❍ Heart rate monitoring features only (basic model) (1)
- ❍ Heart rate monitoring, speed, distance and cadence features (advanced model) (2)
- ❍ Heart rate monitoring, speed, distance, cadence and GPS features (advanced model) (3)
- ❍ I do not know (4)
- ❍ Other, please specify (5) _____

Answer If What activity data features are included in the heart rate monitor that you wore while recreating in the Port Hills today? (Tick one answer) Heart rate monitoring features only (basic model) Is Selected Or What activity data features are included in the heart rate monitor that you wore while recreating in the Port Hills today? (Tick one answer) Heart rate monitoring, speed, distance and cadence features (advanced model) Is Selected Or What activity data features are included in the heart rate monitor that you wore while recreating in the Port Hills today? (Tick one answer) Heart rate monitoring, speed, distance, cadence and GPS features (advanced model) Is Selected

Q73 How unimportant or important to you are each of the following heart rate data collected through the heart rate monitor that you wore while recreating in the Port Hills today? (1= Very unimportant, 2= Moderately unimportance, 3= Slightly unimportant, 4= Neutral, 5= Slightly important, 6= Moderately important, 7= Very important)

	Very unimportant (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very important (7) (7)
Heart rate (1)	❍	❍	❍	❍	❍	❍	❍
Calorie expenditure (2)	❍	❍	❍	❍	❍	❍	❍

Answer If What activity data features are included in the heart rate monitor that you wore while recreating in the Port Hills today? (Tick one answer) Heart rate monitoring, speed, distance and cadence features (advanced model) Is Selected Or What activity data features are included in the heart rate monitor that you wore while recreating in the Port Hills today? (Tick one answer) Heart rate monitoring, speed, distance, cadence and GPS features (advanced model) Is Selected

Q74 How unimportant or important to you are each of the following activity data collected through the heart rate monitor that you wore while recreating in the Port Hills today? (1= Very unimportant, 2= Moderately unimportance, 3= Slightly unimportant, 4= Neutral, 5= Slightly important, 6= Moderately important, 7= Very important)

	Very unimportant (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very important (7) (7)
Average speed (1)	❍	❍	❍	❍	❍	❍	❍
Maximum speed (2)	❍	❍	❍	❍	❍	❍	❍
Minimum speed (3)	❍	❍	❍	❍	❍	❍	❍
Distance (4)	❍	❍	❍	❍	❍	❍	❍
Pace (5)	❍	❍	❍	❍	❍	❍	❍
Time (6)	❍	❍	❍	❍	❍	❍	❍
Cadence (7)	❍	❍	❍	❍	❍	❍	❍

Answer If What activity data features are included in the heart rate monitor that you wore while recreating in the Port Hills today? (Tick one answer) Heart rate monitoring, speed, distance, cadence and GPS features (advanced model) Is Selected

Q75 How unimportant or important to you is the elevation profile data collected through the heart rate monitor that you wore while recreating in the Port Hills today? (1= Very unimportant, 2= Moderately unimportance, 3= Slightly unimportant, 4= Neutral, 5= Slightly important, 6= Moderately important, 7= Very important)

	Very unimportant (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very important (7) (7)
Elevation profile (1)	❍	❍	❍	❍	❍	❍	❍

Answer If Were you carrying any of the following electronic devices while recreating in the Port Hills today? (Tick all that apply) Heart rate monitor Is Selected

Q76 With the activity data that you collected through the heart rate monitor that you wore while recreating in the Port Hills today, how unlikely or likely is it that you will: (1= Very unlikely, 2= Moderately unlikely, 3= Slightly unlikely, 4= Neutral, 5= Slightly likely, 6= Moderately likely, 7= Very likely)

	Very unlikely (1) (1)	(2) (2)	(3) (3)	Neutral (4) (4)	(5) (5)	(6) (6)	Very likely (7) (7)
Download the data on a computer (1)	❍	❍	❍	❍	❍	❍	❍
Compare the data with your personal data (2)	❍	❍	❍	❍	❍	❍	❍
Compare the data with other people's data (3)	❍	❍	❍	❍	❍	❍	❍
Integrate the data with other software or apps such as Strava, Map my Ride, Google map and/or Garmin Connect (4)	❍	❍	❍	❍	❍	❍	❍
Do nothing with the data collected on the heart rate	❍	❍	❍	❍	❍	❍	❍

monitor (5)							

Answer If Thank you for sharing general information about your Port Hills visit. The next set of questions asks about your use of electronic technologies during today's visit. Were you carrying a... Digital watch Is Selected

Q77 While recreating in the Port Hills today, did you use a digital watch to: (For each action tick Yes or No. If the watch you are using does not have the function asked about, please tick N/A)

	Yes (1)	No (2)	N/A (3)
Check the time (1)	❍	❍	❍
Measure your heart rate by looking at the seconds or by using the "stop watch function" (2)	❍	❍	❍
Time the lenght of the activity and/or, a segment of the activity, through the "stop watch" function (3)	❍	❍	❍
Access altitude information through the altimeter function (4)	❍	❍	❍
Access temperature information through the thermometer function (5)	❍	❍	❍
Other, please specify: (6)	❍	❍	❍

Answer If Thank you for sharing general information about your Port Hills visit. The next set of questions asks about your use of electronic technologies during today's visit. Were you carrying any... Other(s), please specify: Is Selected

Q78 What are the main reason(s) for using the "other" technological device(s) that you are carrying with you in the Port Hills today? (Please identify each device with reason(s) separately)

Answer If Were you carrying any of the following electronic devices while recreating in the Port Hills today? (Tick all that apply) I did not have an electronic device with me Is Selected

Q79 Please indicate the reason why you did not have an electronic device with you while recreating in the Port Hills today? (Tick one answer)

- ❍ I do not own a portable electronic device (1)
- ❍ I forgot to bring my electronic device(s) with me (2)
- ❍ I decided not to bring my electronic device(s) with me (eg. broken, unavailable, out of battery, awkward to carry, need to disconnect, etc.) (3)
- ❍ Other, please specify: (4) _____

Answer If Please identify the reasons why you did not have an electronic device(s) with you while recreating in the Port Hills today? (Tick one answer) I decided not to bring my electronic device(s) with me (eg. broken, unavailable, out of battery, awkward to carry, need to disconnect, etc.) Is Selected

Q80 What are the reasons you decided not to bring an electronic device(s) with you while recreating in the Port Hills today? (Check ALL that apply)

- ❑ My electronic device(s) is/are broken (1)
- ❑ My electronic device(s) is/are out of battery (2)
- ❑ My electronic device(s) is/are awkward to carry (3)
- ❑ I had no space to carry my electronic device(s) (4)
- ❑ I do not want to risk damaging my electronic device(s) (5)
- ❑ My electronic device(s) was utilised by someone else (6)
- ❑ I wanted to spend time without my electronic device(s) (7)
- ❑ Other(s) (8) _____

Q81 What is your gender?

- ❍ Male (1)
- ❍ Female (2)

Q82 Where do you live?

