Disability and Assistive Technology Advancements in Disability Sport: Understanding the Embodied Experiences of Disabled Athletes

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Abstract

The World Health Organisation estimates that one billion disabled people currently rely on assistive technology in their day-to-day activities. Yet, the participation of disabled people in sports remains significantly low, often due to inadequate access to assistive technology needed to participate, train and compete. Meanwhile, the use of assistive technology in sport has raised critical questions about disability, access, and equity in culture and society. In disability sports, the use of assistive technology by athletes has often been simplified with notions of 'cyborgification', and popular discourses positioning them as 'superhuman', or 'posthuman'. While this is problematic, little is known about how one's impaired experience, self, and mind impact the use of assistive technology in disability sport.

Given this, in this research, I sought to enhance the understanding of the role of assistive technology for disabled athletes with a focus on embodied experiences. Particularly, the various ways that disabled people use, interact with and embody assistive technology throughout their engagement in disability sport. Using embodiment as a theoretical lens, the research drew on a critical qualitative framework, encompassing ethnographic fieldwork, semi-structured interviews and photo-elicitation. I used these methods to complement each other to deeply explore the embodied experiences of twelve disabled athletes with various physical impairments who use assistive technology across different sports.

In this research, assistive technology was fundamentally woven into the lives of disabled individuals and plays a crucial role in shaping an identity that challenges traditional norms and perceptions in disability sport. By becoming socially embodied, assistive technology transformed physical impairments and self-perceptions, enabling athletes to achieve technological competency in their athletic pursuits. The findings revealed that athletes experience a sense of embodied freedom, positioning themselves as active agents in their sport. This was facilitated by the high level of customization of their assistive devices and their proactive approach to seeking adjustments and modifications to enhance their performance. Importantly, using assistive technology involved an embodied knowledge and learning process that addressed pain, fatigue, and impairment limitations. These experiences helped normalise the subjectivities of the disabled athletic body, illustrating how assistive technologies can symbolize and support integration and a sense of belonging in sport.

Broadly, this research challenged discursive accounts that theorised the blurry boundaries of using assistive technologies by centralising the lived experience, voices and accounts of disabled athletes. Doing so enabled me to challenge the dualist or binary notions (i.e. human-nonhuman and artificial-biological) that dominate discussion about how disabled athletes incorporate assistive technology into their bodily experience of sport. By thinking with and through embodiment, the research illustrated the unique, hybrid identity of disabled athletes; skilful, athletic, fluid and the constant shift between the empowering and at times restrictive nature of assistive technology. Despite this positivity, disabled athletes still face inequitable access to assistive technology, and the research highlights the importance of embodied belonging and community in learning how to participate, train and compete with assistive technologies. Taken together, the implications of this research demonstrate the need for better opportunities, provision, services and policies for disabled people to access assistive technology as a means of participating in sport. Importantly, we can understand how the relationship between disability and assistive technology can be perceived, felt, and embodied as one *being*.

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Publications

Journal Articles

Asare F., Townsend R.C., & Burrows, L. (2023): Disentangling assistive technology: exploring the experiences of athletes with physical impairments in disability sport. *Qualitative Research in Sport, Exercise and Health*.

Conference Papers

Asare F., Townsend R.C., & Burrows, L. (2020): Disability and Assistive Technology Advancements in Para-Sport. *Online presentation delivered at the Arts, Law, Psychology and Social Sciences Postgraduate Digital Conference, November 2020,* University of Waikato, Hamilton, New Zealand.

Asare F., Townsend R.C., & Burrows, L. (2021): Understanding Accessibility to Wheelchair Sport for Persons with Physical Impairments: Preliminary Findings of an Ethnographic Study in Wheelchair Rugby in New Zealand. *Online presentation delivered at the International Paralympic Committee (IPC) Vista Conference, November 2021,* KU Leuven, Belgium.

Asare F., Townsend R.C., & Burrows, L. (2022): 'Words Alone Not Enough': Using Photos to Elicit Disabled Athletes' Embodied Experiences of Assistive Technology in Disability sport. *Oral presentation delivered at the Qualitative Research in Sport and Exercise Conference, July 2022,* Durham University, UK.

Asare F., Townsend R.C., & Burrows, L. (2023): The Enabling Opportunities of Assistive Technology: An Ethnographic Understanding of Disabled People's Participation in Wheelchair Rugby in New Zealand. *Oral presentation delivered at the International Symposium of Adapted Physical Activity Conference, Qualitative Research in Sport and Exercise Conference, June 2023,* University of Otago, New Zealand.

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Some Key Definitions and Terms

Disabled athlete	A general description for an individual with physical, intellectual or sensory impairment who engages in adapted or mainstream sporting activities (DePauw and Gavron, 2005).
Disabled people	"Disabled people" has been used in this thesis to reflect the contemporary social model position of disability and also to highlight New Zealand's cultural and policy position on disability (see McBean, Townsend and Petrie, 2022).
Disability sport	Any form of physical activity or sport modified or adapted to meet the impairment needs of disabled people (DePauw and Gavron, 2005).
Para-athlete	A disabled athlete who has competed in the Paralympic games or in a Paralympic pathway (Howe, 2011).
Paralympian	It is a description that is given to a disabled athlete who has competed in the Paralympic Games (Howe, 2008).
Para-sport	A sport that specifically features in the Paralympics (Brittain, 2010).
Rugby chair	A term I have used in this thesis to represent the sport-specific wheelchair for playing Wheelchair Rugby.
Accident Compensation Corporation (ACC)	A private insurance provider which focuses on prevention, care, and recovery for all people in Aotearoa New Zealand who are affected by injury. www.acc.co.nz/about-us
Convention on the Rights of Persons with Disabilities (CRPD)	A convention adopted by nations 'to promote, protect and ensure the full and equal enjoyment of all human rights and fundamental freedoms by all persons with disabilities, and to promote respect for their inherent dignity' (Article 1) (CRPD, 2006).
District Health Board (DHB)	The District Health Board provide health and disability services. There is a DHB in

	each defined regional boundary. www.tewhatuora.govt.nz
Ministry of Disabled People (Whaikaha)	The Ministry of Disabled People (Whaikaha) is a subsidiary organisation of the Ministry of Social Development. It was established to work in partnership with the disability community, Māori and Government for a better, more independent future for disabled people and whānau in Aotearoa New Zealand. https://www.whaikaha.govt.nz/
Ministry of Education (MOE)	The Ministry of Education in New Zealand is the Government's lead advisor on the New Zealand education system, tasked with shaping the direction for sector agencies and providers. www.education.govt.nz
Ministry of Health (MOH)	The Ministry of Health in New Zealand is the Government's lead advisory institution tasked with monitoring and regulating the health system to deliver quality health outcomes. www.health.govt.nz
Ministry of Social Development	The Ministry of Social Development is a national body charged with helping to build successful individuals and in turn building strong, healthy families and communities through social policies and services. www.msd.govt.nz
New Zealand Artificial Limbs Service (NZALS)	The New Zealand Artificial Limbs Service also known as Peke Waihanga is a specialist healthcare provider that manufactures high-technology medical devices, mainly prosthetics and orthotics, for individual patients with an integrated rehabilitation, coordination of care, and peer support service. https://www.pw.co.nz/about-us/
Parafeds	Regionally based sport and recreation organisations established to provide opportunities specifically for physically disabled people. Seventeen of these organisations were founded between 1966 and 2010. Eleven remain operational in Northland, Auckland (now named Disability Sport Auckland), Waikato, Bay of Plenty, Gisborne, Taranaki, Manawatu, Wellington (now called dsport), Canterbury, Otago and

	Southland and are members of Paralympics New Zealand (PNZ). www.parafednetwork.co.nz
World Health Organization (WHO)	A United Nations organisation that coordinated the World's response to health emergencies, promotion of well-being, prevent disease and promoting access to equal health care (WHO, 2020).

Chapter One

Introduction: How I Came to Research Assistive Technology, Disability and Sport

This doctoral research stems from my life journey as a sports administrator in Ghana keen to enhance disabled people's lives and experiences in sport. In 2014, working as a sports administrator with very little knowledge about disability and disability sport, I had the opportunity to travel with a contingent of elite teams to participate in events such as cycling, weightlifting, athletics, and swimming at the Glasgow 2014 Commonwealth Games in Scotland. The contingent also included physically disabled athletes. At the end of the games, Ghana secured only two bronze medals with none won by the disabled athletes. I remember on our return and in a conversation with one of the disabled athletes, he lamented about how he felt negative public attitudes, inadequate infrastructure, lack of funds and poor-quality assistive devices impeded his preparation and subsequent performance in the games. Knowing, these barriers still exist and in light of multiple calls for further interrogation of these barriers (e.g. Brittain, 2010; DePauw & Gavron, 2005; Martin, 2013; Wilson & Khoo, 2013), I was motivated to jump at any opportunity to research disabled people's experiences in sport.

Hence, in 2015, when I had the opportunity to pursue a master's degree in Sports and Olympic Studies at the University of Tsukuba, Japan, I sought to understand the discriminatory practices that confront disabled athletes' when they engage in sports at the recreational level. During this master's study, I worked with disabled athletes who found it difficult to access sporting facilities. For example, finding facilities that permitted wheelchair use was a challenge for many. This personal revelation helped me connect better to disability studies – moving from personal experiences to theory and back, a finding which resonated as I immersed myself in the disability studies literature (e.g. Barnes, 2012; Oliver, 1996; Shakespeare, 2006a; Thomas, 2004c). My emerging understanding of disability as stemming from social attitudes and structural barriers, prompted a desire to know more and, as I read, the lack of empirical research in disability studies and sports became evident (Smith & Bundon, 2018; Smith & Sparkes, 2019).

Against this backdrop, not long after, in 2017, I embarked on another master's project in Sport Ethics and Integrity at Swansea University. I wanted to understand the ethical barriers to disabled people's involvement in sport and I used interviews with athletes to understand

how they are commercially represented in elite sport. I found technological advancement was the main catalyst in reframing and disrupting the identities of disabled athletes in sports and public settings (Howe, 2011; Howe & Silva, 2017) in stigmatic ways. In bringing these two Master theses together, it became evident to me that assistive technology (AT) played a fundamental role in disabled people's experience with sports, yet the lack of access, levels of inequity and highly visible nature of these devices complicated their experience in sport. Thus, I developed an interest in exploring these complex experiences as a gap for this PhD research, focusing on the everyday embodied experiences of using ATs.

At this juncture, while not overly confident, I understood disability better and believed the social model perspective to be an appropriate way of both understanding disability (see Oliver, 1996) and researching how disabled people participate in sporting activities. Moreover, I became more aware of the limitations of the social model when it comes to political barriers disabled people face when using assistive technology in daily life and sport. Not only that, traditionally, assistive technology as it relates to disability, has been dominated by medical, rehabilitation and social interventions (MacLachlan et al., 2018; Ripat & Woodgate, 2011; Smith et al., 2018). This limits the understanding and role of assistive technologies for disabled people themselves to purely restorative, normalising or socially liberating roles – one which complicates their life experience. This is magnified in a variety of ways in the disability sport literature, for example (Berger, 2004; Brittain, 2016; DePauw & Gavron, 2005; Geppert et al., 2022; Haslett et al., 2017; Pullen & Silk, 2020). Against this background, I decided to embark on this doctoral research to contribute an understanding of disability, particularly, the complex ways disabled people interact with assistive technology for participation, training and competing in sport. In doing this, I adopted a research shift that explored the relationship between disability, sport and assistive technology experiences beyond individual needs to consider the AT experience as an interaction between the mind, body, self and *other* (see Merleau-Ponty, 2004), situated within a particular sport culture. I wanted to develop an understanding of how AT reduces limitations and facilitates disabled people's engagement as well as inclusion with others in their sporting environment. There remains a huge gap in this area which needs researchers' attention.

Therefore, as a former sports administrator, with aspiration to become a disability researcher, advocate, activist and expert in disability, assistive technology, and sport field, I

quickly recognised my position as a non-disabled researcher. By identifying as a non-disabled researcher, my mission was to contribute to the emerging goals of the disability rights movement. This included familiarising readers with new ways of thinking about disability, new ways of challenging disability oppression and giving voice to disabled people in research. Furthermore, the agenda for this research was an attempt to improve the understanding of the conventional way of thinking about disability, not *from* my experience as a non-disabled individual but *from* the lived-body experience of the disabled people themselves. In the context of this research, as Barnes and Sheldon (2007) suggested, it has become necessary for disability researchers to identify topics that serve as means of providing solutions to social problems that confront disabled people such as inadequate health systems, unemployment, inaccessible transports and limited sport opportunities. As such, my interest was to illuminate social issues that confront disabled people, specifically, as they attempt to participate in sport by navigating the complications of using everyday and specialised assistive technologies for sport.

Assistive Technology

The World Health Organisation (WHO) estimates one billion disabled people[1] currently depend on assistive technology (hereafter referred to as AT) (WHO, 2020) in their day-to-day lives. Furthermore, it is projected that 2.5 billion disabled people will require AT by 2050, but only 10% will have access to it (AT2030, 2020). Thus, in Aotearoa New Zealand, these statistics have necessitated a policy shift where access to assistive technology is facilitated not through only health but educational systems (Taherian & Davies, 2018). For example, according to Taherian and Davies (2018) in the acquisition of ATs, the Ministry of Education and Ministry of Health "employ service professionals to conduct run provisional assessments and provide support for AT use by individuals with disabilities and their caregiver network" (p.649). Given that access to assistive technology is a fundamental human right (CRPD, 2006) and central to the social living standards of disabled people, these statistics can raise bigger questions about the intersection of disability and assistive technology particularly in cultural areas such as

[1]Throughout this study the term "disabled people" is used to reflect the contemporary social model position of disability and also to highlight New Zealand's cultural and policy position on disability (see McBean, Townsend and Petrie, 2022).

sport, which is positioned as a powerful vehicle for disability empowerment, representation and visibility (Howe, 2011; Silva & Howe, 2012).

In disability studies, "assistive technology" is a broad term for a range of systems and products that enhance the quality of life of disabled people which offers a useful distinction to frame this work. 'Systems' represent "the development and application of organized knowledge, skills, procedures and policies relevant to the provision, use and assessment of assistive products" (Khasnabis et al., 2015, p. 2229). Assistive products represent devices specially designed or that are commonly available (e.g., wheelchairs, prosthetics, support aids, canes) to enhance the autonomy, everyday independence and functioning of disabled people in society, education and work (AT2030, 2020; Khasnabis et al., 2015; Nierling et al., 2018; The Lancet, 2022). In disability sport research, discussions of AT tend to focus on the latter, rather than the systems which enable the use of assistive devices (e.g. Hill et al., 2014; van der Woude et al., 2006).

While these explanations provide some understanding of assistive technology, this research aligns with Ravneberg and Söderström (2017b) who described ATs as devices that "integrate people into the community and open it up for participation; enabling creative shaping of self and social identities" (p.7). As such, assistive technologies are not only instrumental but important sociologically in that they can facilitate social engagement and the maintenance of valued relationships, power and independence, and access to social and cultural life for disabled people.

Disability

According to Meekosha and Shuttleworth (2009), disability is a contested phenomenon, and its understanding continues to evolve. However, historically, disability is generally understood in two, often opposing ways, each of which provides an ontological framework for studying disability and assistive technology. The medical model has historically been dominant in understanding disability and informing research activity, particularly in disability sport (Brighton et al., 2021), positioning disability as a direct result of the limitations of an individual's impairment. Thus, from a medical model viewpoint, AT has a restorative or rehabilitative function either to restore loss of body function or to enhance active participation (Borg et al., 2011) of physically disabled people. However, an obvious criticism

of this perspective is that it perpetuates the ableist assumption of ability. The assumption is that disabled people require normalising and are dependent on their assistive devices to approximate a nondisabled ideal (Sparkes et al., 2018). These assumptions, according to MacLachlan et al. (2018), can create inequities in national healthcare systems, services and policies related to the provision of AT.

In contrast, the social model was borne out of advocacy from like-minded disabled activists – the Union of the Physically Impaired Against Segregation (UPIAS) – in 1974. They argued disability is a complex form of social oppression. In other words, disability stems from exclusionary social attitudes, institutional discrimination, and inaccessible structures (Oliver, 2013). According to Barnes (2019), while it retains an understanding of the rehabilitative function of disability, the social model primarily argues the devalued economic and social status of people with impairments is 'disabling', constituting a form of oppression. In Aotearoa New Zealand, this understanding is reflected in the use of the label "disabled people". It is not only a sharp contrast to the label "persons with disabilities" used by the *Convention on the Rights of Persons with Disabilities* (CRPD) but guides the country's socio-cultural and policy stance on disability (McBean et al., 2022) and, presumably, access to AT. As such, the social model positions AT as a social and material resource to improve the everyday life chances and affordances of disabled people, improving access to social services, and policies, including employment, education, health and, in the context of this research, sport.

While the social model provides some understanding of disability and the use of AT, it has been criticised. Oliver (2013) argued the social model fails to adequately recognize impairment experiences, and thus positions disabled people as one group. In this context, it fails to recognise how impairments have direct and immediate effects (e.g., reduced function, physical weakness) and that, at the same time, socially engendered restrictions can arise in different forms (e.g., structural, and attitudinal) (Goodley, 2013). Thomas (1999), referred to this as 'impairment effects' by drawing attention to the everyday related limitations of living with impairment. For example, in the context of using assistive technology, due to pain or amputation, one may be unable to engage in certain life activities (i.e. walking or running on a prosthesis).

These criticisms gave rise to the social-relational model. Thus, housed within the social-relational model of disability, the idea is that disability comprises "characteristics of socially constructed environments that transform a person's impairment into a disability" (Darcy et al., 2023, p. 19). It provides an understanding of AT to facilitate social inclusion and enhances the interaction between disabled people, their impairment, and the social environment. However, the social-relational model fails to account for their bodily experiences of AT.

Another important perspective in understanding AT is the human rights model of disability embedded in the United Nations (2006) *Convention on Rights of Persons with Disability (CRPD)*. According to Darcy et al. (2017), the CRPD was developed under the social model conceptualizations of disability and ratified by more than 160 countries, including New Zealand. Underpinned by Article 30 of the CRPD to "…recognize the right of persons with disabilities to take part on an equal basis with others in cultural life" the human rights model promotes the need for respect and dignity of disabled people. The hope is to encourage disability strategies, policies and legislation that allow disabled people to exercise equal rights of citizens to social life. An example is the Disability Act 1990 (United States), Equality Act (United Kingdom) and the Public Health and Disability Act 2000 (New Zealand). Putting together, scholars claim it recognizes disabled people have the right to freely exercise and enjoy unrestricted social experience and inclusion at all times (Albert & Hurst, 2005; Degener, 2016; Lawson & Beckett, 2021). Despite these initiatives, assistive technologies which are central to the freedom, fairness and equal participation of disabled people in leisure, recreational, and sporting activities (CRPD, 2006) are still inaccessible to those who need them.

The nuances evident in these approaches to understanding assistive technology illustrate a level of complexity in conceptualising disabled peoples' uses of AT. For example, assistive technology is undoubtedly 'good' for many disabled people; the day-to-day use of AT helps to navigate barriers to participation in activities, promoting equity, inclusion and independence (Ripat & Woodgate, 2011). Furthermore, assistive technology is not culturally neutral, and while research illustrates that the use of AT might help to challenge often negative cultural perceptions and resist the stigma associated with disability (Ravneberg & Söderström, 2017b), it also functions as a cultural reference point for individual ableist values

of autonomy, self-determination, and independence (Ripat & Woodgate, 2011). Assistive technology, then, is closely entangled in and with the disability experience, raising critical questions about how disabled people are shaped by, and shape the meanings attached to, assistive devices across various aspects of social life (cf. Ravneberg & Söderström, 2017b). Taken together, these discussions about disability are informative. However, I argue that differing interpretations of disability, devoid of critical inquiry, further contribute to blurring knowledge about disability (Albert & Hurst, 2005) and how the relationship between disability and AT can be understood as embodiment.

While I have briefly drawn attention to disability and its relationship with assistive technology, generating an in-depth understanding of the complexities and need for context-specific experience remains a huge challenge, especially in disability sport. Therefore, embedded in this thesis is an alignment with some ideas and debates of critical disability studies (CDS). Specifically, interrogating the ways 'impairment effects' (Thomas, 1999) and embodiment can help deconstruct the binary distinctions that create differences for disabled people such as disabled and nondisabled people (Shildrick, 2019) as well as human and non-humans when they use AT. Not only that but how disability is experienced in the everyday world and how oppression and inequities are embodied and become part of everyday reality (Paterson & Hughes, 1999) as disabled people use AT for sport. Most importantly according to Galis (2019) and Smith and Bundon (2018), it has become crucial to engage with how personal experiences and interactions between the body and the environment can be combined as an effective way to understand disabled people's use of assistive technology in everyday life and sport.

Disability Sport

Disability sport provides a unique context to understand assistive technology, as technology is deeply ingrained in the rapid advancement of how disabled people play, train and compete in disability sport. Disability sport is a broad term used to describe sports that accommodate people with physical, sensory and intellectual disabilities (DePauw & Gavron, 2005). The genesis of disability sports was fashioned out of a rehabilitation activity - wounded soldiers used their everyday wheelchairs to play archery and amputees used their wooden prosthetics for running – innovative adaptations that facilitated the foundation for modern disability sport (Brittain, 2010, 2018; DePauw & Gavron, 2005). These early provisions ensured that

athletes were able to participate with minimal adaptation required to the structure and organisation of sports, enabling a level of social integration. However, the rapid advancement and high visibility of more specialized sport ATs in modern disability sport has not only impacted the appearance, privileges, and participation of disabled people (Legg & Steadward, 2011) but also has a significant influence on how disabled people construct their embodied selves in sport (Asare et al., 2023). For example, the rapid rise of complex lightweight aerodynamic prostheses and wheelchairs to improve competition and enhance performance (Howe, 2011) has led to controversy and questions about the human meaning attributed to the disabled body and its sporting 'abilities' (Goodley, Lawthom & Cole, 2014). As such, the use of AT has blurred the lines between 'natural' human capability and what constitutes enhanced performance for disabled people in sport, which has implications for the way we theorise disabled bodies in sport (Brighton et al., 2021).

Moreover, the shifting and - at times - contradictory meanings associated with disabled peoples' use of assistive technology are magnified in sport. In this context, sport AT generally refers to specialised devices designed to enhance sports performance (Burkett, 2010). While 'everyday' assistive devices can be used for sports participation (Burkett, 2010), they can be uncomfortable, inefficient or expensive to maintain, thus limiting access or compromising sports performance. As such, it is common for disabled athletes to seek out specialized ancillary devices for a specific sport - blurring the lines between what Butryn (2003) has previously termed *self, rehabilitative* and *implement* technologies. For example, a carbon fibre 'blade' prosthetic becomes *self-technologies* when infused into the physical body, *rehabilitative technologies* when administered by a specialist for athletic training and *implement technologies* when used as sporting equipment (Asare et al., 2023).

Research has also highlighted how access to assistive technology is not always equitably distributed (see Smith & Thomas 2012) and its use in elite sports can lead to suggestions of unfair advantages and assumptions of 'techno-doping' (Wolbring & Tynedal, 2013) together with debates around fairness and ethics (Burkett et al., 2011). Scholars have particularly drawn concerns about the lack of discussion of issues of access (Harris, 2010; Moser, 2006), particularly in disability sport. Disability advocates argued that there is a huge disparity between many disabled people and countries such that they are unable to experience full sporting performance and achievement due to the unavailability and inability

to afford these expensive racing wheelchairs and prostheses (Bantjes & Swartz, 2017; Howe, 2011). Yet, there are still limited discussions on how to improve the experiences of disabled people with assistive technology.

Additionally, media representations of disabled athletes are often problematic, fostering "established hierarchies of disability acceptance" (Pullen & Silk, 2020, p. 467) and an elevated focus on technologically-enhanced para-athletes – those described as 'supercrips' (Howe, 2011). The 'supercrip' notion, while seemingly empowering, is underpinned by a dominant nondisabled value system and further reinforces the medicalised view of disability (Silva & Howe, 2012), generating critical questions about the extent to which disabled athletes' experiences of AT can be considered empowering. Perhaps most significantly, assistive technology has significant implications for disabled people's constructions of self; it has been suggested in using AT, disabled athletes incorporate assistive devices into their embodied sense of self and subjectivity (Apelmo, 2012; Asare et al., 2023), demonstrating considerable agency and resistance to negative disability-specific associations. Further muddying the waters is the connection between disability, assistive technology and posthumanism (cf. Braidotti, 2013). For example, it has been suggested disabled athletes have an "intense experience of complex hybridization" (Haraway, 1991, p. 178) with their assistive sporting devices, a process described through the posthumanist notion of 'cyborgification' (see Howe, 2011). The notion of a cyborg was introduced in Haraway's (1987) 'Cyborg Manifesto' to critique the boundaries between humans and technology. This is echoed by Reeve (2012) who argued technology has considerable potential to unsettle the categories of nondisabled/disabled, where cyborg theory provides a useful platform to explore "embodiment and subjectivity in new and productive ways" (p.108) within disability and sport.

Thus, disability sport, is, in the words of Butryn (2003, p. 18), a "major battleground" for controversies and debates surrounding the use of assistive technology. What is commonly missing from such debates is the centralisation of disabled athletes themselves, attending to the biological, material, social, *and* embodied dimensions of the disability experience (Wolbring 2008). Little is known about how disabled athletes negotiate their athletic body citizenship as it intersects with assistive technology (cf. Butryn 2003; Sparkes et al., 2018). Indeed, as Brighton et al. (2021) argued, there remain few in-depth empirical accounts of how

disabled athletes relate to AT (see Sparkes, Brighton, and Inckle 2018; deBono, 2017), with even less research focusing on embodiment as an object of inquiry (cf. Butryn 2003). Such a focus on embodiment is important, in illustrating the processes through which the self, identity, technology and disabled sporting body merges (cf. Merleau-Ponty, 2004) as disabled people navigate disability sport. On the other hand, embodiment helps to understand the connection between oneself (disabled body), assistive technology and human existence in sport. As such, this research attempts to address this gap by illustrating through athletes' experiences how assistive technologies influence embodied practices in disability sport. This is done by building on existing scholarship that has explored the social implications of disabled people's participation in sport drawing on embodied perspectives.

Aim of Study

As such, in order to understand the embodied experiences of disabled people's use of AT in sport, the thesis aimed to provide some level of understanding of the role of assistive technology in disability sport which has been described as unclear (Burkett et al., 2011) despite the positives mentioned earlier in this chapter. Additionally, Ryall (2012) suggests that AT has increasingly compromised many aspects of human life. Given this, the thesis also aims to share insights about how AT can generate extreme controversy about the nature of the disabled body and escalate equity issues for disabled people (Moser, 2006). Altogether, the thesis aims to address Kath, Buzato, and Guimarães Neto's (2019) claim that a general lack of understanding still exists regarding the social and other implications on the *being* and experiences of disabled people. This lack of understanding is magnified in the disability sport context. Based on this premise, it is my expectation that this thesis will bridge the understanding gap for disabled athletes, disability researchers, and sport professionals within the disability sport landscape.

Study Objectives

As already established in this chapter, the use of assistive technology impacts the lives of disabled people when performing daily activities and engaging in other aspects of social life, where sport is an area of considerable interest and potential. Hence, this study seeks to provide a deeper understanding of the experiences of disabled athletes while interacting with

assistive technology by focusing on their lived body experiences of disability sport. On the back of this, the research will attempt to answer the following research questions:

1. *What are the embodied dimensions of assistive technology use in disability sport?*

While broad in scope, the decision was made to frame the research in this way due to the limited analysis that previous research has paid to the understanding of disability and assistive technology in sport. From this, the following sub-questions were formulated:

i. *What role does assistive technology play in the lives of disabled people in sport?*

ii. *How are impaired bodies (re)shaped by assistive technology within the disability sport environment?*

iii. *How does assistive technology impact the self-representation of disabled athletes?*

Furthermore, these sub-questions provided clear questions around which to generate suitable methods to answer the research question. The use of these sub-questions enabled me to create a deep view from which to answer the research question – that is – a view from the perspectives of disabled athletes themselves who are central to the study. This afforded a general sense of how assistive technology has impacted their bodily engagement in sport and how issues of power and access were embodied by disabled people.

Structure of The Thesis

The thesis is outlined in nine chapters, and I will summarise each chapter from here. The thesis opens with an introduction (i.e., chapter one), followed by the literature review in chapter two and then the research methodology, design, and methods in chapter three. This is followed by the theoretical framework that drove the research in chapter four. Chapters five, six and seven are dedicated to the analysis and discussion of findings. The eighth chapter summarises the discussion and arguments, and the last chapter nine is dedicated to the conclusion directing attention to the implications of the findings for future research and key contributions.

Chapter two focuses on a review of relevant theoretical and empirical research related to assistive technology, disability, and the embodied dimensions in disability and sport providing a rationale for this research. In so doing, this chapter highlights the gaps in sociocultural research on disabled people's use of assistive technology in disability sport. This chapter also outlines relevant social theories within assistive technology, disability, and sport research providing insights into the gap within disability research and the embodied approach to exploring the social implications of using assistive technology in sport.

Chapter three discusses the methodology and research design and pays attention to the theoretical resources used and the relevance of methods driving the research. This chapter discusses the philosophical position of the research, that is, the paradigm (interpretivism), the ontology (relativist) and the epistemology (interpretivist). It also discusses the selection of participants, the methods of data collection, that is, ethnographic fieldwork, semi-structured interviews, and photo-elicitation as well as the process of data analysis (thematic analysis). The chapter ends by discussing research rigour and the ethical considerations of the research.

Chapter four establishes embodiment as a theoretical lens that drives the research. In doing so, this chapter enumerates how embodiment provides an anchor for which to explore the embodied approach to assistive technology in disability sport. The chapter explores how using embodiment can provide a social understanding of the connection between disability, body, and assistive technology in sport. In doing this, the dimensions of embodiment such as lived body and sensuous actions are drawn upon, providing an analytical framework for which to understand the embodied process of disabled people's use of assistive technologies for participating, training, and competing in sport.

Chapters five to seven contain the analysis and discussion of the findings aiming to answer the broad objectives of enhancing the understanding of disabled athletes' embodied experiences of using assistive devices. Specifically, *chapter five* discusses the findings of an 18-month ethnographic fieldwork with a wheelchair rugby team to understand how assistive technology enables athletes' participation, training, and competition in their rugby environment. This chapter discussed how disabled players negotiated the use of the rugby chair as a process of enwheelment in their sporting space, offering opportunities for

understanding their new selves and building new social relationships. Given this, chapter five raised further questions on the role ATs play in the construction of a hybridised sporting body.

In providing further clarifications, *chapter six* discusses by taking issue with the concept of cyborg to develop further understanding of its application within the study of disability, AT and sport, specifically how the disabled athletic body is constructed and embodied. Drawing on semi-structured interviews with a cross-section of participants using different assistive devices, *chapter six* analyses and specifically discusses the realities of becoming a hybridised sporting body. The chapter discusses the process of embodiment in terms of how disabled athletes navigated the blurred boundaries between their impaired bodies and the assistive technology in both everyday and sporting contexts, while constantly reconstructing their bodily identities in their *own* terms.

Chapter seven offers an expanded analysis of the embodied process of becoming a hybridised sporting body drawing on photo conversations with the participants to explore the self-representation of disabled athletes' embodied experiences of using their assistive devices. Particularly, the chapter discusses how disabled athletes perceived their bodies meshed with assistive technology and how they constructed their embodied identity through their photos.

Chapter eight presents a summary of key arguments, theories, and discussions across chapters five to seven - highlighting how the study contributes, builds on and relates to existing literature. The chapter discusses how access is beyond the physical provision of assistive technology, it is a process that requires embodied negotiation, adjustments, and modifications of assistive technology. Reflecting on previous chapters, the chapter highlights how disabled people's use of assistive technology in sport somewhat represents a ‘symbol’ that normalises the disabled identity in everyday life and sport. The distinction between disability and impairment is collapsed during the process of becoming a disabled sporting cyborg. On this note, the chapter then shares how disabled people dissolve ‘hybridised’ boundaries through their process of sporting embodiment.

Chapter nine summarises the research with a conclusion. The chapter highlights key contributions to disability, AT research as well as the embodied approach to disability sport. Focus is given to methodological, theoretical, empirical, and practical contributions to the

field of studies. In doing this, the chapter then highlights some potential research limitations, including a brief empathetic statement, the implications for future research and the conclusion remarks.

Chapter Two

Literature Review

Introduction

In this chapter, I argue that a more embodied approach is needed when analysing disabled athletes' experiences of using assistive technology (AT) to participate, train and compete in sport. To make this argument, I first review previous studies to uncover the connections between different theories, concepts and practices relevant to understanding the relationship between disability, assistive technology and sport. In the process, I highlight key gaps and problems arising from the intersections of disability, sport and assistive technology. I then begin to introduce my alternative embodied approach to understanding the way ATs are experienced, focusing on the perspective of physically disabled people across different spectrums of disability sports which needs more attention.

The literature review is structured into two broad sections. In the first section, I focus on the general yet prominent issues around technology and disabled people's participation in sport. In particular, I pay attention to some of the common technologies in the specific context of disability sport, while highlighting relevant themes and debates around access and equity to ATs. In this section, I draw conceptually on critical disability studies to move beyond models of disability as impairment, specifically to examine the relationship between *disability* and *impairment* (cf. Powis, 2020) and how this intersects with assistive technology. To do this, I map out how specific theoretical approaches have started to uncover aspects of the contested nature of assistive technology, impairment, and disability within the sociology of sport. This section further demonstrates a clear opportunity for research that considers embodied realities as a robust way to illuminate the complex phenomenon of utilizing, representing, and accessing assistive technology by physically disabled people in disability sport.

Disabled People's Participation in Sport

Within disability studies, assistive technology has taken centre stage and is positioned as influential in most analyses of disabled people's participation in society (Harris, 2010; Nierling & Maia, 2020; Ravneberg & Söderström, 2017b, 2017a) as well as in the promotion of

disability sport (Burkett, 2012; DePauw & Gavron, 2005; Geppert et al., 2022; Howe, 2011). The assumption is that many disabled people have become more involved in sport due to the use of assistive technology. However, although assistive technology is popular among disabled people who participate in sport, Kath et al. (2019) argued that for some disabled people the recommendation to use assistive technologies, particularly those that involve device modification, is not entirely worthwhile nor innovative. They suggest that outcomes of AT use are often idealized and/or often misplaced. According to Roulstone (2016), the disability experience can lead to abandonment, disuse and rejection of one's technology. Such studies provide evidence of numerous barriers to assistive technology and highlight the risks they pose to disabled people's experience and participation in sport. This finding is reinforced in the following studies, an analysis of which allows a deeper exploration of the challenges in analysing assistive technologies in sport.

As Vandenbergue et al. (2023) state, assistive technology has emerged as a viable way of enabling disabled people to access the benefits of physical activity, helping to reduce functional loss and chronic disease. Using semi-structured interviews, Vandenbergue and colleagues explored the contextual factors that negatively affect the activity and participation among powerchair football players. They argued that, despite the physical benefits of participating in powerchair football, players experienced negative impacts of discomfort, physical and mental fatigue and pain that required seating modifications. While these modifications continue to impact disabled people in both everyday life and sports little is known about how these AT modifications are embodied.

Moreover, assistive technology has steadily complicated the everyday lives of disabled people (Harris, 2010). For example, in disability sport, the human body and for that matter, the disabled athlete has become a site of technology invasion as each device must be customized to meet a specific impairment (Ott, 2015). Given this, assistive technology at times becomes the basis of querying not only the humanness of disabled people but their status as rationally autonomous beings (Norman & Moola, 2011). Furthering their argument, Norman and Moola (2011) claim that the socio-cultural legitimacy of the disabled sporting body is disrupted by the advancements in assistive technology often due to the effort to enhance athletic performance. For example, in offering a thematic critique of *Murderball (i.e., the sport of Wheelchair Rugby),* Gard and Fitzgerald (2008) highlighted the ways in which

wheelchair rugby has become a sport distanced “from the participatory ‘feel-good’ ethos of other disability sport and positioned it closer to the competitive seriousness of elite mainstream sport” (p.136) due to advancement in technology. These scholars stop short, however, of offering an empirical explanation for these findings, and they do not analyse how they complicate disabled people’s participation in sport.

Burkett (2010) has further highlighted how technological advancements have not yet technically met some practical sporting needs of all disabled people. Hill, Scarborough, Berkson and Herr (2014) reinforced this point in their study which explored the current state of assistive technology for athletes with mobility conditions, and found that current advanced technologies sometimes do not suit the motions that form the ethos of the sports. Hence, disabled people will continue to push the limits of technological innovations to increase their physical potential and interactions within their environment (Laferrier, Rice, Pearlman & Schein, 2012), including disability sport. For this reason, Harris (2010) posited the need for further study on the requirements disabled people have for advanced assistive technology, in terms of independent living, their social and environmental interactions, and what challenges may arise from the use of these technologies when their bodies are incorporated with assistive technology.

Other scholarship provides a political perspective on the role of assistive technology in disabled people's engagement in sport, contending that, historically nondisabled sports had overlooked any environmental or regulatory alterations of the disabled athlete, or the use of assistive technology, thus including disabled athletes in nondisabled sports (Marcellini et al., 2012). This work argued that the disabled athlete was not classified as inferior as long as disabled athletes met the categories of the sport and were situated in the right body hierarchy. Unfortunately, the presence of advanced technology has challenged these inclusive traditions while distorting human boundaries (Marcellini et al., 2012) as disabled people engage in sport. While these ideas interrogate the broader interactions of disability, assistive technology and sport, they nevertheless overlook what assistive technology could be from the perspective of the embodied experiences of disabled people's participation in sport.

Ringuet-Riot, Hahn and James (2013) used the needs assessment model and stakeholder theory to evaluate technology literacy and innovation; they argued that modern

sport has accommodated complex technologies particularly due to the high interest in performance monitoring, entwined with the proliferation of and demand for large-scale manufacture of consumer products in sport. Hence, technological innovation in sports has become unavoidable (Rintala, 1995) affecting many areas of sport, from on-and off-field performance to fan engagement, stakeholders' profiles and athlete's experience. In the context of disability sport, Longmuir and Axelson (2005) claimed that in the search to improve participation and performance experience, disabled athletes engage in making equipment adaptations that range from very subtle changes (i.e., a change in strap, width, length, or material) to highly custom and complex innovations (i.e., custom-moulded racing mono-ski). However, Longmuir and Axelson (2005) contended that knowledge of available technologies and obtaining the 'right' common assistive device for each individual continue to be a major barrier to participation in sport. Given this, it has become important for this research to explore what these barriers to advanced technologies for disabled people in sport are from an embodied perspective.

Taken together, while assistive technology is vital for disabled people to participate in sport, it might not be universally beneficial to all disabled people. The reason is, that while the advancement of ATs has become common in disability sport, it has not entirely met the practical needs of disabled people's participation in sport. At times these technologies have not only contributed to disrupting the ethos of disability sport but generated sociological interest in the way that "promotes but also *impedes* social participation" (Ravneberg & Söderström, 2017b, p. 8).

Common Technologies in Disability Sport

So far in this chapter, I have discussed some of the common issues pertaining to disabled people's participation in sport drawn from the general disability and assistive technology literature. This was done to establish the rationale for an embodied approach to examining assistive technology in disability sport. With the rights to both sport and assistive technology enshrined in the *Convention for Rights of Persons with Disabilities* (CRPD) (CRPD, 2006), disability sport is a unique context to examine the intersection of disability, impairment and assistive technology. Butryn's (2003) typology of sports technologies, for example, has gained prominence from sport sociologists who use the typology to examine expanded issues of access, embodiment and subjectivity in disability sport (Asare et al., 2023). Butryn's (2003)

study outlined five types of sports technology: *self-technologies* used to augment the physical and mental make-up (i.e., prosthetics and genetic engineering); *landscape* technologies, which can refer to the sporting environments in which athletes compete (i.e., multi-purpose sports complexes and media networks); *implement* technologies, instruments and pieces of equipment that athletes use during an event and that are a part of the contest (i.e., lightweight running shoes and aluminium baseball bats); *rehabilitative* technologies, used by injured athletes to counter the otherwise debilitating effects of training regimens (i.e., hydrotherapy pool and ultrasound equipment); and *movement/evaluative* technologies, referred to as those devices and procedures designed to assess the form and efficiency of athlete's body (i.e., video analysis and GPS).

While a useful typology for nondisabled sports, these frameworks tell us very little about how assistive technology might be used in disability sports, particularly as research has shown that the boundaries between self, rehabilitative, implement, landscape and evaluative technologies may be blurred (Asare, Townsend & Lisette, 2023). As Butryn (2003) argued, however, sport is a "major battleground" (p. 18) for controversies and debates surrounding the use of assistive technology and disability sport produce even more of these. Debates about fairness, ethics, and performance collide with issues of access, equity, embodiment, and subjectivity (Asare et al., 2023) in sporting settings. Drawing on interview data (see chapter six) with physically disabled athletes using sporting AT across different sports, Asare et al. (2023) concluded that the complexities in the inequitable use of ATs require more nuanced perspectives that may contribute to more equitable provision and availability of assistive technologies for disabled sports people.

Further illustrating the 'blurring' of boundaries between different types of assistive technology is the fact that, in disability sports events, some athletes use their 'everyday' wheelchairs and prosthetics to compete (Burkett, 2010). For example, in the sport of archery, the athlete who requires a wheelchair typically uses their 'day chair', and ambulant athletes who stand (e.g., amputees or those with cerebral palsy) might use their typical prosthesis or walking device. Boccia athletes also typically use their day chairs (self-technologies), and as such the need for sport-specific (i.e., implement) assistive technologies is minimized (Burkett, 2010, p.216). However, in sports which place greater demands on AT for training or performance, athletes may use specialized implement technologies to enhance or improve

their performance. Further, an athlete's day-to-day assistive technology may cause pain, break easily or not be designed for sport-specific movements.

In wheelchair sports such as wheelchair basketball, wheelchair tennis and wheelchair rugby, it is common for athletes to use more aerodynamic microfibre wheelchairs (Burkett, 2010; Laferrier et al., 2012; Lindemann & Cherney, 2008; van der Woude et al., 2006), particularly as they progress through talent development pathways towards high-performance para-sport. Thus, through these bespoke sport-specific wheelchairs, disabled people are required to meet the dynamics of one sport and execute manoeuvres and athletic actions of the sport. Likewise, competing in the sport of athletics would be impossible for disabled people without special 'J-Leg blade technology' or the 'racing chair'. As such, the provision, demand and supply of these high-tech devices have expanded significantly (Brittain, 2018; Burkett, 2010), yet access to these technologies is not always equitably provided, compromising the sporting experience of some disabled people (Brittain, 2010). Moreover, as reinforced in my work (Asare et al., 2023), in disability sport, both everyday and sport-specific technologies have often expanded complex but significant issues such as access, which I will explore below.

Access, Inequity and AT in Disability Sport

In contextualizing any exploration of disability, fundamental questions of access and equity should be addressed. Research has suggested that there is a high level of inequity embedded in the relationship between disability, sport, and assistive technology, where access to ATs represents something of an "arms race" (Howe, 2008, p. 122). According to Nind and Seale (2009), research has discussed access but not recognized its multidimensionality, overlooking issues of power, physical access, knowledge, relationships and communication, advocacy, participation, and quality of life. While initially intended for individuals with learning disabilities (see Nind & Seale, 2009), this research can help illustrate distinctive approaches to how access to assistive technology can be negotiated by disabled people with different impairments. Yet, little is known about how these negotiations impact the relationship between disabled people and their access to everyday or sport-specific ATs within the context of disability sport.

Those whose impairment effects require the use of AT rely extensively on different types of assistive technology in order to access, participate, train and compete in disability

sport. While some may be able to use their 'everyday' assistive technology, as the demands of the sport change and increase, so do they rely on more sport-specific or bespoke AT. Since accessing these bespoke AT depends on economic status, economic factors tend to impact their performance and participation in recreational and elite sports (Bantjes & Swartz, 2017; cf. Borg et al., 2011; Harris, 2010). Despite the importance of access to bespoke ATs, there is a range of evidence on the inequitable distribution of such technologies for disabled athletes that suggests further scrutiny is needed.

For instance, Bantjes and Swartz (2017) conducted a case study on the 2015 International Paralympic Committee (IPC) Athletics Championships in Doha. Reviewing the results of the case study, they concluded that the ability to access expensive, customized technology influenced the total number of medals awarded to disabled athletes from low- and middle-income countries. These findings appear to be supported by Brittain's (2010, 2018) work that chronicled the development of disability sport. Drawing on data obtained through historical analysis of disability sport, Brittain (2018) argued that wealthy athletes from high-income countries who possess specialized *implement* technologies often gained performance advantages over athletes from low- and middle-income countries because wealthy athletes are better resourced.

This is important to understand because it illustrates how access to affordable sport-specific assistive technology provides a marked advantage for disabled athletes' cultural politics of disability sport. Drawing upon his own experiences as a Paralympic athlete, Howe (2008) emphasized that the pace of technological advancements, enabling some athletes to excel in performance through access to advanced technology, has led to a rise in athletes with mechanically and artificially designed bodies, unlocking new sporting potential. Howe (2008) cautioned that the Paralympics could shift towards showcasing radical technology rather than athleticism, potentially disadvantaging athletes from developing nations who lack access to performance-enhancing technology. Such a shift could destroy the meaning of disability sport.

Smith and Thomas (2012) have also highlighted equity issues in disability sport related to the inclusion of disabled athletes in mainstream sports competitions, the sports they participate in, and their use of various technologies to enhance their performance. While access to ATs enhances athleticism, the authors argued that including high-performance

technologies in disability sports does not address the deeper issues of political and social inequities faced by disabled people within the Paralympic framework. It requires an understanding of the nuanced connection between impairment, disability and assistive technology, and how these combine to produce *lived experiences* often neglected in technology and disability sport literature.

Furthermore, the discussion regarding the role of technology's place in disability sports has predominantly focused on ethical issues, encompassing aspects such as performance enhancement, access, and fairness. For example, Burkett (2010) utilized a systematic review of peer-reviewed literature and personal observations of technological developments at the Athens (2004) and Beijing (2008) Paralympic Games to explore the future challenges of assistive devices. Burkett concluded that the definitive role of assistive technologies for disabled people is unclear, and its potential to create a *level playing field* in modern disability sport remains debatable (Burkett, 2010). Such research suggested that the use of ATs for sport participation calls for further embodied enquiries. Moreover, the lack of embodied understanding has limited our comprehension of access and subjectivity present in disabled people's utilization of assistive technology, highlighting the need for a deeper exploration. One way of doing so is to connect with Critical Disability Studies, CDS and the theoretical toolbox it provides to explore the relationship between AT and disabled people within everyday and sport contexts. The following section lays the foundation for such a connection.

Critical Disability Studies, AT and Disability Sport

So far in the literature, for disabled people, the use of assistive technology can be socially, culturally and politically contextualised in disability sport. As already highlighted in the introduction chapter, the essence of this research is not only to enhance understanding of the complex relationship between disabled people and AT but also the related 'impairment effects' and different contextual accounts (Thomas, 2004) of using AT. Therefore, in exploring the embodied experiences of disabled people in sport, it is important to connect with the debates of critical disability studies (CDS) and the theoretical approaches it embraces.

Critical disability studies start with disability but never end with it (Goodley, 2011, 2013) because CDS provides an avenue to explore disability from an embodied standpoint,

understanding it as a socially constructed phenomenon and offering "a space to consider political, theoretical and real-world issues" (Powis, 2020, p. 22-23). The assumption then is that disability is a complex social phenomenon embedded within issues of intersectionality (Goodley, 2011). Intersectionality, here, refers to the multiple axes of identity that intersect with a disability, requiring a range of social and critical theories to deconstruct the discourses and ideologies that surround this identity and offer alternative theoretical knowledge (Powis, 2020) which is crucial for exploring this research.

CDS theorists often described disability as a "site for inquiry" (Powis, 2020, p. 24) into the experiences of disabled people. As Shildrick (2019) claimed, CDS is a new way of thinking that challenges the traditionally held medical view of disability, questioning what constitutes the body as a way of theorizing the fluidity between *impairment* and *disability* beyond the ordinary realm of discourse. As Powis (2020) stated, CDS draws on postmodern or poststructural theories, which Powis argued undertheorizes disabled peoples' embodied aspects of impairment, power, and ableism and overemphasizes the role of discourse in the production of disability subjectivity. Moreover, as Shakespeare (2008) maintained, CDS can also be a platform for poststructuralist debates inspired by the political language and arguments about disability that influence normative practices. In this context, "its criticality is only reserved for discourse and cultural ideology, whereas the embodied realities of being a disabled person are completely absent" (Powis, 2020, p. 23). In the context of disability, AT and sport, this under-theorization is problematic, and thus requires the application of CDS to address this issue.

Providing a structural and political review of disability, Shakespeare (2006, 2008) argued that disability is not just a matter of culture, discourse or language but has material implications and underpinnings often ignored in disability studies. However, CDS theorists have suggested that disability studies have a materialist origin (Gleeson, 1997; Shildrick, 2019). For example, in a study that explored the historical materialist view of recent accounts of disability in Western societies, Gleeson (1997) argued that disability cannot be "dematerialised and explained simply as the product of discriminatory beliefs, symbols, and perceptions" (p. 198). Building on this study, Shildrick (2019) asserted that CDS is thus useful for theorizing disability, having in mind the significant material effects on the everyday realities of disabled people, and challenging normative assumptions between disabled people

and non-disabled (Goodley, 2011). In the context of sport, assistive technology is arguably the most material of issues for disabled people. However, in ignoring the material aspects of AT, disability studies discussions have mostly centred around the instrumental usage of assistive technology. Specifically, neglecting how CDS can offer insights into the intersection of disability, body, and AT which can produce real-life issues for disabled people in sport.

Central to this research, ideas of CDS are vital in understanding how disability, the body and society intersect. Goodley (2011) argued that CDS draws on "carnal sociology" (p. 56) to theorize the disabled body as the place where self and society interact with disability. In such instances, without sociology, phenomenology is too focused on the essence of experience and lacks both a critical understanding of disability and a clear political intent (Goodley, 2011). Consequently, CDS offer a more intricate perspective to reconsider distinctions, encouraging us to challenge the assumed norms regarding nondisabled and impaired bodies. It calls into question the clarity of these categories, emphasizing the overlapping and unclear lines between various types of embodiment (Shildrick, 2019). Despite Shildrick's (2019) recognition of embodied experience, disability theory has predominantly reduced the "body to a disembodied object" (Powis, 2020, p. 24). Therefore, these two perspectives - phenomenology and sociology - need to be brought together, and this can be accomplished through a concept that is integral to this thesis – embodiment. In what follows, I delve into how some relevant CDS theories such as poststructuralism, new materialism, posthumanism and embodiment have been applied to the study of disabled people's experience of assistive technology in everyday and sports settings.

Poststructuralism

Poststructuralism emerged primarily from Foucault's concern for the politics of language, knowledge, and truth, questioning the traditional theories about discourse, culture, and power, what it means to be human, and what one can know (Belsey, 2002; Feely, 2016). Within poststructuralism, disability is shaped through language and culture; disabled people are entities shaped and defined by specific sociocultural arrangements (Brighton et al., 2021). Furthermore, poststructuralism emphasises the technologies of dominance, bio-politics and bio-power that divide human beings into 'able' and 'impaired' people' (Shildrick, 2015, 2019). In light of its principles, which emphasize language and its influence on social realities, Feely

(2016) maintained that poststructuralism offers a unique way of understanding disabled people's everyday experience in the world.