- ❍ Christchurch - which suburb? (1) _____
- ❍ In Canterbury, other than Christchurch city - which area? (2) _____
- ❍ In New Zealand, outside of Canterbury area- which town/city? (3) _____
- ❍ Outside of New Zealand - which country? (4) _____

Q83 Which ethnic group do you belong to? (Tick ALL that apply)

- ❑ New Zealand European (1)
- ❑ Māori (2)
- ❑ Samoan (3)
- ❑ Cook Island Māori (4)
- ❑ Tonga (5)
- ❑ Niuean (6)
- ❑ Chinese (7)
- ❑ Indian (8)

❑ Other (such as DUTCH, JAPANESE), please specify: (9) _____

Q84 What was your age group on your last birthday? (Tick one answer)

❍ 13-17 (1)
❍ 18-24 (2)
❍ 25-29 (3)
❍ 30-34 (4)
❍ 35-39 (5)
❍ 40-44 (6)
❍ 45-49 (7)
❍ 50-54 (8)
❍ 55-59 (9)
❍ 60-64 (10)
❍ 65-69 (11)
❍ 70-74 (12)
❍ 75-79 (13)
❍ 80-84 (14)
❍ 85 and over (15)

Q85 Congratulations you have made it to the last page of the survey and thank you for your insights so far. Do you have any additional thoughts on the relationship between the use of electronic technologies and outdoor recreation?

❍ Yes, please specify: (1) _____
❍ No, I have nothing to add (2)

Q86 Would you be willing to participate in a 45-minute interview at a later time, date and place that suits you? This is for us to collect in-depth information on the topic of electronic technologies and outdoor recreation. Please note that if you answer yes below you will have the opportunity to give your name and contact info by clicking on the link available to you at the end of the survey once you have submitted your responses. Be assured that your contact details will not be associated to your survey responses. Alternatively, you may see a survey administrator or contact the principal investigator at caroline.depatie@lincolnuni.ac.nz to let her know that you are willing to be interviewed. If selected for the interview, you will be contacted via e-mail or text shorthly to set up a convenient time, date and place for the interview. Thank you. I am willing to participate in a 45-minute interview:

❍ Yes (1)
❍ No (2)

Q87 Once you press the >> arrows at the bottom of this page your answers will be permanently recorded. At this point, if you do not wish to submit your response, you can press the "X" on the top right of the tablet screen or exit the web browser on the device that you are using. Please feel free to contact the principal investigator or the research co-supervisors if you have any questions, comments and/or feedback about this project: Principal investigator:

caroline.depatie@lincolnuni.ac.nz, 021 083 83515 Co-supervisors: Dr. Stephen Espiner, 64 3 423 0485; Dr. Emma J. Stewart, 64 3 423 0500; Dr. Roslyn Kerr, 64 3 423 0491

Appendix D

Questions Details and Logic

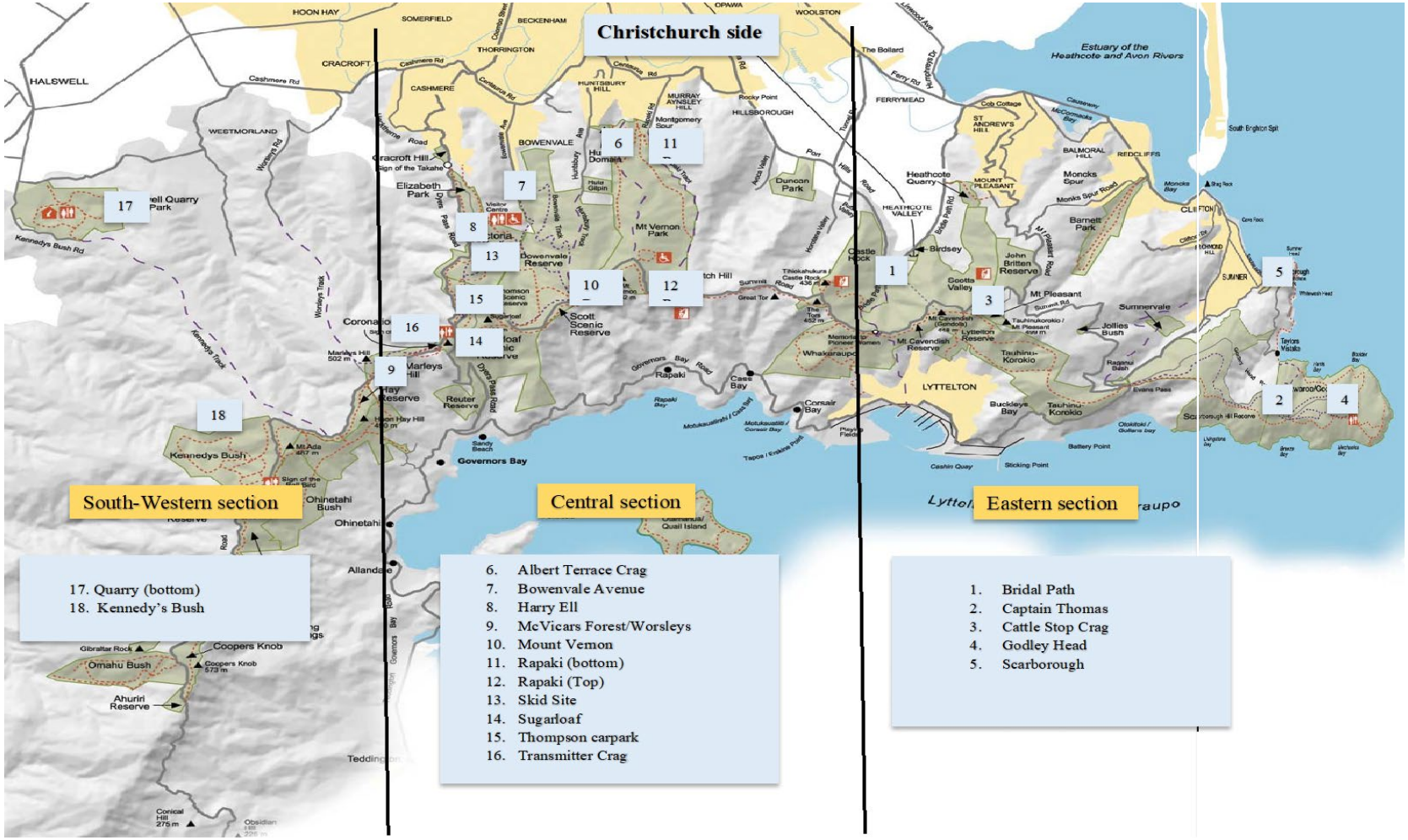
Block # and title	#	#	#	#	#	General idea of question
Block 1 - Consent	1					Research information
	2					Consent
Block 2 - Activity	3					Frequency of visits in Port Hills
	4					Main activity
	5					Mountain bike style
	6					Area(s) recreating in
	7					Who recreating with
	8					How many people
	9					Dogs
	10					Recreation length
	11					Reasons for activity
Block 3 - Technology general	12					Technological devices
	13					% of use
Block 4 - Basic mobile phone	14	16	27	38		Cellular phone reasons
	15					Today's use
Block 5 - Smart phone	16	14	27	38		Smartphone reasons
	17	15	28	39		Today's use
	18	29	40			SNSs
	19	30	41			Instant messaging
	20	31	42	50		Music why
	21	32	43	51		Music selection
	22	33	44	53	56	Photos
	23	34	45	54	57	Videos
	24	35	46			Apps
	25	36	47			Activity data importance
	26	37	48			Activity date intention
Block 6 - iPod touch	27	14	16	38		iPod reasons
	28	15	17	39		Today's use
	29	18	40			SNSs
	30	19	41			Instant messaging
	31	20	42	50		Music why?
	32	21	43	51		Music selection
	33	22	44	53	56	Photos
	34	23	45	54	57	Videos
	35	24	46			Apps
	36	25	47			Activity data importance
	37	26	48			Activity data intention