Within qualitative research in disability sport, a range of studies have utilised post-structuralist ideas to explore how disabled athletes construct and manage identity as they interact with technology. For example, Wickman (2007) conducted semi-structured interviews with male and female wheelchair athletes to elucidate how ableist discourse constructs and impacts how they manage their identities. Wickman (2007) found that the discourse of ableism had a profound impact on the way female athletes understood and constructed their bodily identity. In using wheelchairs, they actively resist being positioned as disabled, but in doing so they sometimes reproduce the discourse of ableism by positioning other disabled people as deviant. This created a sense of 'othering' that reproduced sports and gender discourses that positioned them as 'passive victims' unable to fulfil the expectation of motherhood. In this way, the study reemphasised that disabled people are not homogeneous entities and that technology, disability and gender continue to shape their identities.

Influenced by poststructuralism, and privileging the notions of discourse and power, research into disability sport has often described it as a site to transform and 'empower' disabled people. However, some disability research has found contrary perspectives. For instance, Peers (2012) utilized Foucauldian discourse analysis to interpret 14 texts on the role of Paralympic history in advancing and reproducing problematic notions of disability. Contrary to popular discourses that Paralympic sport is empowering for disabled people, Peers argued that cultural discourses from rehabilitation, participation, and elite disability sport, have been engaged by society in ways that serve to "implicate in the perpetuation of the practices and unequal power relationships in and through which disability is experienced and sustained" (p.311). In other words, these discourses may reproduce disabling practices while reinforcing the issues of power that tend to marginalize certain impairments in the Paralympics. Importantly, Peers (2012) acknowledged the need to enhance their work via interviews that specifically question how disabled athletes strategically act upon their sporting surroundings, as well as upon their *own* bodies and subjectivities to navigate issues of empowerment.

It would be difficult, however, to overlook the impact of feminist poststructuralist perspectives on understanding physical disability within the sociology of sport field,

particularly the work of Amsterdam, Knoppers and Jongmans (2015). These authors employed a feminist poststructuralist perspective to analyse narratives about sports, physical education, the body, and the self of physically disabled youth. The authors indicated that, despite the dominant societal discourses about sport and physicality constructing disabled bodies as deviant, vulnerable and lacking, these youth constructed the self as 'normal' and accepted disabling aspects of their environment as natural. Here, the poststructuralist narratives disrupted the dominance of ableism and exclusionary practices by allowing alternative constructions and positionings regarding the disabled body as an abled/normal body (Feely, 2016; Goodley et al., 2019; Peers, 2012; van Amsterdam et al., 2015). In contrast, Hargreaves (2020) and Peers (2012) challenged this notion, suggesting that disability and disability studies should not be perceived as a site of resistance against ableism, which has often disrupted how disabled people use assistive technology for sport.

Poststructuralism helps to examine the dynamics of resistance in disability studies. Ashton–Shaeffer et al. (2001) conducted semi-structured interviews to investigate the experiences of elite women's participation in wheelchair basketball, employing a poststructuralist feminist framework of resistance. Ashton–Shaeffer and colleagues noted the ways in which being involved in elite sports symbolised an opportunity for the athletes to regain control of their bodies. The participants described mastering competitive skills and showcased this process as helping them adopt an empowering athlete identity, resisting the passivity attributed to their female and disabled bodies and being defined solely as disabled. Moreover, this study emphasized that a meaningful identity of a female athlete as opposed to a 'disabled female athlete', can be achieved by using assistive technology for sport. Similar findings were recorded in later studies that identified the female sporting body as a capable disabled identity in which female subjectivities are formed in ways that produce a body filled with athletic agency (see Apelmo, 2017; Slocum et al., 2018). Slocum et al. (2018) examined the current status of women and athletes with high support needs within the context of elite disability sport. Using Paralympics sport as a lens, the authors highlighted that, through sport, women with high support needs were able to contend with the social perception that portrays athleticism and superior performance as stereotypically masculine attributes.

While poststructuralism appears widely used in disability research, not many studies have demonstrated an interest specifically in the relationship between disability, AT, and

sport from a poststructuralist viewpoint. However, while I have highlighted the usefulness of poststructuralist notions in understanding power, discourse and social categories such as disability and gender within the sociology of sports, poststructuralism has come under criticism for identifying normativity as a discursive product of binaries. It often ignores the (often inaccessible) material world in which disabled people live, unable to engage productively and non-critically with technology and self (Feely, 2016a; Goodley et al., 2019). The result is a lack of focus which can be addressed in this current research by expanding our understanding of the embodied and the material experience of using assistive technologies in sport. As shown, this area of study remains a work in progress.

New Materialism

Within disability studies, new materialism represents a range of assumptions used to explore the material world that disabled people inhabit. Drawing from post-structuralist (see Feely, 2016), feminist (Haraway, 1987), posthuman (Braidotti, 2013), actor-network (Latour, 1996), and queer theories, new materialism (NM) departs from historical versions of materialism, which primarily emphasized the evolution of social institutions and practices within a comprehensive economic and political framework of material production and consumption (Fox & Alldred, 2018). Having gained attention from many scholars (e.g. Feely, 2016; Goodley et al., 2019; Shildrick, 2019) new materialism represents a broad movement found in contemporary arts, humanities and social sciences, characterized by a shared interest in the exploration of *matter* (Flynn, 2017: Fox & Alldred, 2018). The notion of *matter* signifies a shift in viewpoint focused on the convergence of material and discursive practices, shedding light on the embodiment of disabled people and what their bodies are capable of (Fullagar, 2017; Monforte, 2018). The notion is that NM provides a direct challenge to poststructuralism in moving beyond discursive configurations of reality. Building on this perspective and its exploration of disability, Fox and Alldred (2018) contended that NM highlights how various elements can influence each other. It promotes the idea of theorizing embodiment through material discursive phenomena and argues that the material factors beyond humans, such as assistive technology, can function as social agents, shaping the lives of disabled people.

Based on this premise, Monforte (2018) explored the newness of NM and how it plays out in relation to different domains, such as knowledge translation and partisan positions of understanding disability. According to Monforte (2018), NM ontology dissolves categorical

(binary and hierarchical) distinctions that promote a 'posthuman' and ecological sociological perspective, cutting across the divide between nature and human culture and "seeing humans as an entirely integral part of modifying the environment" (Fox & Alldred, 2016, p. 288). Within the decentralized perspective of NM, humanism is not an essence of a thing or something to be objectified, and the understanding is that the environment is not distinct from humans; rather, the environment is an integral part of the posthuman experience (Braidotti, 2013; Fox & Alldred, 2016). In this sense, the environment goes beyond being a mere backdrop for human actions and meanings. Instead, it is viewed as a complex assemblage that includes both human and non-human entities, affects, objects, and cultural practices (Monforte, 2018). This assemblage played a crucial role in reinforcing the feminist understanding of historical materiality that exists between nature and culture, a concept embedded within the notion of the cyborg (see Haraway, 1987).

In recent times, the relationship between NM, environment, disability, and technology has been qualitatively examined within the field of disability, sport, and physical activity research. This examination is highlighted in the work of Monforte (2018) and later expanded in Monforte et al. (2021). Underpinned by NM ideas, Monforte (2018) challenged the understanding of the rehabilitation environment as a passive space for human actions and meanings. Rather, Monforte argued that the rehabilitation environment has the material capacity to affect the body's capacity, in the things it could and could not do. From this foundation, Monforte et al. (2021) explored the impact of an assemblage of the body, wheelchair, and gym environment during the recovery process of a man who had acquired a spinal cord injury. Drawing on interviews and field observations, Monforte et al. (2021) illustrated how rehabilitation from SCI can be understood as a process of 'enwheelment', referring to becoming one with the wheelchair. The study showed the individual process of becoming enwheeled was *against* and not *with* the chair. In the process of extensive treatment of his body, he reluctantly accepted his enwheeled body as a restoration of a non-disabled identity, disconnected from the wheelchair and recuperated the normative capacities of the nondisabled that humanism regards as essential. The authors further urged disability scholars to embrace diverse theoretical frameworks in their research endeavours, with a particular focus on exploring the human-nonhuman assemblages across a wide range of sports, populations, impairments, and assistive technologies.

Winance (2006) has also illustrated the process of enwheelment. Winance explored the interactions between people suffering from neuromuscular diseases and their wheelchairs. Using the NM dimension of actor-network analysis, the study found wheelchair, shaped action. In other words, the process of enwheelment is filled with adjustments, the body is transformed and formed and goes through material and emotional actions which are integral for social participation. The author added that through enwheelment, “an extended body” (p.65) is formed, and the person's world is transformed, creating possibilities and impossibilities for the impaired identity.

Also advancing the process of enwheelment, Lynch and Hill (2021) combined new materialist, feminist poststructuralism and AT perspectives to highlight how two wheelchair tennis athletes transgressed nondisabled and gendered norms in different spaces. They also examined how these athletes positioned themselves as either athletic and/or disabled bodies in these spaces. Employing a post-critical ethnographic design, the study found that, in using their wheelchair, the athletes appeared marginalised and different in sporting spaces dominated by nondisabled people. However, they felt included, valued, and strong in a disabled sporting space without disrupting the binary between ability and disability. From an NM perspective, while the wheelchair materially affected their knowledge in becoming successful athletes, it also re-emphasized how normative beliefs in society define and constrain disabled people’s (Oliver, 2013; Shakespeare, 2006) experience in sport.

Here, it is quite evident that the material relationship between disabled people and their assistive technology is not a detached or peripheral concern, but an integral part of the human experience. This observation is found to be supported by Chamberlain and Lyons (2016) and Goodley et al. (2019), who underscored there is an inseparable connection between humans and material objects. In shedding light on how materiality and material objects have been explored in some sport research, Chamberlain and Lyons (2016) maintained that materiality has the potential to improve our understanding of the “symbolic, social relationships and entangled subjectivities” (p.164) as disabled people interact with assistive technology. Against this background, the assumption is that materiality can enable disabled people to symbolize and reshape their subjective identity within society while using assistive technology. If so, then these findings hold deeper meanings for this current research,

which seeks to contribute to our understanding of how assistive technology may serve as subjective material when analysed through an embodied approach in disability sport.

Within disability studies, NM has been relatively neglected within AT, disability, and sport studies with even less attention to empirical research related to embodied realities. The reason is that NM is assumed to have limitations and cannot navigate the binary understandings of disability and impairment, disrupting the technology's cultural, social and human interactions of technology (Fox & Alldred, 2016, 2018). For example, NM is perceived to be non-representational thereby rejecting the conscious reflection of the way one experiences the world (Fox & Alldred, 2018) and the interactions between objects (technologies), humans (other people) and non-humans (structures, facilities) (Shilling, 2003, 2005). These limitations prompted Fullagar (2017) to call on qualitative researchers in sports who wish to explore material experiences to pay attention to the interrelation of material, objects and humanness. This call highlighted the need to review posthuman studies, particularly for their insights into shifting away from the myriad perspectives within NM that appeared to overlook embodiment as a way of understanding the relationship between disability, impairment and technology.

Posthumanism

Posthumanism is a methodological and theoretical shift that prompted researchers to focus beyond the perception of individuals as the basis of experience, and it can be used as an umbrella term for a range of approaches that emphasize, and question, the constitution of, and boundaries between, both natural and synthetic objects (Braidotti, 2013). This includes the boundaries between the use of assistive technology and disabled people in disability sport. Within disability studies, posthumanism offers a step beyond the representation of a materialist conceptualization of disability by offering a non-normative view of humanness (Dolezal, 2017; Goodley et al., 2014). In other words, from a theoretical viewpoint, to take a posthuman position is a break away from the prevailing new materialist view of human entanglements and to adopt a relational view that connects the human with several other things (Braidotti, 2013; Goodley et al., 2014) such as technology, the environment and other species. The human (i.e. disabled people) becomes more fluid and can be transformed into multiple identities (Braidotti, 2013). For example, Dolezal (2017) suggested that the prosthesis has not only become an artificial limb that restores a bodily lack but has come to

signify disability as a multiple identity that is augmented, enhanced, and cyborgified (cyborg is explored later in this section).

Given this background, it is unsurprising that many scholars noted that the posthuman is crucial to the study of humanity as people integrate various forms of technology into their daily lives (Braidotti, 2013; Goodley et al., 2014; Triviño, 2013). For example, one important study explored the relationship between technology and bodily enhancement in nondisabled sports. Drawing on posthumanist perspectives, Triviño (2011) explored gene technology and how it blurs performance-enhancement issues in elite sports. According to Triviño (2011), gene doping in sports can cause bodily modification where an athlete may acquire exceptional athletic skills beyond what is humanly natural. While it remains an ongoing debate whether such modification is medically harmful, it has created debates about fairness in performance and inequalities among athletes. Though Triviño's (2011) study had little to do with disability, the associated debates have raised questions about how far technology should augment disabled people's bodily performance in disability sport.

Indeed, these debates are well documented in the disability sports and assistive technology literature, particularly as disabled athletes constantly seek to improve their sporting performance. For example, posthuman studies have often turned to the case of former South African Paralympic runner Oscar Pistorius to highlight how using bespoke carbon fibre prosthetics blurs the performance of disabled athletes (e.g. Bailey, 2008; Marcellini et al., 2012). For instance, Bailey (2008) used posthumanist concepts to analyse Oscar Pistorius's exclusion from participating in the 2008 Olympic Games. Bailey (2008) argued that, by using his prosthetics, Oscar Pistorius ceased to be human in the competitive sports context, as he demonstrated no limitations, or weaknesses, a necessary condition of humanness. Secondly, Oscar Pistorius' use of prosthetics eliminated the test of physical abilities perceived as the true purpose of competitive sports. While this philosophical explanation offers some understanding of disabled athletes' experience of assistive technology, the lack of empirical evidence still leaves a gap in understanding how assistive technology shapes the humanness of disabled athletes.

Moreover, Marcellini et al. (2012) expanded these findings while exploring the sporting boundaries that the debate over 'humanness' poses to disabled athletes. Using Oscar Pistorius as a case study, Marcellini and colleagues suggested that when Pistorius used his

prosthetics, he became a hybrid of humanness and technology in sport. The authors concluded that his sporting performance, thereby, challenged the "purity of sport" (p.8) raising further questions and generating uncertainty and fear of the unknown about the new enhancement and transformation of disabled athletes in sport. While the study applied posthuman ideas to understand disabled people's experiences with bespoke assistive technologies in sport, Dolezal (2017) argued that little is known about how AT can impact the broader embodied representations of disabled athletes from a posthuman perspective.

As highlighted above, the posthuman implications of assistive technology can raise some interesting dilemmas in disability sport, as well as create culturally significant reference points for understanding disability. For example, it is common to hear athletes constructed in popular discourses like "*blade runner"* for sprint athletes (Norman & Moola, 2011, p. 1266) and "*blade jumper"* for long jump athletes (Howe & Silva, 2017, p. 1), or positioned in research as 'cyborgs' (e.g. Butryn, 2003; Butryn & Masucci, 2009). The 'cyborg' is considered a metaphoric expression of posthumanism. In general, a cyborg is any person who relies heavily on technological devices and objects to function. From a feminist perspective, Haraway described the cyborg as a "cybernetic organism, a hybrid of machine and organism, a creature of social reality, and a creature of fiction" (Haraway, 2006, p.117). According to Haraway (1987), the cyborg body is also a "hybridized lived experience of a condensed image of imagination and material reality" (p.2) which blurs the boundaries of human/animal, natural/artificial, and physical/non-physical. However, while Haraway's work had little to say about disability, she did suggest that "disabled people experience potentially the most intense forms of hybridization" (Haraway, 1991, p.178), an experience which requires research attention.

Therefore, to further understand the cyborgified and posthuman aspects of disability, sport, assistive technology and how disabled people experience sport, it is important to explore the dynamics of hybridization processes while highlighting their transformative impact on experiences in sport. This is particularly important as previous studies by Reeve (2012) and Sparkes et al. (2018) have argued that the understanding of cyborgs has been largely undertheorized in disability and disability sport research and other areas of study. In other words, the way the cyborg is understood is limited to an abstract perspective of how technology restores and normalizes the hybridized disabled body. While acknowledging these

limitations, some scholars have used the cyborg metaphor to examine technology and bodily interaction in sports. For instance, Butryn (2003) examined the cyborg identities and life histories of elite track and field athletes, underpinned by qualitative methods such as in-depth, semi-structured life story interviews with seven elite track and field athletes. The study found that athletes viewed their daily life experiences as the basis for becoming competent athletic cyborgs. Also, in becoming cyborg athletes, they went through different individual processes, encounters, and sensory experiences of using their technologies. Butryn advocated for further qualitative investigations to examine the process of cyborgification in other sports, in order to expand on the relationship between the individual and technology and its impact on their bodies' natural/unnatural binaries.

On this foundation, Butryn and Massucci (2009) explored the lived experiences of 12 athletes situated both within wide indoor and outdoor technologized spaces. They found that "the multiple intersections between the techno spaces/natural worlds, cyborg identity, and the environment, are complex, contested, and negotiated" (p.303). Also, the way athletes engaged with their bodies and experienced them in the context of technology and space, both indoors and in the wild, was linked to their sense of self. While this was easy for some athletes, the process was a barrier for other athletes. It is these distinctive individual experiences of technology that this current research seeks to explore, paying particular attention to the lived body and sensuous experiences which are currently limited within disability studies and the sociology of sport.

Following Butryn's (2003) and Butryn and Massucci's (2009) work, recent studies have taken an interest in specifically exploring the process of becoming a disabled sporting cyborg. For example, Sparkes et al. (2018) explored the process of becoming a disabled sporting cyborg for those who have acquired spinal cord injuries. The authors explored data from a four-year ethnographic study. The authors found that in the use of their wheelchairs, the participants tend to redesign their bodies and become the architects of their own identities involved in new ways of life. Additionally, they were released from and directly challenged the normative myth of the disabled body as weak, passive, undesirable and tragic. They became agentic, strong, desirable, and celebrated as sporting cyborgs who took pride and pleasure in their identity, bodies, and their achievements. However, the authors suggested the need for future qualitative research into the processes and products of cyborgification for

disabled athletes to factor in ideas from critical disability studies, particularly ideas that take the body to be simultaneously biological, material, and social.

There is a growing narrative of the cyborg as an enabling entity (see Apelmo, 2012; Schantz, 2016). Apelmo's (2012) work explored how female athletes make use of technology in their identity construction, drawing on the metaphor of the cyborg as well as on science and technology studies and disability research. Apelmo (2012) found that female athletes rejected the idea of disabled people as having unfulfilled and tragic lives. In so doing, they confronted gender stereotypes in sports by demonstrating determination, strength and willingness to take risks. Similar perspectives were expressed differently in Schantz's (2016) work. While commenting on the future implications of posthumanism on modern-day sports, the author suggested that the influx of technologies in modern sport has not only questioned the abstract perspectives of humanism but also created posthuman athletes who excel beyond human bodily identities. To build on this research, this current study seeks to explore the perspectives of the disabled athlete from an embodied perspective.

In other situations, the concept of the cyborg has generated concerns about physical identity, often resulting in the marginalization of certain impaired bodies within disability sport. For instance, Howe and Silva (2017) explored whether the advances in technology are empowering all disabled athletes, or simply those who have the potential to be cyborgs. The authors noted that often assistive technology was beneficial for athletes with mild impairments, as they could perform better with their technology compared to athletes with severe impairments. The authors added that, for athletes with severe impairments, the high extremity of their body, combined with advanced technology often accentuated the stereotypical narrative of the *supercrip.* As Silva and Howe suggested, the supercrip is a "stereotypical narrative that deploys the plot of someone who has to fight his/her impairment in order to overcome it and achieve unlikely success" (2012, p. 175). Within disability studies, it is argued that the *supercrip* narrative has not only led to the exclusion of severely impaired bodies but has created a perception of a cyborg, that through "technology can normalize their 'inferior' bodies" to a point where they can produce super-human results (Howe, 2011, p. 878).

In expanding the supercrip narratives expounded by Howe (2011), Schalk (2016) highlighted the problematic nature of such narratives. Schalk suggested that the narratives

can negatively impact the physical and social development of disabled people. Schalk's critique can be understood in terms of what Silva and Howe (2012, p.1) termed as "achievement syndrome" where the impaired succeed despite their disability and their use of technology, contrary to Haraway's (1987, 2006) assertion about the potential of cyborgification to expand the inclusion of more people in the space of humanity and society. However, according to Howe (2006), the metaphoric nature of cyborg in disability sport has underrepresented certain bodies, as demonstrated by Apelmo (2017) who argued that female disabled athletes are often viewed as overly feminine, weak and seeking social validation of the athletic female-disabled body through alignment with a cyborg identity.

Despite its popularity in sports sociology, the cyborg concept has raised concerns among disability scholars, particularly concerning how it appears to uphold a connection between science, technology, and medical beliefs, perpetuating ableist assumptions (Reeve, 2012; Wolbring, 2018). Wolbring (2018) used the cyborg metaphor to interrogate the media coverage of the Cybathlon games with a specific focus on prostheses. Among many discussions, the author argued that coverage of Cybathlon led to a reinforcement of a medical view of the athlete, encouraging an ableist language that positioned athletes as deficient. Wolbring (2018) therefore immediately called for strategies for the Paralympic Games that reduce the transhuman stories visible in the public realm associated with the public games. Challenged by this call, Richard and Andrieu (2019) also explored how the Cybathlon event questions the nondisabled identity of technologized sporting bodies. The authors argued that the event often pushed a transhumanist cyborg agenda fashioned under ableist and heteronormative conceptions of the body that are opposed to a postmodern definition of the cyborg. Together, these findings are contrary to Haraway's (1987, 2006) notions of contemporary cyborgs that can liberate the oppressed by blurring boundaries and constructing hybrid identities that are less susceptible to the trappings of modernist thought. This constellation of issues requires further critical exploration from an empirical perspective.

In disability sport, the contemporary cyborg has aroused anxiety, challenging the idea of the super-human as disabled athletes interact with technology (see Howe & Silva, 2017; see Swartz & Watermeyer, 2008). As Swartz and Watermeyer (2008) observed, the notion of cyborg has created ethical tensions and dilemmas, whereby the athletic performances of disabled athletes can be attributed to things like techno-boosting and techno-doping (Burkett

et al., 2011; Norman & Moola, 2011). As shown so far, the cyborg metaphor represents a posthumanist or new materialist reading of the interrelations of disability, impairment, and assistive technology in sport. However, it is also reductive in a number of ways, primarily in its potential to overlook the complexities and nuances of human experiences of assistive technology. Therefore, studies that draw on posthumanist theory while interesting can be criticized for the strong emphasis on enhancement that often obscures the unique and varied bodily experiences of disabled people, who may have diverse relationships and interactions with their assistive technologies. These considerations lead me to my focus on embodiment, introduced in the section below.

Embodiment

As the review has shown so far, assistive technology is a significant phenomenon in disability sport. However, to further illustrate the different ways that assistive technology is used in both everyday and sport-specific contexts for disabled people, it is essential to move beyond the level of posthuman and cyborg theorizations, to explore the notion of embodiment (Merleau-Ponty, 1962, 2004). Embodiment is informed by the philosophical strands of phenomenology and, as such, emphasizes lived experience and theorizes the body as more than a biological object. As Merleau-Ponty (1962) explained, embodiment helps us to see and theorize how the body is intimately connected with things in the world and with other people. As such, Brey (2000) suggested that embodiment provides a way of describing, analysing, and explaining the body (disabled) as a site of subjective experiences and patterns of relations as the body fundamentally intertwines with the world, and its objects, to produce lived experience. As Merleau-Ponty (2004) maintained, inside and outside are inseparable, the world is wholly inside, and one is wholly outside of oneself.

By focusing on the embodiment, phenomenologists argued that a strict separation between the body and the world cannot be distinguished. Locating this phenomenological idea within sociology allows for an understanding of assistive technology as not external to the individual but as being incorporated bodily and being felt through the social world. Assistive technology is not absent from the body as it moves through the world. Merleau-Ponty (2004) offered a useful example as he suggested that the blind man's stick has ceased to be an object for him and is no longer perceived for itself; its point has become an area of sensitivity, which extends the scope and active radius of touch, providing a parallel to sight.

Building on this, Ihde (1975) suggested that embodiment might help to uncover how "technology mediates one's experience of one's environment or world, by being a medium positioned in between individual and world through which the individual perceives the world" (p.3). The suggestion, from a phenomenological perspective, is that assistive technology becomes incorporated bodily through its use and that the body becomes 'transplanted' into these objects (Merleau-Ponty, 2004). Theoretically, then, embodiment builds on the new materialist notion that objects are not neutral, but — unlike posthumanism and poststructuralism — focuses on the subjective, lived experience produced by such interaction, and through which objects are given meaning. Inspired by this perspective, Standal (2011) analysed how the wheelchair becomes incorporated — experienced as a part of one's own body — through the dual process of both learning how to use it and learning how to become a wheelchair user. Drawing on the work of Merleau-Ponty, Standal (2009) argued that, through learning to manoeuvre the wheelchair, a reversible relation is established between the moving body-subject and the wheelchair. In this sense, re-embodiment involves a gestalt switch from body image to body schema. In other words, the wheelchair no longer is experienced as a thing, an otherness, but rather has become a part of the wheelchair user's habitual 'being-in-the-world'.

Building on this concept, Powis (2018, 2020) illustrated how embodiment can help understand the distinction between identity, oneself and the sporting body in disability sport. Using embodiment as a lens, and drawing on ethnographic data, Powis (2020) explored how the participation of visually impaired (VI) athletes in cricket fundamentally affects how they perceive their bodies and the bodies of others. Powis found that many players did not want to be perceived as challenging the dominant notions of the sporting body. Instead, reinforcing the 'normality' of their sporting experiences and that their VI does not affect their participation, their embodiment is not distinct from their sighted counterparts. While not researching AT, Powis's findings might be useful to develop in the context of the intimate interaction between impairment, identity, and assistive technology, which is central to this research.

Furthermore, some studies have explored the embodied experiences of using assistive technology in everyday contexts. For example, Moser (2006) examined how limitations and abilities are enabled, and how subjectivity and embodiment arise when disabled people use

newer technologies. The author drew on interviews and ethnographic notes of a man (wheelchair user) paralyzed from the fourth cervical vertebra down. Moser (2006) argued that the use of new technologies often helps disabled people to build an order of the normal and transforms them into competent normal subjects that they strive for. Given the ableist discourse of the findings — that disabled people are outside the status quo and must be brought back into the norm of a standard body — the author expressed the need for deeper exploration into conditions that produce ability and normalcy. This recommendation was framed within the paradigm of critical disability research, urging a transformative revaluation of societal perceptions and biases that have disrupted disabled people's use of technology.

While reflecting on the social participation of disabled people using assistive devices, Standal (2011) argued that the process of re-embodiment of the disabled body is a way to navigate daily, social and political implications, especially for disabled people living in an ableist culture (Howe, 2011; Loja et al., 2013; Papadimitriou, 2008). For instance, Papadimitriou (2008) used interviews and ethnographic descriptions to document the experiences of disabled people after acquiring a spinal cord injury. Papadimitriou argued that more abled paraplegic persons, in the process of self-reconstruction and making the wheelchair part of their embodied existence, are entangled in a situation where the wheelchair becomes a symbol of autonomy mobility and independence. However, Papadimitriou further added that society's perception of wheelchair use has also led to the disabled body being humiliated, downgraded and devalued in public spaces. These findings raise more questions regarding the importance of assistive technology in the lives of physically disabled people in sport.

So far in this section, embodiment is not only central to a person's physical construction but, as I previously stated, it influences an understanding of how the use of technology arouses agency and subjectivity in the daily lives and interactions of disabled people (Moser, 2006). Probing the relationship between embodiment and disabled identity among persons with physical impairments, Loja et al. (2013) concluded that disabled embodiment, as produced and experienced in an ableist context, arouses an agency of the non-disabled gaze that negates the disabled body and compromises its potential economic, social, cultural, emotional and physical abilities. Furthermore, focusing on disabled embodiment in a nondisabled culture is crucial to understanding “disabled people's

experience of oppression and constructions of the disabled identity which focuses on the contours of the non-disabled perspective" (Loja et al., 2013, p.200) while engaging with assistive technologies.

Prior to the current research, there have been few in-depth empirical accounts of how the notion of embodiment can be used to understand disabled people's use of assistive technology for sport. One notable example is Richard, Perera and Le Roux (2019) who, in the context of Powerchair football showed that modifications to the powerchair allowed for mutual adjustments between the powerchair and the individual. They suggested that the powerchair as an embodiment produced an active individual, the athletes gained autonomy, becoming both the decider and the author of their athletic actions. Richard et al. (2019) however, concluded by reiterating the need for a specific examination of how embodied experiences can help us understand the relationship between disability and assistive technology as a "point on which to explore new sporting subjectivities" (p.13).

Lupton (2013) claimed that the extent to which assistive devices are incorporated into the body, identity and embodiment also remains to be explored. In the context of sports, such a focus on embodiment is important, illustrating the processes through which the self, identity and the technology-mediated sporting body are intertwined (cf. Merleau-Ponty, 2004) as disabled people navigate disability sport (Asare et al., 2023; Lynch & Hill, 2021). For instance, Dolezal (2017) examined the image of para-athlete Aimee Mullins to understand how female athletes are perceived in disability policy. The findings suggested the prosthesis negatively affected how Mullin perceived her athletic body and felt uneasy about how others viewed her embodiment in sports. Nonetheless, through her imaginative and skilful use of prosthetics, Mullins demonstrated the enabling and empowering potential for the malleability between her athletic body, identity, and prosthesis. In summary, the results highlighted not only the potential for assistive technology to reshape disabled identity but also the opportunity for this research to examine how disability can destabilize the incorporation of assistive technology into the body.

In theorizing embodiment, there is a further need to explore the rise of technological innovations associated with disability — particularly prostheses — which has created cultural and visual sensitivities about prosthetic embodiment. This has often been referred to as prosthetic aesthetics (Smith & Morra, 2001; Tamari, 2017). Disability aesthetics is a "critical

concept that seeks to emphasize the presence of disability in the tradition of aesthetic representation" (Siebers, 2006, p. 4). From an embodiment perspective, Davidson (2015) observed that aesthetic judgments can impact disability because they presuppose a — "normative standard of perception and an ideal of bodily perfection as the object of affective response" (p.26). Thus, constructions of 'normality' continue to frame how meaning is attributed to AT, shaping the relations between disabled people, bodies, and assistive technology in society and sport.

Using an aesthetic approach to explore the imagery of disability, impairment and assistive technology, Crawford (2015) claimed that the new wave of prostheses has meant that assistive devices not only compensate for the missing body part or aid in physical function. They now also form an essential part of "an embodied identity and a visible object of the disabled body" (Tamari, 2017, p.4) that attracts an awkward "stare — a gesture that creates disability as an oppressive social relationship" (Garland-Thomson, 1997, p. 26). Indeed, Tamari (2017) extended Smith and Morra's (2001) idea of 'prosthetic aesthetics' to explore the contemporary discourse surrounding prostheses which have increased the social sensitivity and perceptions about the body appearance within the Paralympics. In doing so, Tamari argued that the image of the disabled athlete is often thrown into two frictional sensitivities: firstly, an image that connotes the attractiveness/adorable perfection of a machine-human artificial body; and secondly, an unpleasant/supernatural body representing a lived body but of materials and inanimate objects. According to Tamari, this contrasts with approaches that "better understand the ambivalent feelings of both fascination and disgust that the prosthetic synthetic body can generate" (Tamari, 2017, p. 24) for the disabled athlete. Despite this, Tamari had little to say about how disabled athletes negotiate their athletic body citizenship as it intersects with assistive technology (cf. Butryn, 2003; Sparkes, Brighton, and Inckle, 2018). However, this body of literature does illustrate how disabled athletes' active engagement in the world is contoured by attitudes and responses from others, shaping the process of embodiment.

Elsewhere, embodiment research has drawn attention to how aesthetic notions can help us comprehend the future image of the disabled body and its capabilities, raising questions about how to perceive and understand the aesthetic performance of 'new' disabled bodies that become mediated by advanced technology (Tamari, 2017). For instance, Purdue

and Howe (2013) attempted to provide some clarity about how aesthetic norms in Paralympic sport can impact performance and body identity in disability sport. The authors raised a number of concerns that are worth exploring in this research. An important concern was that, in Para-sport, the appearance of the disabled body is often either validated or invalidated by the combination of medics/aesthetics. This further creates an aesthetic body hierarchy which "inhibits the credibility and capital values applied to sporting performances by individuals deemed to possess 'impaired', opposed to 'impaired sporting', bodies" (p.36). For example, according to this research, in the Paralympics, the cerebral palsy athlete is represented as the lowest in the aesthetic hierarchy of valid bodies (Purdue & Howe, 2013) while the wheelchair athlete (amputee) gains preference in terms of aesthetics due to their perceived image of strength, endurance and agility. These analyses are useful for this research, such that the concerns they raised highlighted the need for an embodied approach to how disabled individuals and society perceive the image of the cyborg athlete.

Conclusion

In this literature review, I have teased out a range of approaches to understanding assistive technology, disability and sport and analysed the relative strengths and limitations of these approaches. I have argued that some theoretical stances trade a focus on embodiment for an overt focus on discourse, materiality, posthumanism and the metaphor of the cyborg, overlooking the intersection of body, mind and world in disability sport. In the process, I have attempted to trace the various ways that assistive technology is implicated in disability studies and within the sociology of sport, in this context disability sport. In so doing, a review of studies undertaken looking at the definition of assistive technology in everyday life and sport context showed that AT is undoubtedly 'good', providing both rehabilitative and social inclusion functions. However, its meaning is complex, varied and contested in both disability studies and the sociology of sport, requiring further in-depth empirical understanding. According to Ripat and Woodgate (2011) situating assistive technology use and meaning in the larger social, political, and contextual manner is key to understanding how individuals experience assistive technology, a paramount issue in disability studies that needs resolving.

From analysing the literature, it is clear that studies focused on disabled people's experience of assistive technology appear to be heavily dominated by theoretical explanations of how disability connects with technology. There is no doubt a gap in the

disability sport literature, particularly, relating to how the relationship between disability and assistive technology can be understood from the nuanced lived experiences of the users of the technology, in this context the disabled athletes. My focus is on the inner experience and how assistive technology might be used in disability sport, where the varied embodied meanings, self, identity and subjectivity have proved central in providing a critical understanding of the complex relationship between disability, assistive technology, and sport (Asare et al., 2023).

A clear preference for the recognition of critical disability studies (Goodley et al., 2018, 2019; Shildrick, 2019) is beginning to emerge in the literature, yet little has been done to conceptualize disabled athletes' experiences of using assistive technology from the athlete's *own* perspectives with the notion of embodiment as a lens of enquiry. The potential of this perspective to understand the enabling opportunities, bodily constructions, and self-perceptions of disabled people's use of assistive technology in sport is clear.

While the literature showed some examples of the application of qualitative methods to explore disabled people's interaction with assistive technologies in everyday and sport-context, this review has also highlighted a gap in critical disability studies ideas. In particular, some of the literature is grounded more in abstract perspectives aimed at theorising the impaired body, rather than working to understand the social, cultural and embodied construct of disability more broadly (Lester & Nusbaum, 2018). The review thus corroborated Goodley's (2011, 2013) observation that there is a need for a shift in disability research, taking into account multiple disciplines, and multiple qualitative methods, that focus on insider perspectives of the everyday experience of disabled people in order to generate new meanings of disability. This current study is hoping to contribute to this shift.

Chapter Three

Methodology

Introduction

In this chapter, I discuss the methodology used to address the objective of this research, which is to explore disabled people's embodied experiences of using assistive technology to access, train, play, and compete in sport. The discussion also focuses on the research design used to address the broad research question and the three research sub-questions aimed to enhance an understanding of the experiences that arise when technology and the disabled sporting body intertwine as disabled people participate in disability sport. As a reminder, the broad research question and three sub-research questions are:

1. *What are the embodied dimensions of assistive technology use in disability sport?*

   i. *What role does assistive technology play in the lives of disabled people in sport?*

   ii. *How are impaired bodies (re)shaped by assistive technology within the disability sport environment?*

   iii. *How does assistive technology impact the self-representation of disabled athletes?*

As illustrated in chapter one, the research questions were designed this way to extract deeper, nuanced, multi-layered meanings where the specific embodied realities of the participant's use of assistive technology in sport are foregrounded. Equally important, the research questions were also designed this way to help elicit the social experiences of the participant's use of assistive technology with particular attention to how impairment, the body and mind nexus are central to their participation in sport.

Research Paradigm

A research paradigm is defined as the researcher's "worldview that guides the investigation" (Guba & Lincoln, 1994, p. 105) of a phenomenon; a lens through which researchers perceive the way people inhabit their world and with each other. The research paradigm encompasses assumptions about the nature of reality and the nature of knowledge, and plays a central role in the way the research is framed, taking into consideration the researcher's personal

experiences and belief systems (Creswell, 2009; Creswell & Poth, 2018). According to Smith and Caddick (2012), belief systems tend to shape the ontological (nature of reality), epistemological (theory of knowledge) and methodological underpinnings that guide the approach and practices embraced by the researcher.

The research questions for the thesis as outlined above in this chapter were addressed within the paradigmatic framework of interpretivism. Ahead of discussing interpretivism, it is necessary to discuss some of the common strands of research paradigms that have informed research within the sociology of sport. This is essential, as it provides context and rationale for anchoring this current research on interpretivism. Jones (2022) argued that positivism, post-positivism, critical realism, and interpretivism have often been used and dominated this field of sociological inquiry in sport. Jones (2022) asserts that positivism is a realist, objectivist, and 'scientific' form of acquiring knowledge, allowing the researcher to develop theories that can be measured and tested; however, the researcher does not influence the findings. Thus, post-positivism builds on the objectives of positivism by rejecting objectivity as a single 'truth'. Creswell (2009) suggested that post-positivists acknowledge that we cannot be 'positive' about our claims to knowledge, especially when examining human behaviour, actions, and experiences. On the other hand, while critical realism attempts to bridge the gap between positivism and interpretivism, asserting that knowledge is gained through objectivism, it is influenced by experiences and perceptions (Creswell & Poth, 2018; Lincoln & Guba, 1994). In contrast to critical realism, sociologists suggest that interpretivism is often combined with social constructionism, which holds the perspective that knowledge is subjective, varied, and a contextually human experience (Crotty, 1998; Guba & Lincoln, 1994; Lincoln & Guba, 1994).

In this research, I embraced an interpretivist paradigm to allow for a deeper exploration into the subjective, human experiences of using assistive technologies in sport. Interpretivism is a set of paradigmatic assumptions contoured by the intellectual traditions of phenomenology (e.g., Merleau-Ponty, 2004) symbolic interactionism (e.g., Goffman, 1957) and ethnomethodology (e.g., Garfinkel, 1967) and as such positions knowledge as constructed and reality as inter-subjectively perceived. Hence, Creswell (2009) and Crotty (1998) claimed that interpretivism is well-suited for research that focuses on how people develop subjectivity and interpretations of their experiences toward objects and things. Within interpretivism, knowledge is relative to a particular historical, social, cultural, or

political situation that exists through multiple representations of reality (Krauss, 2005). In other words, interpretivism is a valuable paradigm for researchers concerned with exploring the complexities of a phenomenon with varied and multiple meanings that are difficult to uncover (Creswell, 2009) especially, when it is related to disabled people's embodied experiences with technology.

Driven by the imperative to explore the complex ways in which physically impaired athletes use assistive technology in sports, this current research aligns with the interpretivist assumptions outlined by Crotty (1998). First, I embrace the assumption that meanings are constructed by human beings as they engage in the world; they are interpreting. Secondly, I acknowledge that humans engage with their world and make sense of it based on their historical, social, and cultural perspectives. Thirdly, I recognize that meanings are social and arise in and out of interaction with a human and non-human community. Putting these assumptions together, this research seeks to illuminate ways physically disabled people negotiate the complexities of involvement, access, and use of assistive technology within the sporting environment.

Ontology

According to Crotty (1998) and Harper (2011), ontology includes a set of assumptions concerned with the study of human nature, the nature of history, the properties of the social world, the status of human action, and the analysis of the material entities in the world (Epstein, 2018; Harper, 2011; Laverty, 2003). Importantly, aligning with my interpretivist position is the definition that suggests that reality does not exist in a single unit but comprises multiple realities (Crotty, 1998; Laverty, 2003; Lincoln & Guba, 1994). In essence, the ontology assumptions that I bring to this research assume that reality is a lived experience and is shaped by subjective experiences (Lincoln & Guba, 1994). In other words, the human experience is not an internal object-human interaction; it involves an engagement of the mind and body with the outside world (Laverty, 2003) mediated through our senses (Harper, 2011). This implies that reality emerges when consciousness engages with objects that are already pregnant with meaning (Crotty, 1998, p. 43). As we move through the world as 'one,' we have unique individual realities with the same phenomenon (Neubauer et al., 2019) and uncommon interpretations, meanings, and expressions we give to our world experience (Jackson & Mazzei, 2012). Thus, in this research "reality is constructed through the interaction

between language and aspects of an independent world" (Scotland, 2012, p. 11) where people's subjective experiences are dynamic and informed by social, cultural, physical, material, economic, structural, and political factors, all of which are important to the study of disability (Brighton *et al.,* 2021).

Epistemology

The term epistemology "comes from the Greek word epistêmê" (Krauss, 2005, p.758) which refers to how we come to know. As described by Scotland (2012), at an epistemological level, interpretivism draws on subjectivism. Underpinned by an interpretivist epistemology, this research aims to bridge the gap by bringing together both the sociological and embodied experiences of disabled people using assistive technology in the context of disability sport. The purpose is to expand knowledge about the role of assistive technology in disability sports, specifically giving disabled people the opportunity to provide an accurate narrative of their complex personal relationship with bespoke sporting technology, often overshadowed by abstract theories about the body that overlook the fleshy, material, and lived experiences of those who embody it.

Given this, my epistemological position was equally grounded in the belief that knowledge is relative and subjectively constructed (Crotty, 1998; Guba & Lincoln, 1994; Krauss, 2005; Lincoln & Guba, 1994; Scotland, 2012). As Crotty (1998) puts it, "knowledge and meaningful realities are constructed in and out of interaction between humans and their world and are developed and transmitted in a social context" (p. 42). Knowing manifests in various shapes and forms, ranging from what we know from experience, watching others, and what we learn from them and society (Neubauer et al., 2019; Scotland, 2012). In the context of this research, by adopting an epistemological subjective stance, knowledge was co-constructed through a dynamic interaction between the researcher and the participant (Scotland, 2012). This approach shaped the overarching methodology, allowing for the interpretation of the embodied experiences of the participants' physical impairments as they used their assistive technologies in their respective sports.

As scholars put it, disabled people construct their world, and their 'world' is socially constructed (Thomas, 2004a, 2004b). Hence, to develop nuanced knowledge about the role of ATs for disabled athletes, I embraced the idea that the "social world can only be understood from the standpoint of individuals who are participating in it'' (Cohen et al., 2007, p. 19).

Adopting this epistemological standpoint represented for me a way of knowledge central to empowering the participants as 'knowers', allowed for methods that allowed participants to share their opinions, stories, and everyday experiences, thereby contributing to a richer and more nuanced understanding of the relationship between the body, disability and assistive technology in sports.

Qualitative Research

In locating my work within interpretivism it is well suited to the method of qualitative research. Qualitative research has been widely used across many fields of study, including physical activity and sports (Fullagar, 2017; Jones, 2022). Qualitative research is the means of examining the meanings a group of people or individuals give to their experience of a phenomenon (Creswell, 2007; Creswell & Poth, 2018; Jones, 2022). This research is uniquely positioned within the framework of phenomenologically inspired, sociologically-oriented qualitative research. This is important in order to effectively examine the embodied experiences of disabled people using assistive technology for sport. In other words, this research employed a qualitative research approach with a sociological interest in human embodiment as a way to examine the world, including social reality, just as disabled people experience their everyday lives in the context of sport. Though the phenomenologist and the sociologist may have different philosophical assumptions for conducting qualitative research, they share common interests (Neubauer et al., 2019). This common interest revolves around exploring how people experience a particular phenomenon within their social world (Creswell & Poth, 2018; O'Reilly & Kiyimba, 2015) as well as learning, describing, and interpreting the meaning people give to their subjective experience (Creswell, 2009; Neubauer et al., 2019).

As I have broadly illustrated in chapter two "embodiment is an integral aspect of all research processes" (Ellingson, 2017, p. 1) that explore the sociology of the body. Hence, in positioning this research as qualitative research, I draw on the propositions of Harper (2011) and Shaw (2011) as a means to explore not only textual data, opinions, insights, observations, and social experience but also embodied practices to interpret a given phenomenon. In this context, qualitative research was perceived as a valuable approach to providing an understanding of the broader socio-cultural and lived body sporting experiences of disabled people's use of assistive technology. Historically, the use of qualitative approaches has often been described as a striving force in studying the sociology of the body, sport, and physical

culture (Sparkes & Smith, 2012) however few have focused on how disabled people practically live and experience their bodies, disability, and impairment in sport. The ability to understand these multiple experiences from an embodied perspective resides in qualitative research. As Smith and Caddick (2012) suggested, one characteristic of qualitative research is the ability to explore multiple meanings that people attach to their subjective experiences and seek to identify, describe, and interpret the social structures, spaces, and processes that shape these meanings. In the context of this research, qualitative research appeared appropriate to explore the uncommon but lived experiences of disabled people as they navigate not only their disability but also their impairment, and body, as well as using their assistive technology in order to play sport.

Importantly, the purpose of conducting qualitative research within this thesis aligns with Creswell's (2009) and Creswell and Poth's (2018) claim that qualitative inquiry helps to examine meanings that individuals or a group of people with shared interests make about themselves and other aspects of their environment. In doing this, the goal of this research was to fulfil what most qualitative researchers that explore the body and disability do, which is to examine the complex ways in which people and society function together in the world (Smith & Caddick, 2012). Specifically, to examine the complex experience disabled people go through in society while fusing AT with their bodies. As Flick (2004) suggested, gaining an understanding of such complex social phenomena can be shaped through nuanced, rich, and detailed stories in qualitative research.

On the whole, adopting qualitative research for this thesis allowed for the exploration of how a "person's subjective sense of the world is derived from the society and cultures that they live in and move through" (Smith & Caddick, 2012, p. 61). According to Yilmaz (2013), qualitative understandings of the subjective sense can be achieved through the voices and first-hand narratives people give to their lived experience, as well as their everyday dealings within their social environment (Braun & Clarke, 2013). The voices and first-hand narratives are essential components of qualitative research. They can promote means to explore people's knowledge and orientation towards everyday events, objects and actions (Braun & Clarke, 2013; Flick, 2004) needed to generate emotional, sensuous, bodily and intersubjective experiences, which are essential points of interest in this research.

Methods and Procedures

The objective to explore and enhance the understanding of disabled people's embodiment of assistive technology in many ways influenced the choice of procedure and further engagement with the methods in this research. Furthermore, considering that this research is underpinned by three research objectives, culminating in three different studies but all aimed at elucidating a specific experience and practice of using assistive technology, it was appropriate to utilize different methods useful to explore the embodied, subjective, sensory and material interactions of the participants. As Creswell and Creswell (2018) mentioned, researchers need to employ methods that adequately address the research objectives. In doing so, multiple-methods were adopted not only to give athletes flexibility and a chance to express their experiences in different ways, making them "active agents in the creation of their world" (Darbyshire, Macdougall & Schiller, 2004, p. 423) but also to allow me to examine the deeper meanings, patterns, actions, senses, and experiences (Creswell, 2009) the athletes have with their ATs, others and the environment.

Most importantly, I based the choice of methods on the epistemological standpoint of the research, subjectivism. For instance, it is argued that qualitative researchers in sports studies who seek to interpret feelings, thoughts, emotions, and perceptions often adopt methods that produce rich textual data (Jones, 2022; Smith & Caddick, 2012) such as interviews. Traditionally, qualitative researchers tend to employ structured interviews, semi-structured interviews, and unstructured interviews to explore and interpret people's perspectives. They are considered an effective way of exploring embodied experiences (Ellingson, 2017). Recently, however, qualitative researchers have turned to photo interviews, photo-voice, or photo-elicitation to enhance the examination of issues difficult to explain with only text (Busso, 2011; Pink, 2011; Pyyry et al., 2021; Shaw, 2011) and to elucidate emotional and sensory physical experiences (Busso, 2011; Phoenix, 2010; Pyyry et al., 2021). Yet, researchers have rarely used photo methods in exploring disabled people's experiences within the sociology of sport (Phoenix, 2010).

Given that this research is also interested in interpreting the embodied subjectivity of a particular group of people, the engagement with methods was underpinned by the assertion that researchers investigating a particular culture, norm, and value should employ methods such as focus groups, field observations, or ethnographic approaches (Creswell &

Poth, 2018; Mannay & Morgan, 2015; Smith & Caddick, 2012). The latter was utilised in this research. Taken together, the methods used throughout the entire research include ethnography, semi-structured interviews, and photo-elicitations. Indeed, the idea of using a combination of different methods is not only common in doctoral studies but has been found useful in examining issues within disability and disability sports (e.g. Ives et al., 2021; Powis, 2020; Townsend, 2018; Wilson & Khoo, 2013). Below, I will discuss each of these methods while highlighting their unique philosophy, characteristics, and practical role in providing authentic, important, and credible data.

Ethnographic Study

The ethnographic study was used as the lynchpin of this research. In other words, ethnography was used as the method to address the first research sub-question (i), which focused on what role assistive technology plays in the lives of disabled people in sport. The ethnographic study was positioned to gain an initial first-hand experience of how disabled people interact with ATs within their sporting environment. Specifically, to make sense of and illuminate athletes' "interaction, perceptions and experiences of their social world" (Ryan, 2017, p. 19) while playing wheelchair rugby.

Why Ethnography?

Comparative cultural anthropology in the 20th century gave rise to ethnography (Creswell, 2007). The primary focus of ethnography was a way of studying isolated communities and cultures that were impenetrable to outsiders (Gobo & Marciniak, 2016) analysing detailed written descriptions, stories, artefacts, and documents (Mannay & Morgan, 2015). Moreover, scholars have highlighted that the origin of ethnography can be traced to the anthropological work of Bronislaw Malinowski (1884 – 1942) while exploring the community of Trobriand people (Flick, 2004; Ryan, 2017) where the "primacy of field research and participant observation was first stressed" (Howe, 2008, p. 154). In doing this, Malinowski kept a diary that recorded his feelings, perspective, and emotions about the community, which was subsequently published after his death. The publication celebrated subjective experiences, not only as a way to move beyond objective experience but also foregrounded the importance of the researcher in the field (Ryan, 2017) and what the researcher experiences in modern ethnographic studies (Mannay & Morgan, 2015). Therefore, it is not uncommon for scholars to emphasize the value of researchers' subjective experiences in modern ethnographic work

(Kerr & Sturm, 2019; Townsend & Cushion, 2021) that explore the intersection of disability and sport.

In the sociology of sports, researchers often align to three types of ethnography – realist, critical, and interpretivist (constructivist) ethnography (Creswell, 2007; Creswell & Poth, 2018). Realist ethnography acknowledges people's perceptions and experiences of a phenomenon (Creswell, 2007; Creswell & Creswell, 2018), an approach that interprets knowledge objectively in a third-person voice without exaggeration (Creswell, 2009). With socio-political goals (Creswell, 2007; Creswell & Poth, 2018), researchers have gradually turned attention to 'critical' ethnography. Underpinned by long-term fieldwork, 'critical' ethnographers advocate for the emancipation of marginalized groups. Emerging from emancipatory research, critical ethnographers study issues geared towards empowerment, giving authority, and challenging issues of inequality and power (Creswell, 2009). However, in both 'realist' and 'critical' approaches, the researcher is politically driven with little attention to how disability is socially constructed through social, cultural (Casper & Talley, 2005) and embodied experiences.

In this study, I used constructivist ethnography to generate answers to how assistive technologies enable disabled people's participation in wheelchair rugby. As Ryan (2017) stated, constructivist ethnography sits between critical and realist ethnography and values the 'thick descriptions' of communities and cultures, and importantly the experiences of members. Within the goal of this ethnographic study, constructivist ethnography was adopted to facilitate an understanding of the culture and interaction between the mind and social experiences (Ryan, 2017) of both disabled and non-disabled people in sporting environments in the way other methods not do.

While some studies within disability and sports have supported the use of ethnography (Howe, 2008a; Monforte et al., 2021; Townsend, 2018) there remains a gap in empirical studies focused on the role of assistive technology for disabled people in sports, from an ethnographic perspective, "perhaps due to its time-consuming nature and the difficulties of gaining access to required populations" (Smith & Caddick, 2012, p. 62). Yet, in cases where these studies were carried out, they have significantly impacted our knowledge of various sporting cultures and sub-cultures (Thorpe, 2010). Against this background, this ethnographic study builds on the work of Sparkes et al. (2018) by responding to how

technology enables disabled people's movement into and experiences of the world of disability sport. Specifically, my ethnographic study drew on a sustained period of involvement with a regional wheelchair rugby team. The wheelchair rugby team represented a powerful starting point culturally for exploring AT, particularly, as wheelchairs have become the most visible and prominent signifier of the relationship between disability and assistive technology. Therefore, in immersing myself with the team, the idea was to observe over time at first-hand the complexity of actions and what people (disabled people) do in their social world (Creswell, 2007; Mannay & Morgan, 2015; Smith & Caddick, 2012) when it comes to the use of a wheelchair for sport after becoming injured. Not only that, but also, as Mannay and Morgan (2015) argued, ethnographers can gain an understanding of culture by interpreting individual experiences, and how they negotiate and navigate their norms and values in their particular social-cultural setting. In this context, this ethnography was aimed at exploring how subjective individual experiences related to the process of using and interacting with the wheelchair can be experienced as a social collective for disabled people when playing wheelchair rugby.

The setting

The setting for this ethnographic study was a wheelchair rugby club. The club has been running for more than a decade and has about 20 members comprised of both disabled and non-disabled members (volunteers, families and friends). The disabled members are made up of people with a range of physical impairments, from spinal cord injuries, amputees, and mild cerebral palsy to muscular disorders. The club has two coaches and a mechanic who is a volunteer. Typically, the mechanic helped with the repairs and maintenance of the wheelchairs. The club depends on volunteer officials. The club trains in a local school sports gym, once a week across a season that starts from March to September. During the season, the club competes in local and regional tournaments, leagues, and disability sport festivals. At times, some of the disabled players get selected to compete for the New Zealand Wheelchair Rugby team, known as 'Wheelblacks' at international competitions. I have highlighted other activities of the club which foreground the player's embodied experiences of using their assistive devices in chapter five.

In this thesis, I originally intended to use two methods of data collection, that is, semi-structured interviews and photo elicitations. However, the journey into what became a site

for an ethnographic study began on June 25, 2020, when I spoke to one of the trainers of the Wheelchair Rugby Club. I made a hopeful call to the club to request assistance with recruiting participants for my thesis. Before placing the call, I read about the club online to ensure the potential participants would fit into the initial design of the thesis. This is in line with Atkinson and Hammersley (1998) who asserted that often qualitative researchers need to identify sample areas where the experiences of prospective participants align with the phenomenon under study. Feeling confident that it could be a good place to learn about people's experiences of assistive technology in sport, I decided to give them a call.

> *Researcher: Kia ora,[2] my name is Francis Asare; I am a PhD student at the University of Waikato. I am interested in the experiences of disabled athletes using their assistive technologies to play sports, and I was hoping to have access to and interview some of the rugby players in your club. But, before that, I also wanted to come to look at some of your training.*
>
> *Trainer (Mark): Sounds like interesting research. Previously, we had a researcher who wanted to analyse our physical impairments, and many of the guys were uncomfortable. But what do you mean by assistive technologies?*
>
> *Researcher: Forgive me. I am referring to devices like prosthetics, wheelchairs, etc. But why were they uncomfortable?*
>
> *Trainer (Mark): Most of them felt it was too invasive and didn't find it comfortable to reveal their impairment regularly to the person. We are a small bunch of people with different impairments, and we train every Monday from 6 p.m. to 8 p.m. at the gym at Fairfield College. So anytime you are ready, just let me know, and I will introduce you to the other guys. We are a nice family! Have you tried wheelchair rugby before? If not, can you have a go when you come?*
>
> *Researcher: No, I have not played before, and yes, I would like to try it.*

[2] Kia ora is a Māori greeting that is similar to saying 'good morning' or 'hello'.

Trainer (Mark): You will enjoy it, and it will help with your research too. Okay, see you soon.

Me: Sure, thanks for the opportunity. Bye!

Importantly, the initial intent of the call was to build initial trust with some of the players before requesting the interviews. As my visits to the club's training became regular, my initial design evolved. I began to feel gradually integrated into the setting; it became apparent that it was an opportunity to transform it into an ethnographic study. While this approach may be an uncommon way of commencing an ethnographic work, according to Jones (2022) sport-related ethnography often embraces a flexible methodology, such that researchers begin data collection in an "unstructured, unplanned and unexpected" way (p. 222).

Moreover, it is argued qualitative researchers in sports commonly select easily accessible or familiar places as ethnographic settings (Jones, 2022) with the help of a 'gatekeeper'. According to scholars, 'gatekeepers' determine how members of the group will relate to, respond to, and interpret the researcher's agenda (Creswell, 2009; Jones, 2022; Sangasubana, 2011). In the context of this research, due to my unfamiliarity with the club and being a non-disabled, Mark, one of the coaches with the club, played a crucial role as the 'gatekeeper' facilitating my access to the setting. He was trusted by members of the club; in turn, I was trusted. Mark had a significant influence on how the group members interacted with and interpreted my existence in the setting. I was invited, added, and accepted on the club's Facebook and Messenger platforms. This allowed me to access communications between players, trainers, volunteers, and family members. Most importantly, this facilitated my sustained presence in the lives of the players, the club's training, competitions, and other social events for 18 months.

Within this period of 18 months, I used participant observation, interviews, and field notes as methods to collect data and information from the setting. It is important to note that the use of these methods is not peculiar to ethnography (Krefting, 1989), however, in this study, using a mix of these methods helped create rich descriptions and explanations that captured the complexities, contradictions, and consequences of the participants engagement in their wheelchair rugby setting. These methods revealed different representations of

experience that I analysed throughout the process, helping to refine subjective perceptions, constructions, and questions about how disabled people can use technology for sport.

Participant Observation

Observation, as described by Smith and Caddick (2012) is an "act of perceiving the workings of people, culture and society through one's senses" (p. 65). Often the process of observation is not static, it can be dynamic with researchers moving through different observation experiences. Meanwhile, Krefting (1989) proposed that the goal of participant observation is to "observe a typical scene, one which has been minimally disrupted by the inclusion of the ethnographer" (p.64). As Atkinson and Hammersley (1998) suggested, participant observation is not a mere research technique to collect data but a mode of 'being-in-the-world' for the researcher. Given this, participant observations were performed during the club's events and activities, competitions, and training, with a focus on the six players and other members who had consented to the research. I started as an *observer as a participant* which allowed me to observe the lives of the players "from behind a one-way mirror" (Krefting, 1989, p. 64). This means, by this approach, I could engage in minor participation in the setting as a researcher known to the group. This was an important first practice in order to gain primary insights into the player's life-world experiences and better position myself in the setting. As Smith and Caddick (2012) pointed out, to observe and participate simultaneously is "to examine peoples' lives in situ and life as it happens in 'real-time'" (p.66) as well as navigating the relationship and level of immersion within the context of the setting, and the processes adopted. While aligning with this assertion, however, finding my position as a non-disabled, academic, non-technology user within the setting was not straightforward.

To position myself as a non-disabled observer who will not distract the player's natural way of doing things in the setting as well as my *own* observation of the contextual assumptions and values of the group (O'Reilly, 2009), I aligned myself with what Dwyer and Buckle (2009) described as finding "the space between" (p. 60). The assumption is that, given that the *observer as participant* involves a two-way experience in the setting, the 'space between' offers the researcher the opportunity to negotiate the binary between the *insider-outsider* observer. While the *outsider* is generally understood as observing and gathering participant experiences with "having no prior knowledge of the customs and practices of the participants being studied" (Kerr & Sturm, 2019, p. 1138), the *insider* researcher is understood

as observing experiences as a member of the group or participants understudied (Dwyer & Buckle, 2009; Willig & Billin, 2012) sharing with them the same identity, values, norms, and language (Atkinson & Hammersley, 1998).

In the setting, I navigated between the roles of an *outsider* and an *insider*. As Manny and Morgan (2015) argued, a more nuanced understanding of a social setting can be gained through what ethnographers do in and out of the setting. In other words, I was able to position my non-disabled *self* as an outsider gathering 'insider' perspectives from the players to learn what they are "thinking, feeling, values, and norms which form the basis of their actions" (Krefting, 1991, p. 63) while using assistive technologies. At the same time, I gained an 'insider' status by becoming an active participant involved in participating in activities of the club, not limited to training and playing but attending social gatherings with families and friends (described in chapter five).

Considering the embodiment perspective of the study, these approaches above were a huge step in the data collection process. It allowed me to further adopt a new observational role: that of a *participant as an observer* where I was engaged in active participation in the daily activities of the social group (players) while simultaneously conducting observations (Smith & Caddick, 2012). It afforded trust and friendship that opened doors to collect information and record mundane, taken-for-granted, unremarkable features and actions (Smith & Caddick, 2012) emotions and sensory feelings while players navigated performing with their sport-specific technologies (i.e., rugby chair). As suggested, participant observation is a way of "'knowing people' rather than 'knowing about them'" (Smith and Caddick, 2012, p. 66). Moreover, according to Gobo and Marciniak (2016), through the *participant as an observer*, the researcher not only becomes part of, partakes in the understudied phenomenon, and simultaneously observes, but also makes meaning to the everyday activities, rituals and norms of the group. Considering this, I developed an empathetic relationship and understanding of the player's behaviour, seeing them as participants rather than subjects. Both the players and I became self-conscious of their active participation by learning while observing and paying attention to the mundane routines in the setting, ranging from coming in with families and caregivers, setting the clock for training, arriving early and late, drinking water during game breaks, asking for help to transfer between chairs, and incorporating the chairs into their bodies. This was useful in helping to observe the player's

bodily experience in 'real-time' and first-hand experience of body drills, fatigue, laughter, friendship, and support from families. I became more "open, authentic, honest, deeply interested in their experience, and committing to accurately and adequately representing their experience" (Dwyer & Buckle, 2009, p. 59) in the setting. As posited by Atkinson and Hammersley (1998) studies adopting participant observation have the potential to produce context-specific accounts, which is of interest to the researcher who wants to make informed interpretations of human actions in a setting. In line with this study, I was moved to pay attention to the contextual accounts of how when people experience sport with assistive technology in their natural setting, they can experience their body as a single subjective 'being-in-the world' (Merleau-Ponty, 1962; Tanaka, 2011).

Interviews

Interviews for this ethnographic study were carried out across the 2020-2021 Wheelchair Rugby season. Ethnographic interviews often differ from the traditional way of carrying out interviews in qualitative research. In this context, most importantly, the goal was not all about generating data to understand the experiences and meanings of AT but was asserted as an immersive way of formalising my role as a researcher in the setting. The interviews were a way through which I solidified my relationship with the group over the 18 months of spending time with them. Reflecting on my role *as participant as observer* my objective at this point was to build a rapport with the players that had begun to build up over time. According to Ellingson, rapport is a "sensuous experience of bodies sending signals back and forth continually across a connection" (p. 104). Through spending time and building rapport with the team, my identity as a non-disabled researcher became absent for the players which opened up the opportunity for me to visit their homes, meet their families and delve deeper into taken-for-granted aspects of their interaction with assistive technology. I noticed the importance of this approach throughout the entire interviewing process. It gave control of the interview to the interviewee (players) not just to merely answer the questions I asked them but to provide me with the important information I needed to understand their embodiment of assistive technology. Krefting (1989) maintained that in an ethnographic interview - especially in disability studies -the participant is the teacher, and the researcher must prepare to be the student ready to listen and learn. Taking this into consideration and my own deepened interest in understanding the players' life experiences of using AT, the

interview was structured with open-ended questions to explore rich stories while gaining a thorough understanding of the complex behaviours and actions of the players. The interviews were limited to the players only, those I identified as possessing the character, value and experience relevant to the objectives of the study, after observing and participating in the setting for about six months.

Field notes

In ethnography, researchers record their private, personal thoughts, ideas, and queries about their research observations, interviews, and what may be considered "important and interesting influenced by the setting, the researcher's professional and personal worldview" in field notes (Mulhall, 2003, p. 310). In view of this perspective, field notes were used to capture my reflections as well as the people, daily process of activities, practice, routines, and special events that occurred in the setting. My *observer as participant* role facilitated this exercise smoothly such that many times, I wrote the accounts of the day during and immediately after the day's event. Most importantly, as Mulhall (2003) suggested, documenting events as they occur or shortly after helps prevent the loss of details and the entire memory of the event. In a related manner, I often recorded the actions in a notebook as the event occurred in the setting; however, I avoided sensitive actions that I knew participants may not want to be recorded such as when players have to attend to chronic medical problems associated with their impairment. I used a combination of bullet points and short phrases as a means to capture both my reflections and those of the players, and I expanded them at a later time, often the next day in the research office. To achieve more focused fieldwork, where necessary, I conducted some analysis while expanding short phrases into full data as recommended by Mulhall (2003).

Using the field notes as a process of data collection activity helps generate a robust understanding of the participant's lives, contextualizing their activities to the phenomenon of interest (cf. Creswell, 2009; Creswell & Creswell, 2018). While reflecting on this perspective and the inductive nature of the study, I followed a certain deductive structure of taking notes driven by a reflection of the theoretical framework (embodiment) coupled with the epistemological belief of the study. In so doing, I often collected much of the information without prompting them to retain the naturality of the individual actions and lived experiences within the setting. Many times, while taking notes, I will capture the time, the

place, the participants, and the actions within the space, even at times the atmosphere (Phillippi & Lauderdale, 2018) and emotions (see Smith & Caddick, 2012). In a typical training session, I took the opportunity to make some notes during water breaks, timeouts, and quarter breaks, which appeared to not disrupt the players, although on many occasions they were busy with their training sheets. In doing this, however, I was mindful that spending too much time on writing notes might hinder the deeper, intuitive understanding that comes from truly being part of an ethnographic setting (Mulhall, 2003) which can pose a challenge to finding the balance between observing and taking notes. In this context, I aligned myself with Mulhall (2003, p311) who argued that to navigate this challenge, it is more practical to "go with the flow' and become saturated in the experience".

Besides the notes, I kept a reflexive diary. The diary was made up of my thoughts about entering the field and being there, as well as reflections on my own life experiences that could shape how I interpret what I observe. In order not to take myself out of the work, as a general practice, I used the first person to write reflective diaries and notes and had the reflexive diary beside the field notes. This way, I could easily tie in my reflective comments and phrases with the notes in a productive way, where I could make sense of the data during analysis and organise them into themes (Smith & Caddick, 2012). Through this, it was easier for me to keep track, refresh my memory, sustain my familiarity, and revisit my emotional and subjective experiences of the data anytime I went back to it. While conducting this robust approach and using similar ethnographic sports studies interested in embodied way of living as a guide (Powis, 2020; Sparkes et al., 2018, 2021), I ended up writing fieldnotes about descriptions that captured what I saw, heard, and, ideally, also about what I smelled, touched, and experienced (Ellingson, 2017) as well as conversational notes focused on things that were said in the setting. The field notes were not only vital in understanding how the ATs enabled players in their sport setting, but they also provided me with an additional lens to reduce the risk of biases that may have arisen from my interviews by adding critical non-verbal content to the interpretations (Phillippi & Lauderdale, 2018).

Semi-Structured Interview Study

Building on the ethnographic study I wanted to expand on how assistive technology (re)shapes the impaired bodily experience of disabled people within the disability sport environment. I conducted interviews with other disabled athletes across multiple sports to

answer the second sub-research question (ii). Interviews have proven to be the dominant qualitative approach to collecting information in social sciences and sports (Jones, 2022; Smith & Caddick, 2012) as well as embodiment-related studies (Masoodi, 2017; Smith & Osborn, 2003) that examine people's lived body experiences. A semi-structured interview is an excellent tool for conducting embodied research because an intense sensory interaction occurs between the interviewer and the interviewee (Ellingson, 2017). Specifically, I used semi-structured interviews to explore how individual players' bodies were reconstructed by different assistive technologies within the disability sport environment. In this context, I carried out semi-structured interviews underpinned by Ellingson's (2017) idea of having an 'embodied chat', a way to collectively create knowledge about the world with the players as they engage with each other about using their assistive devices for sport. Generally, I paid attention to bodily, verbal, and non-verbal communication to make sense in interpreting the meanings the participant gave to their assistive technologies while participating in their respective sport, such as wheelchair rugby, wheelchair basketball, skiing, cycling, boccia and rowing.

In this study, I interviewed twelve athletes: three females and nine males. While conducting the interviews, I embraced the following characteristics from the perspective of a researcher interested in the embodied meanings of using assistive technology: First, I designed the interview guide bearing in mind existing literature on disability, sport, and assistive technology. The literature shaped the direction of the interviews. I used the interview schedules as a guide but not to dictate my conversations (Smith & Osborn, 2003, 2008), instead, it allowed me to engage in the conversation as a follow-up to participants' responses. It also allowed for initial questions to be modified based on the athletes' responses and my willingness to 'dig deeper' into participants' stories that were of interest (Faulkner, 2011; Smith & Osborn, 2003) when it came to how they constructed and viewed their bodily experiences of assistive technology. Secondly, I designed the questions in a way that elicited embodiment. Ellingson (2017) suggested that to do this, it is necessary to plan questions that not only ask what participants see and hear but also about the feel, touch, and perceptions of movement and space. Therefore, in this context, open-ended questions were used not only to draw 'thick' and rich narratives (Smith & Caddick, 2012, my emphasis) from the participants but also to allow the participants to be in charge of the conversation and tell their stories of

using AT as it is. This way, I was able to respond to the participant's stories in a way that asked about their experiences of how their bodies felt and their emotions while using their assistive device.

Thirdly, Ellingson (2017) makes the point that in embodied interviewing, the interviewer needs to be embodied in some of the moments and commonalities shared with the participant. Given this, I conducted all the interviews face-to-face physically, except for one athlete who spoke through a caregiver. Indeed, having had some experience in the wheelchair rugby setting, I was able to reflect on myself by asking questions sequenced in sections relating to participants' use of assistive technology, the process of learning to use assistive technology and the sensory aspects of using their assistive technology in sport. For example, I asked participants, 'Describe your first-time experience of using your sport AT' and 'How does your AT help you to participate and play your sport'? To ensure that these and other related questions were answered well and within the central theme of the research, it was important to allow participants to take their time and ponder questions before responding (Frith & Gleeson, 2011; Smith & Caddick, 2012). I noticed that the conversations often aroused an automatic process of reflection (Frith & Gleeson, 2011; Willig & Billin, 2012) of my own lived experience of disability, before this thesis and those experienced during the ethnographic study. So I kept reflexive notes to capture "not only what I heard but also the sensations felt throughout my body in moments of connection and mutual understanding with the participants" (Ellingson, 2017, p. 117).

Fourthly, I viewed the interview location as "a place where social relations, identities and meaning can unfold in multiple ways" (Gagnon et al., 2015, p. 204). As such, I ensured the location was accessible, relaxed, quiet and convenient for the participants to share their real-life stories. Moreover, for this study, the choice of place for the interview mattered for the participants, especially as Ellingson (2017) suggested that the interview setting is entangled with meanings that can be co-constructed through the interactions between the interviewer and the interviewee. Given this, I adopted flexibility while allowing the participants to choose places that reflected their everyday life experience of AT. The places ranged from gyms, sports facilities, and public cafes to their homes. All the interviews were tape-recorded and lasted between 45 minutes and 1 hour.

Photo Elicitation Study

To provide a further understanding of how assistive technologies impact the self-representations of disabled athletes, I used photo-elicitation to answer the third sub-research question (iii). Despite the rise of visual methods in social science and health research (Guillemin & Drew, 2010), few or no qualitative research has used visual data and research materials (Emmison, 2016; Pink, 2011) in disability, assistive technology and sport research. Photo elicitation is a research method that utilizes photos in combination with interviews to illuminate essential aspects of lived experience that are often missed by researchers (Drew & Guillemin, 2014; Pope, 2010; Pyyry et al., 2021). According to Harper (2002) and Pink (2011), photos can represent and illuminate the subjectivities of one's embodied experience. In other words, I used the photos as a process to enliven participants' accounts and help illustrate the material elements of their respective lives (Ellingson, 2017) as they used their AT. Specifically, as part of this research, the photos were used to draw attention to participants' embodied and emplaced experiences through visual representation of bodies (particularly their own bodies) (Azzarito, 2010; Busso, 2011) as they interacted with their sport-assistive technologies.

There are two types of photo elicitation: namely researcher-generated and participant-generated photo elicitation. To be able to deeply explore the embodied representations of participants' participation in sports, I conducted participant-generated photo-led interviews. Participant-generated photo elicitation is central for researchers who wish to emphasize the participant's role in shaping the creation (Guillemin & Drew, 2010) and interpretation of embodied images. I asked the individual participants to bring their own photos to the interview, either old photos or new ones purposely taken for the interview. Additionally, I asked individual participants to produce three photos that reflected how their specialized ATs impacted their culture and self-representation when participating in sport. For example, in simple terms, I asked the participants the following questions: 'Describe why they chose the photos', 'What does the photo represent for them using ATs for sport'? And 'Can you tell me what is significant for you here'? These questions allowed participants to be experts on their experience with AT void any imposition act from the researcher (Emmison, 2016; Pyyry et al., 2021) especially as they ascribe meanings to how life is lived through

images rather than texts, meanings to emotional connections. This helped them to bring their present or historical experiences to life (Drew & Guillemin, 2014).

In terms of generating rich data, I used the photos to give power to the participants to "'show' rather than just 'tell' things about their lives" (Smith & Caddick, 2012, p. 67) when using AT. Pink (2011) proposed that when participants engage in photo interviews, it allows them to be more expressive and reduces the power imbalance between the researcher and the participant. Thus, the photos enabled me to interact with participants while moving into their everyday individual lives in a non-formal way. In light of this, many of the conversations with the participants generated rich detailed data related to living through and navigating specific embodied events of using ATs.

In line with the objectives of this study, I also used photos to probe into the human senses that are difficult to notice (Harper, 2002; Pyyry et al., 2021). In doing this, the aim was not only to use the photos to elicit the not-so-common experiences but to make the interview process more participatory by being conscious of the realities discussed by participants and the meanings given to the photos (Drew & Guillemin, 2014; Guillemin & Drew, 2010; Harper, 2002; Pyyry et al., 2021). In this context, the participants and I interacted about self-representations and affections of their ATs, through their photos, which were otherwise difficult for disabled people to communicate and describe, giving them an additional voice in the interview process. In summary, given that photo-elicitation was an expansion of the semi-structured interview, each interview lasted between 20 and 30 minutes at the participant's choice of time and location. Out of the eight (8) participants photo-interviewed, six were done face-to-face and two were done online due to COVID restrictions. This did not impact the pragmatic nature of the method, where participants could speak to their experiences in the photo from any location or via any medium.

Participants

As Creswell (2009) noted, when selecting participants, researchers must focus on people who can explain, describe, and illustrate the topic being explored. In this research, the primary aim was to select participants from a population of disabled people who experienced or had experience using AT for sport. In adhering to embodiment tradition – and in the context of this research – the aim was to access participants who could describe the essence of different

embodied experiences from a sporting perspective. Upon ethical approval from the University of Waikato Human Research Ethics Committee, I commenced the recruitment process.

In total, twelve (12) people (participants) took part in this research (see Table 1 for the breakdown of participants). Access to the participants was acquired in multiple ways. I used contacts within my supervisor's network to build up a snowball sample of accessing participants. First, through my supervisor's network, I contacted the New Zealand Artificial Limbs Service [3] (NZALS) about the possibility of recruiting participants through their organisation. Although NZALS is not a disability sport organisation, I contacted them knowing that some of their clients used assistive technology for sport. Upon agreement to support the recruitment, I drafted and submitted a piece of research information to my lead contact for posting on their notice boards and sharing with their clients. Two participants were accessed through this network. After contacting the NZALS, I contacted Paralympics New Zealand (PNZ) to assist with participant recruitment who then connected me to Parafed Waikato who subsequently assisted with the recruitment process. Accordingly, Parafed Waikato connected me to a similar regional disability sport organisation namely Parafed Auckland (now known as Disability Sport Auckland) and Parafed Bay of Plenty. I identified one person in each organization who acted as a 'research contact' to help disseminate the research information. Persons who showed interest were recruited to participate. I gave them a research information sheet and informed consent form addressed to them to complete and return to me either by post or email.

Through this snowball sampling, the other ten (10) participants were recruited from two sample organizations: the Parafed Waikato[4] and the Parafed Bay of Plenty[5]. These are regional disability sport organizations, which promote and develop sport, play and active recreational activities for people with physical and visual impairments. It is argued that researchers must set key specific sampling characteristics to select participants to conduct an effective purposeful sample technique (Jones, 2022). As Neubauer et al. (2019) mentioned,

[3] New Zealand Artificial Limbs Centre also knowns as Peke Waihanga is a specialist healthcare provider that manufactures high technology medical devices, mainly prosthetics and orthotics, for individual patients with an integrated rehabilitation, coordination of care, and peer support service. It is overseen by the Ministry of Social Development.

[4] Parafed Waikato is an incorporated organisation that promotes sports and active recreation for physically disabled and people with visual impairment in the Waikato Region, New Zealand.

[5] Parafed Bay of Plenty is a not-for-profit organisation that enables sport, recreation and play opportunities for physically disabled people in the Bay of Plenty Region, New Zealand.

exploring embodied experience requires the researched population to have a great deal of understanding and lived experience of the subject matter. Given this, two participant characteristics were set for this research. First, participants must possess some form of physical impairment with experience of using AT for sport. Secondly, participants must have had a range of experiences from training to competing in regional, national, and representing New Zealand at international competitions.

The use of network and snowball sampling techniques can provide some advantages to the researcher. One advantage was that it provided me with the opportunity to recruit a diverse group of physically disabled people with the experience to provide rich "information cases" (Smith & Caddick, 2012, p. 61) about impaired bodily experiences of using technology for sport. As Creswell and Creswell (2018) suggested, qualitative researchers must avoid rigidity and demonstrate flexibility throughout the participant recruitment process. This was reflected in the different forms of physical impairment experienced by the participants. The participants' impairments ranged from severe spinal cord injuries, cerebral palsy, and lower limb amputations to spastic paraparesis. Out of the twelve (12) participants recruited, nine (9) are males and three (3) are females. All participants were over 18 years old. To recap, out of this total of twelve (12) participants, six (6) participated in the ethnography study, all twelve (12) participated in the semi-structured interview study and eight (8) participated in the photo-elicitation study. The difference in participant numbers for each study was not deliberate or part of the research design. Taken together, this sample was useful because the sample of participants did not change significantly due to the nature of the research. Although relatively small, with twelve participants, it is considered ideal for research using thematic analysis (the chosen method of data analysis) (Braun et al., 2016; Maguire & Delahunt, 2017).

Owing to the constraints of the research and the dynamic nature of conducting an ethnographic study, it was easy to study the six players as they play wheelchair rugby in the same region where I lived at the time of undertaking the research. It is important to state that other non-disabled participants were featured in the ethnographic study but were not the focus. However, I managed to engage all the participants in the semi-structured interview because I drove to their locations. It was easier this way, as it was often a challenge for some of them to move out of their home without a support worker. In contrast, only eight participants took part in the photo-elicitation study, as not all the participants felt confident

about adding their photos. Some were just too shy, while others did not want their photos to be included in the research. This was understandable due to the close-knit nature of the disability sport environment in Aotearoa, New Zealand. I pseudonymised the names of the participants for this research to prevent any issues of anonymity and identity. Table 1 below shows a breakdown of the participants.

Table 1 Breakdown of Participants

Participants (Pseudonyms)	Gender	AT Type	Level	Sport	Ethnographic Study	Semi-structured Interviews Study	Photo-Elicitation Study
Mark is a 39-year-old former Paralympian who doubles as the trainer of the Wheelchair Rugby Club. He acquired spinal cord damage after a motocross accident that broke his neck. He is classified as C6-C7. In wheelchair rugby, Mark is a low pointer, classified as 1.5.	Male	Wheelchair	Elite	Wheelchair Rugby	Participated	Participated	Participated
Oliver is a 26-year-old man. Oliver suffered a neck injury after diving into a pool. His impairment classification is C6-C7. In wheelchair rugby, he is a low pointer, classified as 1.0.	Male	Wheelchair	Amateur	Wheelchair Rugby	Participated	Participated	Participated
Giles is a 39-year-old Paralympian. He acquired a spinal cord injury after a bad tackle in rugby. He is classified as C6-C7.	Male	Wheelchair	Elite	Wheelchair Rugby	Participated	Participated	Participated

In wheelchair rugby, Giles is a high pointer, classified as 2.0.							
Clara is a 19-year-old. She played hockey and rugby before she suffered a medical condition known as spastic paraparesis, and now plays wheelchair rugby. She is 'socially'[6] classified as a high pointer of 4.0 in wheelchair rugby.	Female	Forearm Crutches/ Wheelchair	Beginner	Wheelchair Rugby	Participated	Participated	Did not participate
Maya is a 49-year-old swimmer. She is classified as either S2 or S3. She also plays wheelchair rugby as a low pointer, classified as 1.5.	Female	Wheelchair	Elite	Wheelchair Rugby, Swimming	Participated	Participated	Did not participate
Ben is a 24-year-old former Paralympian with mild cerebral palsy in his legs. He plays wheelchair rugby. He is 'socially 'classified as a high pointer of 4.0 because he has full function of his upper body.	Male	Wheelchair (only for rugby)	Elite	Athletics (Track), Wheelchair Rugby	Participated	Participated	Participated
Leo is a 24-year-old quadriplegic with a C5 spinal cord injury acquired after falling off a tree. He plays wheelchair	Male	Wheelchair	Beginner	Wheelchair Rugby	Did not participate	Participated	Participated

[6] 'Socially' classified means not officially classified but a classification grading that allow all with different abilities to play.

rugby. He plays as a low pointer, classified as 0.5.							
Lindsey is a 58-year-old one-leg amputee. She suffered amputations after multiple accidents in her leg. She is a retired ski athlete and has taken on Wheelchair Basketball.	Female	Transtibial Ski Prosthetics	Retired Elite	Alpine Skiing/ Wheelchair Basketball	Did not participate	Participated	Did not participate
Peter is a 21-year-old with severe cerebral palsy from birth complications. He plays Boccia and is classified BC3.	Male	Electric Wheelchair	Elite	Boccia	Did not participate	Participated	Participated
Noah is a 75-year-old one-leg amputee. He suffered an ankle sprain which led to an aneurysm in one foot. He has been a rower and continues with rowing after amputation.	Male	Transtibial Rowing Prosthetics	Retired Elite	Para-Rowing	Did not participate	Participated	Did not participate
King is a 71-year-old double-leg amputee. His was amputated due to a medical problem that led to an infection. He engaged in long-distance running before switching to cycling after impairment.	Male	Transtibial Cycling Prosthetics	Retired Elite	Para-Cycling Road	Did not participate	Participated	Participated

Craig is a 35-year-old one-leg amputee. He was born with a tumour in his spinal canal leading to the loss of his leg. He started with Wheelchair Rugby but ended up with Wheelchair Basketball and graded 3.0.	Male	Wheelchair	Elite	Wheelchair Basketball	Did not participate	Participated	Participated
Jon is non-disabled and a mechanic for the wheelchair rugby club. He has been with the club for about 20 years.	Male	Non-disabled	Mechanic	Wheelchair Rugby	Participated	Did not participate	Did not participate
Sofia is non-disabled and volunteers as an official for the wheelchair rugby club.	Female	Non-disabled	Volunteer Referee	Wheelchair Rugby	Participated	Did not participate	Did not participate

Analysis

Reflexive Thematic Analysis

To analyse the participant's experiences of their sport and assistive technology across the three methods (studies), I conducted a thematic analysis (TA). Thematic analysis has been commonly used in disability and disability sport studies such as (Aitchison et al., 2022; Asare et al., 2023; Haslett et al., 2017; Powis, 2020; Sparkes et al., 2018; Swartz et al., 2018). According to Braun and Clarke (2006), thematic analysis is the process of constructing patterns or themes within a qualitative dataset. It illuminates important patterns of meaning in the data and is essential for understanding experiences (Maguire & Delahunt, 2017). Although, thematic analysis is commonly used in qualitative sport and exercise research (Braun & Clarke, 2019), according to Trainor and Bundon (2021) there is no single approach to thematic analysis. Instead, Braun and Clarke (2020a) identified three categories of thematic analysis, which include the coding reliability approach, the reflexive approach and the codebook approach. Each offers a unique analytic procedure that can be applied across a range of theoretical frameworks, research paradigms, and multiple data collection methods (Braun & Clarke, 2020a; Clarke & Braun, 2017).

Therefore, in line with the paradigmatic and epistemological position of this research, I followed the reflexive approach as it acknowledges ''the active role of the researcher" as essential in creating knowledge (Clarke & Braun, 2017, p. 297). It is also considered a flexible method rather than a methodology (Braun & Clarke, 2006; Clarke & Braun, 2017). This means, unlike other qualitative methodologies reflexive thematic analysis is not tied to a particular epistemological or theoretical assumption (Maguire & Delahunt, 2017). This makes it a flexible method "to identify patterns within and across data in relation to participants' lived experience, views and perspectives, and behaviour and practices; 'experiential' research which seeks to understand what participants' think, feel, and do" (Clarke & Braun, 2017, p. 297) when using AT for sport.

Reflexive thematic analysis can be used for both inductive (data-driven) and deductive (theory-driven) analyses and to capture both manifest (explicit) and latent (underlying) meanings (Braun & Clarke, 2020a; Clarke & Braun, 2017). The deductive approach is theoretically driven and focuses more on the semantic and detailed analysis aspects of the data (Braun & Clarke, 2006, 2013). From a reflexive thematic analysis approach, deductive

means that existing research and theory provide the lens through which we analyse and interpret data. Moreover, in an inductive approach, the themes are linked to the data. In other words, the researcher creates a "rich, thick description" by staying "close to the data" (Jackson & Mazzei, 2017, p. 729). Inductive approaches are particularly useful when exploring new terrain, and in this study, there is much new terrain to explore relating to disabled people embodying assistive technology in sport. In practice, most reflexive thematic analyses include both deductive and inductive elements of the data as well as semantic and latent meanings (Braun & Clarke, 2006, 2019, 2020b, 2020a). For this reason, throughout this research, while deductively, embodiment was used as a lens to interpret the data, inductively, I approached the analysis and theme development in a 'data-driven', 'bottom-up' manner to construct latent meanings about the individual players embodied and lived experiences about accessing and negotiating the use of assistive technology.

Analysing the Data

A reflexive thematic analysis of the data as described by Braun and Clarke (2020b) and Trainor and Bundon (2021) was chosen as the appropriate approach to addressing the research objectives, while coherently linking together the studies and other parts of the research. According to Trainor and Bundon (2021), to conduct this approach "requires a reflexive practitioner" (p. 2). In other words, conducting high-quality reflexive thematic analysis is not about completing a series of steps but rather about the "researcher's reflective and thoughtful engagement with their data and their reflexive and thoughtful engagement with the analytic process" (Braun & Clarke, 2019, p.594). In doing this, I used Braun and Clarke's (2020b) six-step analytic process which includes becoming familiar with the data, identifying initial codes, searching for themes, reviewing the themes, naming the themes, and writing scholarly reports on the analysis.

According to Braun and Clarke (2006), the process of thematic analysis is not linear; instead, it requires the researcher to move back and forth between stages. To produce comprehensive, actual, reliable embodied accounts, I reflected on the research questions and my interpretivist position. I then began to transcribe the interviews using the Otter transcription software as a strategy to familiarise myself with the data (Braun et al., 2016; Braun & Clarke, 2020b). Initially, I used the free version to transcribe one interview to see how it would turn out. Although it was transcribed verbatim, it transcribed only 30 minutes

of the interview. This required that I upgrade to unlimited transcription time. In the end, I transcribed 20 interviews, each lasting around 60 minutes on average, totalling approximately 1,200 minutes of interviews. Afterwards, I read through each transcript, fixing misspellings while correcting grammar and any phrase that could change the context of the conversation. I then began to actively read and reread the transcripts of each participant more than once; this is a major process for being conversant with the data (Braun & Clarke, 2020b). This process was useful as it provided me with the opportunity to generate preliminary ideas for coding. At this point, I started to make sense of what the participants had said in the data while keeping reflective notes that I knew would be useful to come back to at some point as part of the analysis.

This opened the opportunity for the next phase of the analysis to generate initial codes from the data. Codes provide the building blocks of analysis (Braun & Clarke, 2013, 2020b), and the foundation for theme development (Braun, Clarke & Weate, 2016). In this research, due to the rich data at my disposal, I performed both manual (word document) and software (Nvivo) coding. In both the manual and Nvivo coding, I conducted *open coding*, thus coding without any pre-defined code. In doing this, I used different colours while making notes or phrases on the data of the participant's response. I repeated this process, systematically coding each transcript one after the other while ensuring I reflected on the notes kept during the initial reading stage, containing speculations, potential underpinning meanings, commonalities between interviews, questions I had, or things for me to look into (Braun & Clarke, 2020b). This helped to provide more context for the coding process. In doing this, I adhered to the proposal of Braun and Clarke (2020a) to code naturally, which means to code without limiting myself to any number of codes, while going back and forth between the interview transcripts for about three rounds. Guided by Braun and Clarke's (2013) suggestion that "'good' codes capture the essence of what it is about that bit of data that interests you, . . .

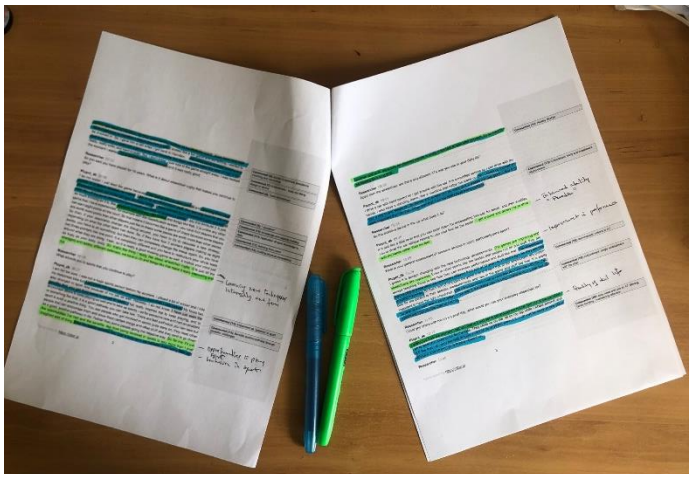

Figure 1 Extracts from the initial coding.

and informative enough to capture what was in the data, and your analytic take on it" (p. 210), I noticed I had come to a natural conclusion, and began to prune it down more focused about my research questions. This started to draw my awareness to start generating my overarching themes.

In the third stage of the analysis, I began to generate themes. In this instance, the initial construction of themes was iterative, involving a primary data-driven (inductive) approach with theory-driven reasoning (deductive) to group semantic patterns of data with latent meanings derived through engagement with the theory of embodiment. Most importantly, I constantly reflected on Braun and Clarke's (2019, 2020b) advice that themes do not emerge from the data; instead, analysis is an iterative process where themes are generated or developed. This allowed me to conduct a stage of analysis by reviewing and grouping the codes under brief descriptions (initial themes) with the guidance of addressing the research objectives. For example, in the ethnographic study, I placed codes such as 'friends', 'community relationship', 'meeting new people', 'having other people support', 'sharing ideas with people' and 'social camaraderie' under an initial theme of "enhancing social relationships". In the semi-structured interview study, I placed codes such as 'knowing the chair,' 'body adjustments,' 'frustrated,' 'feel like bloody transformer' and 'no body control' under the initial theme of "becoming one with assistive technology." In the photo elicitations study, I placed codes such as 'represents achievement,' 'determination,' 'success,' 'achieving goals,' 'independence' and 'new goal in life' under the initial theme of "sense of achievement". These initial themes provided an anchor to move into the fourth stage of the analysis.

In the fourth stage, I moved on to reviewing and refining themes. The aim was to make sense of the initial themes in the sequence in which they emerged. I applied a rigorous analytical approach by finding connections between the preliminary themes, which often ended up as a cluster of themes. While refining themes, I also kept in mind that each of them needed "to have a centralising concept, what the relationship and boundaries were between themes, and themes should tell a coherent story that reflects my data set and answered my research questions" (Trainor and Bundon, 2021, p.790). Reflecting on this, I was mindful that at this stage of the analysis, initial themes may either overlap, collapse, or merge to form one theme (Braun & Clarke, 2006, 2013; Harper & Thompson, 2011). This was carefully done as I

constantly revisited the original data to ensure that these connections captured the actual responses of the participants.

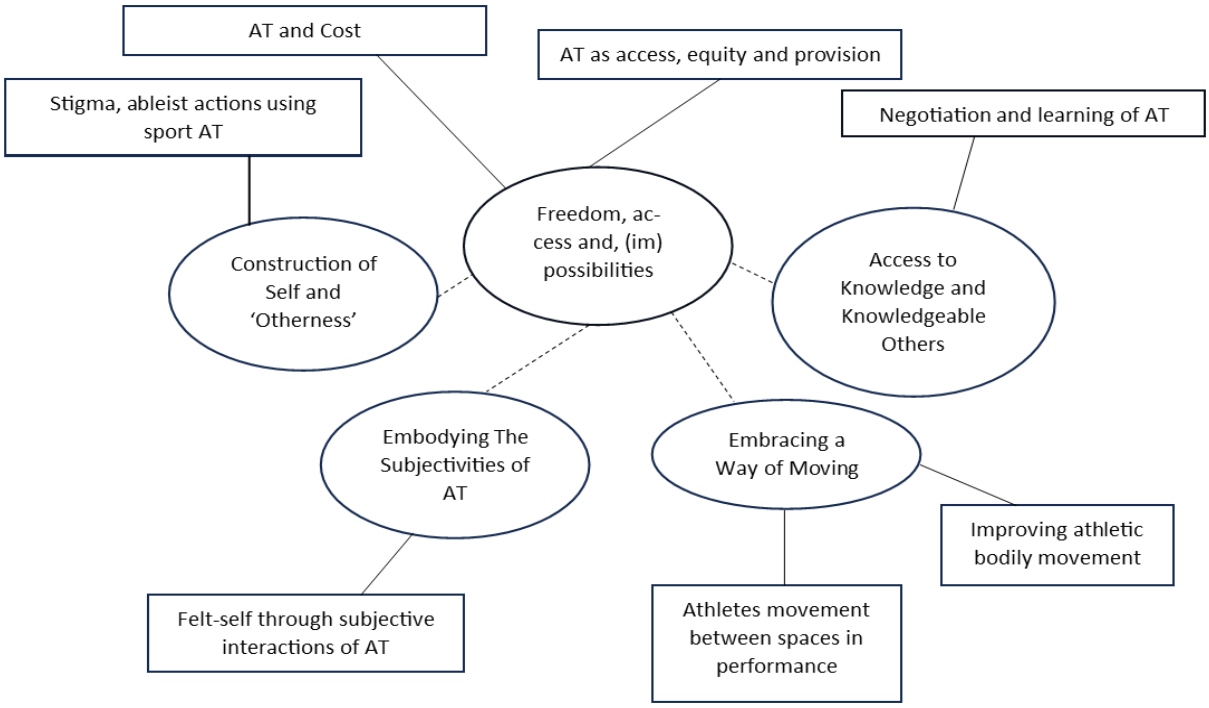

Figure 2 Example of finalised themes showing initial themes and connections (Semi-structured study).

In the fifth stage, I began to define and name the themes. Specifically, the cluster of themes that produced connections between the initial themes was given names to produce overarching themes to address the research objectives. This process was not an easy task for me to achieve as Braun and Clarke (2006, p. 93) suggested that the name given to each theme, "needs to be concise, punchy, and immediately give the reader a sense of what the theme is about". Reflecting on my notes and research objectives, and having embedded myself in the analysis for more than 150 days, for example, I generated the following key themes: 'the chair is the game', 'wheels of inclusion', 'enhancing social relationships', and 'familyhood' in the ethnographic study, 'freedom, access and, (im)possibilities', 'construction of self and 'otherness' and 'access to knowledgeable others', 'embracing a way of moving' and 'embodying the subjectivities of AT' in the semi-structured interview study and, 'sense of achievement', 'sense of self-validation' and 'performance and competition' in the photo elicitation study. Most importantly, these final themes were created bearing in mind Braun and Clarke's (2019) suggestion that it should facilitate an illustrative report that goes beyond description, but is written in a way that provides a theoretically informed argument in the existing literature. It is hoped that together these key themes will be useful in telling a holistic

story that reflects the neglected embodied experiences of disabled athletes' use of assistive technology. As the last stage of the process, which is writing out, I have discussed these themes in chapters five, six and seven in the hope of representing a coherent lucid narrative of the disabled athlete's experience of using ATs for sport.

Ethical Considerations and Consent

During this research, I remained mindful of the ethical considerations in the research process. As noted by Tracy (2010), any research that interacts with people and their environment needs to pay attention while addressing ethical issues that may arise out of such interactions. In this study, I was careful to consider possible ethical problems related to how the researcher enters the research environment and the potential influence they might have on the members. As already mentioned in this chapter, as part of procedural ethics, I obtained ethical approval from the University of Waikato's Human Research Ethics Committee (HREC), on September 18, 2020 (see Appendix 1). This was the first step in following the right procedure for ethical consideration before commencing the data collection for all three studies (i.e., ethnography, semi-structured interview, and photo elicitation). The ethical approval from the HREC facilitated the subsequent phase, which strengthened the ethical considerations in this research.

I distributed a research information sheet to invite the participants and provided consent forms for them to complete (see appendices 2 and 4). In line with the idea that informed consent is achieved when researchers make the objective, aims, purpose, consequences of the research, and conflicts of interest very clear to prospective research participants (Thompson & Chamber, 2012), I ensured that the participant information sheet captured key information about the research. This included who the researcher is, research significance, benefits of being a participant, participant's role, and assurance of anonymity and confidentiality. The consent outlined what the participants would provide and what I would do as a researcher with their data, and I sought permission from them. Participants across the three studies were requested to indicate their interest in participating and return the signed consent forms in two weeks. However, their participation was voluntary, and they could withdraw at any time without giving any reason. The consent also gave them the right to withdraw their data four weeks after data collection. However, after the four weeks they were made to understand, they were unable to withdraw the data. Most importantly, as

already illustrated in the chapter, specifically within the ethnographic study, access was gained through Mark. From an ethical perspective, Mark's role as the gatekeeper in the setting was vital, as he always introduced and explained my motive and role as a researcher to all club members (old and new). This gave me access to training and activities and helped to 'break the ice' between me and the players to arrange interviews.

From a relational ethics perspective, an ethical concern associated with social inquiry is the potential for the data collection process to disrupt transparency between the researcher and the participants (Tracy, 2010). For example, to minimise this, in the field observation, I informed the participants that some of the actions would be video recorded. The same principle was also applied in the interviews, the participants were informed the interviews would be tape-recorded. However, they could stop the recording at any time. This was important because as stated by Smith and Caddick (2012) qualitative research can open new risks to both researchers and participants. As a non-disabled person researching disabled people, I took into account the outcomes of both field observations and interviews, which can have potential benefits or harm to the participants (Kitchin, 2000). Taking this into consideration, I discussed with the participants at the beginning of the observation and interview - they could request a stop or reschedule if they became uncomfortable about certain incidents, or unsafe practices (i.e., during field observations) or felt emotional, traumatized, or any pain as a result of their impairment (i.e., during semi-structured interviews and photo elicitations).

Another important ethical consideration was that, through the research process, both electronic and raw data were kept on a secured laptop that was password protected. Transcripts were kept in a secure file under a locked cabinet that was accessible only to me. Throughout the research process, only supervisors had access to the data. The raw data and the printed transcripts were labelled with codes so that they were not easy to identify. As part of procedural ethics, it is expected that the data will be kept for five years under the supervision of the University of Waikato before being destroyed to prevent any ethical issues.

Meanwhile, reflecting on the day-to-day ethical issues in the research process, I considered what damage I may cause in the field, for participants and the club, through my actions and representations. In this research, I paid attention to the careful representation of the identity, profile, and personal information and data provided by the participants

throughout the research process. For example, in the club setting, I was mindful of the integrity of the club and each player to reduce the potential harm that may arise through their responses and the information they shared with me. As I have already highlighted in this chapter, I used pseudonyms to anonymize the participants in the thesis and related publications. However, due to the detailed descriptions and ample references to specific contexts, it is difficult to achieve full anonymity (Creswell, 2009; Creswell & Creswell, 2018; Jones, 2022; Smith & Caddick, 2012) as the members can easily recognize each other. Where photos were used, consent was sought, however with the understanding of all the participants that anonymity could not be entirely guaranteed.

From a reflexive viewpoint, as a nondisabled researcher seeking to interpret the embodied experience of disabled people, it is necessary to recognize the researchers' standpoint, power, and the politics between the participants and the researcher to prevent any ethical issues. According to Barton (2001), disability politics as it relates to disability research has neglected to tackle internal and external forms of oppression, identify, understand, and overcome disabling barriers, and seek individual and collective empowerment of disabled people. Many disability scholars disabled people want to be more involved in disability research (Kitchin, 2000; Lester & Nusbaum, 2018; Oliver, 1992; Wickenden & Kembhavi-Tam, 2014). In affirmation, Kitchin (2000) argued, that future disability research must be inclusive – a time to display an equal-based, democratic, partnership research between disabled people and non-disabled. About this research, an important goal was to address such ethical concerns that disabled people are often excluded from assistive technology research (Ripat & Woodgate, 2011). Therefore, their voices were centralised in this thesis.

As Oliver (1992) argued, "disabled people have come to see research as a violation of their experience, as irrelevant to their needs and as failing to improve their material circumstances and quality of life"(p. 105). Therefore, one important ethical consideration of this research resides in Sparkes, Brighton and Inckle's (2021) assertion that disability research should avoid ethical issues such as exploitation and inequality and ensure that outcomes directly improve the lives of disabled people. To achieve this, I always circled back to my research objectives, constantly reminding myself that I was not the one being investigated

but the research was primarily about an opportunity to improve the athlete's participation in sport and the disabled community as a whole.