Block 7 - Tablet	38	14	16	27		Tablet reasons
	39	15	17	28		Today's use
	40	18	29			SNSs
	41	19	30			Instant messaging
	42	29	31	50		Music why?
	43	21	32	51		Music selection
	44	22	33	53	56	Photos
	45	23	34	54	57	Videos
	46	24	35			Apps
	47	25	36			Activity data importance
	48	26	37			Activity data intention
Block 8 - Digital music player	49					Digital music player today's use
	50	20	31	42		Music why?
	51	21	32	43		Music selection
Block 9 - POV	52					POV today's use
	53	22	33	44	56	Photos
	54	23	34	45	57	Videos
Block 10 - Digital camera for	55					Digital camera use
	56	22	33	44	53	Photos
	57	23	34	45	54	Videos
Block 11 - GPS	58					GPS format
	59					GPS use
	60					Activity data (yes/no) to HR, cadence, power
	61					Activity data general (7)
	62	68	73			Activity data - HR
	63					Activity data - Cadence
	64	69				Activity data - Power
	65	71	76			Activity data - Intentions
Block 12 - Cycle computer	66	74				Activity data general (7)
	67					Activity data (yes/no) HR, power, elevation profile
	68	62	73			Activity data HR
	69	64				Activity data power
	70	75				Activity data elevation profile
	71	65	76			Activity data - Intentions
Block 13 - HRM	72					Type of HRMs
	73	62	68			Activity data HR
	74	66				Activity data general (7)
	75	70				Activity data - elevation profile
	76	65	71			Activity data - Intentions
Block 14 - Digital watch	77					Digital watch today's use
Block 15 - Other device(s)	78					

Block 16 - No electronic devices	79	Reasons for no technology
	80	Reasons not to bring technology
Block 17 -Demographics	81	Gender
	82	Live
	83	Ethnic group
	84	Age
Block 18- Follow up interview	85	Additional thoughts
	86	Interview
	87	Follow up interview

Appendix E

Port Hills Map with Survey Intercept Sites



Appendix F

Data Collection and Intercepts Detailed Information

	Area	Specific location	Date	day	Time	Mns	Pop	Recruit	%	All-ready	Declined	Compl-eted	%	% Sample	Comments
1	SW	Kennedy's	20/04	S	3-5	120	19	7	36.8	0	0	3	42.9	15.8	Overcasted, approx. 16 degrees.
2	E	GH/Taylor	21/04	M	1-2:30	90	83	25	30.1	0	0	7	28.0	8.4	Easter Monday. Walked on track. Sunny, approx. 22.
3	C	Rapaki (t)	22/04	Tu	3-4:30	90	2	1	50.0	0	0	0	0.0	0.0	Horrible weather. Windy and rainy, approx 12.
4	C	Harry Ell	07/05	W	10:30-11:45	75	19	16	84.2	0	3	4	25.0	21.1	Overcast, approx 15 degrees. Walking track only.
5	C	Rapaki (t)	11/05	Sat	3-3:45	45	58	23	39.7	0	0	2	8.7	3.4	Beautiful weather 20 degrees. Mothers day (Sunday)
6	E	Bridal Path	15/05	Th	11-12	60	3	3	100.0	0	0	2	66.7	66.7	Very quiet, nice weather, overcast. Muddy track.
7	C	Rapaki (t)	19/05	M	11-12:30	90	35	23	65.7	0	2	6	26.1	17.1	Sunny and warm, 20 degrees.
8	SW	Kennedy's	24/05	Sat	1-2:30	90	34	18	52.9	0	0	9	50.0	26.5	Sunny and warm, 20 degrees
9	C	Thompsons	25/05	Su	3:30-4:00	30	22	18	81.8	0	1	8	44.4	36.4	Overcast and very windy, 15 degrees
10	C	Harry Ell	07/06	Sat	1:15-2:45	90	50	32	64.0	0	0	5	15.6	10.0	Overcast, 13 degrees
11	SW	Halswell Q	13/06	F	10-11:30	90	12	12	100.0	0	1	5	41.7	41.7	Overvast/sun, 10 degrees. Wet tracks. dog walkers
12	C	Rapaki (top)	15/06	Su	2:45-3:45	60	53	21	39.6	0	0	9	42.9	17.0	Windy and overcast, approx 8 degrees
13	C	Worsley	22/06	Ty	1:45-2:15	90	50	23	46.0	0	2	8	34.8	16.0	Sunny with clouds Approx 10 degrees
14	E	Taylor's	26/06	Th	11-1	120	21	15	71.4	0	0	3	20.0	14.3	Sunny and warm 15 degrees
15	E	Bridal Path	29/06	Su	9:45-11:45	120	75	41	54.7	0	2	11	26.8	14.7	Sunny and cold wind approx 12
16	C	Albert Terr	29/06	Su	1-2	60	7	5	71.4	0	0	5	100.0	71.4	Sunny and cool approx 12
17	C	Harry Ell	02/07	W	10-11:30	90	3	2	66.7	0	0	1	50.0	33.3	Mix of sun and clouds, cold approx 5. No one out,
18	C	Bowenvale	03/07	Th	7:30-8	30	0	0	0.0	0	0	0	0.0	0.0	Cloudy and cold - no one came in 30 mns
19	C	Skidder site	05/07	Sa	2:15-4	105	80	48	60.0	0	2	26	54.2	32.5	Sunny, cold and windy. Approx 7
20	C	Transmitter	06/07	Su	2-3	60	7	6	85.7	0	0	5	83.3	71.4	Sunny with clouds, light winds approx 8 degrees
21	C	Bowenvale	11/07	F	11:15-12:15	60	4	4	100.0	0	0	1	25.0	25.0	Sunny with limited clouds, light winds approx 10
22	SW	Kennedy's	12/07	Sa	2:30-3:45	75	20	14	70.0	0	2	3	21.4	15.0	Cloudy with high cold winds, approx 8 degrees
23	E	Bridal Path	23/07	W	10-11	60	1	1	100.0	0	0	1	100.0	100	Windy and cold, approx 5 degrees
24	C	Harry Ell	24/07	Th	7:20-9:20	120	17	12	70.6	0	0	3	25.0	17.6	Clear and cool - approx 2 degrees
25	C	Rapaki (top)	26/07	Sa	2-4	120	84	45	53.6	2	3	22	48.9	26.2	Windy and cold - approx 2 degrees
26	E	Bridal Path	02/08	Sa	11:45-12:30	45	41	23	56.1	0	2	10	43.5	24.4	Warm and sunny approx 15 debrees
27	SW	Halswell Q	05/08	Tu	7:30-9:30	120	10	8	80.0	0	1	5	62.5	50.0	Early morning - cold approx 2 degrees
28	E	Scarborough	10/08	Su	12:30-2:50	140	70	49	70.0	0	0	5	10.2	7.1	Warm and sunny approx 12 degrees
29	C	Rapaki (top)	24/08	Su	12:00-2:00	120	112	71	63.4	2	3	24	33.8	21.4	Windy and cold, some light rain, approx 5 degrees
30	E	Bridal Path	27/08	W	8:50-10:20	90	19	14	73.7	0	1	7	50.0	36.8	Sunny and calm. Approx 12 degrees
31	SW	Halswell Q	06/09	Sa	12:15-2:15	120	34	16	47.1	1	2	14	87.5	41.2	Sunny approx 15
32	SW	Kennedy's	07/09	Su	12:30-1:30	60	13	4	30.8	0	0	4	100.0	30.8	Sunny approx 15