Rigour and Reflexivity

According to Cypress (2017), issues persist even now in the 21st century concerned with achieving rigour in qualitative research, this includes the many general studies within the field of sport and exercise (see Smith & McGannon, 2018). In search of what makes research rigorous, many explanations have been offered in qualitative research with different meanings for different people. For example, while Tracy (2010) suggests rigour "increases the odds for high quality" research (p.841), Smith and McGannon (2018) described the notion of rigour as a "marker of excellence sought through the method" (p.103) which can improve the quality of qualitative research. Tracy (2010) identified eight key markers to judge the qualitative quality of research, which can be achieved through a variety of skills, preferences, reflections of the researcher, and the goals of the study. The researcher must ensure the topic is 'worthy' to be explored and demonstrate 'rich rigour' with 'sincerity' marked by 'credibility' and 'resonance' so that the research influences and affects readers. In addition, the research must endeavour to make a 'significant contribution' to knowledge guided by 'ethical' considerations, making the research a 'meaningful coherent' study to achieve its purpose while it interconnects with appropriate methods, literature, and findings. While I aligned with these markers as a way of demonstrating rigour in this research, however, I am mindful of Smith and McGannon's (2018) assertion that without focus on methods, these key markers offer a reductive view, "methods when properly applied, are said to provide rigour" (p.103). In the context of this thesis, methods were utilised in an interpretive way, which according to Smith and McGannon (2018) can provide a means to reject the notion that "reliability is an appropriate criterion for judging the rigour of qualitative research" (p.112).

Indeed, Krefting (1991) maintained that the way a researcher thinks, collects, analyses, and reports data can ensure rigour and trustworthiness in qualitative research. Establishing trustworthiness in qualitative research is not straightforward. The researcher has to convince the reader that the study results are significant (Creswell & Creswell, 2018; Creswell & Poth, 2018; Krefting, 1991; Lincoln & Guba, 1986). Trustworthiness, as described by Guba and Lincoln (1986) is a demonstration that the researcher has established truth in the findings, whether the findings can be applied in other contexts, if the findings would be

consistent in similar inquiries with the same group, that the researcher has paid attention to their own reflections and those of the participants. Given the epistemological position of this research, this research also recognized reflexivity as a valuable method for enhancing trustworthiness and promoted techniques such as audit trails, peer debriefing, member reflections, crystallization, and reflexivity. While reflexivity can be described as "an introspective process by which the researcher becomes aware of and more 'transparent' when presenting their subjective influence on the research process" (Darawsheh, 2014, p. 562), this research recognised reflexivity can enhance the establishment of rigour.

In this case, as I reflexively drew on my own experiences as a nondisabled researcher training and competing with some of the athletes, I consciously maintained and captured the stories and meanings of the participants. This culminated in the thick, rich descriptions of the settings, and participants' experiences as well as mine, which I have reported across chapters five, six and seven. This is in line with Smith and Caddick (2012) who posited that, in qualitative research, the research aims to provide rich, thick descriptions of the phenomenon understudied so that "the readers themselves can reflect upon it and make connections or naturalistic generalizations to their situations" (p. 69). In qualitative inquiry, naturalistic generalizations mean the results are not intended for statistical generalizations but for generalizations that resonate, arouse, and stimulate the curiosity of readers (Smith & Caddick, 2012).

One important characteristic of reflexivity employed as a way of establishing rigour in qualitative inquiry is peer debriefing. According to Krefting (1991), peer debriefing is based on the "same principle as member checks but involves the researcher's discussing the research process and findings with impartial colleagues who have experience with qualitative methods" (p.219). This approach minimizes distortions and biases that may occur due to the researcher's prolonged and sustained engagement with the participants (Cypress, 2017). For example, in adopting peer debriefing to enhance rigour in this research, my supervisors acted as "critical friends" (Smith & Caddick, 2012, p. 71) reviewing transcripts and reflexively comparing and contrasting the initial themes I generated. They encouraged reflexivity by challenging and developing interpretations that made me construct a coherent and theoretically sound argument in relation to data (Smith & Caddick, 2012). The idea is not to

claim ‘validity’ or ‘reliability’ but to deepen and extend the interpretation by reducing any subjective biases.

Often, the rigour and trustworthiness of interpretations of data and research results can be judged valid when different and contrasting methods appear to produce similar results in the same research; this is called triangulation (Smith & McGannon, 2018; Tracy, 2010). Guba and Lincoln (1994) and Yilmaz (2013) argued that using a triangulation of methods and theories strengthens all facets of data collection and increases the possibility that an acceptable interpretation may be reached. However, while triangulation is commonly viewed as ensuring rigour, triangulation does not reflexively sit effectively with the interpretive position of this research (Tracy, 2010). Instead, rigour in this research was established through what Tracy (2010) described as crystallization. To clarify, the research was not interested in establishing rigour by employing multiple datasets such as ethnography, semi-structured data, and photo elicitation. In other words, the focus was to establish credibility about the participant's embodied experiences with assistive technology through multiple data sources. Instead, I collected data through these multiple sources while reflexively engaging with my thoughts. I acknowledged the possibility that research participants may espouse very different values in different forms of interviews than the values they enact in contextual interactions. For example, while I observed in the ethnographic setting that Mark was a reserved, laid-back and soft-spoken person in the club, talking about his use of the wheelchair during the interview, Mark indicated how he utilised the wheelchair as a way to play, lead, and coach a team, in the photo elicitation, he demonstrated how the rugby chair represented a means to displaying athletic abilities at the highest level. This awareness of data deepened my understanding and encouraged credible interpretations of data throughout the research.

One extensively used method of rigour and trustworthiness is member checking, also known as “respondent or participant validation” (Smith & McGannon, 2018, p. 103). It involves sending the data, analysis, and interpretations to research participants to verify, judge and critically comment on the adequacy of the interpretations (Jones, 2022; Smith & McGannon, 2018). One of the key strengths of member checking is participants can review the transcript and the analysis. While member checking has been widely studied in qualitative research in sport and exercise, the concept is considered problematic in establishing rigour. Brett and McGannon (2018) argued researchers cannot ascertain if participants are faithfully

and thoroughly engaged with data, and the length of time may compromise it. On the back of this, in this research, I utilized what has been proposed as “member reflections” (Smith & McGannon, 2018, p. 108), where the researcher and the participant reflexively explore the insights, differences, and similarities in the data interpretations. Both the researcher and the participants can bring up and discuss their perceptions and emotions about the data in both formal and informal ways. Many times, participants expressed satisfaction with the transcript as it captured their real-world experience with AT the way they narrated it.

Conclusion

In this chapter, the goal was to describe the methodological approach I used to address the broad objective of this research. In doing so, I have explained the reason for the research design, why the research was identified as a qualitative study, and discussed the rationale behind the choice of research paradigm and theoretic beliefs. Moreover, in this chapter, I have also described the choice of methods, the process I went through in sampling and recruiting participants, and outlined how I collected, analysed the data and generated the research findings. Finally, I have shared insights about ethical considerations, and how I attempted to establish rigor and reflexivity in the research.

Chapter Four

Theoretical Framework: Grasping the Embodiment of the Sporting Body

Introduction

The lack of phenomenologically-inspired analyses of sporting activity within sociology is perhaps surprising, especially when embodied experiences feature so strongly in people's experiences of sport (Hockey & Allen-Collinson, 2007). As Powis (2017) suggested, however, an exclusive phenomenologically-inspired exploration of embodied experiences is not entirely tenable, as the body simultaneously holds a social dimension that phenomenology does not adequately attend to. As such, in this thesis, I embraced a version of embodiment as an approach that simultaneously "recognises the social and biological aspects of the body" (Powis, 2017, p. 24). Doing so allows me to better locate the embodied realities of disabled athletes as they experience impairment, disability, assistive technology and the social world. French phenomenologist Maurice Merleau-Ponty (1908 – 1961) is believed to be the advocate of the concept of embodiment (Brey, 2000; Toadvine, 2019; Waskul & Vannini, 2006) and its use is widespread across the sociology of sport (Brighton et al., 2021; Richard et al., 2019). According to Waskul and Vannini (2006), an embodied approach can be generally understood as capturing the intersubjective constructions of the body as it interacts with others and is lived and sensed through the world. An embodied approach is especially important in the context of disability, sport and assistive technology because it draws attention to the corporeal experience of disabled people as they use technology for disability sport practices.

Disability is generally understood through medical or social models. An embodied approach allows us to capture the reality of impairment while at the same time understanding the lived experience of society and culture. Brighton et al. (2021) argued that moving beyond models as a means of theorising physical disability is important for exploring the complex production and experience of disability. An embodied perspective helps to expand our repertoire for thinking and understanding disability as it intersects with assistive technology. However, the materiality of the body in sport is often overlooked, with an unequal focus on the "discursive construction of embodiment" (Longhurst, 2000, p. 125). Indeed, it would be a

difficult claim to suggest that disability has little to do with the materiality of the body, the physical environment, or embodied practices and is entirely reducible to discourse or a social relation (Norman & Moola, 2017). Similarly, it is equally difficult to argue that disability is not concerned with how (inter)subjectivity relates to shared meaning, interactions and feelings that can be shaped through consciousness and awareness of the body and mind as one *being* (Paterson & Hughes, 1999).

Embodiment may thus help to understand the disability experience in sport, not as a normative identity but as embodied in the body and mind, a subjective experience that encompasses "heterogeneity of their lives, fluid, situated and contextual nature of disablement and impairment" (Shakespeare & Watson, 2010, p. 73). Despite this, the "role of technologies and what other material arrangements play in enabling and or disabling interactions" (Moser, 2006, p. 374) of disabled people in sports remain unclear. For this reason, embodiment can be useful in expanding "what is made of disability, the disabled subject and body, and, even more specifically, what positions, capacities and competences are enabled through the mobilization of technologies" (Moser, 2006, p. 374) for disabled athletes.

As I have illustrated in chapter two, a growing number of theoretical and empirical works within the disability, technology and the sociology of sport have embraced embodiment concerning the study of the body and technology (Asare et al., 2023; Crawford, 2015; Lupton, 2013), disability sport (Fullagar, 2017; Powis, 2020; Powis, 2017; Richard et al., 2019), subjective experience of technology (Moser, 2006) and posthumanism (Dolezal, 2017; Kath et al., 2019). Together, these works help to question the relationship between disability, impairment and sport. However, what is commonly missing is how "disability is experienced in, on and through the body, just as impairment is experienced in terms of the personal and cultural narratives that help to constitute its meaning" (Huges and Patterson, 1997, p.334) in disability sport. I argue that this is a complex phenomenon that requires further examination from the perspective of a lived experience.

As such, my embodied approach to exploring this research resides in the "unbounded set of flexible embodied practices that encompass mind, emotional, physical, reflexive and engages socially" (Ellingson, 2017, p. 6). In the process, I attempt to establish an embodied approach to understanding the experiences of disabled people and their use of assistive technologies for participating, training, and competing in sports. Such a corporeal focus can

provide a rich and nuanced understanding of the unique relationship between disability, assistive technology and sport. My entry into and departure from exploring disabled people's experiences of using assistive technology in sports are theoretically represented by two propositions. Firstly, from Morris (2010, p. 1):

> Human bodies are not simply anatomical, physiological, or physical objects. They are our very being-there in the world and that by which there is a world for us; they are that by which we act and express and that in which we feel; they are that which sediments the past and projects toward the future; they are that on whose surface power is inscribed and that by whose powers such power is 'incorporated'; they are natural symbols, as well as the existential ground of culture.

And secondly, from Perry and Medina (2011, p. 63,) who assert that "the body is our method, our subject, our means of making, representing, and performing". While these perspectives may not be directly linked to disability, they are fundamental to this research: as Iwakuma (2002) argued, Merleau-Ponty's embodied perspective of disability suggests that disability is simultaneously biological, social, cultural and in a constant state of 'being-in-the world'. Similar to the work of Powis (2020), who established a novel embodied approach to understanding disability sport, my work extends this into the realm of the material world of assistive technology. My contention, drawing on Merleau-Ponty (1945 [2002] p.273), is that the body "is the fabric into which all objects are woven, and it is, at least related to the perceived world, the general instrument of my 'comprehension'". Applied to my research, then, such an approach can provide a useful sociological lens (cf. Powis, 2020) through which to examine the complicated relationship between disability, sport and assistive technology.

Thus, in this chapter, I establish my conceptual interpretation of 'embodiment'. In doing this, I will start by providing a holistic overview of embodiment, and its importance within sociological research, with a focus on how it can help expand our understanding of disabled people's embodiment of technology. I then explore three dominant dimensions of embodiment useful for this research: the lived body, the sensuous body and body schema. By exploring these three dimensions, it is hoped that they will provide a valuable lens that can bring together an embodied understanding of the complex relationship between assistive technology, body and disability in disability sport.

Embracing the Embodied Approach

As suggested by many scholars (Iwakuma, 2002; Moran, 2010; Powis, 2020; Shilling, 2003; Wheeler, 2020), the origin of embodiment can be traced through the history of European philosophy. According to Iwakuma (2002), the influence of French philosopher René Descartes (1596 -1650), is evident in 'Cartesian dualism' in which the body is as secondary to, and separated from the mind. However, the 'Cartesian dualist' perspective of understanding the body was challenged and later critiqued by French philosopher, Merleau-Ponty (1908 – 1961). As noted by a number of scholars (e.g., Gallagher, 1986; Iwakuma, 2002; Powis, 2020; Tanaka, 2011), Merleau-Ponty criticised the impact of these theoretical assumptions for many reasons; one important reason is that it mechanistically separated the body from the mind. Another critique is that consciousness is not absent from our bodies but rooted in our body's interaction with the environment and other materials (Gallagher, 1986; Iwakuma, 2002). Therefore, Powis (2020) and Tanaka (2011) explained that while Descartes identified the mind with the phrase 'I think' (cogito), Merleau-Ponty viewed consciousness within the body as 'I can', aligning with the philosophies of German philosophers Edmund Husserl (1859 – 1938) and Martin Heidegger (1889 – 1976). Together, Merleau-Ponty, Husserl and Heidegger laid the foundations for the development of the phenomenological tradition. According to Giorgi and Giorgi (2003), the Husserlian notion of consciousness of the *being* referred to one's awareness, capturing the experience of pre-consciousness, consciousness, and unconsciousness in our mind. Heidegger's propositions about the body moved from Husserl's idea of *experience* that focused on conscious propositions, towards a phenomenology that focused on *'being and time'* (Wheeler, 2020). Tanaka (2011) further explained that the 'I can' represents a pre-reflective form of consciousness which exists in the immediate awareness of each bodily movement. Importantly, Iwakuma (2002) and Tanaka (2011) reported that through the 'I can', Merleau-Ponty viewed the body as fundamentally corporeal or embodied in both the mind and body without distinction, a sharp contrast to Descartes' idea that the essence of the human body is exclusively a cognitive experience. This perspective provides a lens through which disabled people's complex interaction of access and use of technology in sport can be extended, and, more broadly, an alternative theoretical avenue to consider the embodied relationship between impairment, the body and assistive technology in order to expand the meaning of disability.

According to Ellingson (2017), despite more than three decades of discourse among qualitative, feminist, postmodern, poststructuralist, critical race, post-colonialist, and other critical researchers about the centrality of embodiment in research and sense-making, research that makes bodies a meaningful presence is not widespread. Therefore, one broadly important reason for embracing embodiment for this research is its flexibility in helping to explore both the body and the social. Although the concept of embodiment is underpinned by the study of the body within phenomenology, a particular branch of philosophy that is distinguishable from others such as ontology (the study of being), epistemology (the study of knowledge), metaphysics, logic and ethics. Shilling (2003) maintained that embodiment can be an approach to studying bodily experience within the framework of sociology. As a lens of inquiry, embodiment can help illustrate the processes by which disabled athletes experience their bodies as they intertwine with assistive technology in the social world.

Another major reason for embracing embodiment in this research is the ability to gain insights into the physical and perceptual nature of the body as seen from the first-person viewpoint. In recent times, the body as embodiment has become a central object of interest due to calls to "bring the body back" (Allen-Collinson, 2009, p. 3) in the sociological theorisation of sport, in the context of this research, disabled people's participation in disability sport. As such, embodiment allows for an exploration of multiple ways of the physical 'being-in-the-world'. The concept of 'being-in-the-world' simultaneously acknowledges the diversity of subjective experiences and embraces the notion that people are conscious of their perspectives as a medium to understand their bodies and the world they live in (Moran, 2010). As Shilling (2003) argued, within sociology, the body occupies a place of centrality and importance, forming a basis for, and shaping, social interactions, and facilitating the experiences of one's life. The body, therefore, represents a social tool for effective communication, and interpersonal experiences (Shilling, 2003) which is magnified in the context of disability, where disabled bodies are often marked with stigmatised identities and social biases which shape interpersonal experiences in often negative ways.

Additionally, everything the body knows comes through our consciousness, and we know and experience the world through our sense perceptions (Merleau-Ponty, 2004; Moran, 2010). The central idea is that the body exists as itself, as a mutual connection to the *Lebenswelt* or lifeworld (Allen-Collinson, 2009; Paterson & Hughes, 1999), which is

experienced through embodied sensations (Moran, 2010). Taken together, the conclusion is that the body holds an interactionist perspective. Thus, to effectively understand the way disabled people interact with assistive technology in sport, Waskul and Vannini (2006) suggested that the social, body and the individual can intimately interact and interrelate and, through this, the body is constantly reconfigured and re-experienced. It is this complex interrelatedness as experienced by disabled people, through the body and the assistive technology that I seek to understand.

Perhaps most importantly, the broader reason for embracing embodiment in this research is its inherent characteristic of collapsing a range of binaries evident in the study of disability such as disability/impairment, self/other, medical/social, discourse/materiality or subjective/objective, which is central to the aim of this research. Here, while subjectivity represents the unique individual experience as it occurs through the lived body (described below in this chapter), objectivity, in this sense, suggests our experience is always situated in a specific objective reality. However, by drawing on embodiment, the body can be understood as a single experience of the world, where the body influences how one perceives the world and makes sense of it without any objective interpretations. As observed by Iwakuma (2002), embodiment then does not objectify the body, nor does it subjectivise the body; instead, it allows us to experience our body rooted in our posture as 'being-in-the-world'. Within the broader field of disability sport, these perspectives have enhanced the comprehension of how disabled people navigate and challenge the ableist attitudes that reconstruct, their identities and self in sport (Asare et al., 2023; Ives et al., 2021). Nevertheless, more work is needed, especially, as Butryn (2000) previously noted, in the sociology of sports: the interaction between human (subjective body) and technology (object) can elicit a state of reconstruction as disabled people undergo re-embodiment while performing sport. Consequently, by centralising embodiment in understanding disability, sport and AT, I am well placed to understand the body as the basis for, and reshaping of, social interactions, facilitating the reconstruction of one's life as it merges with technology (cf. Shilling, 2003).

In the context of this research, an embodied approach enables an examination of the experience of assistive technology in ways that dismiss a distinction between the technology and the disabled body, an approach evident in existing studies (e.g., Moser, 2006; Standal, 2011). In so doing, this research hopes to sociologically expand an understanding of the

process of disabled people becoming sporting bodies merged with technology. Through embodiment, Merleau-Ponty (1962), argued there is no gap between one's body and the objects attached to it; in this framework, technology does not just sit between the body and the world: it is an extension of the body in the world (Ihde, 1975). From this perspective, it is necessary to discuss relevant embodied approaches such as the lived body, sensuous body and body schema, which can help understand the complex experiences of disabled people using assistive technology.

The Lived Body

The lived body is, as observed by Merleau-Ponty (1962), the fundamental instrument of perception. From a sociology of body perspective, Shilling (2005) proposed that humans essentially live in perceptual phenomena, their bodies presenting a space to pursue integration, coordination, and a sense of purpose in a world full of opportunities and limitations. Based on this, the lived body positions us as body-subjects. This can allow us to illuminate how disabled sporting bodies move through cultural interaction, gain meanings through sociocultural dealings and form subjective essences (Hockey & Allen-Collinson, 2007; Waskul & Vannini, 2006) as they play, train and compete in sport. However, in disability and disability sport research, only a few accounts are "truly grounded in the 'flesh' of the lived sporting body" (Allen-Collinson, 2009, p.3). Considering that, in participating in sport, disabled people engage in real-life experiences of their sporting devices through their 'lived body', this research, from an embodied approach intends to expand such understandings as one of multiple ways of 'being-in-the-world'.

In framing AT use through the concept of the lived body, I am therefore able to explore the disabled sporting body beyond an object, abstractly existing in the world without any experience of the human consciousness, instead, an embodied 'normal' sporting body (Allen-Collinson, 2009). It is a subjective body that exists as a "vehicle of the *being* in the world, it is as having the body of a full living creature, to be intervolved in a definite environment, to identify oneself with certain projects, and be continually committed to them" (Merleau-Ponty, 1962, p. 94). As Crossley stated, "to be a body is to be both a locus of action and a focus of power" (Crossley, 1995, p. 60) to a greater extent shaping 'normalcy'. The realities of the body in its social and natural state can also be described as pre-reflective human experience, from which lived body experience is ultimately derived (Gallagher, 1986). This is

important because, from an embodied approach, the interaction between assistive technology and the disabled body can be examined as a non-mechanistic action, an experience that involves a conscious or intentional activity, and not an experience that limits the body to abstract and passive physical being (Gallagher, 1986).

Examining disabled people in sport through the lived body is of great significance to this research, especially the way disabled athletes use their AT through their perceptual experience. According to Gallagher (1986) and Langer (1989), we can understand the human experience as a body that sees or that exists in the act of seeing. However, little is known about how humans essentially live in perceptual phenomena, their bodies presenting a space to pursue integration, coordination and sense of purpose (Shilling, 2005) in a world full of opportunities and limitations. Moreover, other qualitative research focuses instead on the discursive construction of lived experience and pays less attention to the lived, sensed, fleshy realities (Hockey & Allen-Collinson, 2007; Sparkes & Smith, 2012). Through embodiment, sporting bodies can move through cultural interaction, gain meanings through socio-cultural dealings and form subjective essences that are mediated through perceptions (Hockey & Collinson, 2007). This suggests we can comprehend how disabled people's use of AT in sport is a rational human experience, independent of the unnatural constructions associated with the disability experience.

According to Richard et al. (2019), the analysis of our lived body is based on information accessible to our perception but passed through the filter of our representations and our cultural categories that structure and guide our self or social perceptions of our body. For instance, applying the lived body as a lens, according to Tamari (2017), can help ‘make sense’ of the process of having to experience the incorporation of a lifeless, synthetic bodily part into a biological body. However, the dominant conception within the disability sport literature is that the lived body undergoes an intense hybridization perceived as a “transhuman cyborg” (Richard & Andrieu, 2019, p. 3). As I have discussed in chapter two, this is problematic, because such perceptions can be reductive in many ways, primarily in their potential to overlook the individual complexities and subjectivities of human experiences of assistive technology, which I consider essential in tracing the “patterns of embodiment” (Paterson & Hughes, 1999, p. 598) as disabled people live through the mutually incorporated experiences of impairment, disability and assistive technology.

In summary, as exemplified in a previous disability, sport and AT study (see Richard et al., 2019), the lived body has proven valuable as an analytical tool. It allowed for delving into complex socio-cultural challenges associated with living with disability, as well as using assistive technology. This research aims to expand this perspective. My perception of the lived body is of an analytical lens that can promote a rich analysis of disabled athletes' physical, as well as embodied, existence in the world of sports. Not only that, but this lens provides a perspective through which we can attend to the way disabled athletes construct varied body-self relationships and different identities by using assistive technology in disability sport.

The Sensuous Body

To understand more fully the perspective of the lived sporting body, it is necessary to engage with the body from a sensuous and sensing perspective (Hockey & Allen-Collinson, 2007). The senses are key to perceiving the world and our place in it (Merleau-Ponty, 2004; Shildrick, 2015; Shilling, 2005). In the sociology of sport, however, only a few studies, have highlighted the sensory dimensions of disability sport. For example, Powis (2017, 2020), while studying visually impaired embodied experience in cricket talked about how sensory interactions can facilitate actions in sport. Similarly, in this research, the importance of the senses can be foregrounded when considering the impact of impairment and assistive technology on disrupting or shaping sensory experiences.

The relationship between the senses, disabled body and assistive technology can be traced to Merleau-Ponty's seminal work that explored the embodied experience of amputees who felt sensations in a phantom limb. As such, Merleau-Ponty's work is naturally oriented to the study of disability as a means of throwing light on what may be considered a sense of normative embodiment. Merleau-Ponty (1962) posited that our senses are crucial not just to experiencing the world, but also to perceiving and interacting with the senses through the body. Given this, many disability studies have highlighted how the embodied senses can help understand living with a disability identity (Powis, 2020; Sparkes et al., 2014, 2018; Sparkes & Smith, 2002, 2008). For example, in their work that explored the narrative identity dilemmas of four men who have experienced spinal cord injury (SCI) through playing rugby, Sparkes and Smith (2002) asserted that "the stories we are told, and the stories we learn to tell about ourselves and our bodies, are important in terms of how we come to impose order on our embodied experiences and make sense of events and actions in our lives" (p. 261). These

perspectives are useful for examining the way the athletes construct their sense of space and time as they use bespoke technologies for sport.

Toadvine (2019) argued that Merleau-Ponty's assumptions of embodiment allow for understanding bodily and internal sensations of human experience. Within the context of this thesis, my concern is about giving initial meaning to internal and bodily sensations as "having an objectivist function of allowing the object to appear, as well as manifesting the body touching it, and the appearance of the sensation of the body as a bearer of sensations'' (Moran, 2010, p. 54). Moran (2010), however, argued that bodily sensations. Bodily sensation "emphasizes the parallels and continuities between touch and vision which are more usually contrasted constituting the sense of materiality and spatiality" (p. 57). This perspective, in the context of the experience of AT, is useful for analysing the "lived experience of disability — and how embodied absences, displacements, and technology additions — can generate, at the very least, its own specific possibilities that both limit and extend the performativity of self" (Shildrick, 2015, p. 14).

In adopting an approach in which the sensuous and sensing body is foregrounded, I attempt to explore beyond visual sensations or visual impressions of consciousness (Shilling, 2005) to better understand and locate lived experience. This experience is instead dependent on one's inter-corporeal and internal senses, these being considered to be the priority when describing one's subjective perception of the world (Richard et al., 2019). The senses, therefore, represent an opportunity to explore the "inner sensations" of athletes' subjective body experiences such as pain (Paterson & Hughes, 1999, p. 602). This can also be referred to as the dys-appearing body, which Pavey, Warren and Collinson (2015) described as the body which is suddenly and often forcibly brought to our conscious attention, often in experiences of discomfort, and illness, but also moments of intense pleasure (p.444). From a disability and sport perspective, these assumptions related to the sensuous body have been useful in providing an understanding of how assistive technology experience can be constructed, shaped and constrained by the specificities of embodiment (Tamari, 2017). Additionally, it is within this context that embodiment in this thesis is used as a way of thinking through how disabled people experience the effects of using assistive technology.

Important for this thesis, the physical stimuli the body presents and the subjective sensations generated by sensory organs are also encountered by the individual (Moran,

2010). In the sociology of sports, Hockey and Collinson (2007), for example, observed that sensory experience facilitates the execution of rhythmic sporting actions. For example, it is through this observation that we understand how disabled athletes embody a sense of rhythm within sport – the way athletes coordinate their whole bodily senses to accomplish an action such as starting, stopping, moving, shifting and turning. The use of embodiment as a lens helps for a better understanding of the impact of these rhythms as disabled people use AT in sport.

According to Powis (2017), "sensory experience is not just the material basis of perception, it is also an active, social interaction" (p.24): this observation is useful for this research, as it can provide a perspective to examine how disabled people make sense of their sensory interaction with their bodies, assistive technology and environment. When moving through the world, one is in a constant conscious relationship and communication with objects in the environment, which is received through bodily senses (Merleau-Ponty, 1962; Shilling, 2005). Our perception is therefore that our body incorporates all our human sensual organs, exposing us to the experience of our immediate social environment and, at the same time creating a social environment. From an embodiment perspective, Merleau-Ponty (1962), had, however, a reservation. He argued that our conceived perception, a sense of smell, taste, and hearing, could not represent the true conscious impression of sense, as sense is a quality. Analysing sensory perception is not only a means for understanding the embodied meanings of the disabled body but also provides an opportunity to explore the historical/cultural situatedness and the very real social corporeality (Morris, 2010) of physically disabled people's participation in sports. These insights offer more opportunities to expand, specifically capturing how disabled people who use assistive technology create "meaning and make sense of social interaction" (Murray, 2004, p. 966), topics often unexplored in disability sport.

In taking sensory perception as a focus for this research, we necessarily require an equal focus on how the athlete's body-in-action "incorporates into their structure objects in the environment, so that the limits between the body and the environment is blurred" (Standal, 2011, p.178). This requires a way of mapping an individual's relationship with the world, body and their place in it. It is to this that my attention now turns.

Body Schema

The concept of body schema is partly about embodied knowledge (Tanaka, 2011). According to Tanaka, body schema refers to "the knowledge where the body knows how to act" (Tanaka, 2011, p. 149). Merleau-Ponty's definition of body schema changed over time, described as body image which referred specifically to the visual—and other, sensory—appearance of one's own body, as presented by conscious awareness and interpretation. However, the difference between body schema and image is that with the body image, ''one is consciously attending to body'', whereas, with the body schema, one is ''marginally aware of the body'' (Standal, 2010, p.178). Despite the difference, understanding the body schema and image of disabled athletes begins with the notion of interactions with others (Crawford, 2015). According to Merleau-Ponty (1962), the nature of these interactions comprises the subjective realities of the individual bodily actions that provide dual impressions of the body - an impression of the body's internal and external actions experienced at any time. However, the way these assumptions can help analyse assistive technology and the disabled body has been underutilised in disability studies.

As such, in the context of this study, the body schema and image can present minute ways of figuring out how the disabled athlete, intertwined with AT, is tossed between notions of the athlete's perception of the normal body and 'abnormal' bodies from a socio-cultural perspective. This is important, as Merleau-Ponty (1962) claimed that the body schema or image not only helps to understand how to act but also helps to understand how the body acts spontaneously without any pre-thought when it interacts with objects. For example, Tanaka (2011) stated that the cyclist learns and knows how to ride a bicycle without any formal deliberation being required; the cyclist furthermore is not uttering each riding process in the mind, it operates below the level of consciousness, providing an 'inner sense' of the body's own spatiality. This argument can be applied to the discussion of how disabled athletes embody the use of AT, and also to the natural sense of knowing how and in what ways ATs are attached to their bodies without conscious awareness, as a habitual practice. This is most evident in the way Tanaka (2011) suggested that the amputee does not print the lost body part in memory but feels it as an embodied action. According to Tanaka (2011), the body schema or the body image is useful for exploring how "the sensation of missing limb seems to occur as a part of a habitual action established between the body and certain situation" (p.

150). Not only that but through body schema this thesis can explore how assistive technology can impact the visual representation and integration of artificial material into the disabled body.

Shilling (2003, 2005) observed, drawing on the concept of embodied knowledge, that there is a personal awareness of one's body through the body schema. The awareness of one's body, however, does not, occur spontaneously and is not a spontaneous connector of humans to the world. It is, instead, a bodily awareness that passes through a gradual development (Shilling, 2005); Shilling adds that awareness is developed by feeling the senses or location of one's body. Thus, the body schema, when analysed from a personal bodily awareness viewpoint, brings a fresh understanding of how disabled athletes navigate the process of performing sport in an entirely 'new' body.

Understanding how people *live with the world* and *through the world* using AT, centres on Merleau-Ponty's way of talking about the body schema. As such embodiment helps orient the analysis on/towards the embodied learning process - in this case, associated with the use of assistive technology to participate in sport:

> We have learned to feel our body; we found underneath the objective and detached knowledge of the body that other knowledge which we have of it in virtue of its always being with us and of the fact that we are our body. In the same way, we shall need to reawaken our experiences of the world as it appears to us in so far as we are in the world with our body, and in so far as we perceive the world with our body (Merleau-Ponty, 1962, p. 239).

Our bodily image symbolizes the recognition of continuous new bodily action (Shilling, 2005). Merleau-Ponty (1962) stated that the body image "register(s) for me the positional changes of the parts of my body for each movement of one of them, the position of each local stimulus in the body as a whole, an account of the movements performed at every instant during a complex gesture…" (p.113). The body is therefore experienced in immediacy because the body is who one is (Langer, 1989). Taken together, Merleau-Ponty's concepts of body image and body schema are important to consider in exploring how the skilled use of sport-specific assistive technology may lead to altered multisensory or sensorimotor interactions when it is incorporated into the disabled body.

Moreover, the concepts of the body schema or image can be used to describe the superior feeling of one's own body, independent of its movement in spatiality (Langer, 1989; Young, 1980) in disability studies. Spatiality is personal space, an extended boundary of the self, the body displaying forms of defence when this space is invaded (Tanaka, 2011), or moves from one space to the other. Studying disabled athletes using the embodied knowledge of spatiality promotes an understanding of how moving from a non-sporting personal space into a technology-dominated sporting environment causes disabled athletes a variety of visible reactions and internal feelings of discomfort (Tanaka, 2011). The disabled body, when viewed through the body schema and image, allows for clearer insights and analysis into the controversies that surround the embodied personal space of disabled athletes using ATs.

Tanaka (2011) stated that through body schema we can understand the relationship between body and distance - the closer the distance, the more intimate the interaction, and the greater the distance, the more formal the interaction. The nature of the distance displayed gives an understanding of the relationships and interactions one can have with actors in an environment. Thus, Merleau-Ponty indicated that the schema is the spatiality of the body schema, not a mere composition of body organs' movement in space (Merleau-Ponty, 1962). The body schema or image has a subtle sense of distance, and it knows how to regulate this for cordial communication with others far and near (Tanaka, 2011). While these understandings are missing in disability and technology studies, the discussion so far would suggest that through body schema we can understand how disabled people perceive and use AT while interacting with human and non-human actors from a distance. Taken together, while the body schema may appear to represent a bodily image of many parts and senses when used to examine the relationship between disabled body and assistive technology, it provides an opportunity to explore the way the body (irrespective of whether technology-enhanced) moves as one assemblage in the world (Langer, 1989).

Conclusion

As I have outlined in this chapter, an embodied approach thus provides a core focus for this research. I contend that there are a series of sensations, perceptions, and fleshy negotiations comprising the experiences of disabled athletes that are commonly missing from existing descriptions of AT, instead, it is subsumed within the posthuman language of 'enwheelment'

and ‘cyborgification’. Thus, an embodied approach can help provide deeper meanings and breathe ‘life’ into disabled athletes’ lived experiences of assistive technology. In taking an embodied approach, I am drawing primarily on the phenomenological tradition as outlined by Merleau-Ponty (1962) to understand a particular form of disabled sporting embodiment. Additionally, in order to properly attend to disability, it is necessary to interrogate the sociological aspects of the disabled body often informed by the medical and social model of disability, as well as issues of access, inequity, culture and power.

To achieve this, I have discussed the theoretical framework that underpins this research. In doing so, I have discussed how the key perspectives of embodiment, relevant to this research, can provide an interpretive lens to investigate disabled people’s embodied experience of assistive technology in disability sport. In following Ellingson (2017), in this thesis I intended to “begin with the body” (p.1), in order to highlight how the disabled body is shaped, constructed and constrained by cultural meanings as well as specificities of embodiment. This is central to the objective of this research (see chapter three) which seeks to understand the biological and physical body as one ‘being-in-the-world’. Particularly, this research seeks to understand the process by which the experiences of disabled athletes using assistive technology are felt through the lived body and sensed in disability sport. The physiological lived body, shaped through the consciousness and awareness of the body and mind as one *being* (Merleau-Ponty, 1962), can help with the understanding of the subjective, active and sensuous nature of disabled athletes' engagement with assistive technology for participating, training, and competing in sport. Moreover, the concept of embodiment expands our understanding of how disabled athletes incorporate assistive technology into their body schema or image so that the limits between their impaired body, assistive technology and the environment are made indistinct.

By adopting embodiment as an analytical framework, it is hoped that this research will yield rich, nuanced, detailed, real-life experiences through which I can interpret and discuss the unique relationship between disability, assistive technology, and sport. The aim is to improve the understanding of how embodied experiences of disability impact the ways that disabled people navigate the complex issues of advanced assistive technology in sport. Particularly, in the context of how disabled athletes become more enabled while using assistive technology and construct their hybridised bodily experience and self-perceptions

while participating, training, and competing in sport. With this aim, and in the chapters that follow, I present, analyse, and discuss the findings.

Chapter Five

The Enabling Opportunities of Assistive Technology: An Ethnographic Understanding of Disabled Athletes' Participation in Sport

Introduction

In this chapter, I present, describe, and discuss the findings of the 18-month ethnographic study in a wheelchair rugby setting. The objective is to explore how wheelchair access, particularly the process of enwheelment can engage disabled people in a new physical experience (Papadimitriou, 2008), enabling them to participate, train and compete in their chosen sport. By doing so, I aim to enhance the understanding of how disabled people's access to AT in sports influences inclusion, celebrates athleticism and enhances the social experience (Brittain, 2012) along with the embodied negotiations comprising AT use. Specifically, the purpose of this chapter is to expand the work of Sparkes, Brighton and Inckle (2018) by responding to the role technology plays in the lives of disabled people enabling movement into, and experiences of, the world of disability sport. In doing so, I offer deep, rich and 'thick descriptions' of how players in wheelchair rugby live, act and experience using wheelchairs to play sport.

Little empirical understanding exists about the way disabled people use and experience AT in the context of sports. As I have already highlighted in previous chapters one and two, disability sport is a *major battleground* (my emphasis) for debates and tensions surrounding disabled peoples' uses of assistive technology to participate, train and compete. While access to assistive technology can play an important role in facilitating inclusion for disabled people in sports and physical activity, little is known about how the self, identity and the technology-mediated sporting body are intertwined as disabled people participate in disability sports (Asare et al., 2023). Understanding the self and identity as it relates to disabled people's participation in sports requires exploring the athletes' first-hand experiences (Butryn & Masucci, 2009; Sparkes et al., 2018) from their cultural environment.

Particularly, the purpose of this chapter is to illustrate while tracing how athletes achieve enwheeled competence as they engage in wheelchair rugby. As I have highlighted in

chapter three, this was necessary as often the wheelchair assumed a primary signifier or symbol of disability. Therefore, it appeared appropriate to set the wheelchair rugby club as a natural starting point for inquiry into AT – coupled with a growing body of literature describing "wheelchair use as a sign of failure" (Woods & Watson, 2005, p.1) and as a process of enwheelment (Monforte et al., 2021; Papadimitriou, 2008). The chapter draws on field observations, semi-structured interviews and field notes to explore the culture, life, and actions of nondisabled and disabled members within a wheelchair rugby club. The interviews were conducted with six of the players. One of the players also served as the team's trainer. Among the six players, four have spinal cord injuries, one has mild cerebral palsy, and one has spastic paraparesis (see chapter three, pages 67-70 for a table of the demographics of participants). Thus, both disabled and non-disabled voices are presented in this chapter as an authentic representation of disability and enwheelment. In doing so, I describe, analyse, and discuss the club's 'way of life' through these subjects: 'what is wheelchair rugby', 'unveiling the embodied essence: wheelchair rugby and 'enwheelment' and 'familyhood'. Then, I also share insights on how 'the chair is the game', the process of using the rugby wheelchair can symbolise physical capacity, promote inclusion and enhance social relationships.

What is Wheelchair Rugby?

From a historical context, wheelchair rugby was one of the few sports accessible to disabled people and was included in the International Paralympic Committee's, IPC sports program in 1994. In 2000, it featured for the first time at the Sydney 2000 Paralympics.

Figure 3. Wheelchair rugby. Photo credit: New Zealand Wheelchair Rugby

Wheelchair rugby was often referred to as 'murderball' or 'quad rugby' due to its extreme levels of physical contact which are synonymous with nondisabled rugby. A thrilling, fast-paced sport, wheelchair rugby originated in Canada in the 1970s as a team sport for disabled people with both upper and lower limb impairments looking for other sports opportunities aside from wheelchair basketball. Wheelchair rugby was developed to provide a sense of community, raise awareness and create equal participation in the sport for disabled

people with severely limited hand and arm function. As already reiterated, as wheelchair rugby is derivative of nondisabled rugby, it is common for disabled athletes who play wheelchair rugby to be quadriplegic with some form of severe cervical spinal cord injury. However, the sport has recently attracted other athletes with multiple amputations, neurological disorders, or other conditions. Wheelchair rugby uses an individual classification or points system from 0.5 to 3.5 depending on the degree of limitations - the lower the points the higher the degree of impairment. A team consists of 4 people with a maximum rating of 8. As a mixed-gender sport, a team can consist of both women and men, in which case the total score increases to 8.5. A typical wheelchair rugby setting is filled with context-specific languages and idioms such as 'low pointers' for classes 1.5 and below and 'high pointers' for classes 2.0 and above. These classes at times, are used to create and describe different versions of games. Often, the 'low pointers' games or competitions feature players with severe spinal cord injuries and 'high pointers' games comprise those with 'good' arm function.

To train, participate and compete in the sport, participants use what I will colloquially refer to as the 'rugby chair' - a sport-specific wheelchair designed to improve manoeuvrability and withstand high-impact collisions. The 'rugby chairs' feature metal guards covering the wheel spokes and lower frame tubes helping to withstand the wild, crushing impact of high-speed tackles. The metal guards are to protect the athletes and prevent serious injury. For added safety, the chairs feature straps that keep athletes firmly strapped into the chairs to prevent tipping. In wheelchair rugby, there are generally two types of chairs - offensive and defensive chairs. The offensive chairs allow offensive athletes to dodge, manoeuvre, and generally move faster to score points, while the defensive chair is used to prevent, block, and deflect offensive moves. Most commonly, the offensive chair is used by athletes with lesser impairments (high pointers) and the offensive chair with severe impairments (low pointers), making the high pointers mostly the attackers, and the low pointers the defenders in competitions. This can change depending on a team's tactics or strategy. Wheelchair rugby has many differences compared to nondisabled rugby; forward passes are allowed in wheelchair rugby, while a try is scored when a player gets the ball or rolls over with two wheels of the chair across the opponent's line. The chair is a massive integral part of wheelchair rugby, it has a role in defining the win, draw and loss of the game.

In this research, wheelchair rugby was used to provide a context not because I had any prior experience as a player a manager, or a coach. Instead, as previously stated in this chapter, it all happened due to my initial and sustained interaction with Mark, the trainer of the wheelchair rugby club. As a disability researcher, I became curious and interested in what wheelchair rugby could provide for this research especially as Haslett (2017) suggested that wheelchair rugby can have a positive psychological influence on disabled people. In New Zealand, wheelchair rugby, despite the aggressiveness and high-contact nature of the sport, is popular among the spinal cord injured and features strongly in the spinal cord rehabilitation process at most of the spinal units. Given this, wheelchair rugby appears to be one of the most popular wheelchair sports among the Aotearoa New Zealand disabled community, perhaps due to New Zealand's strong rugby culture and the global success of the nondisabled rugby teams. Wheelchair rugby also became well known when the Paralympic team won gold at the 2004 Paralympic Games in Athens. The national wheelchair rugby team is called the 'Wheel Blacks'. On the surface, the name does not only signify an attempt to leverage the name of the nondisabled men's rugby team 'All Blacks' but appears to reinforce the idea that assistive technology (the rugby wheelchair) is a vital element to playing the sport which I have illustrated later in this chapter. Accordingly, it appeared useful for me to explore how these bespoke rugby wheelchairs impact participation among disabled people. My interest was piqued the more, as I watched the 'Wheel Blacks' perform at the Tokyo 2020 Paralympic Games. Watching on live television, I was thrilled to see the strength and passion that came not only through the player's bodies but their 'inner souls' while playing with the wheelchairs. Despite, the team placing 8th at the end of games, I was left not only in awe of their entire performance, displaying great speed, skills, and athleticism with their chair but it was amazing the way they controlled their bodies in the chair. At this point, I was left with more questions related to what disabled people can embody, experience and achieve within their sporting environment when assistive technology is involved.

Unveiling the Embodied Essence: Wheelchair Rugby and 'Enwheelment'

My inspiration for embarking on a journey into the world of wheelchair rugby as a way of understanding the players and their process of becoming enwheeled was motivated by the statement below:

Human beings, who are almost unique in having the ability to learn from the experience of others, are also remarkable for their apparent disinclination to do so —Douglas Adams

Before delving into the narratives, it is essential to briefly share my embodied experience of the rugby chair as a nondisabled person situated in a culture dominated by disabled and hybrid bodies. I use 'hybrid bodies' in this context to refer to the bodies visible to me in the setting as the players go through a process of becoming an embodiment of the rugby wheelchair. This, then enabled the creation and discovery of new bodily capabilities (Richard & Andrieu, 2019). According to Papadimitriou (2008), enwheelment is an embodied process of endeavouring to become one with the wheelchair. These embodied experiences that I share are significant as they provide me with a deeper contextual knowledge in expanding the process of enwheelment as previously discussed by (Monforte et al., 2021; Papadimitriou, 2008). Ultimately, contributing to my better comprehension of the embodied meanings and constructions disabled people attribute to their own bodies merged with technology. The journey began on the evening of 05 October 2020.

This evening was the first day of the invitation to the wheelchair rugby training venue. As a first-timer, I did not know what to expect or carry along, except I needed pants, a red T-shirt (because I was meant to play for the red team) and trainers. Embarking on my journey, I hopped into my car, departing from the familiar surroundings of the campus office. Relying on the guidance of Google Maps, I navigated my way about ten minutes westward from the bustling heart of the city to the venue. Training starts at 6:00 pm but I arrived at 5:50 pm. I pulled up at the car park, and a few cars were parked, amidst them, one particular standout caught my eye - a 4x4 pick-up truck, coupled with a trailer adorned with the emblem of the rugby club. Getting closer, I witnessed a man dedicatedly assembling rugby chairs within the trailer, ensuring the tires were in perfect condition. At the same time, a harmonious collaboration unfolded as athletes, both disabled and nondisabled players worked together, transferring the rugby chairs from the trailer to the nearby court with camaraderie and purpose. One interesting thing that also piqued my attention was the disabled players showcased their incredible resourcefulness, effortlessly propelling the rugby chairs forward with one hand while gracefully manoeuvring their everyday

wheelchairs with the other, gliding towards the gymnasium with finesse (Field note, 05 October 2020).

Typical of what Butryn (2003) described as *landscape technologies*, the club trained and held other sporting activities in a multi-purpose indoor gymnasium. The club did not own this indoor facility, it belonged to a high school located in a relatively quiet northeast suburb of Hamilton. The school provided a reduced rental rate for the gymnasium to help the club create a stronger disability community. Most importantly, the facility was 'disability friendly'. The main entrance led into a tiled corridor decorated with pictures of the school's sports events, medals, trophies and flags. This gave a sporty ambience. At the sides of the corridor were changing rooms marked 'boys' and 'girls' which the team hardly used because they preferred to change on the court. Both males and females in the team used one disabled toilet located between the changing rooms. The door to the gym was very light and wooden, easy for players to push in and out of the court. Importantly, the playing court was a wooden floor that looked perfect for rugby chairs. Importantly, the main entrance to the gym had what is described as *accessible technologies* (Hammel et al., 2002) – a concrete ramp with metallic handrails so that it was easy for the disabled players to push their daily wheelchairs into the gymnasium with less difficulty. As a non-wheelchair user, I became aware of how the lack of accessible facility structure could create multiple barriers for wheelchair users in using both everyday and sport-specific wheelchairs for sport. Furthermore, I became aware of how unequal access to technology without accessible structural designs can potentially limit the social participation of the disabled in the wider environment (MacLachlan et al., 2018; Smith et al., 2018).

Still, in my office clothes, I pushed the door and entered the court, the 'field of play' as the players usually call it. I was met with flurry of many activities, it looked chaotic – people chatting, people changing and players bouncing rugby balls around. The hall was well-lit, the air was a bit warmer inside compared to the freezing weather outside. I could smell a mixture of woody court and bodies changing along the court. Immediately, I realized I was in a different world with bodies different from mine. In the sense that, the players possessed bodies that were either missing a bodily part or deformed. I walked past wheelchairs (both everyday wheelchairs and rugby chairs) and parts of the chairs (i.e., tires, spokes, rims) lying everywhere in the open space at

the sides of the court. I sighted an open bag filled with materials, tools and tapes on the right side of the court – it was for the mechanic. More people arrived either with their caregivers or relatives being chaperoned or pushed gently in their everyday chairs to get ready. But most interestingly for me, looking at the extremity of the players' impairment, I was overwhelmed to see those with severe spinal cord injuries pushing and moving swiftly in the rugby chairs as they warmed up. I began to stare with surprise - Mark spotted me, 'Hey Francis how are you, ready to push'? 'I am fine thanks', I responded. Cruising in his rugby chair towards me he said': We are about to start the first game, you will need to change in a hurry, try the boys' changing room, you can change here if you want after I find you a chair' (Mark). I went to the boys' changing room to change and ready to play, a space nobody else uses except for outsiders (Field notes, 05 October 2020).

Seeing the players' impaired bodies as they changed allowed me to challenge some of my ableist notions towards wheelchair users. Ableism is commonly understood as the negative, prejudicial and discriminative practices that classify disabled people as inferior to nondisabled norms (Ives et al., 2021; Loja et al., 2013). On the back of this, my nondisabled self was thrown into questioning the disability stare. As I stared at the disabled players, I questioned the perception that the disabled body is different and the perception that disabled bodies are athletically weak. In so doing, I re-examined my ableist perceptions of the players and the wheelchair against the awareness of my mind and abled-bodied self and came to the idea that the body is "able and disabled in different and specific ways because we are all made able and disabled through the heterogeneous environment in which we are included" (Winance, 2006, p. 53).

The club accepts all persons with different abilities ranging from mild to the severely disabled as well as non-disabled people, like me, as a way to promote disability acceptance and equalize the space between disabled and nondisabled communities. It also appeared to be a way of creating a positive perception among nondisabled persons of what disabled people are capable and not capable of. In this regard, it triggered my appreciation of how the process of playing wheelchair rugby can be used as a space for removing ableist narratives, power and body politics that can reinforce the idea of legitimate bodies - the idea is that

certain impaired bodies are suitable while others are not in disability sport (Purdue & Howe, 2013). With these perspectives lingering in my perceptual mind:

> *I came back from the changing room feeling more inclusive and indifferent in my consciousness that my body was different from theirs. I heard 'prrrrr' - a whistling sound from the scoreboard that echoed across the court. It was time to play! "Francis, you can pop into that chair (Mark pointed to an old rugby chair on the sides of the court). Grab a pair of gloves from the bag and ask my dad to tape them around your arm for you" (Field notes, 05, October 2020).*

Importantly, I experienced what Berger (2008) described as 'disability consciousness', which means reflecting on my nondisabled self and understanding the limitations of hand impairment associated with spinal cord injury. After strapping the gloves around my hand, I was given a slightly old rugby wheelchair. The gloves were meant to give me a better grip on the rim of the chair and (hopefully) reduce sore and blistered palms. Most importantly, I had to work out how to incorporate the gloves as part of my palm, taking it out of my consciousness during play. No matter how hard I tried, I experienced this clear sensation of soreness as the gloves were old and worn.

> *Suddenly, I heard a loud voice from the court 'Mark! Can we start?' In a rush, but in a soft voice Mark said to me: "I will explain to you later as today is your first time. Just aim to get the ball across the opposite end pushing two wheels of your chair across the line. Don't keep the ball for more than ten seconds, just pass it or bounce it. I think that is enough for today" (Mark).*
>
> *At this moment, I was sitting on the sideline of the court in my chair, watching with key interest. While some of the players skilfully pushed their chairs, others were grappling with how to control the chair. Quick as a flash, I heard, "Sub, Francis, get on!! (Mark). I pushed myself onto the court to join the action with all the rules mixed up in my head. I was nervous seeing how the players were moving so fast and smashing into each other generating loud noise rattling constantly across the court. When I had my first collision, it was scary, I felt the metallic impact rattle through my body. At this point in my conscious self, everybody was moving too fast, and I felt useless! Those minutes were difficult and one of the most challenging experiences of*

my life as an abled body trying to understand disabled people's enabling experiences of using assistive devices for sport (Field notes, 05 October 2020).

This reflection indeed drew my attention to the social norms and dispositions that guide behaviour or thinking about the body in society, and my discomfort showed that these are not always transferable. In this context, being nondisabled did not automatically mean I would transfer instant bodily competence at playing wheelchair rugby, it required accumulated knowledge and lessons often developed after long-term use of the device, something which was evident in the way the players effortlessly controlled their chairs and flew around the court. The collision in the chair was an immediate and confronting demonstration of the physical challenge of the sport, and the impact of the 'rugby chair' on players' bodies. It allowed me to experience the physicality of the sport and the immediacy of the AT, not just for movement but for battles, tactics and tackling.

Typically, the players trained in four quarters: 8 minutes in each quarter with a 3-minute break. The game was intense. The players mostly engaged in violent and aggressive contact, very similar to the level of physicality in non-disabled rugby, even in training sessions. Typically, the goal of players was about scoring tries, defending, finding and manoeuvring the chair into tiny spaces on the court. This enabled the players to make space in order to receive a pass from teammates and required players to push hard and fast at the same time, feinting away from opponents, to get freedom away from the opponent's defence (described as "screens"). To successfully execute this, players must carefully and nicely synchronize timing, space and the orientation of their body in the chair in relation to the other players and the boundaries of the court. At times this was an easy fit for me. For example, in one of the trainings, I found myself in some space, with no defenders in front of me, having received a pass. All I heard was *'Push, push hard Francis, use your muscles'*, and once I went over the opponent's line, there was a loud cheer. However, on occasions when players got into trouble, found themselves stuck between defenders and could not move their chairs or pass a ball to a teammate, they called for a time-out. In wheelchair rugby, a team is allowed four time-outs and can be called out by a player in times like this.

It is important to emphasize that my experience of using the wheelchair was not only felt in the body, but it was also sensual. Typically, I saw many of the players brought with them painkillers, body balms and ointments. The air was engulfed with the smell of these

sprays. It did not take long for all these to make sense to me given my burning shoulders and ripped and calloused hands/bruises from impact. In playing and training with the group, I was suddenly and consciously aware of my body, often in the experience of joy and pleasure, but also sustained moments of intense pain and discomfort – a collection of moments in which my body experienced "dys-appearance" (Paterson & Hughes, 1999, p. 602):

> *While playing, I could feel burning sensations in my shoulder muscles, travelling throughout my body. I struggled to manage the pain. I struggled to keep balanced in the chair plus I had no sensual control of my body and chair. I was still relatively faster than some of them, particularly those with severe spinal cord injury and almost zero core muscle function. In those moments, it was purely my body at work and not my senses. Many of the players always reached for a water bottle at break times to cool down their bodies. At one of the breaks, Giles stated: 'Guys don't forget our first rule, take in some water guys, and refuel please keep pushing'. I felt like the odd one out, without a water bottle, 'get some water bro, there is a fountain down the corridor' said one of my teammates. Mark took the opportunity for a team talk; breathing heavily and sweating profusely Francis, when we have the ball, just try to push into the spaces we will find you or try and create spaces for us to push through (Field notes, October 05, 2020).*

From a phenomenological standpoint, Leder asserts that in everyday life our experience is characterised by the disappearance of our body from awareness, describing how the "body not only projects outward in experience but falls back into unexperienced-able depths" (Leder, 1990, p. 53). However, in my immersion in wheelchair rugby, this experience was profoundly disrupted. I realized how ATs (wheelchairs) in sports can stimulate sensations in the body and reconstruct one's lived space, times, and interaction with others and oneself – my body, seated within the rugby char was "unceasingly present in experience, albeit in an alien and dysfunctional manner" (Paterson and Hughes, 1999, p. 603). Thus, in the context of my bodily engagement in wheelchair rugby, the body was foregrounded "as a thematic focus of attention, but precisely in a dys-state" (Leder, 1990, p. 84). As such, I was able to focus my interest and attention on the players and their particular forms of embodiment, where my own embodiment acted as an – albeit ableist – reference point. While I lacked enwheelment with the wheelchair, the players demonstrated their control and power

over the chairs with ease, and it seemed to me that their 'selves' extended to include the chair as an extension of their bodies. Whereas I was highly aware of and triggered by the materiality of the wheelchair – the chair was quite uncomfortable leaving me quite sore in my back. Given this, my body felt separated from the wheelchair, and I struggled to achieve a level of enwheelment in which I was a competent and useful player.

Despite this initial experience, I enjoyed it. Mark, pushing his chair skilfully towards me with a sweaty body, dripping down his face, shoulders, arms and soaked in his shirt, said:

> *"You did well today bro, I will add you to the upcoming Stampede League. You have got fast hands and strong arms. You just need chair control, and basic rules of movements on the court and you are good". Others came around 'good work, Francis. Giles: "Please remember to help with 'your chair' back to the trailer, thank you" (Field notes, October 05, 2020).*

Ethnographers typically encounter moments like these – where we are 'tested' in order to gain acceptance and whether we can be trusted as genuine researchers in the environment (Hammersley & Atkinson, 2007). In my case it was not just social acceptance that I was striving for, but bodily acceptance in the social environment where I could operate in terms of not only exploring my own identity but establishing quality relationships with the participants in the environment. I wish the day did not come to an end, and it was the same for the players. The players will stay and chat for some extra minutes, sharing information about what the rest of the week looks like for them as well as their excitement ahead of the next training and tournaments. As everyone left the gym, and the evening progressed, the excitement wore off, however, the wheelchair left many unanswered questions in my mind that I could not wait to go back the next time to explore.

Familyhood

In Aotearoa New Zealand, families are central to how disabled people access assistive technology from provision, and usability to support (Taherian & Davies, 2018). It was therefore common to see in the setting how the concept of a family played an important role in the understanding of the "social and cultural sense of disability" (Casper & Talley, 2005, p. 117). For example, the club often organised social club events to promote a space where

disabled people and non-disabled members develop a shared sense of identity and belonging. However, what stood out was the club's members relating to each other like families.

> *In the setting, it was observable that members respected and adapted to each other, and communicated to each other with respect while sharing and spending time together. Mark drew my attention to the latter in one of our conversations that dived into the well-being of the members:*
>
> *You remember when we had the end-of-year dinner together, it was like a big family, a nice event where people bring their wives and girlfriends and mothers and fathers and kids and everyone's invited to just make everyone feel welcome and happy. If you treat people nicely then they stay around. We make sure that no one's getting abused or anything like that as people come to the club for a reason, you know. That is all the important stuff. We just tried to create a healthy good environment then new people will be happy to join. Interview with Mark (Trainer).*

In my initial observations and interest in the players' use of assistive technology, I did not expect such a clear and overt focus on the interpersonal aspects of the culture. Therefore, the AT played a role in fostering accessibility, trust, and respect for boundaries among the players. Thus, it was common for the club to conduct its activities in a family-like manner that allowed new and old players to better connect with the rugby chair, build trust, confidence and a sense of reliability in the club as a site that can meaningfully help them to learn skills and incorporate AT into their body.

> *At one of the club's social gatherings – it was a break in the season. It was announced on the club's Facebook page that members were allowed to invite and bring along friends, family and new members. Mark was chatting with a new member. Mark had a penchant for inviting new people to the club. Wearing a smile, he muttered to one of the invitees sitting next to him (a young man who had just come out from rehab) "Hey bro, I understand you just came out from the spinal unit, you should come over to our training and have a go in the chair if you have the chance, we all come together to play as a family you know, I will get you chair" Did you try it at the spinal unit in Auckland? Mark asked him. He responded, "No I didn't, I wasn't sure I could play" (Field observation, December 20, 2021).*

According to Wilson and Khoo (2013), social support is important for success in disability sports. As such, it was easy to see many supporters; relatives and friends of players served as supportive mechanisms offering social support and care, helping players with severe spinal injury change, transitioning between their day and rugby chairs, and offering physical support to the players when needed. One of those particular moments stuck with me:

> *Collisions and dislodgment of players from their chairs were regular, especially in competitions but could also happen during training. At one of the training sessions, there was a high-impact collision between Ben and Oliver. Oliver was dislodged from the chair in the process (Oliver has a severe spinal cord injury). Suddenly, Russ the father of one of the players, rushed, grabbed a mat and ran across the court to help him up. The mat was often placed under the wheel to prevent court damage. If players fell on their back, they were often lifted with one person lifting from the back while the other person guided the chair onto the mat from the front (Field note, April 14, 2021).*

This data is a sharp contrast to previous findings that indicated that family attitudes can be barriers to disabled people's use of ATs (Ravneberg, 2012). In this study, the actions of the members of the club reflected a sense of empathy towards the players as they incorporated the wheelchair into their athletic selves. In an embodied term, the sense of family in the club illustrated how the AT embodiment can serve as a bridge between oneself and others, establishing mutual relationships and connections between people. This observation was recorded in a conversation with Oliver when told me that:

> *"Sometimes, I don't have the urge to go for training, especially during times when I am recovering from some minor surgery or like when I have treated an infection, I want to be home and just relax but after that, you get lazy sometimes yeah, but these guys call me all every time like we are relatives yeah sometimes they will arrange for someone to pick me up to come and play. I enjoy that sense of family which is good otherwise I would be lazy throughout the season, Mark is a good guy" (Interview with Oliver).*

While disability sport has the potential to integrate disabled people into mainstream society (Misener & Darcy, 2014; Smith & Sparkes, 2019; Thomas & Smith, 2009), in this study, through rugby chairs, the team used the metaphor of family to describe the shared and interpersonal dynamics of the culture, regardless of impairment. It was common to see a culture in which both disabled and non-disabled members offered their support as volunteers. Indeed, volunteers appeared to be a vital support network in the efficient use of chairs for disabled players in training and competitions. Such that, they were mediums of access to playing wheelchair rugby and it is almost impossible without them.

> *That's the culture we try and create, it's a bit of a family, we look after our volunteers. We bring them all in, they're part of the group and new people. That's just how we like to run it. The people there are great, that's how we keep our volunteers for so long, they've been there for 10 years, they don't leave, they have just as much fun, and they feel like they're part of the family. They do so much for us, help at tournaments and give up their weekends, they do amazing things that we couldn't ask for. Volunteers just are amazing. We couldn't do it without them (Interview with Mark/Trainer).*

It was observed that using the rugby chair in a family-oriented sports setting reduced perceptions of disability such as weakness and pitiful in the outside world, it made a difference in the way families assessed players' abilities (cf. Brittain, 2004). More often than not disability sport is perceived with a more ableist view, one that focuses on disability and the athlete's athletic ability (Brittain, 2004; Silva & Howe, 2012). Due to adaptive technologies, disabled athletes' are "unable to embody athlete on an equal footing to able-bodied athletes" (Lynch & Hill, 2021, p. 12) as the technology becomes the means for justifying their performance other than their athletic abilities. However, in the setting, there was a constant commitment to challenge these stereotypical narratives through competition. This was illustrated in the way James described the Low-Pointers competition which was often organised like a 'family' having big a competition:

> *The Low-pointers competition happens once a year specifically tailored for players with severe impairments. This unique competition serves as a platform for athletes predominantly classified as 1.5 or below, demonstrating the club's commitment to*

give opportunities for players significant challenges. From my observation, it appeared it required a lot of effort to plan and organise compared to the other competitions organised by the club. Mark, Giles and James frequently will have a chat about the preparation for the competition after training, emphasizing the significance of the Low pointers in the club's annual calendar. James will then request the club members to support the organisation of the competition.

Out of curiosity, I asked James what was special about the Low-Pointers competition.

James, with a little pause and a think, answered "The Low-Pointers is like our family reunion where we all rally behind our mate dealing with severe injuries. Unfortunately, we missed out last time due to covid. People say these champs are boring, I mean it's very slow and can drag but it's a good competition for these fellas with severe impairment like Mark and Oliver who just want to play, you know to have a go at each other, show their athletic abilities and look I find it fulfilling to help them achieve their dreams, you know".

Giles jumped in uninvited saying, "Hey Francis, you should definitely come along to that Francis, to see what happens there, we all put in bits and pieces of everything, and is not the play for me, but the vibe of being part of this tight-knit wheelchair family. We all contribute in our own ways, and it's crazy how we make it happen" (Field notes, April 18, 2021).

Here, the data illustrated how events can be a powerful force through which the players can enhance their relationship with their wheelchairs. As scheduled the Low-pointer competition was held as planned. Players began to arrive at the Sports Events Centre, a multi-purpose indoor sports hall with some seating areas. The hall was being marked out for wheelchair rugby by volunteers who were all non-disabled people. Russ joined in to help:

James: 'Hey, Francis, can you help with marking the courts, grab the black tape in that bag and mark the penalty box on courts A and B'.

Me: Are the markings the same as we play in the normal game in Hamilton?

James: Yes, markings are the same, and chairs are the same (he laughs) but one significant difference in this event is the players have more severe impairment so you will see a lot of carers like family members and others assisting, coaching and organizing things around (Field notes, April 18, 2021).

On one hand, this scenario can be likened to previous research that suggested disability sport is a culture of social hierarchy; a power imbalance of nondisabled with most institutional managers (Howe, 2008) and coaching staff being abled-bodied individuals (Townsend et al., 2015). On the other hand, the low pointer competition often provided another opportunity for people with severe spinal cord injuries to connect with their families and others through the 'rugby chair'. As they displayed athletic ability, physical strength and considerable rugby chair control to score a try, it evoked a new sense of family bonding and support:

The final game was intense attracting loud cheers and roars from family members, carers and friends for every try from both teams. Oliver had a great game scoring an important try. "I haven't seen Oliver play so well like today; he is smashing it" (James). "Oh, his mama should be proud of him, he played good too in the morning game on court B too" (Sofia -Volunteer Official). Oliver received a prize as the rising player. With a thankful face he remarked, "I thank you all guys for this prize and also my mum for the support. Even when she is tired, she brings me to training, help me thank her" (Field notes, April 18, 2021).

This data not only demonstrates that families react emotionally to evidence of proficient use of wheelchairs but confirms the work of Litchke and colleagues (2012) who proposed that family support plays a central in enabling people with spinal cord injuries to participate in wheelchair rugby. Furthermore, an analysis of James' comments reflects an embodied experience of witnessing a remarkable performance from Oliver. Sofia's comment then adds another layer to Oliver's embodied experience, recognising his overall sporting competence with the chair. Taking together, the findings in this section, capture an embodiment of the sporting experience, encompassing the bodily actions of the players and the affects of an environment that does things in a family-like manner. Indeed, these embodied practices contributed to the overall success of the players "developing an

affirmative relationship with the wheelchair (and with disability), and necessary for them in terms of flourishing and living a good life" (Monforte et al 2021, p.2451) as enwheeled athletes.

The Chair Is The Game

What was immediately observable within the context of the club was that all participants used what might be described as a 'rugby chair', separate from their 'day chairs', to play rugby. In this context, the 'rugby chair' was a high-tech, aerodynamic indoor chair designed for the specific purpose of playing rugby – those without a 'rugby chair' were unable to play as it was considered unsafe to use their daily chair. Access to and 'becoming one' with the 'rugby chair' therefore was the first point of call for players in terms of playing, training, and competing in rugby. In this sense, whether participants were non-disabled/disabled people, young/adult, new/old players, male/female, partner/friend and amateur/elite players, use of the 'rugby chair' was fundamental to their ability to play rugby:

> *"The club has only eight rugby wheelchairs those are usually chairs that someone has finished using or if someone gets a new chair, they hand over their old chair to the club" (Mark, July 14, 2021).*

From an embodiment perspective, the phrase 'someone has finished using' did not necessarily mean when players permanently stopped playing the sport, it meant as participants' bodies changed, the chairs were no longer fit for their impairment needs so required new chairs. It could also mean to play at a high-performance level, players sought high-grade chairs such that they were willing to transfer the old 'rugby chair' to beginners. Thus, in the setting, access to AT appeared to be influenced by a transfer system that shifted used AT from one person to another, providing new and old players with considerable variety in the quality of chairs available.

In the day-to-day activities of the club, it was observable that the process for players' access to 'rugby chairs' was shaped by the level of players' performance in the club. In this sense, elite players owned their chairs, and old chairs were 'assigned' to beginners and social players while fairly new ones were used by those perceived as average players by the club. Typically, despite the shifting 'market' of chairs available for the players, and the informal status hierarchy observed in terms of individual skill levels, players gained a sense of

ownership with their rugby chairs, building a relationship with a specific chair to improve the playing experience and performance. This is typical of the process of enwheelment, where gradually players develop an embodied identity with the chair through which they experience the rugby environment and the chair is positively 'felt' (Richard et al., 2019).

> *"I am not fussy about the chairs, anyone available I pop in, but everyone knows this one is my favourite" (Ben, March 15, 2021).*

Ben had mild cerebral palsy which affected only his legs, and he was considered very good with rugby chairs in terms of speed and ball control but was struggling to manipulate the rugby chair out of tight spaces and corners. He has been playing for three years and is keen on improving his performance to the elite level. His hesitation was that he could not be officially classified to play at an international elite level due to his impairment.

Another dimension of access observed was the challenge for the players to integrate the rugby chair into their habitual actions. The process takes longer because, despite some players displaying varying levels of ownership of individual chairs, some chairs were shared among other players thereby reducing the possibility of using the same chair all the time.

> *"We are one of the strongest clubs in the country, I think this is because we are lucky to have enough chairs to pass around but when you have someone who wants to take his or her training and performance to the next level, it becomes a challenge since they can have a chair to themselves. Levi nearly stopped playing because of this, some people have left because of this too" (Mark, July 14, 2021).*

However, the challenge was reduced significantly when players had their own chairs custom-made for their impairment.

> *During training, Mark wheeled into the court carrying on his lap a big black bag and wearing a big smile which was noticeable by all. It was noticeable the bag contained the wheels of the new rugby chair which belonged to Levi. Levi always looked up to Mark for inspiration. This was not surprising to me. In normal life, a few times that I met Mark he was a reserved personality. However, he was admired by many in the club. He acquired his disability after fracturing his neck bone in a motocross accident. Much of this admiration stemmed from being a former Paralympian- he competed in*

wheelchair rugby at two Paralympic games, has a family, has a degree and a good job. He was perceived to have defied all the medical and social notions of living with disability by members, especially those who had just started playing.

In a short ceremony before the start of training, he also presented a new custom-made chair to Oliver: "We are grateful for the chair from the Lion Foundation[7]. It cost about 11,000 New Zealand dollars" (Mark).

"This chair should make a lot of difference today" Jon – Jon is the club mechanic (Field observation, March 15, 2021).

This ceremony was a landmark as it symbolised a dimension of access which is contoured by power – that is, the ability to… (Nind & Seale, 2009). Oliver had been playing in a club's shared old chair for about a year. He had fractured his C6-C7 vertebrae after a miscalculated dive into a swimming pool. Though he had become faster, more agile and skilful in a club chair over time, he lacked what Papadimitriou (2008) suggest is essential in the process of enwheelment, the capability to use the chair in a way that his bodily awareness extends to the frame of the chair. Further, he did not have the financial means of acquiring his own chair, one specifically made for his body. By receiving a custom-made rugby chair, Oliver was empowered to play with an enhanced possibility of achieving success in the sport. Most importantly, excerpts of Mark's comments reflected how access to rugby chairs was influenced and controlled by institutional power through sponsorship and donations from corporate organisations and charities. This also highlights how access to AT facilitated through governing bodies, sport organisations and funding agencies has the potential to influence the distribution of AT resources in ways that could favour some selected few. While these factors may limit the autonomy of clubs to purchase ATs at their discretion, in this study, it rather helped the club to navigate the high cost of AT which is a major barrier to disabled people's access and participation in sport (Brittain, 2016; DePauw & Gavron, 2005).

Previous research by Brighton (2015) had shown that athletes like to change the aesthetics of their wheelchairs, however, this was not prominent in this study, but the players were focused on what they could do with the chairs. In other words, modifying the way the

[7] The Lion Foundation is one of New Zealand's oldest and most respected Charitable Trusts that sponsors high-cost sport assistive technology for disabled athletes through the regional Parafed Organisations.

chair looked was at times secondary compared to the way the chair would improve their athletic strength and mobility. For example, the relationship Giles had with the chair was highly functional, a reflection of what Standal (2011) described as a process of rediscovering loco-motor capacities after sudden injury, where the wheelchair affects 'being-in-the-world' and an individual's subjective experience with movement in space. This was evident in the way:

> *Giles swivelled his chair through a couple of players and headed towards the try line. But he fumbles with the ball and, in haste tries to gather the ball and regain control of the chair, Oliver seizes the rebound opportunity, charges in with a ferocious push and smashes his new chair into Giles, Giles was left sprawling on the court with the surprise of all (Field note, May 24, 2021).*

Giles comes across as a nice, decent, soft-spoken gentleman. His tactical knowledge of the game is unmatched and always on the lookout to offer tips for players to improve their performance. He was one of the reasons why some of the players such as Ben do not want to miss training. He was an active nondisabled rugby player until a bad tackle in a rugby game caused his spinal cord injury. He took up wheelchair rugby when he met Mark at one of his rehab sessions. Similar to disabled players interviewed in Sparkes and Smith (2002), Giles's pre-experience in nondisabled rugby before becoming disabled appears to be the reason for his attraction to the physical contact nature of playing wheelchair rugby. Here, Giles's access to the 'rugby chair' can be connected to Nind and Seale's (2009) access theory of physical access. A process where he relived the physical experiences of being able to make physical contact, swivels and feints as he did in nondisabled rugby:

> *Researcher: Did you experience similar feelings when you played nondisabled rugby?*
>
> *After a long silence and deep thought, Giles answered "Yes, see it is the same structure and the same way I get ready those times. It looks a little bit different on the outside but for me; it is essentially the same thing. I could not play rugby without my boots - I cannot play rugby without my chair. I could make all those hard tackles and I still make them now, look without the chair I can't. I do my little tricks; you know here and there with the ball even better with the chair haha!" (Interview with Giles, March 15, 2021).*

As been described in the literature, wheelchair rugby and other sports like American football signify a 'normal', hegemonic and heterosexual masculinity (Gard & Fitzgerald, 2008) raising questions about whether disabled people can engage in wheelchair rugby. As a matter of fact, the way the club conducted its activities, particularly training and drills with the rugby chairs were not different from scholars who described wheelchair rugby as a "hard-hitting" sport (Litchke et al., 2012, p. 27). As I observed in the setting, the aerodynamic design of the chair, rapid racing and physical contact nature of the sport did not hinder players' participation, even those with severe impairment, as one would have thought. The players were positive and enjoyed the aggressive and physically tough nature of the sport, relishing the sport's alleged viciousness of the sport. This was illustrated by Mark and Maya when I asked:

> *Researcher: I have noticed the chairs get a lot of smashing either training or competing; does it affect your body in any way?*
>
> *I understand people think the game is dangerous, but they don't know we are safe, the chairs wear down now and then (but) the chair is made that way. It did bother me that I would break my finger or something when I started but now it does not bother me just like any other sport you have injuries too (Interview with Mark, May 24, 2021).*

For Maya, she decided to answer the question by comparing the rugby chair to her everyday chair. In doing this, she narrated how she embodied trust and a sense of safety in the rugby chair as compared to living in the world through her day-to-day wheelchair:

> *In the rugby chair, you're not going to go backwards like with a daily chair when I am out, you're safe; you feel safe in them. So, the minute someone smacks you, you realise you are so safe. And I think the sense of feeling safe; even though we're playing quite an aggressive sport is a really important element of why it feels so good to play. Because I'm strapped in, I'm not going to go anywhere, my chairs not gonna tip over backwards. It's designed to take these hits. And, you know, because of that I feel like my life in my day chair feels quite precarious (Interview with Maya, April 22, 2021).*

The data also highlights how in the process of being an embodied athlete, the chair plays a crucial role in embodying the brutality and aggression of the sport which is often taken for granted. Most commonly players will burst the wheels of the chair due to ferocious contact. I watched Maya experience this with her chair when trying to do a defence in one of the trainings. Because of the severity of Maya's impairment, she often played in a defensive position – a common tactic in wheelchair rugby where the chair gets smashed into often. Maya had a spinal cord injury. She injured her C6 and C7 neck bones through a misjudged dive while surfing. She is viewed as a multi-sport star in her community as she is also involved in swimming. Maya took up wheelchair rugby after being identified by a coach who believed she had "good triceps" to push and control a 'rugby chair' despite her very weak trunk muscles. In an interview, she narrated to me how the journey of incorporating the rugby chair into her world took off:

> *In a low voice which is unusual for Maya, she said "Three months after my accident I met James, who's the coach of our team down here, and I got kind of hooked up with him as just a good peer support person because he's got two kids who were the same age as mine, and as soon he met me, he was like, "can you lift your hand above your head" and I was like "yeah" and I demoed it for him. He then goes, "Can you raise it? And then he's like, "Whoa, you've got triceps, you need to come and try wheelchair rugby", and I'm like, "Do I? And he goes "No, no you do!" and so he (the coach) just dragged me down to the gym, I met the team and I got into the rugby chair for the first time three months after my accident and I loved it, and never looked back and it was the best thing I did for my recovery" (Interview with Maya, April 22, 2021).*

Maya's story above affirms Standal's (2011) point that incorporating the wheelchair is also an essential part of rehabilitation for people who have suddenly become disabled. For Maya, the process of incorporating the wheelchair was something more than a rehabilitation exercise, it involved specialised practices that ensured the chair was in good condition for the players to always use at all times. In the club, the mechanics played an integral role in maintaining the chairs, either in training or competition:

> *Players often turned to Jon when the wheels were damaged, so he was vital to each player's bodily experience playing with the wheelchair as well as enjoyment of the*

sport. I asked Jon "You always have spare wheels for everyone?" He responded "Oh I just bring enough, it's a common thing, I don't know how many wheels I have changed on this court, maybe hundreds, thousands" (Field notes, 15 March, 2021).

While it took a great deal of work for Jon to ensure that the chair was in good condition for players to experience what Monforte et al. (2021) described as "positive enwheelment with the chair" (p. 2451), it even took something more than a great deal to ensure the fit between athlete and chair was right. This appears evidenced in this brief conversation between Jon and me on one occasion when he was adjusting and refixing Oliver's new chair. The process required Oliver to be moved in and out of the chair a few times:

Me: "Jon, so everyone with a new custom rugby chair goes through this?!! I thought it was the right size designed for him by the manufacturers or…?"

(Jon sensed the confusion in my eyes)

Jon: "Haha! It doesn't work that way. It is not plucked and play! I still have to do this, it is called "setting up". I do adjustments, strapping and stuff like that especially here on the court so I can observe while he is using it. It is a frustrating process but, in the end, (it) is good for them I think" (Field note, 15 March 2021).

These data illustrate what Winance (2006) refers to as "material adjustments" (p. 55). In this context, Jon engaged Oliver in a trying-out session consisting of fitting the chair and positioning and repositioning the different parts of Oliver's bodily schema – his legs, arms, feet and back to locate the most comfortable position for him. This is an example of the several dynamic practices involved in the embodiment process of the players as the testing and remaking of chairs is central; shaping and defining the extent to which the players could perform to the best of their abilities. The statement below from Mark extracted from the club's Facebook page is a good illustration.

It was great to see how much faster and more manoeuvrable he was on just his first go at it. I look forward to seeing Oliver flying around the court in the weeks and years to come! (Mark wrote on Club's Facebook Page, on March 16, 2021).

So far in this chapter, it is evident that the club and its activities were a dynamic site in which a range of embodied practices were evident – resulting in varying degrees of bodily incorporation of the rugby chair. Papadimitriou (2008) suggested that "becoming enwheeled is not only a means of becoming newly able but is constituted through practices and through doing" (p.699) when access to the chair is established. This can foster an intimate relationship between their impaired bodies and their wheelchair while integrating the wheelchair into their sports world. Therefore, it was most important that the sessions, training, ceremonies, games and exercises were lived and facilitated through the rugby chair, which helped the players experience new wheelchair actions that helped enhance their physical capacity.

Wheelchair as Symbol of Physical Capacity

Building on Papadimitriou's (2008) work, this theme is foregrounded to understand the embodied aspects of the process of enwheelment. The idea is that the process of 'becoming en-wheeled' can be characterised by an embodied experience of action and physical meaning-making. In this context, while previous research reports that becoming enwheeled is a complicated negotiation; reorganizing, and reconfiguring one's way of being (Papadimitriou, 2008), for some of the participants in this study, becoming enwheeled while playing wheelchair rugby involved a moment transformation of their physical self, opening them up for newer capabilities in an athletic way. As such, I argue that this process reflects a set of embodied negotiations, whereby developing an 'enwheeled self' requires a (re)discovery and (re)ignition of an athletic self. As established in previous research, the incorporation of range of "assistive technology simple to complicated and it alone does not into the does not dictate athletic performance" (Hill et al., 2014, p.162) how with training enhancements one becomes athletically re-embodied. This was evident in Giles' response when I asked him:

> *Researcher: I see that you are good with the rugby chair. Was it like this from the start because you did sports before?*
>
> *Giles: Probably frustrating, it was extremely frustrating because I have been involved in sports, for a long, long time, and then you hurt yourself and you are weak, and everyone else is zooming around you. But with training, suddenly there is the realization you are as athletic as everyone else because you are in a rugby chair, and it is good.*

Through an embodied interaction with the rugby chair and his immediate wheelchair rugby space, Giles transformed frustration of his 'weaknesses' to regain a sense of athleticism. In this context, Giles was involved in an embodied realization of his impaired body being transformed from able-body to physically disabled body to wheelchair abled-body. Through training in their natural setting, some of the players were able to renegotiate their body citizenship by constantly reconstructing themselves as a physically strong athlete through their embodied use of the chair. This had secondary effects, such as improving their mind and body schema. It improved their body schema in the sense their athletic body acts spontaneously without any pre-thought when it interacts with their ATs:

> *(Conversation with Ben at one of the trainings)*
>
> *Researcher: Looks like there is an improvement in how strong you are now in terms of playing wheelchair rugby.*
>
> *Ben: Yeah, I think I have noticed a bit more because obviously, in a way, I am using muscles that I do not use frequently on a day-to-day basis kind of thing, being in a wheelchair just for sport. So yeah, I have noticed, I am a bit physically better, and a bit stronger in the mind as well due to the tactics of the games.*

Previous research suggests the incorporation of a wheelchair is an embodied practice where athletes must navigate experiences of what Monforte et al. (2018) described as 'assemblage restitution'. Monforte suggests that assemblage restitution refers to narratives about the restoration of something lost (i.e. function ability and athleticism). In the case of this study, restitution meant the restoration of the disabled body through the assemblage with the chair. In this context, the players reconfigured their physical and personal self, bodies and skills through a dynamic interplay with the wheelchair. Aspects of this were identified in the responses from some of the players, in that, in the process of enhancing physical skills, Mark described how the 'rugby chair' reinforced the weakness of his body and the struggles of playing sport with long-term immobility. This emerged strongly in Mark's story below where the process was not swift, it took time:

> *It was really hard because the chair was excessively big for me, and I was not very strong. I have just been in hospital for a few months and lost a lot of muscle strength*

and power. I was just slowly trying to push around the court in this big chair, but the other guys whizzing past me. I do not know, it was overwhelming how fast everyone was and how good they were and stuff like that, compared to me just trying to get around in this big chair. But I don't know it didn't really put me off or anything like that it made me want to play and maybe want to get better in a sporting sense. Interview with Mark.

As disabled athletes incorporate the wheelchair into their *self*, it redefines what the impaired body can and cannot do (Howe, 2017; Moser, 2006). According to Papadimitriou (2008) in becoming competent wheelchair users, disabled people are confronted with the situated nature of the process where they may see themselves as capable, as 'active doers' in the world at one point and at other times not. Aspects of this were magnified in the context of this study. For example, Clara's use of the 'rugby chair' within the wheelchair rugby setting sparked a process a type of re-embodiment where the forgetfulness of the device can allow the user to embrace different physical actions in the world (Standal, 2011):

I played regular rugby for like two years but not that long because of what happened (Clara developed muscle stiffness and spasms in one of her legs growing up slowing her sense of free movement). Now, I am pretty fast. I mean, I am building upper body strength. I am definitely speedier. I think that as you play more with the wheelchair, you get more strength. Interview with Clara.

Clara is not an everyday wheelchair user. However, due to her muscular condition in her leg, she relied on the rugby chair to be able to participate in wheelchair rugby. At that moment she assumes an (albeit shifting) wheelchair embodiment that provides her with free movement as well as a positive individual perception and image of her 'enwheeled' *self*. Taken together, this represents an example of how the image of the disabled body can facilitate a superior feeling of one's own body, independent of its movement in spatiality (Langer, 1989; Young, 1980) when it interacts with sport-specific assistive technology. At times, the process of becoming competent wheelchair embodiment required the players to transfer enwheeled knowledge from previous situatedness to another while learning the values of the sport in their new setting. Ben's experience below exemplified this:

… with wheelchair rugby, I have only just started playing recently but in the past, I played wheelchair basketball for four years. I already had wheelchair experience. So it was not like for some people, where manoeuvring the wheelchair is the hardest part to start with but for me it was more of, learning the tactics and the rules of the games in the chair, that was where I was a novice in that sense. I did not experience that kind of I guess teething period of not knowing how to manoeuvre the wheelchairs, per se. I was lucky in that sense; I can remember and apply my experience when I played wheelchair basketball (Ben).

Previous research has suggested while some disabled athletes struggle with their embodiment due to the tension between their technology lives and navigating their natural environment others do not (Butryn & Masucci, 2009; Wickman, 2007). However, in this study, Ben's embodied experience as a wheelchair athlete represented those sections of athletes who did not perceive the process of embodiment as a struggle. By using the rugby chair in the setting, Ben's comments below suggest that he becomes physically active, and sensitive and engages the wheelchair in a positive spatial-embodied experience. This was illustrated in a conversation when I asked him:

Researcher: Would you have been able to play nondisabled rugby, if you wanted to, considering your Cerebral Palsy is mild?

I guess in the rugby chair it is a lot easier to kind of move around and dodge. I know that, potentially, I would not be able to do as well standing up. Given that, my disability is in my legs. I guess yes so when I am in a rugby chair, I am relying on my arms to do all the movements and stuff which is perfectly fine. Therefore, I can perform I guess yeah more physical movements, a lot more successfully (Ben).

The data puts embodied movement (cf. Murray, 2004) into perspective, in that the ability to initiate embodied learning and skills was not only integral for Ben's incorporation of the wheelchair but enhanced his awareness of his own bodily actions and sensory experience in relation to his performance. This essential embodied action was however not quite straightforward for other players like Clara. This was observable in the setting where she had to navigate different uncoordinated actions to make the wheelchair and her impaired body part of her body schema.

Clara's movements were constantly 'controlled' by and impacted by the rugby chair. Clara could not confidently steer the chair in the desired direction with both hands, the situation was even more difficult when she was in possession of the ball and she tried to push it with one hand, she got stuck and often turned in the wrong direction. Nevertheless, Clara navigated these challenges and built competence and confidence due to the constant training with the chair (Field observation, 20 June 2021).

In the end, she adapted to the dynamics of using the rugby chair in the setting, despite the chair demonstrating agency over her body as she wrestled with it. However, at times, this form of wheelchair embodiment required disabled people to adopt an intense form of environmental consciousness and awareness (Jones, 2017) to navigate the failures of the rugby chair to become enwheeled competent with their wheelchairs. This was evident in Giles' response when I asked:

Researcher: How have the skills gained from the wheelchair rugby environment impacted your overall physical abilities?

Not so much on how I use it but how I set it up. So, just recreating the bits and skills like in wheelchair rugby so it makes me more stable during everyday life. So, I have taken little bits and pieces from that (rugby wheelchair experience) to help with my chair setup, just to make everyday life easier as well as my physical well-being (Giles).

As shown so far, it is possible to achieve wheelchair capacity through the ability to negotiate personal body and physical actions. By adopting a positive physical engagement with technology, disabled people move away from the rigidity and narrow mindset (Dolezal, 2017; Goodley et al., 2014; Monforte et al., 2021) that impedes the possibilities of using the wheelchair. The process of becoming an enwheeled athlete as I have highlighted in the context of wheelchair rugby culture reinforces the notion that in a given setting, wheelchair users can redefine themselves as capable, active doers and feel included in the world (Papadimitriou, 2008) they consider as part of their being.

Wheels of Inclusion

Despite their many and varied trajectories towards fully embodying the wheelchair to play rugby, for the particular group of athletes it was clear that the wheelchair acted as a symbol

for, and instrument of, inclusion. For example, for Oliver, his early inclusion in a new sport during and after rehabilitation made possible by wheelchair symbolized not only a sense of identifying with a sport but signalled an understanding of his 'new' embodiment:

> *Around 2017, I was in the spinal unit, I saw the guys using the wheelchairs and Mark (the club trainer) actually came and asked me to come train. This was before my hand surgeries. I have gone to, and I have been going to training a couple of times during the year. When I had my hand surgery, it put me off for a bit, for a while. It was a setback, for a while again I did not follow it through the next year because I knew my other hand was going to be done. But when I finished, I went back to playing for some time, I felt included and then immediately I knew it was a sport for me (Oliver).*

There is a dominant, and highly medicalised, narrative that positions sport as a tool/vehicle for rehabilitation – positioning disabled people as dependent and helpless and in need of integration – and in which assistive technology provides the means through which to participate. However, for the athletes, the wheelchair provided an immediate connection to a sport, and with those feelings of acceptance and belonging:

> *Researcher: Describe your experience after the first few trainings when you started playing.*
>
> *After a deep breath Mark responded "Hmm, I don't know, because the chair was like twice the size of me. It was really, really wide, and hard to push. But I just took to the game straight away. I was hooked to the chair the moment I started. I just liked the team environment, they welcomed me, and it was really good" (Interview with Mark).*

Mark's experience reinforced how within the sporting spaces; wheelchair use not only symbolised a form of inclusion but a medium of inclusion through which a player's sense of self-acceptability was achieved. At times, the process of using the wheelchair as a way to achieve inclusivity in their chosen sport opened conversation around the complex relationship between inclusion, gender, impairment, and technology. In this context, Maya often took the opportunity at any conversation with me to make a point about the concept

of inclusion, particularly about how the wheelchair helped her to navigate any gender unfairness that may otherwise exclude her from playing sport:

> *I play wheelchair rugby now, and I am a 1.5, but as a female, ordinarily, I should play as a 1.0 due to my impairment. So, the team gets a benefit from having me on the team, we get to play .5 over which is fair, I think. Like I said before it is good for my inclusion in the game (Maya).*

While, the wheelchair provided Maya a sense of equity to experience the game in a way that she became actively included in a meaningful way, for some of the players the wheelchair provided a bridge to smoothly transition from an individual sport to a team sport environment. In other words, embodying the wheelchair, it became a vehicle (literally) for inclusion when they achieved enwheelment. For example, Ben shared with me that the wheelchair was a means to escape from the isolation of other sports:

> *When I arrived from Dunedin, I wanted something different from athletics and I saw that in the wheelchair. Like I said before athletics (referring to the T35) is an individual sport, it is quite isolating for a lot of the time and so wheelchair rugby is cool that I get that inclusive team environment. Also, I knew Mark really well and knew that he played or used to play wheelchair rugby and was still involved quite heavily with it (Ben).*

In this context, it is evident that the role of ATs was not only essential in allowing disabled people access to team sport. Most importantly, it can help to expand the relationship between inclusion and the process of embodiment, as to how athlete identities are constrained and included by environment and other bodies (Fullagar, 2017; Monforte, 2018) but most importantly through assistive technology. For example, Clara was invited by a friend to watch a wheelchair rugby game and then decide whether to play or not. Upon seeing the game, the dynamics of the rugby chair triggered sensations of curiosity, stirring up Clara's inner will to try the device:

> *Researcher: I remember in our earlier conversation at training the last time, you said did not want to use the wheelchair after your condition; how come you are involved in wheelchair rugby?*

So, I went along and watched it (referring to wheelchair rugby) once, and I thought it looked cool. As in I was getting good vibes and that was a pretty good environment. I was like "Oh yo, wheelchairs are also for that", and that was even cooler ... what! It was very different, so I was like, ooh I will try it. Because of the wheelchair, I just went to every practice after that (Interview with Clara).

This was the first time Clara learnt that wheelchairs could facilitate the inclusion of her embodiment in sport. The knowledge of the rugby chair accentuated feelings of happiness and a sense of *'being part of'* and *'getting involved'* in a sport while gaining athletic abilities. Thus, in embodying the chair some of the players expanded their opportunities for inclusion. For example, Clara expressed how the wheelchair helped her to physically gain access to the sporting environment as well as feeling emotionally inclusive when I asked her:

Researcher: How has the feeling been like so far being able to play a sport with the rugby chair?

With a little smile at the corner of her cheeks, Clara muttered, "(it's a) good feeling, I feel pretty happy. Just playing and enjoying the sport (wheelchair rugby), being part of a team, and getting involved. Picking up new sporting and wheelchair skills" (Clara).

From an embodied perspective, the sensual bodily emotions during the 'enwheelment' process can be central for disabled people's inclusion in sport. Most importantly in this section, on one hand, I have illuminated how the wheelchair can be a symbolic material when it comes to making activities and the sporting environment open for everyone. On the other hand, the analysis also points to a further understanding that participation in wheelchair rugby can generate a vehicle of belonging, comfort and inclusivity (Aitchison et al., 2022), specifically, for disabled people who seek a state of enwheelment. While this perspective may sound positive, it raises the need for further interrogation into how the complexities of becoming enwheeled rugby players are salient, particularly about the setting, others and the broader society.

Enhancing Social Relationships

In “enhancing social relationships” theme, I trace the players' embodied experience of incorporating the rugby chair into their on and off-court actions from the perspective of interpersonal and social interactions. It was observable that the way technology is used in disability sport can be central to expanding peer support, and social networks and developing social relationships and interactions. As such, in the setting, many of the players described how participating in wheelchair rugby enabled their reconnection with the social world after long periods of rehabilitation. Wheelchair rugby provided a sense of community as players developed long-lasting friendships, a way to network, meet and build a ‘world of their own’ with people who accept their condition. For example, Oliver emphasised how playing rugby helped to develop self-efficacy, self-confidence and the opportunity to connect with the outside world through the rugby chair.

> *Researcher: How do you feel having the opportunity to play for two years now?*
>
> *It just makes me feel good too that I am doing something positive and never stop doing those kinds of things that make you stand up and be independent. Other people start noticing. Good for myself, health-wise. I am just meeting new people too - like yourself and making new bonds with other people and using the wheelchair with other people with disabilities (Interview with Oliver).*

Here, the data is important as it shows how technology, particularly, the routine access and use of the rugby chair can facilitate ‘social agency’ (Pavey et al., 2015). In this context, the chair provided the ability for the players to exert some level of control over their social lives and empower them to engage in sports. Despite the different abilities in the setting, the rugby chair enabled the players to develop independence through strong social bonds with the outside world through training and competition. By using the rugby chair with like-minded people, the chair in the process of embodiment, tends to facilitate opportunities to learn how to overcome technology struggles while gaining feedback and support that enables them to develop efficient use of the chair. This was highlighted in Leo and Clara's following narratives, in which they outlined how the social world was central to their embodiment of the wheelchair:

If I do something wrong with the chair, they (referring to the players, coaches, and other members of the club) will give me feedback and give me tips, on what I should do, and that just helps me feel better because then I am not frustrated. It was just getting that frustration out of my head, really and adjusting to the wheelchair. Interview with Clara.

…is about having a community where you can actually find out about the wheelchair and the game itself for a while and then debate if you should give it a go if you are interested in that. Then long term when you keep playing you have access to coaches and people that can support you with advice to do what you want to do. It is all these things, which we are lucky to have around here. Most of us have access to that, but again not everyone does. Interview with Leo.

The above participants' testimonies offer an explanation for the assumption that embodiment – as it relates to the life world – can be known through the spatial interaction of a person, an object and the people around it (Merleau-Ponty, 1962, 2004). Here, as Warren and Collinson (2015) asserted, "technology can open up social space" (p.444) to establish connections with people in their immediate community helping to redefine notions that perceived wheelchair users as 'other'. This was illustrated in Maya's comments when I asked:

Researcher: What is it about wheelchair rugby that makes you continue to play?

Maya: It's the community, and it's the laughter and it's the camaraderie and the fact that we all just get it. You can walk into that space or roll into that space, and no one, no one is gonna go; what happened to you? Because we all know what happened to us. Because we're the dominant group in that space.

Importantly, this remark is evidence of how the chair can be a symbol of power, visibility and representation (discussed thoroughly in chapter seven), normalising the space without creating any distinction among the group. Additionally, the data appeared to align with research that indicated despite the ableist assumption that the wheelchair is a symbol of limitation and incapability, however, it is also central in the process of normalization (Papadimitriou, 2008; Winance, 2006; Woods & Watson, 2004). Indeed, previous research suggests that organized wheelchair rugby creates a social network that allows participants to

share experiences, discuss adaptation practices, and communicate their impairment experiences (Lindemann & Cherney, 2008). As such, the chair symbolised an artefact of the culture that only took on meaning through the embodiment of the players. This was evident when in playing wheelchair rugby, Maya's embodied experience as a 'disabled mum' or 'disabled partner' or 'female wheelchair rugby player' was shared, normalised, and accepted within and beyond the setting. This is illustrated in her narrative below while reminiscing about her first interaction in joining the wheelchair club after rehabilitation:

> *They were just totally open and accepting. And then my family, my kids, got to meet a community where their mum wasn't the only one in a chair; there were other parents there too. You know, so then they're like oh that's cool. And then, my partner could then talk to other wives or, other partners and find out what it's like to be a partner of someone who's a tetraplegic. Interview with Maya.*

Technology can improve the physical, emotional and affective experience of disabled people through their impaired bodies (Goodley et al., 2018). As such for some of the players, the process of enwheelment extends beyond the sport into their personal lives building an affective dimension. For example, through the chair, the wheelchairs enabled an empowering personal interaction facilitating Mark's ability to perform parental duties. These findings are exemplified through Mark's experience of his day-to-day use of the wheelchair:

> *I guess just from the moment I get up I hop in it and get to get around the house. Get out of the car when I go to work and look out for the kids. They climb up on me, sit on my lap while I wheel around, and stuff like that - to carry the kids around, and it is good for my relationship with them. Interview with Mark.*

In summary, the sociable, warm, friendly culture and non-prejudice nature of the setting allowed for an opportunity for the players to "rebuild the disruption between their body, technology and the world" (Standal, 2011, p. 171) caused by society. Based on this perspective, it can be argued that a culture free of ableist attitudes is fundamental to facilitating a successful process of AT embodiment. Moreover, while ableism can perpetuate stereotypical attitudes and stigmatization from society, as I have shown the AT embodiment is powerful to socially construct disability beyond physical deficit and individual problem. In other words, AT can be successfully incorporated into one's being void of notions that portray

wheelchair users as socially demeaning (Papadimitriou, 2008; Woods & Watson, 2004). As such 'rugby chairs' are not only symbols of inclusion but can enhance positive relationships and interpersonal values, a unique and essential affective dimension needed for the incorporation of chairs to take place.

Conclusion

While there are many studies about the benefits of disabled people's participation in wheelchair rugby (Haslett et al., 2017; Lindemann & Cherney, 2008; Litchke et al., 2012), only a few have explored the embodied experience from an ethnographic perspective. In this chapter, I have provided some ethnographic understanding of how disability and AT as well as explored the process of using a wheelchair to gain a context-specific understanding of AT and its role in disability sport. Together this chapter suggests that 'enwheelment' is not a linear process but heavily reliant on an individual's ability to incorporate the chair into their habitual use – for some it's harder than others, it takes more time, it relies on their transfer from everyday wheelchair use to sport, or their athletic dispositions before their injury. These embodied understandings related to the process of 'enwheelment' are often missing in the disability and sport literature. Thus, this chapter has provided me with some initial threads to investigate other dimensions of AT further in the subsequent chapters.

Meanwhile, in this chapter, I have illustrated that the "enwheeled" (Papadimitriou, 2008, p. 694) is, as a concept, intended to point a way of being in the world is not merely mechanical or practical (as skill acquisition is often assumed to be) but also existential and embodied. In doing so, I have demonstrated access to 'rugby chair' and wheelchair rugby in a close culture can engage the disabled athlete in a new field of bodily experiences (Winance, 2006), and the technology becomes enabling (Pavey, Warren and Allen-Collinson, 2015) to participate, train and compete in sport. Sport-specific ATs, in this context, trigger sensory actions which enhance social relationships, inclusion and participation in sports. As evidenced in this chapter, ATs enabled the creative shaping of the self and social identity (Ravneberg & Söderström, 2017b, 2017a; Ripat & Woodgate, 2011), integrating disabled people into the community and provided some positive embodied experiences. Most importantly, access to the ATs (rugby chair) promoted a unique way of understanding acceptance in a closed group, in that, it accelerated interventions that encouraged disabled people's involvement in sport. For example, by using rugby chairs in a familiar environment, the ATs became quickly

embodied, provided an avenue that transformed the player's physical disability and self and, opened them up to achieve wheelchair competency athletically. Though lack of access to AT can restrict one's environment (Butryn & Masucci, 2009; Hammel et al., 2002; Widehammar et al., 2019), through sport, disabled people became confident in the environment, acted *from* the AT (rugby chair) in ways that transformed their wheelchair embodiment from 'disabled' to become wheelchair 'able'. Consequently, this opened further questions into how disabled athletes navigated and constructed their self and body as they intertwined with their sport ATs. This is explored in the chapter that follows.

Chapter Six

"I feel like I am a bloody transformer": The Hybrid Self and Embodied Negotiations of Assistive Technology

Introduction

This chapter builds on chapter five of this thesis, which focussed on offering an understanding of the process of enwheelment, through the experience of the rugby wheelchair among a group of disabled players. Specifically, I explored the enabling dimensions of the 'rugby chair' and its interaction with the disabled body. The findings outlined in chapter five raised further questions about the role assistive technologies play in contributing to the construction of the 'sporting cyborg' (Sparkes et al., 2018). As I have described elsewhere (see chapter two) in a sporting context, the cyborg refers to the "increasingly intimate relationship between humans and technology" (Butryn and Masucci, 2009, p. 287) in which the boundaries between the two are 'blurred' in so doing altering, problematising and challenging normative views of embodiment.

In the previous chapter, it was clear that the wheelchair played a key role in the production of (disabled) athletic bodies and identities, where the athletes were navigating between natural, artificial and social boundaries in order to explore their disabled sporting embodiment. However, while the cyborg metaphor paints a relatively clean and sterile or sanitised version of AT embodiment (cf. Bale & Vertinsky, 2004), what was clear that the wheelchair rugby environment was an important site for possessing meaning and memories – a site of "sensuous geographies" (Bale & Vertinsky, 2004, p. 2) embedded with meaning about AT embodiment. Thus, while disability sport functions as a space mediated by technology, I wanted to explore the lived aspects of cyborg sporting bodies – what Merleau-Ponty (1962) argued was an "embodied consciousness" where the body is "the locus of a dialectical relationship with the world and the fabric into which all objects are woven" (Meier, 1995, p. 92).