33	C	Sugarloaf	07/09	Su	1:40-2:40	60	15	5	33.3	0	0	5	100.0	33.3	Sunny approx 15
34	C	Transmitter	12/09	F	3-4	60	5	5	100.0	0	0	5	100.0	100	Sunny approx 15
35	SW	Halswell Q	19/09	F	8:10-10:10	120	29	16	55.2	0	1	11	68.8	37.9	Windy and sunny then cool and overcast. Approx 10
36	C	Bowenvale	21/09	Su	9:15-10:15	60	29	20	69.0	2	2	4	20.0	13.8	Cool and overcast approx 10 degrees
37	C	Rapaki (b)	24/09	W	12:30-1:30	60	27	18	66.7	2	0	0	0.0	0.0	Sunny approx 15
38	E	Cattle Stop	25/09	Th	2:00-3:00	60	10	7	70.0	1	1	7	100.0	70.0	Sunny approx 15
39	C	Worsley	30/09	Tu	5:30-6:00	90	28	15	53.6	0	1	7	46.7	25.0	Sunny approx 15
40	E	Bridal Path	01/10	W	11:30-12:30	60	10	6	60.0	0	3	6	100.0	60.0	Sunny and windy approx 15
41	C	Mt Vernon	01/10	W	1-1:30	30	0	0	0.0	0	0	0	0.0	0.0	Sunny and windy approx 15
42	C	Albert Terr	05/10	Su	2:30-4:00	90	8	6	75.0	0	0	6	100.0	75.0	Sunny approx 15
43	C	Rapaki	07/10	Tu	1:30-2:30	60	19	9	47.4	1	0	6	66.7	31.6	Sunny approx 18
44	C	Bowenvale	07/10	Tu	5:50-6:50	60	26	12	46.2	0	0	7	58.3	26.9	Overcast and cool approx 12 degrees
45	E	Cattle Stop	12/10	Su	2:30-4:00	90	21	12	57.1	1	0	12	100.0	57.1	Sunny approx 20
46	SW	Kennedy's	18/10	Sa	6:30-7:30	60	9	6	66.7	0	0	2	33.3	22.2	Grey, light rain approx 12
47	C	Worsley	21/10	Tu	4:40-5:40	60	21	12	57.1	2	0	7	58.3	33.3	Sunny approx 6
48	E	Bridal Path	25/10	Sa	11:45-1:45	120	42	18	42.9	0	1	14	77.8	33.3	Sunny with cool strong wind - approx 15
49	C	Skidder site	09/11	Sa	1:00-3:00	90	94	25	26.6	2	2	20	80.0	21.3	Sunny approx 24
50	SW	Halswel Q	11/11	T	10:00-10:30	30	3	2	66.7	0	0	1	50.0	33.3	Sunny approx 20
51	E	Cpt Thomas	17/11	M	5:00-6:00	60	4	3	75.0	0	0	2	66.7	50.0	Overcast with light drizzle approx 18
52	C	Bowenvale	18/11	T	5:30-7:00	90	35	16	45.7	2	0	8	50.0	22.9	Sunny and very windy - approx 20
53	SW	Halswell Q	21/11	F	7:20-8:20am	60	7	5	71.4	1	1	4	80.0	57.1	Overcast and warm approx 20
54	E	Bridal Path	26/11	W	7:50-8:50am	60	7	4	57.1	0	0	3	75.0	42.9	Sunny approx 18
55	E	Cpt Thomas	26/11	W	7:30-8:30	60	8	6	75.0	0	0	5	83.3	62.5	Sunny and warm approx 22
56	C	Bowenvale	29/11	Sa	4:00-4:30	30	12	6	50.0	0	1	1	16.7	8.3	Sunny and warm approx 25
57	SW	Kennedy's	06/12	Sa	10:30-11:30	60	17	11	64.7	0	1	5	45.5	29.4	Cool and windy approx 15
58	E	Godley H	07/12	Su	9-11	120	56	19	33.9	3	1	11	57.9	19.6	Warm and sunney approx 25
59	E	Cattle Stop	08/12	M	3-3:30	30	3	3	100.0	1	1	2	66.7	66.7	Overcast approx 15
60	C	Rapaki (top)	09/12	Tu	1:40-2:10	90	24	9	37.5	2	0	9	100.0	37.5	Warm and windy approx 20
61	C	Rapaki (top)	19/12	F	2:30-3:30	60	19	13	68.4	1	0	4	30.8	21.1	Warm and sunny, approx 25
62	SW	Halswell Q	19/12	F	11-1	120	18	8	44.4	0	0	8	100.0	44.4	Warm and sunny, approx 25
63	E	Cpt Thomas	21/12	S	5-6	60	5	5	100.0	0	0	5	100.0	100	Overcast, approx 20
64	Cl	Albert Terr	22/12	M	6-7	60	5	5	100.0	0	0	5	100.0	100	Sunny, approx 20
65	C	Bowenvale	23/12	T	11-1	120	28	12	42.9	0	0	11	91.7	39.3	Overcast and sunny, approx 22
66	E	Bridal Path	05/01	M	4-6	120	13	7	53.8	0	0	5	71.4	38.5	Sunny and warm, approx 28 - light breeze
67	C	Rapaki (top)	10/01	Sa	6-8	120	53	31	58.5	2	0	14	45.2	26.4	Sunny and warm, approx 25
68	E	Taylor's mist	11/01	S	8-9am	60	20	9	45.0	0	0	5	55.6	25.0	Overcast and warm, approx 25
69	E	Bridal Path	21/01	W	6-7	60	10	7	70.0	0	0	7	100.0	70.0	Overcast, light wind, approx 18
70	SW	Kennedy's	22/01	Th	4:15-5:15	60	9	5	55.6	0	0	3	60.0	33.3	Sunny and warm, light wind, approx 25
71	SW	Kennedy's	24/01	Sa	10:15-11:15	60	31	16	51.6	1	2	7	43.8	22.6	Sunny and warm, approx 25
72	E	Bridal Path	29/01	Th	9-11	120	8	8	100.0	0	0	2	25.0	25.0	Overcast, foggy and drizzle approx 22
73	C	Bowenvale	29/01	Th	4-6	120	36	25	69.4	2	0	9	36.0	25.0	Sunny and warm, approx 25
74	C	Transmitter	01/02	Su	10:30-1100	30	2	1	50.0	0	0	1	100.0	50.0	Sunny and hot, approx 30

75	SW	Halswell Q	16/02	M	10:45-11:45	60	8	5	62.5	1	1	3	60.0	37.5	Cloudy, approx 16
76	C	Bowenvale	16/02	M	3-5	120	17	8	47.1	1	1	4	50.0	23.5	Clear and warm, approx 22
77	E	Cpt Thomas	17/02	Tu	1-3	120	5	3	60.0	0	0	3	100.0	60.0	Clear and warm, approx 20
78	E	Taylor's mist	24/02	Tu	4-6	120	4	3	75.0	0	0	1	33.3	25.0	Overcast, light wind approx 15
79	E	Cpt Thomas	26/02	Th	5-7	120	5	5	100.0	1	0	1	20.0	20.0	Overcast, light wind, approx 15
80	E	Bridal Path	27/02	F	6-8	120	20	13	65.0	3	0	6	46.2	30.0	Clear with light wind, approx 15
81	C	Rapaki (top)	27/02	F	7:45-8:45	60	17	13	76.5	2	0	2	15.4	11.8	Clear with light wind, approx 15
82	Cl	Bowenvale	07/03	Sa	7:30-9:30	120	20	12	60.0	1	0	5	41.7	25.0	Overcast with light wind, approx 20
83	SW	Halswell Q	11/03	W	7:30-8:30	60	0	0	0.0	0	0	0	0.0	0.0	Overcast with light rain, approcx 18
84	SW	Kennedy's	11/03	W	12:30-1:30	60	2	2	100.0	0	0	0	0.0	0.0	Overcast with light wind, approx 18
85	C	Thompsons	12/03	Th	12-1	60	14	10	71.4	1	0	3	30.0	21.4	Overcast, approx 18
86	C	Worsley	14/03	Sa	11:15-12:15	60	32	18	56.3	2	0	12	66.7	37.5	Overcast, approx 18
87	C	Transmitter	15/03	Su	2:30-3:30	60	4	4	100.0	2	0	4	100.0	100	Sunny and warm, approx 22
88	C	Albert Terr	15/03	Su	3:30-4:30	60	2	2	100.0	0	0	2	100.0	100	Sunny and warm, approx 22
89	C	Bowenvale	16/03	M	8-930	90	2	2	100.0	0	0	0	0.0	0.0	Overcast with light rain, approx 15
90	SW	Kennedy's	16/03	M	1-2:30	90	0	0	0.0	0	0	0	0.0	0.0	Rainy and windy. Approx 15
					Total:	**7205**	**2036**	**1128**	**55.4**	**45.0**	**47.0**	**520**	**46.1**	**25.5**	
					% of intercepts					**4.0**	**4.2**				
					Hrs	**120.1**	**17.0**	**9.4**				**4.3**			

Population:
Recreationists who are walking, running, mountain biking or/and climbing and who can be interrupted from their activities

Intercepts:
Recreationists who are given a card with the survey link/QR code and/or asked to complete the survey on the tablet

% Intercepts:
% of the population who have been intercepted to complete the survey

Already recruited:
Numbers of recreationists who mention that they have already been intercepted for the study. These recreationists are included in the population and intercepts numbers.

Declined:
Number of recreationists who were not interested in completing the survey on tablet or receiving the link/QR code to survey whether intercepted for the first time or not.

Completed surveys:
Number of intercepted recreationists who have completed the survey

% of completion:
Number of intercepted recreationists who have completed the survey against the amount of recreationists who were intercepted in %

Sample:
Number of recreationists completed the survey against the population in %