As such I want to further explore the ways in which technology becomes figural in the experience of the body, focusing not just on the corporeal but the subjective and intimately experiential aspects of AT use (Asare *et al.,* 2023). Such understandings are crucial for

expanding the intersection of the body and technology in disability sport. What is more, “it can still be argued that the sociology of sport has to date addressed the body primarily at a certain abstract, theoretical level, with relatively few accounts to be found that is truly grounded in the carnal realities of the lived sporting body” (Hockey & Allen-Collinson, 2007, p.116). Additionally, as I have argued elsewhere the existing cyborg literature lacks an understanding of the diverse embodied experiences of the hybrid disabled sporting body and how they shape the self, and identity of disabled people (Asare *et al.,* 2023). Such a focus on embodiment is important, illustrating the processes through which the self, identity and the technology-mediated sporting body are intertwined (cf. Merleau-Ponty, 2004) as disabled people navigate disability sport. Despite the importance of embodiment, less is known about how technology amplifies issues of bodily agency and subjectivity in the lives of disabled people (Moser, 2006).

In this chapter, I extend the work in chapter five to explore the embodied realities of becoming a hybrid sporting body (Apelmo, 2012; Butryn, 2003). I collected data through semi-structured interviews with 12 disabled athletes participating in various sports and utilizing different assistive technologies. The athletes I interviewed used a range of assistive technologies, including ski prosthetics, adapted rowing prosthetics, cycling prosthetics, dual-function electric wheelchairs (used for everyday life and sports participation), as well as rugby and basketball wheelchairs (see Asare *et al.,* 2023, for a fuller methodological discussion). The semi-structured interviews, lasting between 45 and 60 minutes, allowed both the participants and me to delve deep into their embodied experiences of their assistive technologies. As illustrated in chapter three, to do this, I asked questions such as 'Describe your first-time experience of using your sport assistive technology' and 'How does your assistive technology help you participate and play your sport?'. Using embodiment as a lens, I conducted a reflexive thematic analysis, following the process discussed in chapter three. This analysis revealed several themes related to the sense of freedom, access and independence, construction of self and otherness, access to knowledge and knowledgeable others, and embracing a way of moving and embodying the subjectivities of AT. Each of these themes is discussed in detail below in this chapter.

Freedom, access and, (im)possibilities

In understanding how technology shapes the lives of disabled athletes, it is necessary to recognise that for disabled people, impairment can limit and reduce the opportunities available to them day-to-day (cf. Thomas, 1999) such that the use of general assistive devices to navigate their daily and sport environment is not uncommon. Fundamentally, equitable access to ATs is not only central to when and how disabled people participate (Nind & Seale, 2009) in sports but can facilitate a level of bodily freedom and independence that they may not otherwise experience as I partly described in chapter five. By freedom, I mean the assistive device allowed the participants to execute physical activities, giving them back independence after acquiring their impairment. As Craig signalled in our conversation below, AT enabled a level of freedom previously unimagined in terms of both exhibiting sporting prowess and his capacity to express who he is and can be to others.

Researcher: How was your first experience with a basketball wheelchair?

Craig: It was like; I had freedom in a sporting context. For once, I could do the things I would want to do that I previously could not because of a lack of agility. Now, I can move my body around much better. So, it has really opened up that door, giving me the freedom to express myself and my physical abilities in a sporting context. I also realized that I could be good at a team sport because I had good speed and body control, and it is quite a central part of the wheelchair.

Here, AT enabled him to engage in sports and accomplish athletic movements that would otherwise be impossible. This implies that his embodiment not only provided him with physical freedom but also a means of self-expression and personal fulfilment. The sense of freedom and removal of felt barriers for Craig could be regarded as an embodied relationship with technology which triggers an expanded set of embodied possibilities (Brey, 2000; Ihde, 2004). However, while such embodied relationship with sport-specific assistive devices can afford some level of freedom and opportunity in sport (cf. Apelmo 2017; Sparkes et al., 2018), at the same time some of the participants described the material restrictions that ATs imposed on their bodies. For example, despite, King's prosthetics allowing him access to bike riding, he is often confronted with a technology restriction compounding his sporting experience, especially riding on a steep:

Researcher: If your prosthetic is custom, why do you still experience difficulties riding the steep?

King: Purely because of locking. It is quite difficult riding a steep (climb). If I could get more power, if I could rotate, generating power on my prosthetic limb, I can then probably just with an action, I can generate around 20 to 30% more power and drive.

King's experience exemplified how the fusion of prosthetics and human potential can augment one's physical abilities beyond natural limitations. However, it also revealed that assistive technology can be restrictive. At times, these limitations were exacerbated by institutional ableism, a process that excludes disabled people from participating in society and accessing quality newer AT due to unfavourable policies and inequitable national systems (Harris, 2010; Ravneberg, 2012). For example, in Aotearoa New Zealand (NZ), disabled people are situated within a complex healthcare system that facilitates access to AT directly through the District Health Board [8](DHB), via an insurance provider (e.g., Accident Compensation Corporation, ACC[9]), or, on certain occasions, from the Ministry of Social Development via community health care providers (e.g., New Zealand Artificial Limb Centre). For example, only people experiencing disability through accident or injury can access AT free from ACC while people living with congenital disabilities receive AT from the DHB (Asare et al., 2023). In most cases, the DHB is slow to provide the ATs compared to the ACC. Additionally, disabled people turn to health centres under the social development system for maintenance, training, and servicing at a high cost. For example:

I have had this Botox sedation treatment for this stump in the last two years and it is just awesome, it just gives me much more stability and I can do more on the bike. It all helps you know, and I am fortunate that ACC recognizes the procedure otherwise it is very difficult. They were expensive. The average person could not afford them and that is about it (Lindsey).

Here Lindsey who acquired impairment through a motor accident shared her mixed feelings related to the inequities characterising access to AT-related treatment and cost for

[8] District Health Board (DHB) is responsible for providing or funding the provision of health services within the districts in New Zealand.

[9] Accident Compensation Corporation (ACC) is the government organisation that manages the accident compensation scheme and makes decisions about claims.

others who do not have ACC coverage. The system creates inequity and cost for disabled people to access both daily and sports ATs. While the high cost of AT was a major barrier to the participant's participation, for other participants the lack of the same opportunity to acquire the necessary AT and services for an improved quality of life, personal aspirations and embodied life goals was a concern. This was the case with Leo:

> *I am on ACC because of my injury. They are quite open to purchasing new chairs, provided they think it is going to be of good use to you. I am lucky to have ACC and it is all about goals. If you get your goals in, they will try to do their best. However, many people do not have access to ACC or case managers who want to help them do these things. A lot of access is probably a big thing, to these types of equipment, which allows you to have a better quality of life and I am lucky really (Leo).*

In the context of sport, all the participants utilised assistive devices that were specialised, or bespoke. These technologies often come at considerable expense, and are not easily acquired, relying on either funding support or discretionary income, directly impacting what types of sport an individual can participate and compete in:

> *There is a hope that in the future, I will get a chair that is more ideally suited to me. However, I know, that is up to whoever makes the decisions and whether I want to invest in one for myself. Obviously, as I said it is quite an expensive piece of equipment to try to fund myself (Leo).*

Sport-specific ATs were therefore crucial in enhancing participants' access to a range of sporting opportunities. Not only that but in using their ATs, the athletes were able to demonstrate a level of athletic control and agency over their bodies. For example, Craig's Rugby wheelchair enabled him to engage in sport and accomplish athletic movements that would otherwise be impossible:

> *I had the freedom in a sporting context. For once, I could do the things I would want to do that I previously could not because of a lack of agility. Now, I am able to move my body around much better. So, it has really opened up that door, giving me the freedom to express myself and my physical abilities in a sporting context (Craig).*

The use of AT was instrumental in facilitating the removal of the 'felt' barriers to participating in sport (Kath et al., 2019) and culminated in a sense of freedom. The sense of freedom expressed by athletes, however, at times reflected conformity to ableist hegemony and a value system that encouraged approximation to nondisabled norms and structures in sport. Noah's story is illustrative:

> *I wouldn't be able to row without the single adaptability of the leg . . . when I've got my prosthetics on, I can go out in a normal boat and race against nondisabled rowers. That's because I've adapted that leg so that I get into a boat and row normally. The Limb Centre has done a really good job, to help me and I can sit in the boat, and really, people wouldn't realise that I had a prosthetic on (Noah).*

The sense of freedom and removal of 'felt' barriers reflects an embodied relationship with technology, involving an expanded set of possibilities for participation and competition. This is reinforced by some participants who positioned their AT as central to athletic performance, a signifier of what Butryn (2003) described as *implement technologies*:

> *The wheelchair is just a flash pair of rugby boots. Trying to jump in my rugby chair is the same as putting on my rugby boots and getting ready to play. It helps me get around the court just as getting around the field (Giles).*

> *The wheelchair definitely provided me with a bit of ability in my body, a bit of exercise to try to get faster and stronger and increase my actual tactics on the court - how I play and do what my role is within the team (Leo).*

Here the participants reconfigured their assistive devices as part of them, inscribing the devices with a level of agency in enhancing the participants' athletic potential and competency. However, while the relationship with AT afforded some level of freedom and opportunity in sport (Apelmo, 2017; Sparkes, Brighton and Inckle, 2018) at the same time participants described the material restrictions that ATs imposed on their bodily capabilities:

> *My chair has a setup of someone with my level of impairment, but it is not the right size, because I am quite thin. It is set up too wide. So, it means I push a lot, I have to push a lot wider rather than the best push of speed, nice and close to my body. So, if the wheels were set, that is, just the frame of the chair is brought in closer to my*

body, a new chair or on this smaller narrower frame, probably it would make a big difference to my speed on the court. So, it is an effective thing I think about, but I guess until I get a narrower one, I do not know how much faster I will be (Leo).

As explained by Chamberlain and Lyons (2016), our physical bodies and the objects we interact with are interconnected and influence our physical experiences. In light of this, the impact of assistive devices on participants' physical competencies was accentuated not only in sport but also in their everyday physical activities:

I always wanted to have a crank-wearing stump. I have been over in Rotorua[10] riding and come down from the top. I always want to do that, but it is too risky. I probably could do it (but) I will probably be in a wheelchair after doing it (Lindsey).

These material restrictions were further compounded for participants who were unable to access bespoke assistive devices. Thus, similar to findings in chapter five, some wheelchair rugby players described their experiences of using 'hand me down' wheelchairs, which were often heavy, sluggish and unsuited to the dynamic nature of the sport. This was contained in one of Mark's responses when I asked him to share with me how he came to play wheelchair rugby:

So, they gave me the number of the Waikato coach, down here, and said when I get back to Hamilton, I should give him a call. It looked like a fun game and something I wanted to be involved in. So, I gave him a call when I got back to Hamilton. He came along to team training and had a chair that I could not push around because the chair was twice my size. It was really wide and hard to push (Mark).

Previous research in wheelchair sport contexts has illustrated the process of 'enwheelment' (see Monforte et al., 2021; Papadimitriou, 2008; Sparkes et al., 2018) that in this context describes athletes negotiating a new sport while at the same time navigating the 'fit' between their wheelchairs and their bodies. This process is not uncommon as athletes attempt to enter new environments, enmesh with technology and demonstrate athletic competency, resulting in a lack of control and reduced ability to perform. As such, in focusing on embodiment, the analysis highlights a paradox; on the one hand, fusing with technology

[10]Rotorua is a city in the Bay of Plenty region of New Zealand famous for its mountain biking trails.

(Apelmo, 2017) opens up opportunities to demonstrate power and agency (Moser, 2006). On the other hand, incorporating assistive devices into bodily schema is not always a straightforward process, with a powerful material influence on participants' negotiation of their environment. For example, the everyday disabling barriers experienced by Maya in her day chair rendered her passive and vulnerable. In contrast, sport and her sports chair enabled Maya to challenge her day-to-day subject position, positioning her as strong, invulnerable and capable (cf. Apelmo, 2012):

> *Researcher: Describe any differences experienced between your everyday and sport chair.*
>
> *I feel like most of the world is trying to kill me with bumpy roads and really shitty curb cuts and all of the environmental stuff. It is a constant negotiation for a tetraplegic in a manual chair. Where you are always looking at your feet, waiting to see what's in front of you, what you're going to run into. So you don't often get to roll along and just look at the world and be part of it because you're too busy trying to not die by hitting something. In the hall where we play wheelchair rugby…there is nothing that's going to go wrong. In the outside world, you are vulnerable, but in the hall, you're not. Yeah, I loved it, the speed and the freedom (Maya).*

Maya's story is important as it puts the previous work by Butryn (2003) into a contextual perspective. Butryn (2003) suggested that self-technologies do not just alter an athlete's physical makeup but incorporate a psychological dimension. In this case, the athletes' body technologies helped them to develop esteem and self-confidence, which crucially translated into strategies for negotiating everyday life:

> *. . .because of the dynamic nature of the sport and the way that you learn to move your chair in that sport, it has given me more knowledge and confidence in everyday life (Clara).*

Athletes incorporated their assistive devices into their sense of self and bodily schema, 'blurring' the boundaries between their physical bodies and material technologies. For example, Peter – a powerchair user and Boccia player – described how he orients himself in a competitive situation and collapses the distinction between his chair and his body:

Researcher: Is there something you have to be conscious about when using your powerchair for sport?

Peter: You have to be very conscious . . . I am too focused on getting the shot and lining up the shot right. One technicality is I can line up the shot out of the box and then I have to put myself back in the box to take it. I can line it up to make sure it's all right, then move myself back into the box to push it but that's where sometimes I will leave a wheel still out.

These data suggest the incorporation of assistive devices into athletic performance varied greatly between participants. Thus, the ways disabled athletes interfaced with their assistive technology to compete and train illustrate the porousness of natural and artificial bodies, as well as having implications for the production of identity (cf. Butryn, 2003):

I definitely feel much better (in) the rugby one (chair). I feel like I am a bloody transformer...I would not be able to go and play rugby on this one (referring to an everyday wheelchair) (Oliver).

This 'blurring' of the boundaries between (disabled) humans and technology produced unique effects on the participants' embodied sense of athletic self, where the body-self-object distinction disappeared from conscious awareness and reflection (Leder, 1990; Sparkes et al., 2018):

It does feel like that when you are playing you do not notice that you are pushing a chair; you just feel you are playing. It feels like that. Once you get the right equipment and the right chair it does feel like a body part of you (Mark).

While Mark's narrative reinforced some of the embodied experience related to the process of enwheelment highlighted in chapter five, it also signals how ATs are not passive and immutable as the analysis demonstrates how the assistive technology acted against and with participants' bodies at the same time, shaping the athletes' relationships with their devices over time. This is illustrated in Craig's comment below:

Researcher: Previously, you said at times it was uncomfortable playing with your infected leg. How has the experience been after your surgery?

When I returned after my leg amputation, I was in a tight strap on my wheelchair that caused a blood clot. So yes, it felt a bit difficult, it was just a weird feeling, and then I did not feel like one with the chair because I did not use the strap any more. I always felt disconnected from the chair. Whereas before that it felt like the chair was part of me because I was strapped tightly (Craig).

While the athletes used their assistive devices instrumentally, enabling them to be socially active, assistive technology exerted considerable agency, shaping the participants' "mobility and agility, sensory apprehension, communication, and cognitive action" (Ott, 2015, p. 104). The athletes, therefore, were engaged in an embodied process of negotiating and learning to use their AT in ways that might be considered simultaneously transformative and restrictive. This is illustrative that assistive technology provision alone is of little use as disabled athletes must navigate self-work and process of knowledge for *full* access to AT.

Construction of Self and 'Otherness'

Previous research suggests that disabled people face difficulties in separating their physical presence from the constructions associated with the cyborg metaphor (Cromby & Stande, 1999; Howe & Silva, 2017; Swartz & Watermeyer, 2008). However, in this research, in adjusting to AT and enabling technologies to become 'part of them' in a performative sense, the participants were engaged in forms of self and identity work. Indeed, in the process of embodiment, the relationship between technology, impairment, and the body was central to the participants' "very notions of their selves" (Butryn & Masucci, 2009, p. 288), enabling the production of a particular athletic subjectivity. Mark's experience is illustrative of how technology reshaped his relationship with disability:

Researcher: Describe your feelings when playing wheelchair rugby.

Mark: I do not realize I am disabled. It is just as if I am just playing a normal sport; it is such a fun game. When you have an accident and you have broken your neck, there is pretty much only one sport that you can play which is wheelchair rugby, but thankfully, it is the best sport in the world.

At other times, the assistive devices became an identity marker (Ravneberg & Söderström, 2017a) such that – at an aesthetic level – the AT modified or enhanced the

natural appearance of the disabled athletes, ultimately constructing a sensual bodily feeling of 'otherness' and exclusion:

> *Before I was an amputee, I originally worked as a chef, and I have two friends. When I became an amputee, they all disappeared, you know. I stopped being invited out to events because I was always on crutches. They liked me when I had two good legs not when I was a cripple. It is what it is, people tend only to like the good parts of people's lives, not the hard part. I knew who my real friends were, but I quite like my company here (referring to the wheelchair basketball team) (Lindsey).*

Such feelings of 'otherness' are exacerbated by what Garland-Thomson (1997) described as "the stare — a gesture that creates disability as an oppressive social relationship" (p. 26) through which disabled people are visually othered, and stigmatised. Oliver and Noah illustrate this as follows:

> *Sometimes (people are) just curious or just look and stare. They wonder how you got into a wheelchair...and think you are not really capable. I am still me. I am still Oliver, you know Oliver is just in wheels but other people, they are curious. Their question is "Ooh what happened to you"? That is always the question (Oliver).*

> *In fact, in the last couple of days ago, I was walking, it was at the Warehouse actually just yesterday and I was with my wife, she was wanting some bags of newer stuff. It was a little bit heavier than usual so I can carry that. So, I walked to her and then the inquisitive people, the young ones, you know, they saw me walking around with my leg and watch me go by and stop and looked back at me, things like that. They said to their mum look at that guy, what's going on there? I've had kids come up to me and look at me, look at my leg, have asked a question about my leg and I will have a bit of a conversation with them about it. That's the reaction and I don't mind it (Noah).*

In further analysis, it can be argued that Oliver and Noah were comfortable with their embodiment as they reflected an awareness of the sense of self and self-acceptance of their bodies, despite experiencing different forms of 'otherness'. "Otherness" describes the experience of occupying one or more marginalised identity categories (Brighton et al., 2021,

p. 5); in this case reflecting the athlete's experiences of social invalidation (cf. Hughes, 2000**)** in everyday life. Immersion in disability sport, however, accentuated by the use of ATs, alleviated some feelings of internalised 'otherness':

> *I met the team and I got into the chair for the first time three months after my accident and I loved it, and never looked back and it was the best thing I did in terms of my recovery. Just because you're immersed in this culture where you buggers with legs are the odd ones out because all of us are in wheelchairs and then my family, my kids, got to meet a community where their mum wasn't the only one in a chair; there are other parents there too. It's the community, it's the laughter and it's the camaraderie. You can walk into that space or roll into that space, and no one, no one is gonna go; 'what happened to you'? Because we all know what happened to us (Maya).*

> *… it is one of those things where I could do many nondisabled sports if I wanted to. It is just whether or not I would get the same enjoyment out of it as I do with this sport (referring to wheelchair rugby) where there is that assistive technology that makes it more, or I guess for lack of a better word an even playing field and that everyone is in a chair (Ben).*

Here the data is suggestive of a particular social configuration – disability sport – that is, in many ways 'normalising' of impairment. However, 'Othering' was still present – in this case manifesting in hierarchies of the disabled body, that were structured according to the level of function and use of AT. This was the case with Mark:

> *All the other players were telling me what to do. I was using one of the other guy's chairs, so he helped me with getting set up. There are also wheelchair rugby players who are a lot weaker than I am because you are graded from 3.5 to 0.5. I'm at 1.5 so there are still all the 1.0 and all the 0.5's that have less function than I do. So, I'm not the slowest player out there or the weakest player. So, when I was seeing guys who have a lot less function than I do, but they are still playing the game, doing the best they can with the wheelchair, as one-pointer or as point five that inspires me (Mark).*

At times due to such othering related to bodily hierarchies and level of function, some of the disabled athletes experienced negative feelings of difference and felt "marked out as different and subject to stigma" (Reeve, 2012, p. 97) when they engaged with the world through their everyday ATs. This was evident in Craig's description of the way society viewed the appearance of his body symbolises the sub-consciousness of society's negative perception towards disabled athletes' engagement with others in their immediate society:

> *For instance, I will go out for dinner with my girlfriend I will pay cash, and they will give the change to my girlfriend and that happens quite often. It is strange, I do not know what it is, maybe they have had experience with tetraplegics who cannot use their hands properly or something I do not know. However, a few times, I have handed the money surely and they handed the change back to me, but probably just 50% of the time, that happens (Craig).*

Craig recounted another incident where he felt stigmatised when I asked him to share with me some of the positive experiences of using the Basketball chair.

> *… for example, in a wheelchair people treat me differently. People like to make me feel special and overaccommodate my needs – that is what I have found. People talk to the nondisabled person next to them, rather than talk directly to you. Those are some observations I have noticed about being disabled and being a disabled wheelchair user, but it is totally the opposite when I am using the Basketball chair (Craig).*

Therefore, while not overtly oppressive, being stigmatised and 'othered' through the perpetuation of hierarchies encouraged internalised ableism (Loja et al., 2013) with athletes generally continuing to seek a nondisabled ideal:

> *The first time I tried to play, they tried to get me to play the game by throwing the balls. After a while, I had been trying to throw the balls (and) a woman who is an international referee came in and said no, I am a ramp player[11]. So, that's when I started using a ramp and I never tried to throw a ball again. It is a lot easier, there is*

[11] In Boccia, 'ramp players' use a ramp to propel the balls to their desired target.

no way I would or want to use my hands at a competitive level. The ramp has given me everything in Boccia. I would be nothing without a ramp (Peter).

Elsewhere, Ben described his frustration as a result of the embodied experience of his own mobility limitation - his inability to manoeuvre his wheelchair compared with his teammates with more function:

The only thing really that I noticed was just my speed, just being slow, not as quick as some other people in terms of pushing the chair faster. It can be frustrating, but I've progressed over time, almost a year (Ben).

Here the data is also suggestive of navigating an 'internalised ableist' mindset where the AT can improve skills and bodily function – also indicating that the process of embodiment can be a subject of growth and development. However, at times, life for disabled people outside of disability sports can perpetuate a certain stigma, and social interaction with disability reduces disabled people's life chances, particularly in engaging with other people (Faucett et al., 2017). Lindsey and Maya decided to talk about this phenomenon when I asked them to share with me how their assistive devices have influenced their life in and outside of disability sport:

I personally think we are adaptive because we adapt to fit our circumstances. I tell people I am not disabled; I am adaptive, and I think it is a better term than "disabled". People are caught up in the language of disability but all we are doing is adapting to life and some people have more issues than other people. When I talk to anyone, I talk to the face I do not talk to the individual's device, and I do not look at a person like that. I look at the person in the face. I find it frustrating me going to the supermarket and everyone is looking at my limb. They should be looking at your face because that is who you are. This (pointing at his prosthetic limb) does not define you; this (pointing at his face) does and that is the difference (Lindsey).

The social world and the physical world are so difficult to negotiate with technology. For the impaired, unless you have a really strong personality and a really strong person, many will choose not to do it. It's just too hard. You know even someone like me. I just, sometimes you think why I bother; the stupid and patronising things that

people say, and what they do, and I'm out there living my life as big as I can, and as well as I can. But I can see why some disabled people just go "You know what, I'm not going out today the support worker can do my shopping, I'm gonna just do something else because it's too hard (Maya).

As shown, these experiences appear to exemplify what Garland-Thomson (2009) described as the manifestation of dominance, where people in privileged positions feel entitled to stare at disabled individuals' impaired bodies. In this scenario, the starer (non-disabled or society) represents a site of normativity, symbolizing a power that portrays disabled athletes as marginalized identities. In this study, these difficulties are further compounded by the constant scrutiny of non-disabled individuals, highlighting how the impact of AT has the power to influence social dynamics that draw the medical gaze and encourage stereotypical attitudes (McNamee et al., 2021). For instance, Maya described how in wheeling her athletic self through daily activities, she faced stereotypical attitudes from the public that patronized her skills and challenged her female embodiment in public spaces:

Someone will come up to me and go "Oh well done" and I'm like, "What, what for? For remembering my pin number?" Like, I get what they're saying, well done for the fact that I'm a mother in a wheelchair out accessing the normal world and shopping but I'm also just a mum with their kids going shopping, and that is not a big deal (Maya).

The data is indicative of how disabled women face the worst form of double discrimination in Western society resulting from challenges of the intersectional relationship between sexism and ableism (Bates, 2014) often compounded by assistive technology. In the context of this study, Maya's experience highlighted how technology can compound the experience of negotiating disability sports as a woman, disabled woman, and female disabled sporting athlete in an abled-bodied dominated environment. Taken together, the analysis illustrates the power of body-self-object relationships within disability sport, not only in shaping participants' orientations towards the self and others but in constructing symbolic boundaries within and between disabled athletes. In this sense, further research is required to explore the entanglement of disability and AT in the production of subjectivities and social

relationships, or more broadly as part of material sporting culture (Chamberlain and Lyons, 2016).

Access to Knowledge and Knowledgeable Others

While previous research has paid minimal attention to the learning process associated with disability, technology and embodiment in sport, in the ethnographic study I hinted at the shared nature of embodied knowledge as athletes learned tips and tricks from each other for handling their chairs. In this section, I trace the embodied learning process of the participants as they acquired the knowledge and skills to use their ATs. In so doing I position 'access' as a multi-dimensional concept, encompassing issues of physical access, power, relationships and communication, advocacy, participation, quality of life, as well as knowledge. In this context, knowledge – as it links to access – refers not only to athletes' knowledge about the availability of sport-specific AT but the ongoing process of learning to use AT to train, compete and generally participate (cf. Nind & Seale, 2009). Their use of AT involved an accelerated learning process that relied on access to teammates and peers, creating a network of embodied skills and knowledge:

> *The challenges are there but there are other players trying to help you out and teaching you how to cope. Yeah, just learning, learning especially off teammates you know, if it was not for them, I probably would not have that much knowledge about using the wheelchair and playing (Oliver).*

> *I am always just learning, learning especially from teammates too. If it was not for them, I probably would not have that much knowledge about using the wheelchair and playing (Clara).*

These narratives show how, for disabled athletes, the learning process occurs at both social and embodied levels; through teammates and the material-flesh-environment interaction as AT becomes a medium through which the environment is experienced and acted upon. The importance of peer support networks for helping participants understand and negotiate their AT in a sporting context was crucial, particularly for those with acquired impairments; learning the balance of living a 'new' life and learning to navigate the material and biological body (cf. Lowry et al., 2022), building new purpose and meaning. Similarly, the

data echoes how disabled athletes "go through a drastic sensory reorientation process" (Sparkes et al., 2018, p. 157) to experience oneness with the AT. Importantly, this 'reorientation' process was influenced powerfully by the community in which the participants were situated, as Maya states:

> *So, (being) part of the community is a massive benefit. I mean health and fitness are one thing, but the most important learning comes from the community, learning about your body, learning about how to parent, and learning about how to be (Maya).*

Following the findings in chapter five, it was easier to identify how the shared experiences of other disabled athletes were pivotal to the participants' capacity to get the most out of their assistive devices. Lindsey recounted how she achieves an efficient use of her device:

> *He (another athlete) was a mountain climber; he lost his legs, and he knew how to ski so I looked him up and found him. I sent him an email and asked, "How do you ski with a prosthetic" and he said, "Oh, you need a thigh brace" Oh okay good. So once your limb is on you need a thigh brace and so I put a thigh brace on, and I was good, good in saying that I had knee control (Lindsey).*

In learning to function competently with their AT, the sports environment provided a focused community that played a crucial role in the knowledge-sharing process of utilising AT, providing a social framework through which participants could engage in a process of 'trial and error', learning to negotiate and manage their AT:

> *. . . with my prosthetics, it is by trial and error. This one I've got it's got a screw on the end, and the screw bolts in there. It's got a cable that runs up inside the socket, screws that onto the socket, which then holds the lid in place. I have got a peg clip that goes straight onto the pad and locks it on, and when it is locked it's perfect. The only disadvantage is I haven't been able to find a way around it to rotate. As you're going around fiddling and when you get to the bottom of the stroke pedalling it straightens up and when it does that it locks . . . all the weights are on the other pedal and what*

happens is that you're normally going quite fast it just scares me. There's no checklist for it I can go to (King).

If King's experience is any indication, while athletes might have (albeit inequitable) physical access to AT devices for sport and physical activity and their day-to-day lives, the knowledge of how to use and optimise such devices is not always readily available. This generated frustrations for athletes, who had to resort to methods of self-teaching, and active experimentation:

Many people when I see them at the limb centre get quite excited even at their first limb because it is something different. However, they do not realize the amount of work that is involved to get to walking around and where to go or actually, getting out of that wheelchair. A lot of people may never get out of the wheelchair, and I have seen it before because it is difficult (Lindsey).

For many of the participants, the data illustrate a constant and shifting process of adjustment, adaptation and integration into individual AT. Therefore, despite Noah using prosthetic limbs, his embodied experience was not significantly different from the process of enwheelment as highlighted in chapter five:

Researcher: How did you navigate the restrictions of your prosthetics?

I was still experimenting because I was trying to walk in my rowing leg, which was a loose-fitting leg so that when I'm rowing the leg tends to swell up a bit . . . I was very uncomfortable at times walking on it. It caused a bit of damage at the bottom of the stump, but I was very apprehensive the first time, the first couple of times out. I still hadn't worked out the good foot arrangement but with the Limb Centre, we're still working on that and experimenting more a bit on that. A couple more or three outings on the boat, two more visits to the Limb Centre and we had it sorted. It was a big relief and like I said it's been going on for about three and half years (Noah).

At times, the level of adjustment ranged from shaping their bodies to 'fit' the AT, to modifying the design of their AT to suit their needs:

As time goes on, you're still making slight adjustments all the time to your chair, acknowledging that your body's changing . . . I have muscular scoliosis, so when I'm sitting flat, I'm perfect, but when I sit in a more active position my left hip drops. I'm stronger on my right side than I am on my left...In wheelchairs, particularly when you're a tetraplegic you sit with your legs high and your bum down, that set-up gives you more dump. . . I'm not a paraplegic and I don't have any core so if you sit me on a flat seat, I wobble all over the place . . . Our asses are way down, and our knees are higher which makes us more stable. The tighter we're in our chairs, the better we are. So, for me what we've done is put a whole bunch of sponges; tucking underneath one side of my seat so that when my bum drops down, the left side of me is lifted (Maya).

For some athletes, this process – while frustrating and uncomfortable – culminated in a sense of improvement in their capacity to train and compete in this chosen sport:

The basketball chair I use is an adjustable wheelchair that is adjusted to fit me, but it is not customized. They fix belts for starters - so solid there are no flips about in my movement that could happen on impact or whatever. Probably, it should be a bit narrower, so I will fit into the gaps, smaller gaps. That will make me a bit more agile, and it could make me sit up higher so I could be taller and lighter on the court (Craig).

At times, embodied learning required participants' ability to adjust between different inter-bodily and material senses in order to perform their sport. This type of experience is exemplified when Peter, the ramp Boccia player described how his carer calibrates and adjusts his ramp to enable him to play. The process involves various forms of work:

I always need someone in with me in competitions and the person's entire job is moving the ramp and doing whatever I instruct. It is because I cannot move the ramp, pick the balls up or do anything. We have to be on the same page, or else it will never work. A lot of teamwork, practice and yelling but not in the competition. In the competitions, the person who is doing the ramp is not allowed to talk make a noise or do any form of communication (Peter).

Peter needed an inter-corporeal process of human-material-human embodiment to accomplish a sporting task. He as a human relied on both his ramp (material) and carer

(human) to achieve the dynamics of the sport. In extending the work of Papadimitriou (2008), it can be argued that the incorporation of material devices into the bodily schema in sport is not a straightforward, individualistic process, but one that occurs over time and is heavily reliant on outside intervention from disabled peers and healthcare professionals. Thus, raises critical questions on the distribution of knowledge – as a point of access – for disabled athletes, particularly when sport-specific devices are not prioritised within healthcare systems as essential.

Embracing a Way of Moving

In the process of applying the knowledge to become an embodiment of their sporting AT, many of the participants' responses also reflected how specialised sporting technologies enhanced their mobility and gave them the ability to embrace and learn how to move their bodily self through the world from one place to another. As highlighted in chapter five, AT can provide participants with new opportunities to improve their physical abilities and participate more actively in society. It was not surprising to see athletes continue to seek improved self-mobility as they incorporated assistive technologies into their sports activities. In many instances, the inseparable connection between participants and their AT produced a continuous sensorimotor experience (Hockey & Allen-Collinson, 2007; Jones, 2017) that culminated in improved physical attributes and a deep understanding of how to move and manoeuvre their ATs. This was evident in my conversation with Craig:

> *Researcher: Can you describe how the way you manipulate your everyday wheelchair has improved due to how you move your basketball wheelchair?*
>
> *Craig: Oh yes, my agility, speed, and body strength improved but important also, how I manipulate the wheelchair around objects or back out of tight areas in restaurants and supermarkets. It has helped with all of that, the manoeuvrability because when you are on the court you have to work out the most efficient way to achieve a task and it does transfer over to my everyday wheelchair use.*

As established by Richard and Andrieu (2019), the wheelchair as part of an embodiment can seamlessly transition one's experience between sports and daily activities. Thus, the integration of AT into his bodily practices allowed Craig to overcome spatial

constraints, and move through tight areas effortlessly, transforming the wheelchair from a mere tool into an essential part of his identity and mobility in daily life. Moreover, for disabled people in sport, physical bodily movements and efficient use of assistive devices can be constrained due to the dynamic and progressive nature of impairment (Hill et al., 2014). When this happened, participants relied on different parts of their bodily schema to gain a sense of control over their AT and mobility. For example, Peter illustrated how he explored different parts of his impaired body schema to discover which parts would give him the ability to move his AT with ease.

> *Researcher: Can you share with me one significant modification that you made to help your movement?*
>
> *Peter: For 15 years, I drove with a joystick with my hand. However, over time my hand movements have gotten worse. So, it got to the point that I did not want to go out in public in my power chair. I only wanted to go out in the manual chair being pushed. When I moved to Waikato, they gave me the offer to try this (referring to the new powerchair). I use my head not my hands. That has opened a lot more doors for me.*

Previous research has illustrated how the Powerchair can trigger a form of hybridization, "the body becomes a sensitive set; it mingles with 'the world' via the sensory-motor experience" (Richard et al., 2019, p. 9). In relation to this study, as participants repeated and varied their motor experiences, they altered their bodily schema and movement. As such their being in the world becomes intensified and the process involved not only understanding the impact their body had on the sporting space but also, more significantly, internalizing the dynamics of the equipment they use, leading them to become more aware of their freedom to move, compete and perform. The emphasis on chair movement was made by Peter when I asked:

> *Researcher: How does the chair help you to play Boccia?*
>
> *Peter: In Boccia, you have a two-meter by one-meter box. Well, sorry one meter by two meters. I have to have my entire wheelchair in the box. Boccia is all about angles. So if I can move my chair to line myself, it sets me up better with the shots, it gives me better angles and improves my game.*

Peter's experience of using an everyday Powerchair for sport illustrates how disabled athletes can become a hybridised athletic body, being both the decider and the originator of their athletic actions and movements. The active engagement allowed for the seamless integration of the wheelchair into the body's movement processes. For Maya, as her body and wheelchair become entwined through practice, her body schema, overall mobility and independence in everyday life became greatly enhanced:

> *Researcher: Describe ways in which the rugby chair has helped to improve your bodily skills regarding your everyday wheelchair.*
>
> *Maya: Probably, the knowledge of how the chair is going to move and respond in particular, you know. So, playing wheelchair rugby has helped me be better in my day chair. Because of the dynamic nature of the sport and the way that you learn to move your chair in that sport, it's given me more knowledge and confidence in everyday life.*

Maya's experience embodies skill and knowledge as she adapts to the rugby chair, becoming an experienced agile enwheeled individual. Similarly, as some of the participants intertwine their bodies with assistive technologies, a glimpse of technology's agentic and powerful embodied nature emerges, restoring a sense of embodied moving competence. This was reflected in King's response when I asked him:

> *Researcher: So typically, what would the prosthetics help you to do when you are cycling?*
>
> *King: Throughout the training, they (the prosthetics) helped me to have access to the development of different cycling and moving techniques. It helps the joints in that I am able to walk well on the good knee.*

Here, King's experience with the prosthetics indicated an embodied awareness of the device's impact on his physical functioning, particularly about his knee, reshaping his sense of agency, movement, and the relationship between his body and the artificial limb. Kim's (2021) assertion that one can experience multiple embodied awareness of a sense of agency in bodily movement became evident. Furthermore, while I have highlighted in the section, that an awareness of one's bodily movements can motivate changes in bodily perception and, and

the same time impact awareness of the changes in things, however, for Maya, sometimes the process of using her rugby chair required a stimulated stable body movement that enhanced her capacity to perform:

> *In rugby wheelchairs, particularly when you're a tetraplegic you sit with your legs high and your bum down, that set-up gives you more 'dump'. So, the more that your ass is down, the more stable you are. I'm not a paraplegic and I don't have any core so if you sit me on a flat seat, I wobble all over the place. But the minute you put my ass down; you look at most of our rugby team members, they are like triangles, and I feel a stable core muscle (Maya).*

Maya's experience with a rugby wheelchair offers further valuable insights into the role of AT in restoring competence, as previously discussed in chapter five. Specifically, the use of the wheelchair enabled Maya to transform her uncoordinated movements, which were associated with her impairment, into a powerful, reinforced, and stable body. This transformation allowed her to develop new training movements. Through the reconfiguration provided by the AT, Maya overcame her limitations and embraced a new sense of physical capability, enhancing her athletic performance and overall quality of life.

As Richard et al., (2019) argued, modification or customisation is the crucial first step in the embodiment of moving, a process that requires a fluid spatial relationship between the body and assistive technology. This process is not always positive. Smith et al. (2018), argued that AT modifications sometimes fail to align with the mobility conditions of disabled people, creating incapacity and inconveniences. This phenomenon was reinforced by some of the participants' responses, as they encountered technical challenges while striving to attain control of their athletic selves. For example, in an attempt to gain embodiment of his prosthetics, King talked about the struggles to maintain balance revealing the impact of prosthetics on his bodily movements and spatial awareness:

> *…with this prosthetic (referring to everyday prosthetic) it does not happen very often, but it does sometimes in a confined space, it is awkward. You cannot move around comfortably, and quickly, maintaining balance, and quite often, I lose my balance when grabbing things and that is frustrating. But you build it into the way you think*

because it is not going to go nice all day. I just put up with it, I cannot change it and move on (King)

So far under this theme, I have drawn attention to how the process of AT embodiment aided athletic bodily movements when performing sport. The participants often needed to intimately personalize the sport assistive technology into their bodily schema, particularly providing further understanding to Shilling's (2005) assertion about how achieving embodied movement involves "an extension of the body schema, through the incorporation of new skills and new objects, which enables one to expand the quantity and quality of movements and to exercise agency" (p. 55). Taking together, these understandings raise further questions, importantly, how the lack of mobility not only affects disabled people in their everyday lives, hampers their participation in sports, but influences internal feelings of isolation, decreased self-esteem, and reduced overall quality of life (Carver et al., 2015) which is essential in understanding bodily subjectivity as disabled people negotiate assistive technology in disability sport (Asare et al., 2023).

Embodying The Subjectivities of AT

Previous studies by Cromby and Stande (1999) suggested that assistive technology can bring a range of opportunities including access to multiple environments which can shape and extend the subjectivities of disabled people. Additionally, as I have already highlighted in this chapter, in the process of embodiment, the transformative potentials of assistive technologies can shape athletic experiences, identities and subjectivity. Building on this perspective, while adapting to their AT and enabling technologies to become 'part of them', many of the participants' responses also showed in the process, they were "subjectively embodied in a fluid, emergent, and negotiated process of being" (Waskul & Vannini, 2006, p. 3). This can be identified in the way King described his relationship with his prosthetic as a partnership that enhanced both his confidence and well-being in doing sport:

Researcher: Share with me how your prosthetic limbs help you on your bike.

It (referring to his prosthetics) really helped me to focus. It's helping me in a lot of ways with developing my confidence on the bike, and in my ability on my bike with the prosthetic. It's a partnership. It does all of it, it improved my mental state. You

feel better in yourself like when I am riding the bike, I wouldn't know I've got a prosthetic on, it just gives me a sense of well-being (King).

By engaging with prosthetics, King actively lived through his amputation in a way that intricately intertwined with his subjective self, emphasizing the inseparability of the experience from his perspective. However, as already illustrated in this chapter, the design of ATs can sometimes make their use restrictive, requiring modifications to fully realize any transformational benefits they may offer (see Papadimitriou, 2008). In worst-case scenarios, the absence of custom ATs and slight misalignments can hinder desired actions capabilities, and control, thereby reducing the ability to perform and distorting the participants' subjective playing experience. Giles' experience served as an illustrative example of this phenomenon:

Researcher: Describe how your current chair restricted your performance on the court.

Giles: Mainly for me in wheelchair rugby, it would be how the chair is made. When the chairs with the seats are slightly forward, it is like pushing me forward. I cannot sit up to do what I want to. Then I take it back to try to get it modified.

Papadimitriou (2008) and Winance (2006) maintained that when disabled people modify their technology, the process can shape subjectivity in the way that they perceive their body is interrelated with the device in its immediate environment. Thus, as the participants sought AT modifications to enhance bodily performance, they encountered a subjective bodily experience, akin to what Leder (1990) described as an *ecstatic body* – a process of perceiving their body as an out-standing body, when projected outward into its environment becomes aware of itself via reaction mechanisms. For example, Ben discovered the changes in his body-self in a hand-me-down chair which he described as a ‘bit better’ for his everyday sporting body. In the process, he reconstructed his body as not merely passive but an active experience shaping a mutual connection with the chair:

Researcher: I have noticed an improvement in your performance, did you get your own chair?

Ben: I was using a different chair. I do not know if it was the last time, we talked but I have now moved into Giles's chair, which is a little bit fit for me. So yeah, I have a

chair that is a bit better than the one I was originally in, and, yeah, I can already see a difference in that chair because it fits my body.

Ben's relationship with technology emerged as a central aspect of his bodily subjectivity, experiencing differences in self-awareness, and his interaction with the chair as his body and mind connected with the chair. Some studies such as Butryn and Masucci (2009) and Kath et al. (2019) claimed that technology not only enables disabled people to transform into athletic bodies but also allows them to experience "subjective possibilities" (Cromby & Stande, 1999, p. 97). In other words, technology can influence disabled people to reconstruct their disabled identity impacting their subjective and lived experience. A notable example is Mark, whose remarks demonstrated a focus on subjective possibilities that allowed him to self-perceive his disability differently without any sense of feeling limited (I explore such self-perceptions in detail in the next chapter). Through adaptive engagement in wheelchair rugby, his identity and self-awareness became intertwined, resulting in a subjective perception towards the assistive device:

There is a frame (referring to the rugby wheelchair) around you and stuff so you do not really get much pain. No so much damage and ache to yourself apart from casual bruises. I have not really seen many big injuries in wheelchair rugby. I broke my finger once but that was probably the main and the biggest injury I have had in 19 years of wheelchair rugby (Mark).

Taking Mark's assertion into perspective, participants, generally, actively rejected the feelings of disablement at an embodied level while participating in sports. Indeed, the ATs played a crucial role in facilitating a bodily sense similar to that of non-disabled people. In other words, as disabled people performed sports with their ATs, their disability became subjectively normalised challenging the traditionally held beliefs that perceived disability as an individual problem. At times, the participants perceived a sense of a non-existence of their impairment while performing. Craig pointed out that while playing on the court, using the rugby chair, his body underwent a hybrid experience, making it feel forgetful and distinct from an impaired body:

I forget that I have an impairment when I am on the court playing. Even like now, here right now sitting in the wheelchair too, it does not feel like I have an impairment (Craig).

This data is indicative of a spatial-somatic-perceptual contribution to the understanding of the body (Gallagher, 1986; see Moran, 2010). In other words, a hybridised experience where one's impaired body is impacted by its immediate space in which it acts with no subjective affections of feeling impaired. While much of these subjective affections towards AT are discussed in the next chapter, as some of the participants incorporated their assistive technologies into their hybrid body, they reduced the anxiety of living with a disability. The AT reconstructed a subjective sporting identity that was physically capable and powerful, challenging bodily senses of fear and anxiety:

Researcher: Describe to me how the rugby chair has impacted your physical skills.

Leo: I think of myself as a disabled person, and I cannot forget about that, but I feel like I associate a bit more with the identity of being a wheelchair rugby player and it is so good. I still think I am using a wheelchair I am a disabled person but when I am involved in rugby, it takes a lot of that anxiety and feeling disabled away. Everyone on the court is the same, everyone is in chairs, and even if you are nondisabled, it is the same sport. I do not feel like they are different. I do not feel like I am different from anyone else playing.

Leo's remark can help us expand the subjectivity associated with the relationship between disability and the use of assistive technology. From an embodied perspective, Leo underwent a subjective experience of disability where in a social sense he feels disabled and abnormal, but in another breadth internally, he does not feel disabled since the incorporation of a wheelchair provided a unique experience of the world. This analysis is also an expansion of Pavey et al. (2015) work that suggests that not all bodies accept the notions of normality; the assumption is that certain bodies are disabled and others are free of disability and impairment. So that in instances where the body is still brought to the consciousness as disabled, weak and impaired, technology can aid the process of overcoming such consciousness.

As already mentioned in this chapter, as disabled people experience a sense of subjectivity, they intentionally compare their hybrid self with others, referred to as 'otherness' (cf Asare et al., 2023), a state of experience of internalising more than one marginalised identity category (Brighton et al., 2021). However, for some participants, such constructions or feelings of 'otherness' did not impact their bodily perception. As such some athletes perceive their impairment as 'absent' from the objective body - meaning the impaired body is blurred in the background - and the technology becomes accepted and normalised as a way of making their hybrid body work again (Leder, 1990). Thus, the assistive technology does not create a sense of difference, but an inclusivity work and a harmonious hybridisation of their athletic pursuits:

> *We just feel like sportspeople playing a game we love, and the equipment does help with that. I am not sure how other people perceive us playing that, or how nondisabled people view us but from my perspective, I guess we do not feel different using the equipment (Mark).*

As Standal (2011) argued, a reversible relationship between one's body and technology is formed through re-embodiment, a difference between the AT and body experienced, yet the identity formed is inseparable. Given this, previous research by DePauw and Gavron (2005) observed that disabled people, particularly in disability sports, often face perceptions of being non-athletes. These perceptions arise from the intense process of hybridisation of the disabled sporting cyborg (Haraway, 1991, 2006). However, for some disabled athletes, the 'blurry' nature resulting from hybridisation appeared 'removed' between the device, body, and mind as disabled athletes became connected to the right AT. In many ways, it can be suggested that when athletes were immersed in these elements their actions became instinctive, akin to a smooth bodily movement. Mark talked about an unexplained sensory self that was transferred from the body to the wheelchair aiding a powerful use of his custom-made chair:

> *Researcher: You only become a good player when you get your own chair?*
>
> *Once you have the right chair fitted for you then it is just working for you, instead of against you sort of thing. Yeah, once I just hopped in my chair, I do not know what to*

call it, every little bit of effort that you put in just translates into power, sort of thing, rather than like you are trying to push a chair and that does not fit you (Mark).

Similar to discussions in chapter five, the access to *implement technology*, enhanced this sensation, reinforcing the integration of the chair as an integral part of the self. For some participants, this was not always possible. For example, Craig reflected how after rehabilitation, his sensual reactions prevented him from feeling connected to his chair as an extension of his abilities, which was something he had previously experienced:

Now, that I do not use the leg strap, it is not quite the same. I do not have the balance and manoeuvrability that I did have before in my chair (Craig).

When athletes integrate AT into their bodies as both *rehabilitative* and *implement technology* (see Butryn, 2003) at different times can hinder a more fluid and intuitive relationship between their body, physical environment, and subjectivity. However, as already discussed in this thesis, such challenges can be overcome through dedicated embodied learning, and practice over time with the specific AT setup. This was again reinforced in Leo's subjective response when I asked him to describe how the wheelchair improved his athletic ability:

Probably a lot of that is mostly around my speed on the court because it all comes from your push. If I am able to push better in a chair that is set up for me, nearer towards me, then I think I would be able to get a lot faster. Then practising with that chair over some time, I should improve my push and speed as well (Leo).

While scholars suggest that an actively embodied and sustained practice can refine one's ability to use assistive technology (AT), and subjectively construct a certain sense of bodily agency, shaping performance (cf. Paterson & Hughes, 1999; Clinkenbeard, 2020; Kim, 2021), however, for some athletes the embodied relationship between their physicality and their AT negatively influenced their sports performance and enjoyment. This was evident when I asked Giles to:

Researcher: Describe the restrictions when playing with the non-custom chair.

Giles: Horrible! It (the borrowed rugby chair) is uncomfortable, it does not move, how you want it to move. Just terrible, you are always jumping out of chairs, and it was set up for a different person so one minute my knees are around up my head, and the next minute I have no cradle to put the ball on. That was frustrating because you want to get there and have a good time and play but when you are trying to do what you normally do, suddenly you are faced with this monstrosity (referring to using a chair not set up for him).

From the embodiment perspective, I argue that Giles describing his experience as a 'monstrosity' suggests the enormous restriction of the chair's setup on his body disrupting the process of hybridisation. Similarly, for many of the athletes, the frustration of not being able to execute usual moves and feeling ill-suited towards the borrowed AT demonstrates how the interaction between embodiment, *self* and the AT is a complicated subjective experience which should not be reduced to cyborg attributes:

Researcher: How was your first-time experiencing skiing with this prosthetic?

Lindsey: …with the prosthetics, it was terrible. One, you had no sense of where your ski was. You cannot feel the snow within the ski boot because you do not have a foot to actually have a sense of where it is, and it is really a frustrating thing. So, because you cannot feel where the snow is and where the ski is you want to look down at your ski tips. When you look down at your ski tips, you lose your balance, and you fall over. It was quite frustrating. I had not fallen over for 36 years and suddenly I was falling over, and I was like "Jeez".

Here, Lindsey's experience echoes the process of "reciprocity synthesis" (Crawford, 2015, p. 18) that can exist between artificial limbs and one's bodily senses. The reciprocity synthesis is a phantom experience of prosthetics as can be seen but cannot be felt by the body. Importantly, for Lindsey, this produced a lack of embodiment with the ski prosthetics, with no bodily sensations of her environment. In other words, Lindsey's inability to feel the embodied sensation in her foot disrupted her ability to maintain balance as well as interact with the ski environment. Taken together, this analysis reflects a certain subjective understanding of how prosthetic athletes experience can re-awake their 'habitual body'.