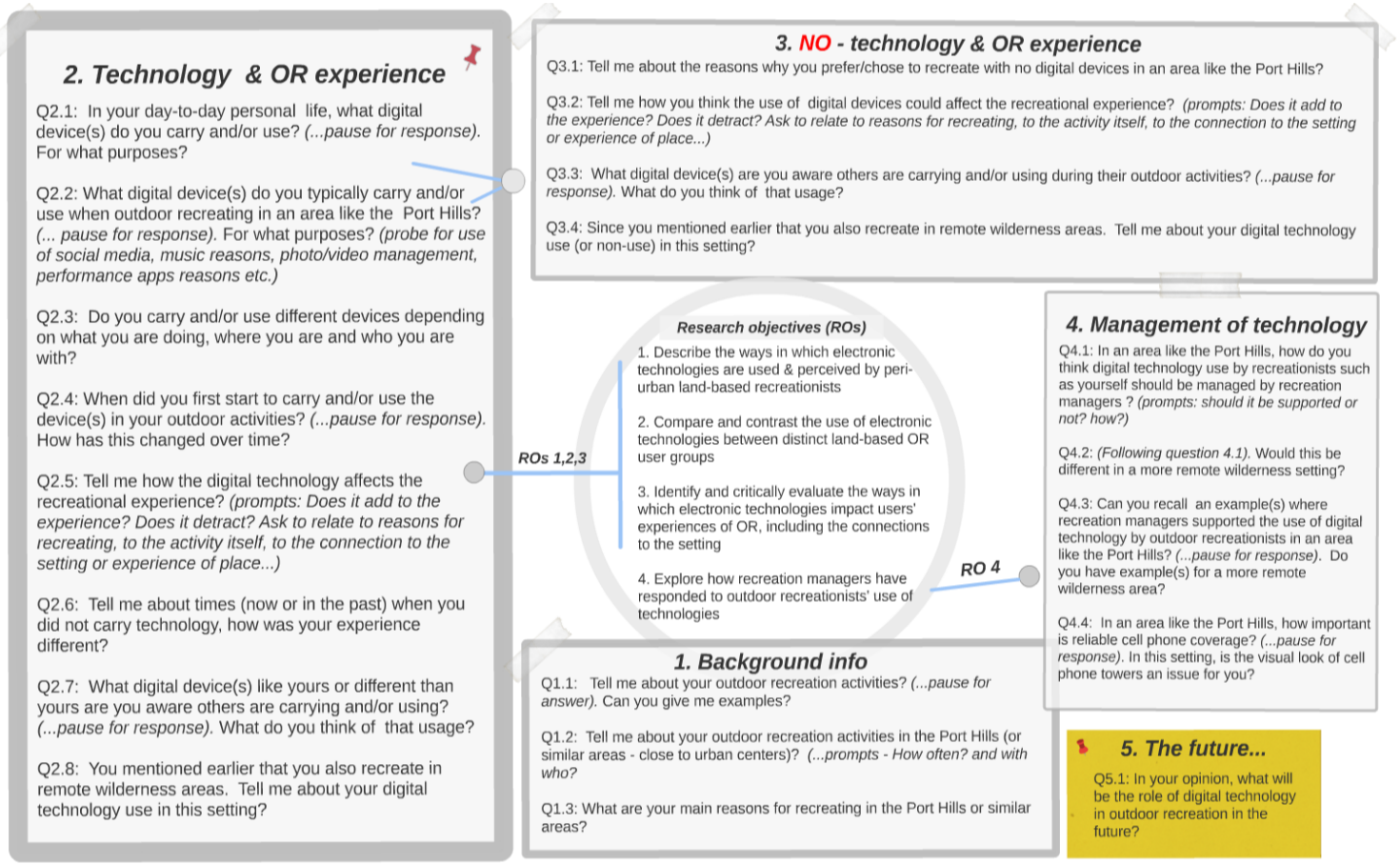
				Population				Recruited				Answered					
	Area	Where	Date	W/R	Bikers	Climbers	Total	W/R	Bikers	Climbers	Total	W/R	Bikers	Multi	Climbers	other	Total
1	SW	Kennedy's	20/04	9	10	-	19	3	4	-	7	2	1	-	-	-	3
2	E	Taylor's mis	21/04	83	-	-	83	25	-	-	25	7	-	-	-	-	7
3	C	Rapaki (top)	22/04	-	2	-	2	0	1	-	1	0	-	-	-	-	0
4	C	Harry Ell	07/05	19	-	-	19	16	-	-	16	4	-	-	-	-	4
5	C	Rapaki (top)	11/05	30	28	-	58	12	11	-	23	1	1	-	-	-	2
6	E	Bridal Path	15/05	3	-	-	3	3	-	-	3	2	-	-	-	-	2
7	C	Rapaki (top)	19/05	15	20	-	35	10	13	-	23	3	3	-	-	-	6
8	SW	Kennedy's	24/05	18	16	-	34	9	9	-	18	4	4	1	-	-	9
9	C	Thompsons	25/05	2	20	-	22	2	16	-	18	-	8	-	-	-	8
10	C	Harry Ell	07/06	50	-	-	50	32	-	-	32	5	-	-	-	-	5
11	SW	Halswell Q	13/06	12	-	-	12	12	-	-	12	5	-	-	-	-	5
12	C	Rapaki (top)	15/06	25	28	-	53	10	11	-	21	3	6	-	-	-	9
13	Cl	Worsley	22/06	15	35	-	50	7	16	-	23	2	6	-	-	-	8
14	E	Taylor's mis	26/06	21	-	-	21	15	-	-	15	3	-	-	-	-	3
15	E	Bridal Path	29/06	48	27	-	75	32	9	-	41	7	4		-	-	11
16	C	Albert Terr	29/06	-	-	7	7	-	-	5	5	-	-	-	5	-	5
17	C	Harry Ell	02/07	3	-	-	3	2	-	-	2	1	-	-	-	-	1
18	C	Bowenvale	03/07	0	0	-	0	0	0	-	0	0	0	-	-	-	0
19	C	Skidder site	05/07	47	33	-	80	25	23	-	48	10	16	-	-	-	26
20	C	Transmitter	06/07	1	-	6	7	1	-	5	6	1	-	1	3	-	5
21	C	Bowenvale	11/07	4	0	-	4	4	0	-	4	1	0	-	-	-	1
22	SW	Kennedy's	12/07	10	10	-	20	8	6	-	14	1	2	-	-	-	3
23	E	Bridal Path	23/07	1	-	-	1	1	-	-	1	1	-	-	-	-	1
24	C	Harry Ell	24/07	17	-	-	17	12	-	-	12	3	-	-	-	-	3
25	C	Rapaki (top) & MB area	26/07	41	43	-	84	20	25	-	45	15	7	-	-	-	22
26	E	Bridal Path	02/08	37	4	-	41	19	4	-	23	9	1	-	-	-	10
27	SW	Halswell Q	05/08	10	0	-	10	8	0	-	8	5	0	-	-	-	5
28	E	Scarborough	10/08	70	-	-	70	49	-	-	49	5	-	-	-	-	5
29	C	Rapaki (top)	24/08	65	47	-	112	40	31	-	71	8	16				24
30	E	Bridal Path	27/08	19	0	-	19	14	0	-	14	7	0	-	-	-	7
31	SW	Halswell Q	06/09	28	6	-	34	14	2	-	16	10	2	1	-	1	14
32	SW	Kennedy's	07/09	13	0	-	13	4	0	-	4	3	0	-	-	1	4
33	C	Sugarloaf	07/09	15	-	-	15	5	-	-	5	5	-	-	-	-	5
34	C	Transmitter	12/09	-	-	5	5	-	-	5	5	-	-	-	5	-	5
35	SW	Halswell Q	19/09	28	1	-	29	16	0	-	16	11	0	-	-	-	11