Unlike the actual body, the habitual body is the bodily experiences that make the prosthesis meaningful in one's perception despite being fixed to a 'damaged' body. This can be applied to the participants who use wheelchairs, such that as they attempted to fuse ATs in their bodies as first-timers, they were engaged in different habitual embodied orientations that simultaneously reflected aspects of what Howe (2011) described as the (dis)empowering athletes. This was contained in Leo's response when I asked him the same question, I asked Lindsey:

> *Researcher: Do you remember your first experience using your device?*
>
> *Oh yes, I remember the first time I gave it a go. It was different for me because I had never pushed a wheelchair before. I permanently use power chairs at that point. I jumped in the chair, and it was cool because I could get myself around without having to rely on an electric motor. However, I was also extremely slow. It was a bit of a double-edged sword (Leo).*

The sport AT enhanced a crucial sense of independence in the lives of disabled people, helping them become hybrid athletes capable of in their daily routines. Perhaps most important for this study, as disabled athletes performed with ATs, this embodied process was not linear but dynamic and constantly negotiated as a means of subsistence generating new identities. Thus, the ATs simultaneously acted *against* and *with* their bodies, transforming them into different active embodied identities. Oliver constructed for *himself* a subjective identity after experiencing the difference between his sports equipment (rugby chair) and everyday equipment (everyday wheelchair).

> *Researcher: Describe ways the wheelchair helped you to participate in sport – play wheelchair rugby?*
>
> *Let us say I can do all the things on the court of playing wheelchair rugby. It is good in many ways, good for comfort and confidence. But then yes, I would not be able to get around a lot in a normal wheelchair. I have seen it happen over again, people just walk into games and look like they are rather comfortable to want to be in a rugby wheelchair than an everyday wheelchair (Oliver).*

Shilling (2003, 2005) argued that personal awareness of one's body identity in the world is valuable as it plays a central role in the connections one establishes with the world while living as a technological body. In summary, disabled athletes in the process of configuring their assistive devices as *part of themselves* not only blur the boundaries between flesh and material but also raise further questions about subjectivity. Specifically, how through individual differences, disabled people self-perceive their assistive "technology as offering them the possibility of extending the self" beyond the physical limitations of the "flesh and body" (Pavey et al., 2015, p. 144). In disability sports, the subjective relationship between the self, *other* and assistive technology at times has contributed to social and cultural practices that invalidate disabled people (Brighton et al., 2021) leading to superficial representations that disabled athletes are not capable and genuine participants in sports.

Conclusion

In this chapter, I discuss how disabled athletes actively engage in reflexive, negotiated and embodied practice while using ATs. Accessing AT represents an experience of freedom from disability, fostering independence for the hybridised body in both sports and daily life. However, certain challenges, such as economic barriers and inequitable systems, have impacted the process of becoming a disabled sporting body (Bantjes & Swartz, 2017; Sparkes et al., 2018). In sports and daily life, disabled people experience enhanced mobility through the crucial role of assistive technologies. By integrating these technologies into their bodily practices, they embodied movements shaped not only by the devices but also by physical sensations with a conscious perception of space and time, gaining greater control over their movements and actions. As disabled athletes engaged with their ATs in participatory, training, or performative contexts, they developed a sense of subjectivity and became aware of their hybrid selves. The integration of ATs required a complex hybridization between the body, mind, and emotions, significantly impacting their overall quality of life. The interactions of disabled athletes with ATs in sports reveal an embodied negotiation that simultaneously transforms and limits the hybrid experiences. Consequently, disabled athletes become powerful and agentic sporting bodies, actively seeking adjustments and modifications to enhance their embodiment within their sport. However, this embodied process is complex and dynamic, profoundly shaping their identities and athletic experiences while being marked by the societal phenomena of stigma (Goffman, 1959) 'ableist stare' and 'othering' (Asare et

al., 2023; Garland-Thomson, 2009; Loja et al., 2013). This relationship between identity, self, others, and assistive technology contributes to social practices that invalidate disabled people and perpetuate ableist stereotypes and representations. Nevertheless, engaging in disability sports with ATs alleviates some of these feelings, challenges power dynamics, and disrupts ableist expectations. A comprehensive exploration of how these perspectives disrupt the self-representations of disabled athletes' use of ATs remains to be further explored, which will be discussed in the next chapter.

Chapter Seven

"The photo reminds me that I am nothing" – Understanding Self-Perceptions of Disabled Athletes Through Their Embodied Experiences of Assistive Technology

Introduction

In chapter six, I illustrated how the relationship between disabled athletes and assistive technology reflects an embodied process, where access to AT shapes the quality of participation and performance possibilities for disabled athletes. Additionally, I have highlighted how, through the process of using assistive technology as embodiment, disabled athletes reconstructed themselves as hybridised bodies that are fluid and competent to navigate the boundaries of using AT in sport. Paradoxically, the autonomy, independence, and strength that AT afforded athletes, simultaneously produced opportunities for further stigmatisation. Thus, as shown in the previous chapter for some while athletes leaned into this notion of being 'more than human', for others it was not as empowering.

As highlighted in chapter two, there is little research that has specifically examined the relationship between sport, assistive technology, and disabled athletes' self-perceptions. Many questions remain about how disabled athletes construct their sense of self alongside their use of ATs. While I have already highlighted, that disabled athletes may require ATs for their engagement in sports, their perceptions of what those ATs do to and for them differ markedly. To understand these different perceptions, this chapter draws on data generated through photo-elicitation techniques from eight disabled athletes. I focus on how these athletes navigated their shifting sense of self in relation to their AT use. When exploring concepts of self, identity, and subjectivity, I am considering how individuals perceive and interact with their sports equipment based on their instinctive bodily awareness. (Shilling, 2005; Theberge, 1991). To put it simply, I am not primarily interested in how the participants look in the photos. Instead, I am examining how the photos showcase the common occurrence of disabled bodies merging with technology to symbolize a distinct sporting identity. As previously stated in chapter three, photo-elicitation is a research method that uses photos in the context of interviews as a way to prompt and elicit deeper and richer

responses (Drew & Guillemin, 2014; Pyyry et al., 2021). Given that disability sport is a hyper-visual culture, photo-elicitation afforded participants another avenue, besides the spoken word, to convey their embodied understandings of ATs (Phoenix, 2010). Each participant generated three photos which served as springboards for interview conversations that delved into their past and current aesthetic and affective responses (Pyyry et al., 2021) toward their ATs. Simple questions like "Describe why you chose this photo" and "Describe what the AT in this photo represents to you" provoked the telling of many stories and I drew on Braun and Clarke's (2020b) reflexive thematic approach, to link image and textual data (Busso, 2011). Three themes namely sense of achievement, sense of self-validation and performance and competition were generated from this analysis, each of which is discussed below.

Sense of Achievement

The participation of disabled people in disability sport is frequently associated with notions of success and accomplishment. As Mauerberg-deCastro, Campbell and Tavares (2016, p. 112) mentioned, disabled people's engagement in sports "can provide opportunities to experience a sense of empowerment, and to achieve excellence". Indeed, achieving is centred around actively accessing and participating in sports of high quality, while simultaneously building self-image and self-confidence (Brittain, 2016; Thomas & Smith, 2009). However, little is known about how achievement is perceived by disabled athletes themselves. In particular, there is much to learn about the relationship between impairment, technology and one's sense of self. The latter is something that photo elicitation can offer insight into. Many participants described affective relationships with their sports technologies or what Goodley et al. (2018) refer to as a special way of feeling and emotionalizing. The contexts within which these affective expressions manifested themselves differed from participant to participant, however. For example, Oliver used his photo below to illustrate a particular relationship between the rugby chair and his impairment. As he signals below, rehabilitation re-configured his relationship with the chair, facilitating his capacity to "do more":

Figure 7 Photo of Oliver playing in a game after his hand surgeries.

Figure 6 Photo of Leo playing one of his competitive games.

Figure 4 Photo of Mark playing as a player and coach.

Figure 5 Photo of Peter first from the front row giving instructions to the other players.

Researcher: What does the rugby chair represent to you playing sport?

There is more to life than anything else. Back then I couldn't play due to my hand surgery, but look at me now, it's not just being down in the corner like I can't do it, so I am not doing it. But now I can do things for myself, and I can do more (Oliver).

Here, Oliver described how the rugby chair facilitated the capacity of his impaired body to move in ways he wanted it to, permitting meaningful participation in sports (Richard et al., 2019; Sparkes et al., 2018). For other athletes, AT was experienced as a vehicle for feeling athletically competent, 'free' of disability and embodied with joy. Leo's description of one of his photos exemplifies this experience:

For me, playing is kind of achieving in a way because it (rugby chair) allows me to participate and do all these things, which I've always enjoyed. Even though I have a pretty severe disability, now, I can still participate, even to a competitive level and I've got something to aspire to be better at, as well. So, it seems like it's empowering (Leo).

Leo described his photo as symbolic of his ability to compete, despite his impairment such that he felt a sense of empowerment that provided him with goals to aspire to. The stories shared by both Leo and Oliver reveal how the specialised wheelchair has a profound effect on their individual life. They found that with the support of technology, they can achieve most if not all, levels of sport participation, progressing from novice, and amateur to high-level competitive athletes (Brittain, 2016; DePauw & Gavron, 2005). For some participants, it would seem that the photos served as a medium for bringing to their awareness links between their embodiment of technology and subjectivity. As Mark described below, in his case, the photo expressed his capacity to navigate between coach and player identities, provoking a sense of achievement that was felt not only personally, but in relation to his team. This was evident as Mark shared with me what piqued his interest in this photo:

In this photo, I was coaching as well as playing. And to get right up to number one within the team, felt like a big achievement for me and our team. It was a good feeling and a good accomplishment (Mark).

This data reminds us, specifically in the ethnography chapter, of how the wheelchair holds a significant emotional value, offering opportunities for situated accomplishment (Papadimitriou, 2008) within the immediate sports environment. Therefore, the photos provided by some participants offer further context regarding situated achievements. These images depict their bodies within specific situations, evoking emotions and intimate interactions while using sporting assistive technologies in a meaningful manner:

> *It was also my first time being a coach. I teamed up with another young girl, who is the one taking the shot there. I had been coaching and training her to use the ramp for four months before this competition and we teamed up to compete at the Nationals, which is cool. That was my first time playing as a captain of a team and I was a lot more vocal that time than I ever was normally to play with other people because normally they just do their own thing. I was surprised by how vocal I was (Peter).*

For Peter, this was a shift in his usual self of interaction with others, which contributed to his development and display of leadership qualities (Zheng et al., 2022). ATs facilitated his capacity to find his 'voice' and contribute in more confident and assertive ways in his sporting environment. The photo was symbolic of an enwheeled process, where he navigated his bodily engagement with the chairs as coach and player, coexisting in a dynamic way.

Photo elicitation also prompted a recounting of the ways in which engagement in disability sport can produce profound senses of athletic achievement. For example, Oliver used one of his photos to communicate an internalised form of ableism (see Loja et al., 2013) despite celebrating his athleticism through comparative achievements of ‘then’ and ‘now’ as a disabled person. This was illustrated, in this photo below as Oliver talked about the influence of his Māori culture which prides itself in supporting and initiating family strength through festivals, which assisted him in building a positive sense of self and mindset going forward.

Figure 8 Photo of Giles with his teammates after winning a trophy during a regional championship.

Figure 9 Photo of Oliver before his accident.

Figure 8 Photo of Ben getting ready for the finals of the Rio Paralympic Games.

This photo was before my accident, but it is like self-achievement now especially when I get compliments about playing wheelchair rugby. Sometimes they (teammates and family) will tell me 'Oh, that's good what you do'. Sometimes, I am too shy to accept it, I just go into my little corner and celebrate. More of those can get your morale up or else you will be down and you're not going to be playing much, not as much as you want to show your abilities (Oliver).

In chapter four, I discussed the importance of support networks such as families, peers, teammates, and friends for navigating disability and in the context of this chapter, the focus is more clearly on the ways successful use of specialised assistive devices can afford particular kinds of support to disabled athletes. One of the interesting findings in relation to photo elicitation, however, is that several participants used their photos to point explicitly to the shared, collective achievements permitted by ATs. They talked about the way AT can create scenarios where athletes rely on each other's unique and different physical abilities to succeed. In essence, the technology has sustained and created a support network and vehicle for collective achievement. Giles's testimony is a case in point.

Researcher: What does this photo represent in terms of your physical abilities?

It kind of represents achievement, because especially in this photo, we're not all the best for our classification, but on any given day, combined with our skills and everything, we can be the best, so you know, it's a sense of achievement (Giles).

In the case of Giles, the photo was utilised as a kind of communicative tool (Harper, 2002), in-depth articulation of various aspects of his athletic self together with others. Through their unique embodied experiences, Giles perceives their achievements within the context of their own abilities and skills. By this, I mean Giles contextualised a certain sense of intersubjectivity through how they individually yet as a team navigate the world through their bodies. Likewise, Ben used his photo below to illustrate how he achieved an athletic self, but also the workings of his mind and the establishment of inner goals, free from normative constraints imposed by ableist norms of disabled/non-disabled (Vehmas & Watson, 2014) which are not always simple to explain:

For me, it's achieving that dream of making the final and probably like I've said in the past, for me, it was starting athletics and that kind of thing to prove myself to people I could do it and could achieve what I wanted to and if I set goals and worked at it. I would make it no matter how tough it was. So, I think that is me achieving those goals and showing all of the doubters I can do it. So, it was kind of a pinnacle in life, both in terms of the physical side of actually making it but also the mental side of making it and proving to the doubters that you can do it. This is not different from me playing wheelchair rugby (Ben).

From an embodiment perspective, the sequence of Ben coming to use specialised sports technologies symbolised an athletic past, one that felt lost but rediscovered, developed and achieved through engagement in multiple sports. Indeed, as already mentioned in this thesis, the use of specialised sports technologies not only facilitates individual successful performances but is crucial for self-negotiation of one's disability to access the everyday world (see chapter five). In describing their photos, some participants did not only visualize ATs as instruments but instead, symbolized them as aesthetic means through which they felt and secured 'eternal' freedom from the medical notions of disability in life (see Hughes, 2010):

It represents, an evolution of life. It's quite a life-changing event. For me from being nondisabled and breaking my neck to being unsure to playing sports and finding, I guess like-minded people that are doing what I'm doing now helping, mentoring and guiding you through to reach your potential, and maximise, gaining your independence and stuff like that, it represents a life-changing experience for me (Mark).

Through the photos, it is evident that the sense of achievement in using assistive technologies in sports is not only an embodied interaction with objects but marked by subjective consequences of being an embodiment of assistive technology. Here, the analysis re-echoed aspect of findings in chapter six where AT symbolised something beyond what Butryn (2003) described as *implement technology*. In this sense, AT facilitated cues, feelings and emotions of bodily capabilities that produced a disabled identity of success in both sport and everyday life. These embodied experiences are however often neglected in the sports,

assistive technology, and disability literature, particularly exploring how AT might positively impact the achievement and success, and how it may lead to the acceptance of disabled people in sport.

Sense of Self-Validation

Given the above, the discussion on disability and assistive technology usage, as evident in disability literature and public discourse, primarily adheres to a medical model, under this theme, I trace the player's experiences of AT seeking self-validation and of others. The medical model emphasizes a negative ontology of disability, viewing disability as a deficit, and considering the primary function of AT to be the restoration of physical function. Such a view can become embedded in disability cultures and internalised by disabled people, contouring their use of AT and the validity of their athletic self. In contrast to the medical view of AT, participants in my study expressed in their photo captions that sporting devices can be a medium for social, internal, and self-validation of the disabled sporting embodiment. For example, Ben discusses how his athletic ability became recognized in a disability sports culture that traditionally had devalued disabled people who used technology for sport:

> *Initially, it was tough, even to join a club. I had a few clubs, and athletic clubs that said they didn't want disabled people to join so they would kind of say no to me. I was very lucky that I had a coach early on who was a big advocate for me. … then I just started, the shy guy kind of running and just running… then started to get more comfortable within the club and with my peers who were nondisabled. Then started to run more often at club nights and … built up my confidence in my athletic ability, I was respected in that community in a way I'd never felt before (Ben).*

In chapter six, I mentioned that the over-medicalization of disability in sports has served, in some cases, to create a general culture of 'otherness' and invalidation of disabled people. Embedded in Ben's story is a visual and symbolic representation of self-validation in that he felt pressured to portray his athletic physique as acceptable and conform to the normal status quo. It took the allyship of a single coach to create a context where Ben felt a sense of belonging and respect from his peers.

Importantly, the photos offered an opportunity to explore participants' relationships with, and orientations towards, their assistive technologies, offering a layered set of meanings

to explore. For example, in chapter four, I identified how some participants perceive AT as an instrument through which to participate in sport. As such, the material and symbolic significance of the image acted as a vehicle to communicate what 'normality'; expressed as physical and emotional freedom from material limitations:

> *It (referring to the photo) makes me realize how important it is in my life to be able to do these things and not having a prosthetic interfere with me being able to do the important things…The feelings of being able to do that and feel like a normal person (King).*

Here, the prosthetic visually alters the look of a person to the extent that it influences their sense of self and perception by others (Murray, 2004). In doing this, the photos then helped King explore the subjectivities of his prosthetic-self, illustrative of how ATs (i.e. prosthetics) can validate disability as 'normal' and 'non-disabled' – in so far as an individual can do essential physical tasks (Nordenfelt, 1993). At times the photos, immersed some of the participants in experiences of adaptation and a sense of agency while using ATs. For example, Craig on this occasion described how his AT and other supportive ATs combined with his abilities facilitated participation in surfing, without these Craig explains 'I am nothing':

> *The photo reminds me that I am nothing. Aside from basketball, it would be difficult for me to surf without the support of other infrastructures and devices like beach wheelchairs. It's not as easy as it used to be with two legs. But it also makes me happy that l can use my own abilities together with these pieces of equipment. Look, I have got one leg that I can use and that makes a big difference (Craig).*

Craig's description does two things. On one hand, it highlighted how he is dependent on forms of technology for his independence, reflecting an internalised form of ableism in which normative notions of independence are produced (see Lowry *et al.,* 2022). On the other hand, he embodied resilience and happiness through his interdependence on AT to play sport.

Figure 12 Photo of Craig trying out surfing with a beach chair.

Figure 11 Photo of Mark playing in his rugby chair in a low-pointers competition meant for those with severely limited upper limbs.

Figure 10 Photo of Giles seated in his custom rugby chair.

Figure 9 Photo of Peter about to take a shot in his chair via the ramp.

Throughout the study, I have highlighted how one's impairment can disrupt the performance of using technology (see Burkett, 2010; Holtslag & Dekker, 2015; Howe & Jones, 2006; Le Clair, 2011) as well as the inherent validity of disabled people's athletic achievements (see chapter six). However, some of the participants used their photos as an opportunity to express how their athletic bodies were authentic, and valid leading to self-gratification. This was evident in how Mark described his photo below:

> *This photo represents good times with my rugby chair. I guess I'm using what I've got, the muscle function I do have and things to play a sport that I enjoy. I'm always very thankful for the ability that I still have after my accident. I can still play the sport and play wheelchair rugby. It's a sport that I didn't know of before I had my accident, but I feel it's really an amazing game (Mark).*

Additionally, both specialized and everyday ATs can generate instances of freedom from the limitations and constraints of one's impairment (see chapter six, section two). What is however different here is the deeper 'self' meanings Mark gives to his freedom from impairment enabled by the photo. In that, through the photo, Mark experienced moments of self-acceptance and self-assurance – staying positive despite his impaired embodiment. This later led to feelings of embodied pleasure for the athleticism made possible through the use of his rugby chair. Similarly, other participants' photos highlighted a pre-conscious bodily experience focused not only on athleticism but the benefits of using sports and sporting devices to gain bodily fulfilment in a shared community:

> *I guess it's (rugby wheelchair) a facilitator of sport. It represents the ability to play a team sport that otherwise I wouldn't be able to do. Now I can play sports, it's quite cool that it's integral to the game because often wheelchairs are seen as kind of bad within society. So, to have that as a symbol of the game is pretty cool (Leo).*

While this data re-echoes the inclusive powers of AT highlighted in chapter five, the AT also served as material that overcame the negative stigma attached to disability. At times assistive technology tends to elevate the disabled embodiment to something exciting and foreign (e.g. blade runner) or further marks them as different (e.g. powerchair) or frame them as ugly, weak and feeble (Howe, 2008). In this thesis, these stigmatised views have led to intense forms of techno-bodily adjustments, negotiations, and adaptations for certain

impaired athletes (see chapter five). As such it was not surprising when some participants described their image to reflect an *affective* way of validating their embodied self while using their sport devices:

> *I know my physical abilities quite well; I know when I started, I wasn't struggling. I was challenged to push faster to push for a long time and then as I progressed, it was a lot easier. The chair didn't get lighter, so something had to have gotten better. I found myself getting stronger and more comfortable in the chair. I think I am aware of my physical abilities and my body's limits and all of that kind of thing, but I'm also obviously yes, aware that the chair aspect has something to do with it because if I were to jump into a chair that wasn't set up for me, it would be a lot more difficult, but still, I would have the same physical ability. So, there is an element of it in terms of the chair, but I think primarily, I'm aware and confident in my physical abilities (Ben).*

Despite these positive physical abilities of disabled people in sport, it is argued that "society has continued to invalidate, treating their impaired bodies as something that defines and affects their identity" (Hughes, 2000, p. 558). As already stated in chapter six, such deficit views have contributed to the blurring of lines about what constitutes *implement* or *self*-technologies (Butryn, 2003) for disabled people. As such, Leo used his image to define what the rugby chair meant for his ability to play sport:

> *…this is just a piece of equipment. It might be a bit larger in the way it appears but only allows a sport to take place which would otherwise not happen, that is it! I can go back to you know, other sports that have pieces of equipment that are vital for them to play. Tennis with the tennis racquet and, hockey with the hockey stick or whatever it is (Leo).*

The data demonstrates an instrumentalist way of viewing technology (Butryn, 2003) where Leo distances himself from the AT - he does not necessarily regard the wheelchair, in this context, as a performance-enhancing AT, but rather as an ordinary, everyday piece of equipment needed to play wheelchair rugby. As he rightly points out, so-called non-disabled athletes also depend on '*implement technologies'* – equipment needed to perform sports (see

Butryn, 2003). Building on this, Leo described his resentment at the unfair societal portrayal of the way to validate disabled people's use of ATs:

> *I think that in some way it is an unfair representational of us in disability sports. You take all these aids and equipment away, and sports don't exist most of the time. This is pretty unfair, and it happens in the nondisabled sports realm as well. You take all these pieces of equipment away, you know, there's not a lot of sports that nondisabled people can play, so that just seemed like a bit of a joke of a representation (Leo).*

As shown in the analysis, in positioning AT as *implement technology*, Leo distanced *himself* from disability, as a negatively valued subjective state of being. He challenged a certain disability stigma - where ATs are still perceived as a therapeutic instrument and its use in sport is still a rehabilitative exercise. As already discussed in chapter five, there is a general trend in disability sports where disabled athletes tend to counter the stereotypical attitudes resulting from medical and ableist notions (Swartz et al., 2018), more, rendering them passive. In contrast, for other participants, the photos gave them agency and power to describe their sporting capabilities to symbolise the athletic identity they wanted:

> *With or without technology, I kind of see myself as an athlete in my own right. Even being a disabled athlete, if I see someone with muscle dysfunction, for instance, like Boccia players with really limited function, I am respectful because they excel at their own sport. Everyone has their place and I enjoy that... I understand the concept of it being inspirational, but it isn't that at all, at the end for me it's just a by-product because I've talked to a lot of people from the Paralympics and they say, 'oh wow we had more enjoyment from watching the Paralympics than we did the Olympics'. Especially if they know someone and I mean, unfortunately, we don't have stellar results, but people took a whole lot away from that and they're just amazed by it. But that's kind of our everyday life nothing special, haha! (Giles).*

Giles used his photo on page 178 to reflect a certain subjective athletic position of the supercrip. The AT did not only symbolise a means to validate his body. Rather, it normalized the ambiguities of his impaired sporting body, transforming him into a powerful athletic body in and out of sport. While I have mentioned in chapter five, that ATs foster exclusionary

practices due to the non-normative identities often assigned to a disability, in this chapter, the photos have also helped to unearth some of the ways disabled people navigate the dominant social norms that incapacitated their natural abilities (Borg et al., 2011; Ravneberg, 2012) and bodily appearance (Hawkesworth, 2001) in sport:

> *My photos might not be as exciting as wheelchair rugby photos, but I still see them as sporting photos. As a disabled person, I do not see other disabled people as disabled depending on the device they use. They're all just people, with unique physical abilities, everyone has just got different stuff wrong with them. Disabled people are just a bit more visible. I don't think disabled people should be seen as others regardless of the sport (Peter).*

Per this data, it would be reasonable to conclude that in disability sport, technology can produce agency, and reconstruct the self and other (Moser, 2006). Not only that but also through technology disabled people often challenge the traditional notions of beauty and normalcy – the idea is that disability is a subjective physical appearance (Davidson, 2015). Taken together, the analysis, thus far, illustrates how an assistive device can symbolise a visible object material that positions disabled athletes as physically and athletically normal. In this context, the photos have helped decouple the way disabled people think about athletic subjectivities, physical normality, and the way society values their use of assistive devices. Specifically, enabling them to deal with the cultural invalidation of disabled people - a consequence of the embodied relationships with AT that have become a significant factor in liberating the way disabled use AT in daily life and sport.

Performance and Competition

So far in this chapter, participants have assigned different affective meanings to their ATs. In centralising these affective meanings, another common theme identified during the photo analysis was related to how the participants described the ATs shaping their athleticism and competitive identity. For the objective of this study, athleticism encompasses the way the participants experienced and perceived their embodied abilities and skills during competition and performance. This is central to this thesis, as, for disabled athletes, both everyday and sport technologies are crucial in either enhancing or limiting their training, participation, and performance experiences in sport depending on the extent of their embodiment of the AT.

Therefore, while reflecting on the research objectives, I wanted to understand through the photos how the ATs shaped their self-perceptions related to athleticism and competition experiences.

Many participants emphasized how in competitive spaces their "bodies had the power to engage in sensory actions in material and spatial senses" (Busso, 2011, p. 49) and inter-subjectivity. In this context, when competing, the most important thing for many of the participants was not the material effect of the sport device but the exposure to the sporting space and dynamics of the game:

> *So that one (referring to his photo below on page 184) is the first competition I played in wheelchair rugby. So, like I said I hadn't played in any competitions before. That was my first taste of a tournament alongside other people and yeah, it just was a great kind of introduction to that side of the chair and in terms of the competition and just really enjoyed I guess not the dynamics but, I guess the competitiveness also the friendliness of the sport (Ben).*

According to scholars, the rapid progress of sport-specific technologies has led to the increased performance, organization, structure, and professionalization of disability sports (Howe & Silva, 2017; Kath et al., 2019; Laferrier et al., 2012). According to Kath et al. (2019), advanced sporting devices have not only removed the 'felt' barriers to competing in sport but enhanced the ability of athletes to compete at elite and high-performance levels. Mark for example, emphasised how the experience of using specialised technology in the Paralympics facilitated self-fulfilment in sport at the highest level:

> *Researcher: Seeing yourself in this photo, what memories does the chair remind you of?*
>
> *Mark: It was so unreal, the experience, compared to anything else that I have ever experienced. It won't be possible without wheelchair rugby. We are all lined up with all the other countries outside in this big car park, waiting to go in and then when you go in you feel like you're so tiny going into this giant stadium and then as soon as you break sort of through the entranceway there's like 95,000 people cheering and waving and going crazy. It was just, so different from what I will be experiencing in life and every other day.*

Mark also used the photo below on page 185 to describe his felt experience in the Paralympics, an embodied space in which experiencing himself as *'who he is'* was made possible:

> *Again, it was good people at home could watch it (the Paralympics) on TV too and so they could see me, our team coming in and walking around and my parents were like oh, 'this is Mark, he is in Beijing'. It's nice to know that the New Zealand public and people at home, watching me as well, and just representing who I am, my country in a big competition, that was a pretty special feeling (Mark).*

Figure 13 Photo of Ben using a rugby chair first -time in a competition after switching from athletics.

Figure 14 Photo of Mark parading at the Opening Ceremony at Paralympics Games in Beijing 2008.

This analysis reinforced findings in chapter six – in that ATs can be regarded as identity markers in people's lives, not only that but highlights the recent potential in how Parasport's coverage can challenge technology and stereotypical representations of disability (Pullen & Silk, 2020). At an aesthetic level specialised sport ATs can modify or enhance the natural appearance of disabled people (Tamari, 2017). As such, many participants examined their photos to illustrate the struggles between their sensory selves, high-tech subjective bodies, and their negotiations of the natural sporting environment (Butryn & Masucci, 2009). For example, Peter's everyday powerchair afforded him a performance at elite-level competitions. He used his photo to describe special moments as characterised by felt sensory restrictions. Not only that but the aesthetic limitations felt between his body, ramp, clothes and playing surface:

> *For me, this photo represents mixed special moments because that was the first ever big international competition I went to and this photo I just remember that was in the warm season and I just remember how hot it was, it was really humid. The New Zealand uniform was thermal pants and so I had to unzip them all the way up, it was too hot. The floor I played on was very difficult to play on, I barely was able to use my chair. The balls just went everywhere. They put on a custom foam floor, and it was pretty bad with the ramp (Peter).*

The data provides an understanding of what Sparkes and Smtih (2012, p. 169) describe as "sensuous scholarship", a somatic experience where the body is felt, perceived and remembered through the senses. The relationship between Peter's body and competition was heightened by engaging his senses of sight, smell, and touch in order to learn and make meaning of his competition environment. Such embodied experiences allowed other participants opportunities to either overcome or reduce the sense of 'othering' (discussed in chapter six) often manifested in hierarchies structured according to the level of function and use of AT. As such the photo produced by Leo emphasized disabled athletes' experiences of their embodied self as strong, resilient, and capable in competition spaces:

> *Research: Why did you choose this photo?*
>
> *I chose this photo because it was the first tournament, I played in the rugby chair. It was a friendly tournament in 2020, which was a year and a half ago now. I was still*

growing into the game, and I liked it because it reflects my game awareness and strength at that time. I'm holding down a two-pointer. So, someone with a lot more function than me trying to stop them from getting to the front and that's what I kind of like about it (Leo).

Researcher: Interesting! So, what would you say the wheelchair means to you?

Oh, I guess it (the rugby chair) represents …look he was a new player (referring to the player in the photo) as well. But it still represents I guess, the ability of someone with less function like me to have a big influence on the game and play correctly. So, for me, it represents someone who should be a worse player but is able to with the correct strategy overcome someone with more function which is kind of I guess quite empowering, and you feel like you're …you feel a lot more important within your team (Leo).

Figure 16 Photo of Peter playing on a foam-like floor impeding good use of the powerchair.

Figure 15 Photo of Leo displays his defensive skills during a game.

In theorising this, Leo's used the photo to reflect a sense of embodied positioning. Particularly, not only reinforcing how disabled athletes strive for internalising and validation of their function as already highlighted in this chapter but the reproduction a hierarchy of impairment within sport. Through the photos, it is evident that ATs can be powerful material for disabled athletes through which a sense of competition is felt and embodied. In particular, the use of AT in a competitive environment enabled spatial-technology interactions as their sports devices afforded them significant bodily agency, self-empowerment, and self-resilience towards negative disability-specific ideals.

Conclusion

In this chapter, I have attempted to expand the findings in chapters five and six and specifically addressed my research objectives focused on enhancing the understanding of disabled people's experience of using assistive technology. In using photos, I provided a further empirical understanding of participants' lived body experiences of AT, focused on self-perceptions and representation. The material and symbolic significance of the photo acted as a vehicle to communicate (Phoenix, 2010) how ATs were symbolic in normalising the ambiguous subjectivities of the disabled athletic body. Key to this chapter, it became clear that negotiating the use of technology represented for the participants not only the construction of powerful sporting identities but an embodiment that bears capabilities, valuable athletic abilities, and the standards of the 'normal' human body as perceived in society. Building on the previous chapters, the photos have helped to address the research objectives by improving our understanding of the sensory and symbolic nature of AT and subjectivity.

From the perspective of chapter five, this chapter has produced nuanced insights into a holistic understanding enwheelment in the context of disabled athletes. Specifically, elaborates on the process while illuminating how we can understand the process of enwheelment by tapping into the "sensorial, affective and aesthetic dimensions of the lives and environments" (Sparkes & Smith, 2012, p. 186) of the disabled athletes. Additionally, by using photos in this chapter, has provided a better comprehension of how athlete navigate their hybrid self, highlighted in chapter six, clarifying multi-sensory boundaries in the process of becoming a hybrid sporting embodiment. In the same vein, through the photos, further understanding of how disabled athletes navigate their hybrid self has been reached,

particularly elucidating the multi-sensory boundaries of becoming a hybrid sporting body. Against this background, with or without using sport ATs, disabled athletes are their 'own' identity as they perceive *themselves* as athletic sporting bodies worthy to partake in any level of sports like their non-disabled counterparts.

Chapter Eight

Introduction

Throughout this research, I have attempted to contribute to an understanding of the relationship between disability, assistive technology, and sport. Additionally, I aimed to address the role assistive technology plays in the lives of disabled people, specifically in the context of their participation in disability sport. Finally, I aimed to enhance our understanding of how a particular form of disabled sporting embodiment is (re)shaped by assistive technology. Disability sport was the context through which I documented the experiences of physically disabled athletes and their embodiment of both everyday and specialized sports assistive technologies as they moved, participated, trained, and competed. The study aimed to clarify the embodied processes and experiences that disabled people give to accessing, participating, training, and competing with assistive technology in disability sports, by drawing on the resources provided by the theoretical framework of embodiment.

By focusing specifically on embodiment, I sought to strengthen our understanding of the intense fusion between disabled people and assistive technology - something that is often theorised in overly abstract ways (e.g., 'cyborgification' and 'posthumanism'), neglecting the experiences of disabled people themselves (Reeve, 2012; Sparkes et al., 2018). In doing this, I have endeavoured to enrich our understanding of the material interactions disabled people have with AT by moving beyond the discursive language that tends to obscure inner sensations, feelings and physicality of using AT. Sparkes et al. (2018) argued that it is time to shift from "theorizing *about* bodies to theorizing *from* lived bodies" (p.164, my emphasis). In line with this perspective, participants' voices, observations, and reflections were utilized, drawing from my ethnographic immersion in a particular sporting context, alongside semi-structured interviews, and photo-elicitation. These methods permitted critical exploration of the self, body, and disability of disabled people while using assistive technologies in sports.

In this discussion chapter, I tease out the key messages from chapters five, six, and seven to highlight how the study relates to, extends, and contributes to previous literature. To review, chapter five analysed and described how access to assistive technologies enabled disabled athletes to participate in sports, focusing on the context of wheelchair rugby. This sets the tone for chapter six, which further expands on how everyday and more specialized

or bespoke sporting assistive devices shape the athletes' impaired bodily selves across various disability sports. Importantly, the chapter also highlights how, through AT, disabled people experience their body as a set of possibilities. These insights then lead to additional questions in chapter seven, exploring how these bodily possibilities impact disabled sports people and their self-perceptions of their hybrid selves. Together, these chapters have contributed to the existing literature by adding to our understanding of the intersection of the body, disability and assistive technology. Technology can enhance one's environment (Butryn & Masucci, 2009; Hammel et al., 2002; Widehammar et al., 2019), through sport, disabled people can use, embody and act *from* the AT in ways that transform their hybridised sporting bodies from 'disabled' to become technology 'able'. In this chapter, I build on this prior analysis to draw the attention of disability scholars, advocates, AT service providers, and policymakers to acknowledge the *lived* body experiences of disabled people as central to clarifying the limitations, controversies and possibilities about the role of assistive technology for disabled athletes.

Access to Assistive Technology

In this research, I highlighted how, for disabled people, access to sport is a complex and multi-dimensional process, comprising an embodied engagement and knowledge of the world around them (Asare et al., 2023). As such, it is important to understand access as it intersects with assistive technology, body and disability. For this reason, in chapter five of this research, I expanded the narrative within disability studies by highlighting the importance of disabled people's access to assistive technology (AT) for their participation in society and sports (Borg et al., 2011; Geppert et al., 2022; Nierling & Maia, 2020; Nind & Seale, 2009). The study found that physical access to AT, whether it was old or new, borrowed or gifted, custom-made or a 'hand-me-down', was a crucial initial step for participants in overcoming barriers to playing, training, and performing in their chosen sports. When participants accessed AT for the first time, they developed a connection with their impairment and body, felt a sense of belonging in sport, and experienced inclusion. This inclusive environment not only accelerated disabled people's participation in sports but was responsible for the fostering of interpersonal relationships and opportunities to play, train and compete alongside others. These findings provide evidence for the claim that the terms of inclusion in disability sport are not just about guaranteeing "access for all" (Kiuppis, 2018, p. 17) but rather about an ongoing, embodied

process where participation in sport demands a continuous learning, adjusting of AT and navigating interrelations with other people.

Highlighting the presence of an inherent global AT challenge, this research has identified that barriers and inequalities still persist in disabled people's access to AT (Asare et al., 2023). The United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) asserts the fundamental right to access AT for inclusion in physical activity and sports (Borg et al., 2011; UNCRPD, 2006). However, the research found that unequal access to assistive technology for disabled people was not only a human rights issue but is also deeply rooted in the social and medical models of disability. The ATs often did not meet the specific needs related to participants' impairments due to inadequate social systems and policies governing AT access (Khasnabis et al., 2015). For instance, in chapter six, I pointed to the complex relationship between AT provision and the broader health system in which disability is situated in New Zealand. The findings suggested that these complexities resulted in disparities for athletes' accessing both everyday and specialized sports ATs and that these disparities limited people's opportunity to engage in disability sport. Importantly, participants' access to assistive technology was influenced by the nature of their impairment (injury vs. congenital), reaffirming Woods and Watson's (2004) assertion that technology continues to be under medical control. In simple terms, the findings confirmed Harris' (2010) assertion that assistive technologies given to disabled people and funded wholly through the public health system, are typically 'prescribed' by professionals. The participants did not have a choice of preferred specific assistive technology, despite the many highlighted embodied possibilities of these technologies in this research. From an embodiment perspective, the unequal access to assistive technology impacted the everyday health and physical well-being of the participants. In particular, the severity of one's impaired body became an object of subjective scrutiny, a process that determined whether one needed to be provided with sport assistive technology or not.

Despite numerous studies having critiqued the costs associated with securing assistive technology (Kath et al., 2019; MacLachlan et al., 2018; WHO, 2020), this study's findings have indicated that not only high costs remained a major obstacle for participants in accessing their preferred sports but there is also an embodied cost. Many disabled participants who would benefit from AT, such as aerodynamic carbon-fibre prostheses and wheelchairs, lacked the

financial means to afford them (Bantjes & Swartz, 2017; Brittain, 2010, 2016; DePauw & Gavron, 2005). Due to the lack of financial means, disabled athletes 'paid the price' by adjusting and fitting their body to AT that is old, borrowed, used which for some athletes was highly restrictive, hence the embodied cost. Consistent with previous studies, the inability to afford sport ATs, meant participants often relied on bespoke sport ATs provided by teams, clubs, peer networks, philanthropy, and corporate sponsorship (Litchke et al., 2012), which increased dependency and limited the autonomy of owning their ATs to attain and sustain access to their sports. Alternatively, limiting the embodied independence of disabled athletes to access ATs that meet their bodily needs. However, these aspects of disabled athletes' experience of access to AT are often missing in the wider disability, sport and AT literature, which might suggest the need for further empirical examinations.

While access to assistive technology, enhanced opportunities for rehabilitation, active performance, and improved physical independence for participants (Widehammar et al., 2019), in this research access was socially embodied. ATs served as a facilitator for participants to connect with their immediate (children, partners) and distant (teammates, coaches) communities. This provided empirical evidence supporting Nind and Seale's (2009) assertion that access should be understood more critically in terms of relationships, communication, and quality of life, which encompass a sense of belonging to a community, enjoying independence/interdependence, social networks, and power. For many of the participants in this research, access to AT facilitated an embodiment which was interactive with the self, other and society. For example, in chapter five, for many of the participants the rugby chair facilitated an embodied state of social belonging, where their impaired bodies became simultaneously physical, affective, and social with people in and out of their sporting environment.

Despite the evidence in the disability literature that access to ATs enhances the social networks of disabled people through sports (Haslett et al., 2017; Purdue & Howe, 2012), an embodied approach in the current research has shed light on both this potential *and* the challenges associated with access to ATs. Even when participants were provided with bespoke technology, state, social and institutional barriers to their chosen sport remained. For example, in the semi-structured interview study, some of the participants were clear that the challenges that they experienced in accessing sport through their specialized sporting

technologies were not necessarily related to their impairment or lack of sporting abilities, skills, or bodily strength. Instead, it was borne out of inadequate state financial support and provision of AT, insufficient resource distribution, and less professional information on how to use, modify or even make little adjustments to their sporting ATs. Indeed, the assumption that access is straightforward through provision is problematic. Instead, as I highlighted in this thesis, access relies on a learning experience and access to shared embodied knowledge. This is important and has broader implications for the general provision of AT to the general population. These implications are further compounded for disabled people by AT policies, schemes and services that do not pay attention to the social and embodied negotiations of disabled people, which I have showed in this thesis can facilitate positive access and AT experiences for disabled people.

Embodying Negotiations of AT in Disability Sport

According to Winance (2006), adjusting to disability and technology is a complex process in which the person becomes oneself-with-his-or-her-device, resulting in greater fluidity in their actions and body. This was evident within this research, as the analysis showed participants perceived the ATs as if they were 'natural' fleshy bodily parts, that is, an extension of their physical self. Though the AT was an object, for the participants, it was imbued with meanings, feelings, senses, and emotions that influenced how they related to and moved their bodies during sports. However, the process of adapting, modifying, and adjusting to assistive technology is less documented in the disability sport literature, with many focused on the medical dimensions of AT. In addressing this gap, I have shown how, for many disabled participants, the process of using their AT is a subjective, reflective, and embodied practice. The embodied practices involved the participants engaging in awareness, self-realisation and building a connection with the AT, while attempting to become an embodiment of AT. In other words, incorporating AT into their everyday routines of their sporting body. For example, the players in the semi-structured interview experienced what is described as "embodiment relations" (Brey, 2000, p.1): a process that involves encountering and recurrence of patterns of experiences between an individual, self and technology. This data is interesting and helps to justify how technology is no longer experienced as a thing, an otherness, but rather as a subjective material, which becomes part of the player's habitual 'being-in-the-world'.

As the research showed, disabled people are constantly faced with the task of connecting their objects, body, and mind (cf. Merleau-Ponty, 1962; Shilling, 2005; Winance, 2006) in order to perform to their best. As such, this required constant negotiation between participants' subjective bodily experiences that occur when the disabled body is intertwined with AT. For example, while training, playing and competing with their sport-specific devices, many of the participants engaged in the process of intimate relationship with the device into their impaired bodies, and vice versa. These findings might suggest a conscious process occurred that there are not hard the limits between body and technology, improving their technology skills in both sport and everyday contexts. However, based on findings in similar studies (e.g. Monforte et al., 2021), another plausible conclusion can be drawn that this conscious process helped improve both sensory and material interactions of the AT while competing. This means an enhanced ability for disabled athletes to exhibit skills within their sporting space when using AT. In this sense, though new materialism has previously been presented as a theoretical framework through which to understand embodiment through material discursive phenomena, however, as I have highlighted in chapter two, new materialism is non-representational and rejects the conscious reflection of the way one experiences the world (Fox & Alldred, 2018) and the interactions between objects (technologies), human (other people) and non-human (structures, facilities) (Shilling, 2003, 2005).

In addressing this gap, the data in this current thesis seem to expand how we understand the materialist notions of *physical matter* (cf. Fox & Alldred, 2018), showing how disabled people can become transformed through an object (i.e., sport-specific ATs) in order to negotiate their sporting environment. Furthermore, participants demonstrated their ability to negotiate the hybridized nature of their technology-infused bodies, while also integrating the device into their embodied selves, making it an extension of their bodies (Papadimitriou, 2008; Sparkes et al., 2018; Tamari, 2017; Winance, 2006), as 'part of them'. However, this was not always a simple process of assimilation, with participants describing discomfort, soreness, pain, and sweat as they navigated the self, body, and consciousness to adjust to both their body and AT to their sport ATs. These forms of adjustments produced dual agency that led to a process where the disabled sporting embodiment became non-passive and immutable.

Indeed, the process of adjustment is an "extension of the bodily synthesis" (Merleau-Ponty, 1962, p. 152). However, in this research, the process of adjustment also included the search for a balance between impaired body and technology as disabled people engaged in sport. As the ethnographic data showed, while some participants often dedicated time to adjusting their body position and orientation in the rugby chair, others spent considerable time tweaking and adjusting the rugby chair itself to fit their body schema. These findings aligned with those of previous studies, indicating that disabled people's negotiations of assistive technology involved both physical and material adjustments to the 'disabled embodiment' as it intersected with technology (cf. Butryn, 2003; Crawford, 2015; Dolezal, 2017; Moser, 2006; Sparkes et al., 2018). In this research, the physical adjustments required endless self-bodily movements, especially for wheelchair users to identify the right body posture in the chair. The material adjustments involved making mechanical alterations to the chair to help make it best fit their body. Moreover, participants in this research utilised a variety of ATs to participate in sport, ranging from using their everyday ATs to more specialized sport devices. As such, participants experienced a range of somatic bodily reactions (Laferrier et al., 2012) which required specific sensory and affective adjustments (Winance, 2006). For example, for participants in this research, the inevitable everyday adjustments to their sport ATs at times culminated in embodied feelings of frustration and an emotional disruption to their body-self. This process of adjustments, however, was crucial for those who have acquired physical impairment, enabling them to attain complete athletic embodiment in both disability sport and everyday life contexts. From a theoretical perspective, these understandings are central to how embodiment can address the shortfall of NM that tends to neglect the cultural, social, and human interactions of technology (Fox & Alldred, 2016, 2018) in understanding disability in sport.

The results show that disabled people's embodied negotiations of bespoke assistive technology in disability sport cannot be explored without the theory of *embodied knowledge*. Embodied knowledge refers to an experience in which the body knows how to act, with that knowledge being imprinted in the mind (Shilling, 2005; Tanaka, 2011). The study findings suggested that negotiating assistive technology was accompanied by a learning process through which participants were continually drawing on embodied knowledge to acquire technology skills through adjusting and coordinating the body and self into an integrated

action. Assistive technology can influence disabled people's understanding of their disability, its origins, and their interactions with objects (cf. Chamberlain & Lyons, 2016). Importantly, the process of learning to use ATs in sport is often not well documented or is just too overgeneralized. However, as I have shown, for participants in this research the learning experience of using specialized assistive technology for sports was both highly individualised and involved learning from others. For example, in the ethnographic study, the participants not only embodied the learning process of acquiring wheelchair skills through their individual subjective actions, but also drew on intersubjective experience - interacting with and observing others (e.g., peers, teammates, opponents, trainers, expert users). When combined, these two learning processes reflect how, for the participants, learning to use sport ATs was a hybridised process, requiring what Tanaka (2011) described as an integration of motor skills and individual habitual actions with perception of the environment, spatial sense of self and behaviour of others.

Moreover, the ethnographic and semi-structured data showed how, in the process of embodiment, an object became part of the disabled athlete's identity specifically to whom it belongs. For example, as I highlighted specifically in the ethnographic chapter, it was observable within the setting that most of the players engaged in adjustments, refining old, while adapting new, ways of incorporating the wheelchair into their newly impaired athletic bodies. In other words, the notion of 'subjectivity', related to the unique aspects of how the individual athletes adjusted to assistive technology, facilitated the interaction of the individual's body and relationship with the world, shaping their knowledge of using the technology (Brey, 2000; Ihde, 1975). As such, for disabled people, the use of AT in sport is not merely a physical *being-in-the-world* but rather a social world experience of ''rearrangements and renewals of body schema'' (Merleau-Ponty, 2004, p. 164). These findings are essential in providing a clearer embodiment of how disabled people negotiate their disability experience, especially in terms of the process of becoming a "fully fledged" person with a disability (Iwakuma, 2002, p.85) when using assistive technology.

As disability is a "complex, scalar, multi-dimensional phenomenon" (Shakespeare, 2013, p. 1); therefore, it was expected in the analysis that not all participants experienced the embodiment of AT in the same way. However, the data indicated that, despite the different experiential qualities in incorporating everyday and specialized sport devices, participants

dissolved the duality of their mind and body, making the body the knowing subject and enabling them to understand how to use their sport ATs. The assumption then is that, in negotiating the use of assistive technology in disability sport, the participant's impaired 'body' or 'flesh' was not alienated from the sporting device; instead, the process reflected what Merleau-Ponty has described as a form of embodied consciousness in which AT is incorporated as part of the athlete's embodied being. In disability sport, these kinds of subjective, negotiated understandings of ATs are missing in the literature and require further analysis.

As I have shown in this research, having an acquired disability, some of the participants reported experiences of what can best be described by the notion of re-embodiment, which refers to undergoing a process of learning about the re-arrangement of one's new embodiment in connection to their 'being-in-the-world' (Merleau-Ponty, 2004; Standal, 2011). While some studies suggest that negotiating re-embodiment is integral to how disabled people act, successfully or unsuccessfully, using their assistive devices (Dolezal, 2017; Moser, 2006; Papadimitriou, 2008), in this research, this process of re-embodiment occurred from the time participants acquired their impairment, changes in impairment, went through rehabilitation, and began to incorporate ATs into their bodies as means of playing sport. Indeed, the findings revealed that learning to be re-embodied through AT in sports involves a "combination of processes that require constant negotiation, reorganization, and reconfiguration of one's way of being" (Papadimitriou, 2008, p. 107). Some participants achieved re-embodiment through trial and error, while others learned by observing others, and some acquired knowledge through support networks such as peers, coaches, and families. These embodied experiences support Papadimitriou's (2008) argument that re-embodiment is a creative process, yet also a complex, lifelong, situational, person-centred learning process that involves others. However, it should not be taken as a "linear learning process where the endpoint is incorporation" (Standal, 2011, p.183) because some disabled people do experience the AT more as an instrument to aid in sport. This is important to note because embracing diversities related to the embodiment of AT for disabled people can facilitate new thinking about the binaries between disability and the incorporation of technology. This insight is even more important when considering the findings discussed so far, which underscore the value of examining disability and assistive technology through the

lens of embodiment. Yet, researchers often overlook the rediscovery and relearning experiences of the disabled body when it becomes one with technology (e.g., Ashton-Shaeffer et al., 2001; Wickman, 2007).

Embodying Modifications of AT

Few studies have explored how modifying assistive technologies affect the ways that disabled people construct or reconstruct their identities (Dolezal, 2017; Papadimitriou, 2008; Richard et al., 2019; Sparkes et al., 2021; Wolbring, 2018). Richard *et al.* (2019) work is one exception. They illustrated how, for powerchair footballers, modifications were necessary for embodiment, to fully integrate AT into the body schema. Furthermore, as Sparkes et al. (2021) have argued modification to AT can occur as an act of resistance, subversion, and transgression against prevailing normative body standards and to reclaim bodily agency. My research contributes to these works by illustrating the ways in which participants modified their ATs, and as such underwent a continual process of re-embodiment, enabling participants to regain control of their impaired bodies, new and old selves. As the data showed, modifying assistive technology was shown to be a way of navigating dominant medicalised narratives of AT, commonly housed in rehabilitative discourse, in that many participants often customized or amended their sporting devices without visibly altering the make or function of the chair. These modification experience helped challenged medicalisation of assistive technology in ways that reinforced disability is not an individual functional problem. For instance, in the semi-structured interview, some of the players made minor modifications such as changing straps and adding an extra seating layer which culminated in creating an improved seating orientation, creating more comfort and safety and improving bodily efficiency.