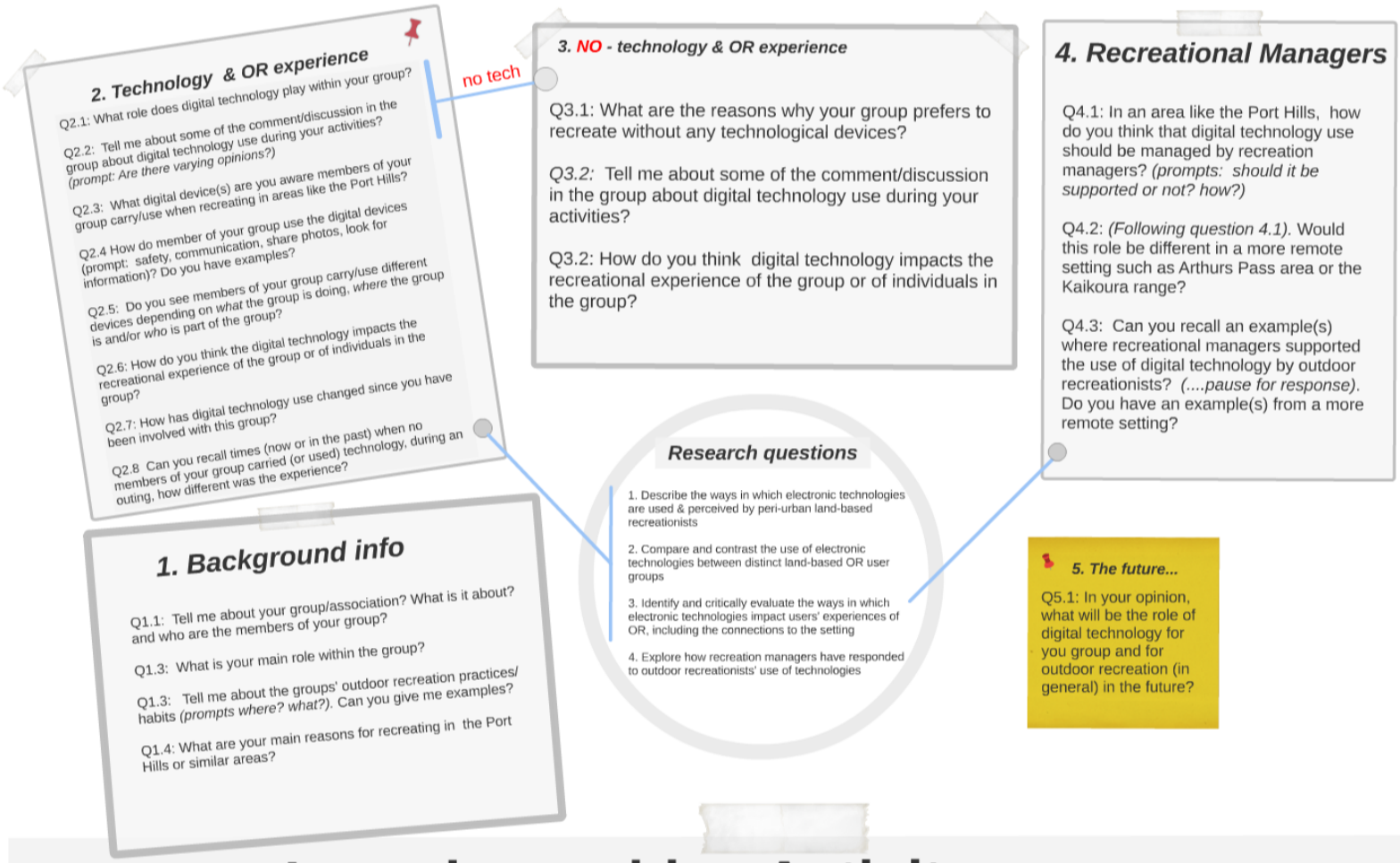
36	C	Bowenvale	22/09	12	17	-	29	6	14	-	20	1	3	-	-	-	4
37	C	Rapaki (b)	24/09	23	4	-	27	17	1	-	18	0	0	-	-	-	0
38	E	Cattle Stop	25/09	-	-	10	10	-	-	7	7	-	-	-	7	-	7
39	C	Worsley	30/09	5	23	-	28	3	12	-	15	2	5	-	-	-	7
40	E	Bridal Path	01/10	10	0	-	10	6	0	-	6	6	0	-	-	-	6
41	C	Mt Vernon	01/10	0	0	-	0	0	0	-	0	0	0	-	-	-	0
42	C	Albert Terr	05/10	-	-	8	8	-	-	6	6	-	-	-	6	-	6
43	C	Rapaki	07/10	6	13	-	19	3	6	-	9	3	3	-	-	-	6
44	C	Bowenvale	07/10	8	18	-	26	7	5	-	12	2	5	-	-	-	7
45	E	Cattle Stop	12/10	-	-	21	21	-	-	12	12	-	-	-	12	-	12
46	SW	Kennedy's	18/10	6	3	-	9	4	2	-	6	1	1	-	-	-	2
47	C	Worsley	21/10	3	18	-	21	1	11	-	12	1	6	-	-	-	7
48	E	Bridal Path	25/10	35	7	-	42	15	3	-	18	10	4	-	-	-	14
49	C	Skidder site	09/11	36	58	-	94	11	14	-	25	6	14	-	-	-	20
50	SW	Halswell Q)	11/11	3	0	-	3	2	0	-	2	1	0	-	-	-	1
51	E	Cpt Thomas	17/11	3	1	-	4	3	0	-	3	2	0	-	-	-	2
52	C	Bowenvale	18/11	8	27	-	35	7	9	-	16	6	2	-	-	-	8
53	SW	Halswell Q	21/11	7	0	-	7	5	0	-	5	4	0	-	-	-	4
54	E	Bridal Path	26/11	6	1	-	7	4	0	-	4	3	0	-	-	-	3
55	E	Cpt Thomas	26/11	6	2		8	5	1	-	6	4	1	-	-	-	5
56	C	Bowenvale	29/11	0	12	-	12	0	6	-	6	0	1	-	-	-	1
57	SW	Kennedy's	06/12	5	12	-	17	3	8	-	11	2	3	-	-	-	5
58	E	Godley H	07/12	56	-	-	56	19	-	-	19	11	-	-	-	-	11
59	E	Cattle Stop	08/12	-	-	3	3	-	-	3	3	-	-	-	2	-	2
60	C	Rapaki (top)	09/12	14	10	-	24	7	2	-	9	7	2	-	-	-	9
61	C	Rapaki (top)	19/12	8	11	-	19	7	6	0	13	1	3	-	-	-	4
62	SW	Halswell Q	19/12	15	3	-	18	5	3	-	8	5	3	-	-	-	8
63	E	Cpt Thomas	21/12	4	1	-	5	4	1	-	5	4	1	-	-	-	5
64	C	Albert Terrace Crag	22/12	-	-	5	5	-	-	5	5	-	-	-	5	-	5
65	C	Bowenvale	23/12	10	18	-	28	5	7	-	12	5	6	-	-	-	11
66	E	Bridal Path	05/01	10	3	-	13	6	1	-	7	5	0	-	-	-	5
67	C	Rapaki (top)	10/01	34	19	-	53	24	7	-	31	10	4	-	-	-	14
68	E	Taylor's mis	11/01	20	-	-	20	9	-	-	9	5	-	-	-	-	5
69	E	Bridal Path	21/01	8	2	-	10	6	1	-	7	6	-	-	-	1	7
70	SW	Kennedy's	22/01	7	2	-	9	3	2	-	5	1	2	-	-	-	3
71	SW	Kennedy's	24/01	13	18	-	31	6	10	-	16	3	4	-	-	-	7
72	E	Bridal Path	29/01	7	1	-	8	7	1	-	8	2	0	-	-	-	2
73	C	Bowenvale	29/01	24	12	-	36	15	10	-	25	5	4	-	-	-	9
74	C	Transmitter	1/02	-	-	2	2	-	-	1	1	-	-	-	1	-	1
75	SW	Halswell Q	16/02	5	3	-	8	3	2	-	5	1	2	-	-	-	3
76	C	Bowenvale	16/02	12	5	-	17	7	1	-	8	4	0	-	-	-	4

77	E	Cpt Thomas	17/02	4	1	-	5	2	1	-	3	2	1	-	-	-	3
78	E	Taylor's mist	24/02	4	0	-	4	3	0	-	3	1	0	-	-	-	1
79	E	Cpt Thomas	26/02	4	1	-	5	4	1	-	5	1	0	-	-	-	1
80	E	Bridal Path	27/02	20	0	-	20	13	0	-	13	6	0	-	-	-	6
81	C	Rapaki (top)	27/02	10	7	-	17	8	5	-	13	2		-	-	-	2
82	C	Bowenvale	07/03	13	7	-	20	7	5	-	12	1	4	-	-	-	6
83	SW	Halswell Q	11/03	0	0	-	0	0	0	-	0	0	0	-	-	-	0
84	SW	Kennedy's	11/03	2	0	-	2	2	0	-	2	0	0	-	-	-	0
85	C	Thompsons	12/03	10	4	-	14	2	8	-	10	0	2	-	-	1	3
86	C	MWorsley	14/03	3	29	-	32	1	17	-	18	0	12	-	-	-	12
87	C	Transmitter	15/03	-	-	4	4	-	-	4	4	-	-	-	4	-	4
88	C	Albert Terr	15/03	-	-	2	2	-	-	2	2	-	-	-	2	-	2
89	C	Bowenvale	16/03	2	0	-	2	2	0	-	2	0	0	-	-	-	0
90	SW	Kennedy's	16/03	0	0	-	0	0	0	-	0	0	0	-	-	-	0
				1260	**703**	**73**	**2036**	**709**	**364**	**55**	**1128**	**286**	**175**	**3**	**52**	**4**	**520**
				61.89	34.53	3.59	100.00	62.85	32.27	4.88	100	55.00	33.65	0.58	10.00	0.77	100.00
				W/R	**Bikers**	**Climbers**	**Total**	**W/R**	**Bikers**	**Climbers**	**Total**	**W/R**	**Bikers**	**Multi**	**Climbers**	**other**	**Total**

Appendix G

Interview Guides (Recreationists, Recreation/Activity Groups and Recreation Managers)





Interview guide - Activity groups

Interview guide - Organisations managing recreation

Appendix H

Ethic Approval

Research and Commercialisation Office
T 64 3 423 0817
PO Box 85084, Lincoln University
Lincoln 7647, Christchurch
New Zealand

www.lincoln.ac.nz

Application No: 2013-61 24 December 2013
Title: Significance of electronic technologies in users' experience of peri-urban outdoor creation

Applicant: Caroline Depatie

The Lincoln University Human Ethics Committee has reviewed the above noted application.

Thank you for your detailed response to the questions which were forwarded to you on the Committee's behalf.
I am satisfied on the Committee's behalf that the issues of concern have been satisfactorily addressed.
I am pleased to give final approval to your project. Please advise Alison Hind when you have completed your research and confirming that you have complied with the terms of the ethical approval.
May I, on behalf of the Committee, wish you success in your research.

Yours sincerely

Professor Grant Cushman

Chair, Human Ethics Committee

Appendix I

Research Information Sheets

Lincoln University
PhD Research - Department of Social Science, Parks, Tourism, Recreation and Sport
Research Information Sheet for INTERCEPT SURVEYS

You are invited to participate in a project entitled: The significance of electronic technologies in users' experiences of outdoor recreation in peri-urban settings.

This PhD research explores the use of electronic technologies by outdoor recreationists. I am interested in why the technologies are used (or not used), how the technologies impact the experiences and the relationships to the setting, and what implications exist for land managers.

Participation in this research project requires you to:

i) Complete a survey (5 to 10 minutes) about your experience with electronic technologies during your outdoor recreation activity or as soon as possible after your activity by the end of the day.
ii) Provide your consent prior to starting the electronic survey by ticking the box.

You can withdraw from the survey at any time by pressing the "X" on the top right corner of the tablet screen or by exiting the browser of the device that you are using.

The results of the project may be published, but you may be assured of your anonymity in this investigation: the identity of any participant will not be made public, or made known to any person other than the researcher. To ensure anonymity and confidentiality the following steps will be taken:
- Your name and contact details will not be collected as part of the survey.
- No individual identifying information will be presented in public.
- If you wish to participate in a research interview at a later time, your name and e-mail address will be
collected on a separate list which will be kept in a locked and secured device accessible by the principal
investigator only.

The project is being carried out by:
Name of principal investigator: Caroline Dépatie, PhD Candidate.
Contact details: caroline.depatie@lincolnuni.ac.nz, mobile: 021 083 83515
I will be pleased to discuss any concerns you have about your participation in the project.

Name and contact details of co-supervisors: Dr. Stephen Espiner 64 3 423 0485, Dr. Emma J. Stewart 64 3 423 0500, Dr. Roslyn Kerr 64 3 423 0491

Permission to administer this survey has been granted by the Port Hills Park Ranger Services and by the Lincoln University Human Ethics Committee.

PhD Research - Department of Social Science, Parks, Tourism, Recreation and Sport

Research Information Sheet for INTERVIEWS

You are invited to participate as a subject in a project entitled:

Name of project: *The significance of electronic technologies in users' experiences of outdoor recreation in peri-urban settings.*

The aim of this project is:

This PhD research explores the use of electronic technologies by outdoor recreationists. I am interested in why the technologies are used, how the technologies impact the experiences and the relationships to the setting, and what implications exist for land managers.

Your participation in this project will:

- Involve voluntary participation in the completion of a semi-structured in depth interview about your use and experience with electronic technologies during your outdoor recreation activities.
- Take 45-60 minutes of your time.
- Require you to give your consent by checking the appropriate box and signing the consent form, and returning it to me prior to the start of the interview.
- Allow you to withdraw from the interview at any time, and in any way are you obligated to complete the whole interview. You may withdraw your participation and the information you have provided for the research by informing me prior to March 31st 2015 by e-mail or telephone.
- Involve with your approval, the recording of the interview using a recording device. If you are not comfortable with this, shorthand notes will be taken during the interview instead.

The results of the project may be published, but you may be assured of your anonymity in this investigation: the identity of any participant will not be made public, or made known to any person other than the researcher. To ensure anonymity and confidentiality the following steps will be taken:

- Your name and contact details will not be used as a part of the data dissemination.
- If applicable, pseudonyms or code names will be used instead in any written or oral presentation.
- No individual identifying information will be presented in public.
- Your interview will be provided with a code related to your set of data in case you wish to withdraw your information from the research prior to April 30th 2015. The interview codes will be kept separately in a locked and secured device only accessible by the main researcher.

The project is being carried out by:

Name of principal researcher: Caroline Dépatie, PhD Candidate.
Contact details: caroline.depatie@lincolnuni.ac.nz, mobile: 021 083 83515

I will be pleased to discuss any concerns you have about participation in the project.

Name of Co-Supervisors: Dr. Stephen Espiner and Dr. Emma J. Stewart, Lincoln University.
Contact Details: Dr. Stephen Espiner 64 3 423 0485 and Dr. Emma J. Stewart 64 3 423 0500

The Lincoln University Human Ethics Committee has reviewed and approved the research

Appendix J

Consent Forms

CONSENT FORM (Survey)

Project: Significance of electronic technologies in users' experiences of outdoor recreation in peri-urban settings.

I understand the description of the above research project and what is expected of me as a participant. I am aware that my cooperation is voluntary and that it can be withdrawn at any time by pressing the X on the upper right corner of the screen tablet or exiting the browser on the device that I am using. On this basis I agree to participate in the project. I consent to reporting of the results for the purposes of a PhD dissertation with the understanding that anonymity and confidentiality will be preserved. If I require any additional information about the project I understand that I may contact the principal researcher Caroline Dépatie at 021 083 83515 or caroline.depatie@lincolnuni.ac.nz

Please tick the following:

☐ I agree to participate in the research project

Name of participant: _____

Signed: _____ Date: _____

The consent of a parent or legal guardian for participants under the age of 16 is preferred if logistically possible:

Name of legal representative: _____

Signed: _____ Date: _____

CONSENT FORM (Interview)

Project: Significance of electronic technologies in users' experiences of outdoor recreation in peri-urban settings.

I understand the description of the above research project and what is expected of me as a participant. I am aware that my cooperation is voluntary and that it can be withdrawn, including my data prior to March 31st 2015. On this basis I agree to participate in the project. I consent to reporting of the results for the purposes of a PhD dissertation with the understanding that anonymity and confidentiality will be preserved. If I require any additional information about the project I understand that I may contact the principal researcher Caroline Dépatie at 021 083 83515 or caroline.depatie@lincolnuni.ac.nz

Please tick the following:

- ☐ I agree to participate in the research project
- ☐ I agree for my interview to be recorded on a recording device

Name of participant: _____

Signed: _____ Date: _____

Participants under the age of 16 years old require consent from their Legal Representative:

Name of Legal Representative: _____

Signed: _____ Date: _____