According to Shilling (2003, 2005), modifying the body improves our sense of self as it becomes visible in our appearance - identity is embodied - and we take time to develop and maintain the 'right' identity. With this in mind, I utilised embodiment as a lens to uncover the process of shifts and tensions that disabled people go through while interacting with their sport ATs. In doing this, the research findings reflected that, while participants incorporated materials and objects (e.g., cloth, cushions, foams) to modify their sporting devices, they not only personalized and made the ATs more functional in a performative sense but also helped with the process of embodying the device. However, as disability is dynamic and

multidimensional these modifications eventually became obsolete, yet also ongoing, requiring further embodied adjustments. In relation to the existing literature, this is evidence not only of the constant rearrangement or re-embodiment that disabled athletes face in relation to their selves and bodies when using advanced assistive devices (Monforte et al., 2021; Papadimitriou, 2008; Sparkes et al., 2018; Standal, 2011); it also raises a further question that necessitates more exploration, specifically to explore the impact of AT on disabled peoples' participation across all levels of disability sport from an embodied perspective.

The Blurred Boundaries

This research highlights a possible shift in thinking about the relationship between disability and posthuman narratives. This shift is important because posthumanism - operationalised through the concept of the cyborg (Haraway, 1987) - attempts to question the boundaries of what is defined and considered as a 'normal' human, and by extension what comprises 'normalcy'. Posthumanism thus positions disability as an assemblage, enmeshed with culture, biology, environment and technology (Brighton et al., 2021). However, it does so in ways that can be metaphoric, superficial, reductive and it often neglects the embodied experiences of disabled people (Apelmo, 2012; Edwards & Imrie, 2003).

Therefore, in this research, I responded to calls to reconceptualize the human-machine binary associated with disabled athletes (Sparkes et al., 2018), providing a better understanding of how disabled people dissolve 'hybridised' boundaries to become a sporting embodiment that inhabits the world as one. These results build on existing evidence that disabled people can experience a blurring of boundaries between their body and their ATs, resulting in a particular form of embodied consciousness – one that shapes both the material body and sense of self. For example, it was not surprising that the data analysis showed some participants symbolised their assistive technologies as a 'transformer', representing the idea the human body is not a fixed abstract entity, but one that is flexible and evolving in nature. This is not to suggest that previous research that contributed to understanding the intense and subjective nature of what it means to 'be' a disabled sporting cyborg (Howe & Silva, 2017; Norman & Moola, 2011; Sparkes et al., 2018; Swartz & Watermeyer, 2008) is not useful in understanding the disability and technology experience. However, the data analysis draws attention to the cyborg theory that may reinforce conceptual binaries such as natural-

synthetic, self-other, and ability-disability, disrupting the way disabled people perform sport. Not only that but reduces the disability and AT experience in sport to something of an unnatural organism without any lived experience of the world.

Throughout the thesis, I have highlighted how the varied embodied experiences of participants might seem a positive reflection of the increasingly intimate relationship between humans and technology, rather than a cyborgification (cf. Howe & Silva, 2017) that blurs the boundaries between the "organic" and "inorganic," as well as the "natural" and "artificial/technological" (Butryn & Masucci, 2009, p. 286). These embodied experiences discussed in this research have provided an alternative understanding of the disabled sporting cyborg – illustrating a unique form of hybridised embodiment characterised by varied *experiences* of learning, culminating into embodied varied sporting outcomes. For instance, while locating participants' embodied experiences as a means to address the gap in research about the connection between the posthuman, embodiment and technological elements (Braidotti, 2013), this research reveals, that, in the process of using their sports ATs in competitive environments, the participants illuminated experiences that centred on the self and the physical realities of their athletic embodiment, allowing for mutual and symbolic engagements with their sport ATs.

Consistent with the findings of my research, I argued that participants do not perceive their hybridised embodiment as an entity possessing abilities beyond either their disability or technology parts alone - often expressed in disability and sports research (Bailey, 2008; Howe, 2011; Howe & Silva, 2017; Smith & Sparkes, 2019; Swartz & Watermeyer, 2008). Instead, participants perceived their hybridised sporting embodiment as a regular social way of living of an "everyday 'cyborg' that 'collapsed' the very constitutive categories of ability and disability" (Norman & Moola, 2011, p. 1269). For example, in the semi-structured interviews, the way that the participants interacted with their different assistive technology to compete, and train illustrated the porousness of natural and artificial bodies and had implications for the reproduction of identity and disability (Butryn, 2003). A noticeable trend also emerges in the findings, where many of the participants in the photo elicitation, through incorporating their custom technologies, embraced some degrees of subjectivities that destabilized the binaries of normal/abnormal and disabled/disabled (Butryn, 2003; Reeve, 2012; Wickman, 2007). However, there is still little understanding of how disabled people transcend the

blurred boundaries between humans, technology, and nature in complex, often contradictory ways in sport (Butryn & Masucci, 2009). As such, in examining the process of embodiment, a key focus should be on the felt, subjective interpretations of the self, which was striking in the research findings.

The power of body-self-object relationships within disability sport can shape orientations towards the self and others, as well as construct symbolic boundaries within and between disabled athletes (Asare et al., 2023). This research is therefore an important contribution to existing disability literature as one of the few studies that have used photos to examine bodily and self-perceptions of disabled people's use of assistive technology in sport. This method was important, as it helped elicit from the participants the perceptions from which it was possible to "'draw out' boundaries about the world 'out there'" (Pyyry et al., 2021, p.77), for disabled athletes who use assistive technology. Broadly, the photo became a means of communication through which the assistive technology became a 'tool' that helped redefine their hybrid selves in a more symbolically valued identity, such as being powerful, competent, and athletic. In extending the work of Azzarito (2010), the results showed how the smooth integration of assistive technology in the embodiment process of disabled people can be strongly influenced and understood through the use of photos.

Taken together, my research shows that participants reconstruct their sporting bodies as a means to build familiarity between their assistive technologies and environment. In doing this, the participants embodied competence in their athletic endeavours through their sport ATs. For example, in the ethnographic study, in the process of 'enwheelment', the ATs, whether old or new, customed or borrowed, transcended their material nature, and took on a transformative role, providing a "semi-transparent means through which one's environment was perceived" (Brey, 2000, p.3). As the data showed, embodying the ATs in this manner, demonstrated a profound fusion of disability and technology, which is particularly essential in relation to the development, affirmation, and integration of athletic identity into their sense of self (Apelmo, 2017; Sparkes et al., 2018, 2021) and their environment. Building on this point, I argue that these results should be taken into account when considering how disabled people can incorporate objects in the environment into their bodily structure, thereby blurring the limits between the body, technology and environment (Butryn & Masucci, 2009; Standal, 2011). In this context, as the findings in the semi-structured interview

study would suggest, when the participants' body schema and sense of self became visible in appearance – hybridised identity was embodied - and developed into the 'right' technology identity (Shilling, 2003, 2005). This process facilitated bodily autonomy and freedom from the boundaries of disability. However, disability has still been neglected when it comes to understanding the disability and machine discourse, despite how it can help digest the hybridised boundaries of disability, technology, and embodiment (Reeve, 2012).

In summary, as I have shown in this thesis, assistive technology can deconstruct and reconstruct the boundaries of what constitutes disability (Goodley, Lawthom, Liddiard & Runswick-Cole, 2019). Research suggest that disabled sporting cyborgs can push disabled people into boundaries that create a new 'norm' and limits social acceptance of disabled identity (Ott, 2015). However, the findings in this thesis have sociological significance, in that, the technology-mediated disabled sporting body is not solely a machine instead it has the embodied capabilities to navigate physical and social boundaries, becomes a subject of perception, socially and sub-culturally constructed through interactions, which cannot be separated from the world (Hockey & Collinson, 2007).

Normality and Power

The medical model of disability that suggests that disabled people possess 'abnormal' biological functions that require therapeutic and rehabilitation intervention (Barnes, 2012; McNamee et al., 2021; Thomas, 2004a, 2004c) in order to play, train and participate in disability sport. Many studies have highlighted in various ways how AT is a signifier of disability, and carries stigma and negative associations of dysfunction, abnormality and frailty (Woods & Watson, 2004). However, the results of this research would suggest that participants actively reconfigured discourses about normality to align with their identities and experiences, assigning power to their AT. That is, ATs played a crucial role in redistributing power and assigning value to disability in a disability sport environment where ableist cultural representations appear to be dominant. Representations of disabled athletes derived from medical model premises often tend to focus on athletes' impairments rather than their athletic abilities (Brittain, 2004; Loja et al., 2013; Richard & Andrieu, 2019). However, in this research, the data showed that the focus was on athletic abilities, challenging the binary perspective that dismissed disability as a dualistic experience of normality and abnormality (see Goodley, 2011) that casts disability as a diminished state of being human.

Many studies have suggested that often the presence of ableist discourses portray a set of values and standards through which disabled people and their sporting performances and abilities are valued or not. This has continued to dominate disability, and negatively influence how physically disabled people use advanced technology in sports (Lindemann & Cherney, 2008; Lynch & Hill, 2021; Monforte et al., 2021; Richard & Andrieu, 2019; Sparkes et al., 2021). These discourses are often a result of non-disabled people's portrayal of disabled people's performance as inspirational, encouraging and as 'supercrips' – a successful overcome of their disabilities (Berger, 2004, 2008; Howe, 2011; Howe & Silva, 2017). However, in this research, specifically by engaging in photo-elicitation, the discussion confirms previous evidence in the work of Ashton-Shaeffer et al. (2001), who reports that disabled people often resisted the passivity attributed to their athletic bodies. Instead, as the data indicated, the participants were engaged in sensual expressions about their bodies, embodied with an ability to explore the limits of disability, and challenged stigmatic attitudes that visualised the appearance of their athletic identity as outside the norm of society. In this sense, my work builds on the findings of Ashton-Shaeffer et al. (2001) but spotlights the role photos play in stimulating disabled people to self-validate their AT embodiment as powerful active bodies that achieve success in sport.

Technology is the catalyst for media narratives in disability sport, often focused on athletes' impairments, portraying their impaired bodies as different from the (nondisabled) status quo; as lacking, weak and having tragic impacts on athlete's sport experience (Brittain, 2004; Purdue & Howe, 2013; Wolbring & Tynedal, 2013). Contrary to the above, the findings in this research extend the work of van Amsterdam et al. (2015) and Wickman (2007), which showed that, despite the ways in which stereotypical narratives can reconfigure and impact how disabled athletes manage their athletic identities, the use of bespoke sport technologies allowed the athletes to attribute power and status to a unique form of disabled embodiment. The unique thing about this research is that as the athletes intertwined with their assistive technology; they demonstrated subjectivity while acknowledging their diverse lived experiences of the device as natural human experiences. As I have illustrated in chapter seven, the ATs became powerful means through which participants "defined themselves in their own terms and under their own terms of reference" (Shakespeare & Watson, 2010, p. 73) in ways that eliminated the conflated perspectives of disability and 'abnormality'. In other

words, the embodied approach facilitated the reconfiguration of their disabled body as a positive identity, and they elevated their disabled embodiment to represent a 'new normal' from which AT was used to increase self-confidence and possibilities for freedom from disability.

The ethnographic and photo elicitation studies underscored the integral role of assistive technology as means of redistribution of power and 'normalcy' often not discussed within the existing disability and sport literature. For example, for newly disabled athletes, participating in sport for the first time, using sport-specific technology was an opportunity to develop competency, thus influencing the reconfiguration of their assistive devices as part of them, inscribing the devices into their new athletic potentials and way of life. Importantly, these findings provided further empirical clarity to Moser's (2000) claim that disabled bodies are embedded with predetermined functions, abilities, and attributes. In using sport-specific technologies athletes not only "built an order of the normal" but transformed the athletes into "competent normal subjects" (Moser, 2006, p. 1). Additionally, this created independence and enabled them to make sporting decisions and implement them in their own space without conforming to nondisabled norms. The embodied experiences illuminated in this research are therefore not only essential in understanding disability within the context of normality and sport, but also raise questions about the "essentialist understandings of the human species and contest discourses" which tend to separate humans into normal/ impaired" subjects (Feely, 2016, p.1).

From a disability studies perspective, the research findings bring attention to a notable gap – specifically, the over-simplification and abstracted perspective of how technology is limited to restoration and normalization of the hybridized disabled body (Reeves, 2012; Sparkes, 2018). By contrast, the study findings revealed that sustained interactions with assistive technologies constantly redefined the capabilities and expectations of 'normal' for disabled athletes. ATs influence the perception and sense of 'normalcy' through unobstructed bodily function. This led to personal bodily fulfilment, validating their subjective sporting selves. In the context of the study findings, I have demonstrated how the embodied actions of using bespoke sport technologies helped the participants to unreflectively experience the capabilities of their sporting embodiment. In the process, they viewed the athletic 'ability' and 'disability' of their disabled sporting body as equal to nondisabled values.

Conclusion

Assistive technologies play a crucial role in the development and maintenance of a particular form of disabled embodiment. In this thesis, this embodiment represents a number of possibilities and opportunities of disabled people in sports. However, barriers still exist for disabled people in terms of accessing, provisioning, and acquiring assistive technologies due to their high costs, limited availability, and unequal distribution. These challenges have further exacerbated the embodied experiences of disabled individuals participating in society and sports, as evidenced in disability and sport research (see Asare et al., 2023). Despite the significant issue this raises for disabled people's experience with the sport, only a limited number of studies have explored these from an embodied perspective, and understandings of access to assistive technologies remain relatively superficial and limited.

To address this research gap, the present research sought to investigate the meanings that disabled people attribute to the use of both everyday and specialized sports devices for engaging in training, competing, and performing sports. Through the use of assistive technologies, participants challenged the notions of the traditional medical and social model of disability (Oliver, 2013; Shakespeare, 2006; Thomas, 2004a) and redefined the disabling factors encountered in sports, thereby normalizing and empowering their participation. By utilizing assistive technologies, participants were able to create an embodiment that was consistent with their own individual identity, effectively reshaping their understanding of disability and impairment (Goodley, 2011; Goodley et al., 2019).

The subjective experiences shared by the study participants have significantly contributed to our understanding of how disabled individuals engage with themselves, their bodies, and technology within the context of sports. For disabled athletes, assistive technologies symbolize a ’bridge’ that connects material reality with their bodily experiences, thereby challenging the dehumanizing notion of becoming a disabled sporting cyborg. This finding expands previous research (Reeve, 2012; Richard et al., 2019; Sparkes et al., 2021; Wickman, 2007), which also highlights the transformative power of the body-self-technology relationships within the sphere of disability sports. These relationships not only shape disabled athletes' hybrid selves with others, but also contribute to the deconstruction of blurry boundaries which helps to ‘uncyborgify’ the disabled sporting cyborg.

Chapter Nine

Introduction

The purpose of this thesis was to deepen our understanding of the embodied aspects of disability and assistive technology through physically disabled people's experiences in disability sport. To explore this, I asked three main questions - what role does assistive technology play in the lives of disabled people enabling their participation in disability sport? - how are impaired bodies reshaped by assistive technology within the disability sport environment? - how does assistive technology impact the self-perceptions of disabled athletes? Throughout this research, I have illustrated the 'hidden' nuances embedded in disabled people's use of assistive technology, providing a critical insight into the complex relationship between disability, assistive technology, and sport. Traditionally, the sociology of sport has often oversimplified the intersection of disability and technology, predominantly influenced by disability theories such as the medical and social model of disability, and the social-relational model. These perspectives tend to think *about* the body, rather than *with and through* the body. As such, my work is firmly grounded in the embodied tradition, focusing on expanded issues beyond "'the body' inscribed by discourse, particularly by highlighting the felt and sensed spatial and temporal aspects of being-in-the-world" (Busso, 2011, p.43).

Most importantly, my research has demonstrated that a range of critical disability theories have been used to capture the relationship between disability, sport and technology, but often neglected embodiment as a focal point (cf. Butryn, 2003) opting for an emphasis on discourse, materiality, posthumanism and cyborg notions. I have addressed this oversight by placing a central focus on the voices and embodied experiences of physically disabled athletes in order to 'bring the body back' into the study of disability sport (cf. Hockey and Allen-Collinson, 2007). Specifically, I have demonstrated that subjectivity, felt sensations, affect and the perceptions one develops towards AT are essential in disentangling and essential in providing an embodied analysis of AT use (Asare et al., 2023). In essence, this research has therefore offered a more holistic understanding of the intersection of body, mind, self and senses (see Merleau-Ponty, 2004) as disabled athletes negotiate the boundaries of human/machine, normal/abnormal and synthetic/flesh while using AT in sport. In what

follows, I will highlight the key contributions of the research, the empathy statement, implications for future research and the concluding remarks.

Key Contributions of Research

Methodological Contribution to the Field

I will begin by highlighting the major key methodological contributions of this research. First, the methodological approach to this study has attempted to respond to Chamberlain and Lyons's (2016) call to expand qualitative research in sport and exercise to "embrace interdisciplinary, utilize multiple methods, and seek to explore the entanglements between our material and social worlds intact" (p. 174). Importantly, a major methodological contribution to the field lies in the sustained interaction with participants as they used their AT in a regional sport setting for about 18 months. This non-high-performance setting provided raw, natural, nuanced and unique insights into the embodied, sensuous and material interaction of using AT in their sporting environment. Only a few disability studies have explored such complex interactions from this perspective, and fewer still consider embodiment.

Secondly, as I highlighted in chapter three, one unique methodological contribution of this research to the sociology of the body and sport is the utilization of photo elicitation. Despite the possibility that visuals can illuminate the subjectivities of one's embodied experience (Pink, 2011), it is absent within disability, sport and AT research. Therefore, in this research, I showed how as opposed to the traditional spoken accounts which talk about "the body, as abstracted and inscribed surface, the use of photographs can offer an experientially grounded approach to exploring embodied experience" (Busso, 2011, p. 52). Particularly, I have shown how written accounts could be enlivened with photos, helping disabled people illustrate the sensory and bodily contexts in which they are enmeshed with assistive technology. It is my hope this research will encourage sport sociologists and disability scholars to pay attention to Azzarito (2010) who encourages the use of a visual method as a considerable potential way to explore the body, thoughts and identities in meaningful and creative ways.

Taken together, given the objectives of the study, utilising multiple methods not only enabled a nuanced exploration into the participants' experiences but also showed how multiple data perspectives can provide the ability to analyse the emotional, routine and

everyday practices of social life. This is important considering the sociology of the body and the issue of embodiment have contributed to an expansion within the broader fields of understanding disability.

Theoretical Contribution to the Field

My key theoretical contribution is the use and application of embodiment to the intersection of disability, sport and AT. In using embodiment as a theoretical lens, this research has contributed to challenging binary notions of disability often "influenced by the theory of Cartesian dualism, privileging mind over body, a practice which often abstracts 'the body' from social, relational, and embodied experience" (Busso, 2011, p.43). This dualist thinking is problematic. It simplifies disability by overlooking the embodied abilities that positively influence disabled people's experience of assistive technology. In this research, I have illustrated that sport-specific assistive technology when used by disabled people in sport can potentially challenge the dualist thinking that perpetuates binaries such as 'disabled and able', 'self and Other', 'normal and abnormal' or 'human and machine'. As I have demonstrated in this research, understanding the relationship between disability and assistive technology, requires a shift from the traditional binary modes of thinking to adopt the perspective that "impairment is social and disability is embodied" (Paterson & Hughes, 1999, p.598).

Most importantly, this research has responded to the call by Sparkes et al. (2018) to shift from "theorizing *about* bodies to theorizing *from* lived bodies" (p.164, my emphasis). In doing this, a major contribution to the field is the shift away from perceiving the disabled sporting body as an abstract or tragic body commonly housed within popular culture and media discourses. While this can be misleading and a misrepresentation of disabled people in sport, it represents a poststructuralist view that reduces disability to language and descriptions of disability in which disabled people are often subject to others' interpretations, rather than their own. Instead, in this work I explored athletes' use of AT as both social and embodied; the connection between social perception and bodily abilities is vital for oneself representation of assistive technology. In relation, the research further indicates that being a disabled athlete fused with technology, commonly theorised as a 'disabled sporting cyborg', does not signify a distinct form of disability embodiment, it only represents a different type of human-technology relationship (Brey, 2000). The dominance of cyborg fails to

acknowledge the lived embodiment which is essential in understanding the lived experience of disabled people use of sport-specific AT. Taken together, the disabled body is not 'abstracted' body but an "embodied being in and living through a relational, spatial, material and socio-political world" (Busso, 2011, p. 44).

Moreover, as demonstrated in this research, the theorisation of the human-technology-disability relationship is often overshadowed by the oversimplification inherent in 'posthuman' theory which reinforces the binary view of human-machine interaction. It has not limited assistive technology to performance enhancement while disrupting athletes' independence and autonomy but contributed to notions that dehumanize disabled athletes who use technology in sport. Through embodiment, I have demonstrated a move beyond the cyborg, specifically while I admit without a doubt that disabled people experience an intense hybridisation when using technology (Haraway, 1987) the process is felt, lived, restrictive, empowering, sweaty, painful, frustrating, normalising, experiencing all things that think through body. Given this, critical disability scholars need to start rethinking how they theorise or define disability when merged with materials and technology in both everyday life and sport, particularly as the beauty of embodiment gives us the opportunity to describe the blurry boundaries of AT.

In relation to the new-materialist perspective of 'the body', as can be seen in this thesis, I have used embodiment as a lens to broaden our horizons around disabled body and material realities in sport, and in so doing further expanded our understanding of AT as a topic of sociological interest. This is also important because the traditional models of disability such as the social and medical models provide a narrow and disembodied view of disability. For example, while the medical model individualises athlete impairment, the social model has little to say about the ways in which impairment is socially produced in the everyday world. I have illustrated through an embodied approach to disability we can understand the interactions and facilitate bodily reconstruction of disabled people's lives as they merge with technology in sport. It can be concluded, this research has provided insight into a distinct form of disability embodiment, tracing the patterns of becoming an embodiment of AT as disabled athletes lived through the mutually incorporated experiences of impairment and disability. While more research is needed to advance deeper into how disabled athletes interact with bespoke sports technologies, this research has provided a fertile ground to theorise disability

and AT through an “unbounded set of flexible embodied practices - cognitive, emotional, physical, reflexive, engaged useful in tracing the hybrid process of embodiment” (Ellingson, 2017, p. 6).

Taken together, it is important to note that this thesis does not intend to undermine the essence of disability concepts (i.e., medical, and social models) and other social theories such as posthuman, new materialism and post-structuralism in advancing research related to disability, sport, and AT. In relation to this, the strength of this thesis lies in using ideas from CDS to reemphasize the essence of the lived experience of disabled people as a better way to understand disability. In other words, an important contribution of this research is shifting from the binary understandings of disability (i.e. ‘disability’ versus ‘impairment’) (Shakespeare & Watson, 2010; Vehmas & Watson, 2014) to focus lived experience related to impairment limitations. This is particularly salient in the context of disability sport where rapid advancements of technology tend to dominate narratives of disabled people’s use of AT.

Empirical Contribution to the Field

The empirical contribution of this research is grounded in Butryn’s (2003) proposal to prioritize the voices and first-hand perspectives of athletes themselves in research that examine sport technologies. Thus, one key empirical contribution to the field is the combination of the above with the personal stories and experiences of the users to disentangle the complexities related to AT use in disability sport. For example, through the participant's personal stories, I have shown that despite the lack of access to AT can restrict one’s environment through sport, disabled people become confident in the environment, and act *from* the AT in ways that transform their hybridised sports bodies from ‘disabled’ to become AT ‘able’. For disabled people, ATs can enable the creative shaping of the self and social identity (Ravneberg & Söderström, 2017b, 2017a; Ripat & Woodgate, 2011). These perspectives cannot be understood without the personal accounts of the participants.

Drawing on the embodied experience of the participants, I have contributed to bringing to the fore the embodied existence of living through time and space as they use their assistive technology. Particularly, providing a better understanding of disabled people’s challenges and advantages in incorporating different forms of assistive technology and how this can be understood from everyday experience. As such, my analysis reveals how disabled athletes' interactions with ATs are a process of embodied negotiation, whereby the AT can

simultaneously transform and limit the hybrid experiences, yet the athletes can become powerful and agentic sporting bodies, actively seeking adjustments and modifications to enhance their 'being-in-the-world' through sport. In doing this, the ATs enhanced social inclusion, enabled athletes to celebrate their athleticism, improved their social experiences, and restored the self-identity, confidence, and self-value of the participants. At the same time, the embodied negotiations of the AT were contoured with frustration, pain, stigma and ableist attitudes.

Some time ago, Harris (2010) posited the need for further empirical study on the requirement disabled people have for advanced assistive technology, what their interactions are, and what challenges may arise from the use of these technologies when their bodies are incorporated with assistive technology. A major contribution of this research is that it brings to the fore the impairment experiences that are often not discussed as disabled athletes seek 'to bring their best selves forward' in the sporting space. It is important to mention that the murkiness of the body coupled with constant tinkering and re-tinkering of their sporting device is central to understanding the use of sport-specific and everyday ATs. This thesis also brought to the fore an understanding of the less talked about sweaty, sore and labouring nature of using AT.

Through the accounts of the athletes, in this research, I have illustrated how the incorporation of ATs is a complex process of embodied hybridisation that has some level of impact on the overall quality of life of disabled people. For example, while the use of bespoke assistive technology in disability sport is not straightforward, however, I have suggested that through a collaborative interdependent activity, where disabled people with their families, trainers and peers work "together to negotiate and reconfigure their assemblages to create different possibilities for action" (Clinkenbeard, 2020, p. 133), AT can be undeniably beneficial, offering an enhanced physical and athletic access to sport.

While previous research affirms the concept of embodiment helps to distinguish between oneself and the technology-mediated body (Apelmo, 2017), a careful analysis of the athlete's lived experiences also suggested something of a contrast. As demonstrated in this thesis, as some of the participants use assistive technology, they perceived no distinction between the self and their technology, instead the assistive technology became an extension of oneself, opening up physical, and athletic possibilities, enhancing individual agency and

shaping subjectivity. However, this level of embodiment was not uniformly shared across all participants due to the varied nature of the impairment, the types of devices used by the athletes, and the different individual subjective experiences. This aligns with previous studies that suggested for some disabled people, assistive technologies are simply practical aids (Ashton-Shaeffer et al., 2001; Monforte et al., 2021) which illustrates a continuum of embodiment to full enmeshment of AT and everything in between. Nevertheless, in listening to the lived experience of the participants, what was common is, in both situations (whether AT was an extension of self or not) the participants developed bodily awareness, new self and acquired habits that significantly shaped sporting experience, providing opportunities to participate, improve or constrain their performance, or influence the way they perceive their disability embodiment which would have been impossible without the AT.

The medical model perspective assumes that AT has a restorative function, however, the sensual experiences of the participants reveal that it is much more than that – AT symbolises the reclamation of 'normality', of an athletic identity that has value, skill, and is 'acceptable' within an ableist society (Reeve, 2012). The sensual experiences of the participants reveal that they participate in sport, the technology acted as a symbol not only to construct powerful sporting identities but an embodiment that bears capabilities, valuable athletic abilities, and the standards of the 'normal' human body as perceived in society. In relation, what we know from this research is that through the sensual experiences of the athletes, by using sport ATs, disabled athletes had their 'own' identity as they felt and perceived *themselves* as athletic sporting bodies worthy to partake in any level of sports like their nondisabled counterparts. This can be traced, in chapter six, where I illustrated how AT constructed a body of athletic (im)possibilities, whereas chapter seven showed disabled athletes as powerful and authentic sporting embodiment, these were built on the findings of chapter five which outlined the process of learning to become an embodiment of AT. The study of disability identity and how AT influences this, is essential for disability researchers to explore further, particularly those interested in how disability can be understood in relation to ableism and assistive technology.

So far, these key empirical contributions raise important aspects of why an embodied approach to exploring disability experience in sport is essential, especially as Brittain (2010) previously suggested that the intersection between disability, the human body, physicality

and sport is always a complex phenomenon and requires in-depth exploration. Given this, it is important to state that, going forward AT must not be theorised as an absolute or fixed state of disability, particularly in disability sport. Assistive technology in disability sport, then, must be analysed from both sociological and phenomenological perspectives, giving credence to individual context, theorisation, and interpretation of AT.

Practical Contribution to the Field

AT provision is highly inequitable – even in a relatively privileged group such as athletes, it can escalate equity issues for disabled people in a particular cultural space. Therefore, this research has an international contribution concerning measures in the CRPD to increase access to sport-specific AT for participation in sport and physical activity. In the context of New Zealand, it is not only a human right or global issue but a national responsibility, captured through the New Zealand Disability Strategy and its focus on disabled peoples' health and wellbeing, and accessibility. This is essential, as this thesis lays the foundation for a potential achievement of relevant outcomes as outlined in the strategy; disabled people to have equal access to all places and services as well as limited barriers to accessing health services. Additionally, the research spotlights the effect of a system in which AT provision is highly variable and in which sport – as a cultural activity – is not prioritised, or at least is difficult and expensive to obtain the right AT for, particularly for more complex or degenerative impairments and for those with higher support needs. Therefore, policy makers need to understand the *lived experience* of AT users which is vital for adequate provision of AT which can culminate in less need for adjustments and adaptation. Without this, sport will continue to be inequitable for disabled people who rely on AT to participate, train and compete at all levels of sport.

As Ripat and Woodgate (2011) suggested cultural belief systems need to be appreciated for their unique cultural and inter-related influence on how AT is perceived and used. For example, as shown in this study, the complex national health and insurance system that provides AT in New Zealand has meant assistive devices for either everyday or sporting purposes are prescribed for disabled people. This can decrease personal autonomy and independence, not only that but serve a selected few. Thus, it draws attention to other disability institutions (i.e., Whaikaha - Ministry of Disabled People and the Ministry of Social Development) to pay attention to and prioritise policies that will ensure access and

distribution of assistive technologies for all disabled people who require them for their daily lives.

This research is also vital for disability sport and sport organisations (i.e., Sport NZ and Paralympics New Zealand) responding to government priorities regarding active recreation and physical activity for disabled people (see Sport New Zealand, 2019). This is important, as demonstrated in this thesis, acquisition of AT was an essential first step of inclusion and participation in sports for the participants. Having explored the experiences of disabled people (disabled athletes) from their own stories, it is my hope that this will be essential for disability technology manufacturers (i.e. New Zealand Artificial Limb Service) and disability support services in developing policies and services for productive use of disability assistive devices. Most importantly, it is the hope that this research will provide these organizations with information, reference points, and contextual and practical understandings that AT is not necessarily a rehabilitative tool but a device that is filled with meanings, emotions, stories and senses that redefine the life of disabled people.

Empathetic Statement

Central to the practice of phenomenologically informed research is the role of empathy. Following the above key contributions, I present a brief empathetic reflection on how I integrated and navigated the embodied stance while attempting to make sense of the participant's embodied experiences of assistive technology. According to Magri (2018), researchers attempting to understand the world of others often engage in a phenomenological form of empathy, specifically radical empathy. Defined as the “capacity to suspend one’s own beliefs and assumptions to recognize relevant features inherent in another’s person sense of reality, a starting point for understanding affective experiences” (Magri, 2018, p. 2), radical empathy serves as a reflexive tool throughout the research. In this context, my empathetic approach to conducting this research was taken from Merleau-Ponty’s writing:

> Nothing determines me from the outside, not because nothing acts upon me, but, on the contrary, because I am from the start outside myself and open to the world (Merleau-Ponty, 1962, p.400).

This means that in order to understand disabled peoples' use of AT – as a distinct form of experience and embodiment - required me to observe their body as it is lived in everyday dealings with the world (Merleau-Ponty, 1962) by being open-minded about disability and setting aside pre-suppositions while recognising ableism and its structuring effect on disability as well as the negative social attitudes and its dispositions on disability. In order to achieve this, I actively paid attention to the participant's embodied experiences of their ATs as an opportunity to make sense of actions and expressions that may represent the incidence of ableism. Most importantly, I was mindful that as a nondisabled I may not be in a position to understand their embodiment of AT, it was important to keep open to learn from them. I found these activities to be essential in navigating interpretive dilemmas – a practice that was carried out throughout the research.

Here, as a 'nondisabled researcher' researching disabled people's interaction with assistive devices, it was important to acknowledge that the "alterity of a disabled embodiment is 'different' from my own" (Brighton, 2015, p. 166) and that researching disabled people experiences as non-disabled can be a difficult task (Brighton, 2015). From a radical empathetic viewpoint, one difficult task was to demonstrate to the participants, to know, and feel that throughout the research, I have been touched, influenced, and impacted by their everyday habits of using assistive technology. I developed self-awareness grounded in routines that positioned my nondisabled self as both *object* and *subject* in an environment where I knew disabled people were dominant. From an object perspective, I was grounded in nondisabled actions dominated by an embodied process of learning and knowing about the object side of using assistive technology. From a subjective perspective, I was engaged in something like a 'porous body' shifting between my nondisabled world and disabled environment, which seemed the only way to grasp the role of AT for disabled people.

Looking back, moments of disconnects and disappointments emerged in both field observation and interviewing (semi-structured and photo elicitation). Tension often arose in navigating the balance in acknowledging and maintaining awareness of our (myself and the participant's) roles and interests. It was anticipated this tension would occur, so the practice was to adopt an empathic view, an interpersonal experience that centrally involves an experience of possibility and, more specifically, a sense of the potential for certain kinds of self-transformative relationships (Merleau-Ponty, 1962) with the participants. For example, I

endeavoured as part of field work to partake in many of the non-sport-related events and, at times volunteered to support in organising these events.

However, because relationships can be broken, I treated my daily interaction with participants as an important aspect of my everyday life. This attitude had a big effect on my understanding of the influence of assistive technology on disabled athletes. The understanding was not academic or theoretical, it was perceptual and embodied understanding, driven by critical reflections on three central areas of my research - my embodied observations during the ethnography study, my engaged communication during the semi-structured interviews and my interpretive visualizations during the photo-elicitation interviews. Taken this together, in this research, I interacted with and embodied AT albeit a nondisabled athlete and albeit temporarily, entering a state of enwheeled embodiment for a time. This enabled me to understand how the athletes navigated their athletic bodies despite the constraints of the AT and exhibited athletic movements and skills within their sport. Moreover, one major embodied experience that defined my empathy for the participants was the pain and sore body and the callused hand I experienced. Together, these experiences helped me to shape my conversations, interactions, questions, and objectives in ways that helped to extract from the participants – their self, knowledge and embodied capabilities of using their sporting devices.

It is also important to mention that my sense of radical empathy was situated in my full immersion in the research, particularly, the way the assistive technology provided me a viewpoint of the embodied learning process as well as sharing some commonalities with the players. In this context, I used my embodied learning experience of the AT to build rapport with the participants. For example, as the players smashed into me and rolled around me with ease while I struggled to navigate the chair, I was not discouraged, instead I was determined. I asked them to teach me how I could also become better at using the wheelchair. My willingness to learn not only reflected their own embodied will to navigate the restraints of using ATs after acquiring injury but also reduced any emotions and feelings that could disrupt their relationship with me, a nondisabled seeking to understand their everyday life.

Here, while reflecting on the objectives of this research, an empathetic understanding was partly constituted by how one perceives the other person. In this sense, I developed a certain form of radical empathy - a mutual connection with participants, acceptance of their

impairment, and an openness to being affected by them. The significance of this empathetic stance became evident as, by the third year of the research, I had acquired profound knowledge about the participants' daily lives, highlighting the transformative nature of empathetic engagement throughout the research. This generated some positives for the research, in terms of the ability to share common interests while influencing some level of self-affecting interactions that I came to empathize with the participant's use of the AT throughout the research. Though my subjective experience of disability was important,

Reflecting on these experiences, as a non-assistive technology user, an ex-disability sport administrator and an upcoming disability researcher without *lived* disability experience, I came to recognize the transformative potential in exercising an empathetic awareness and engagement with the disabled embodiment. I began to quickly internalise and perceive the material world through my reflexive gaze and that of the disabled athletes, enhancing my understanding of the disability experience. Here, I developed a deep sense of empathy for the challenges of oppression and exclusion disabled people face that can occur from the use of assistive technology as well as my own struggles to make sense and come to the same point of the player's experience. This development reinforced the complex connection between technology, embodiment, and effective engagement with the world, providing a nuanced understanding of the technology-infused disabled body.

Implications For Future Research

As illustrated throughout this research, the central objective of this thesis was to expand research on disabled people's experience of, access to and embodiment of assistive technology in disability sport. In doing this, I utilized the notion of embodiment from a critical disability studies perspective to rediscover the "world of perception" (Merleau-Ponty, 2004, p. 7) out there for disabled people, navigating the self and body while using assistive technologies in sport. Through the lens of embodiment, this research symbolised a shift away from traditional disability studies that "dallied with many theoretical ideas" (Goodley, 2013, p. 632) yet offered little in addressing the complexity of disability. This research positioned the body as the interplay where self and society interact, allying with the notion of "carnal sociology" (Goodley, 2011, p. 56) to expand the relationship between disability, assistive technology and sport. Despite the significant contributions this thesis has made to the

disability, AT, and disability sports literature, it also had certain implications for future research.

From a methodological viewpoint, 'generalizations' of findings are typically perceived as difficult to attain in qualitative research (Creswell & Creswell, 2018; Silverman, 2016). However, the findings presented in this thesis have the potential to be generalized through naturalistic generalizability or transferability (see Smith, 2018). By conducting member reflections (see Smith & McGannon, 2018), the detailed descriptions and rich interpretations of the participants appear to align with the everyday experiences of disabled people (see chapter three, section eleven). However, there are potential limitations within this scope. While there have been calls to advance disability studies across all spectrums of impairments, this was difficult to achieve due to the defined focus and design of the research (see chapter three). Here, the research was only limited to disabled athletes with physical impairments, not factoring in those with learning and visual impairments. However, the research was not limited to exploring specialist devices such as wheelchairs and prosthetics but also the systems behind the use of these devices (i.e. embodied learning and, negotiations). This may constitute the object of future studies as exploring the world of learning and visual impairment can tell us more about the multi-sensory experiences of using assistive technology for sport, such as incorporation as part of the body.

Moreover, future research that brings assistive technology into the frontline of disability studies by giving priority to users' rich accounts and internal experience is crucial for understanding the hybrid nature of the relationship between disabled people, technology, society and sport. As illustrated in previous work (Asare et al., 2023) and in this thesis, it is the hope that further studies focused on AT in disability sport will not only acknowledge the contribution of qualitative methods but will prioritize the accounts of disabled athletes, promoting their voices at the centre of exploring the embodied aspects of using AT in both recreational and elite sport.

In exploring assistive technology through the concept of embodiment, I have attempted to unearth valuable insights into what AT can mean for disabled people in disability sport. Within disability sport, the use of assistive technologies represents human and non-human interactions. In so doing, disabled people's interpretation of their embodied relations with AT differs from one another. However, when combined, these different interpretations

contribute to a comprehensive understanding of how disabled athletes become an embodiment of AT and navigate disability in training, participating, or competing in sport. I believe that apart from examining these complex interpretations disabled people have toward AT in sport, as done in this research, future research should contextually strive to examine disability and technology as an everyday reality of lived experience, putting the material and body at the centre of analysis.

Looking at the bigger picture, this thesis has raised questions about how access is underdeveloped as an embodied concept, specifically the way disabled people come to know, learn, and interact with others while using assistive technology in sport. The assumption that the simple provision of AT is enough to ensure a level of access for disabled people, where – as I have shown – access is dependent on individuals' access to knowledge, ability to modify and adapt to their device, the level of specialisation of the device, personal facilitation and interpersonal interaction with device and the ability and influence to achieve with device. For the participants in this research while AT was physically and socially embodied, the analysis highlighted that disabled people still face inequitable access to AT in both everyday and sporting contexts. This reinforces the need to revisit the ways access is understood in disability studies, particularly in view of the Convention on the Rights of Persons with Disabilities.

While access to AT is vital for disabled people's embodied experience in sport, this research was limited in that scope. Going forward future research must develop a holistic understanding of access to AT, research must be mindful of the multidimensional nature of access in order to offer an embodied understanding that extends beyond physical access and provision of AT. Most importantly, to achieve this, scholars must endeavour to focus on the impact of national policies on disabled people's experiences of accessing ATs in everyday life and sports.

Finally, as Kath et al. (2019) claim, there still exists a general lack of understanding of the social implications of the technological era on the being and experiences of disabled people. In other words, while in this research, the participants' embodied experience of assistive technology in disability sport symbolized a 'bridge' that connects material reality with their bodily experiences, thereby challenging the dehumanizing notion of becoming a disabled sporting cyborg. However, further research extending the findings across the

landscape of disability is needed, to explore a range of disabling experiences and hybrid technologies. Specifically, to expand how the hybrid process of enmeshing the 'fleshy reality' of disability with AT is experienced by disabled people in sport from an embodied perspective. This has the potential to expand an understanding of how disabled athletes can negotiate assistive technology as hybrid bodies, undergoing a continual process of embodied negotiations, and acting as a single entity in the world.

Concluding Remarks

In conclusion, within the field of critical disability studies, the study of disability and the role of assistive technology have drawn concerns about the level of inequality and access to advanced assistive technology for disabled people (Harris, 2010; Moser, 2006). As Ripat and Woodgate (2011) remarked, situating AT use and meaning in the larger social, political, and contextual manner is key to understanding how individuals experience assistive technology. Furthermore, research in the sociology of sport has started to unpack the importance of AT, particularly in the way that reduces the burden of *disability* and *impairment* in the everyday life of disabled people. In this research, I have attempted to modestly provide some clarity to these meanings through engaging with the embodied experiences of disabled people using AT in sport. I hope to have demonstrated that the relationship between disability, assistive technology and embodiment is a complex one, often explored in a reductive way through the traditional disability models. Against this perspective, disability sports have provided a context to understand the meanings of assistive technology, as they are deeply ingrained in the structure and culture of disability.

In essence, I have contributed to our understanding of a particular form of disability embodiment, commonly referred to in the disability sport literature as cyborgification. In so doing, I have provided insight into the 'blurring' of the boundaries between (disabled) humans, and technology in and through sport. As such, the research has sought to respond to Lupton's (2013) commentary that the extent to which assistive devices are incorporated into the body, identity and subjectivity – as a form of embodiment - are important issues to explore. This research has shown that for athletes with acquired and congenital physical impairments, the intersection of disability, AT, and sport is a multifaceted experience, shaped by social, cultural, and historical experiences. As I have illustrated, the notion of embodiment (see Merleau-Ponty, 1962) was useful in helping trace the material and affective impact of AT

on disabled athletes' engagement in sport. It revealed how AT reshaped their orientations towards the self and others and traced their embodied learning process with AT in sport. Indeed, while AT contributes to a unique form of disability embodiment, this research emphasizes a crucial 'take home' message: while ATs are symbolic and intertwined with their bodily schema, assistive technology does not override their human interaction with the world.

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Appendices

Appendix 1: Ethical Approval Letter

The University of Waikato
Private Bag 3105
Gate 1, Knighton Road
Hamilton, New Zealand

Human Research Ethics Committee
Roger Moltzen
Telephone: +64021658119
Email:humanethics@waikato.ac.nz

THE UNIVERSITY OF WAIKATO
Te Whare Wānanga o Waikato

18 September 2020

Francis Asare
Te Huataki Waiora School of Health
DHECS
By email: fa111@students.waikato.ac.nz

Dear Francis

HREC(Health)2020#53 : Disability and Assistive Technology Advancements in Para-Sport

Thank you for your attention to the matters raised by the Committee. I am pleased to now be able to give you ethical approval for this research.

Please contact the committee by email (humanethics@waikato.ac.nz) if you wish to make changes to your project as it unfolds, quoting your application number with your future correspondence. Any minor changes or additions to the approved research activities can be handled outside the monthly application cycle.

We wish you all the best with your research.

Regards,

Emeritus Professor Roger Moltzen MNZM
Chairperson
University of Waikato Human Research Ethics Committee

Appendix 2: Participant Information Sheet

Dear Participant,

This participant information sheet is to kindly inform you of the research and to also further help you to decide whether the study is right for you.

1. Who am I?

My name is Francis Asare, a doctoral student at the Te Huataki Waiora School of Health, University of Waikato, New Zealand. I am interested in knowing more about the experiences of persons with disabilities involved in sport. I am conducting a study entitled 'Disability and Assistive Technology Advancements in Para-Sport'. I am interested in understanding your experiences in the use of advanced assistive technology for sport participation as a disabled athlete.

2. What is the study about?

We know very little about how advanced assistive technology influences disabled people's participation in sport. Therefore, my study seeks to learn from disabled athletes, coaches, trainers, classifiers, and sport managers;

- The role advanced assistive technology play in enabling disabled athlete's sport participation.
- How are disabled athletes empowered/disempowered while using advanced assistive technology?
- How do using advanced assistive technologies by disabled athletes further create problems regards to the cultural perceptions towards disabled athletes?

3. Why the study?

I hope that this study will possibly increase disability technology manufacturers' and disability sport organizations understanding of athlete usage of assistive technology. In so doing, the study has the potential to promote better access to assistive technology to enable effective participation in sport.

4. Your Role in the study

I will ask you some questions about your experiences in using assistive devices for sporting activity. I would like to meet you on two different occasions for the interview with your consent. Each meeting will last between 1-2 hours at a place that is most convenient for you.

5. Do you have to take part?

No, it is not mandatory to take part. Even if you decide to participate you can withdraw at any time. You also have the right to withdraw your data four weeks after data collection. However, already analyzed data cannot be withdrawn.

6. Why you?

You have been selected because you are a disabled athlete who has had a lot of experience using advanced assistive devices at various levels of sport participation and daily activities that are relevant to this study.

7. Possible benefits of the study

Your participation and contribution will be key to improving the experiences regarding the use of advanced assistive technology among disabled athletes and the disability community because this will help to understand the barriers to participation.

8. Anonymity and Confidentiality

All information will be kept anonymous. Your identity will be protected and not disclosed at any stage of the study. Any form of identifiable information will be coded to protect your identity. Anything you say will be treated as confidential and stored under secured and password protected storage devices. The data will only be accessed by the researcher and research supervisors and will be used for the final thesis. Some part or all of the anonymized data may be used in scientific research publications and conferences. Your privacy will be respected at all times during the study.

9. Any concerns and questions?

If you have any concerns or questions please get in contact with me at fasare@waikato.ac.nz and/ or the Chief supervisor at robert.townsend@waikato.ac.nz. Finally, having read the participation information, should you wish to participate, kindly complete the informed consent form and send it to me by email. You may also hand in the printed and signed consent form at our first meeting.

I look forward to hearing from you soon and thank you for your assistance.

Kind regards,

Francis ASARE

Appendix 3: Sample Recruitment Email to Be Sent By Parafed Waikato To Its Members (Potential Participants)

Subject: Research in Disability and Assistive Technology Advancements in Disability Sport

Dear Member,

Waikato Parafed wishes to inform you of a study being conducted by a researcher at the School of Health, University of Waikato. The researcher is currently a doctoral student researching the experiences of disabled athletes and the rapidly advanced assistive technology in disability sport. The researcher has had the opportunity to work and interact with disabled athletes and disability sport professionals in previous research that seeks to improve the disability sport environment.

In this study, the researcher seeks to work together with disabled athletes, coaches, trainers, classifiers, and sport managers to deeply understand the experiences of disabled athletes (physical impairments) while using advanced assistive devices for sporting purposes. There is very little about how advanced assistive technology influences disabled peoples' participation in sport and ordinary life. Therefore, the researcher hopes that by interacting with disabled athletes, coaches, trainers, classifiers, and sport managers, he will understand what role this advanced assistive technology plays in enabling disabled athlete's sport participation, how are disabled athletes empowered/disempowered while using advanced assistive technology and how do these advanced assistive technologies further disrupt the cultural notions of disabled athletes.

The researcher wishes to fulfil these objectives by engaging potential participants in conversations while they narrate their accounts and experiences of assistive technology. Given this, the researcher pleads the indulgence of/and would like to work together with potential participants (disabled athletes, coaches, trainers, classifiers, and sport managers) in this study to improve disabled athletes' experiences of assistive technology in New Zealand.

The researcher has received ethical approval from the University of Waikato, Human Research and Ethics Committee and this indicates the researcher's assurance that the protection of participants' identity, confidentiality, and the right to withdraw participation will be duly addressed in the research process.

On this note, members are invited to take part in the study. All interested participants can reach the researcher at fasare@waikato.ac.nz or by phone call on 027 772 0267. We encourage members to join in this important study that will enhance the relationship between our disabled community and the use of assistive technology in sport as well as ordinary life.

Yours sincerely,

Francis Asare

PhD Researcher

Appendix 4: Informed Consent Form

By signing this form, I consent to participate in this study – 'Disability and Assistive Technology Advancements in Disability Sport' which will be conducted using phenomenological analysis to understand disabled athletes lived experiences of using assistive technology while participating in sport.

I declare that:

1. I have read and understood the information sheet of the study.

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason and I will not be affected.

3. I understand that I have the right to withdraw my data four weeks after data collection.

4. I understand that the data I provide will be used in writing the final thesis and may be used in reports and academic publications in an anonymous fashion.

5. I understand the data I provide may be re-used for future research.

6. I will be given the opportunity to make reflective comments on the transcript whether it adequately represents my views and make changes where it does not. I am being requested not to share the transcript.

7. I understand that sections of any of the data obtained may be looked at by responsible individuals from the University of Waikato regulatory authorities where it is relevant to my taking part in the research.

8. I understand that the researcher will protect my privacy while maintaining confidentiality at all stages of the study, however, anonymity cannot be fully guaranteed.

9. I understand I am being requested to participate in two audio-recorded interviews with each session that will last between 1-2 hours.

_____	_____	_____
Name of Participant	Date	Signature

Appendix 5: Interview Guide (Semi-Structured Interview)

What are the lived body experiences of disabled people using assistive technology sport participation?

This study as you may be already aware is about exploring the lived experiences of the disabled athlete and the usage of assistive technology, essentially in disability sport.

To start with:

Profile

1. Tell me about yourself.
    a. Can you share with me your impairment? *Prompt: how did you acquire*
    b. What sport do you do and what is your classification, if any?
    c. How did you get into this sport, e.g., wheelchair rugby? prompt: family, friends?
    d. How long have you been playing?
    e. Why sport? Prompt: What is it about sport that makes them continue to play?

A. How does assistive technology in the lives of disabled people enable their access to sport participation?

i. What assistive technologies do you use in your daily life? Probe
ii. Tell me how you came to use assistive technology? What do you need it for?
iii. What is your general assessment of technology in sport and in disability sport?
iv. Could you share your everyday activity and use of assistive technology?
v. Could you participate in sport without assistive tech? How? Why?
vi. How does assistive technology help you participate and perform in sport?
vii. Describe your first-time experience in using your AT to play sport. Prompt: easy, difficult, did you think of giving up, did you need help?
viii. Tell me in what ways has assistive technology helped you improve your sporting skills? Prompt: Speed, strength, manipulate your wheelchair

B. How are impaired bodies marginalized by assistive technology within the disability sport environment?

i. Could you describe what happens to you, the feelings when you are in your Wheelchair playing sport? *prompt: physically, emotionally, mentally*
ii. *What challenges have you faced in using assistive technology? Prompt: was it a learning curve? Is it painful? Was it expensive?*
iii. Do you think access to assistive technology for disabled athletes is fair? Why?
iv. Have you felt restricted by your AT in any way while playing sport? How? Prompt: Because is not customized for you? the way it is designed, old, new

C. How does assistive technology disrupt cultural perceptions of disabled athletes?

i. Do you think people view 'disability' differently when assistive technology is involved?
ii. *Show them some photos* - what do you think when you see these athletes? Do you consider them 'disabled'?

iii. Sometimes, elite para-athletes who use technology are described as 'blade runners' or 'cyborgs' – what do you think about that? Do you think it is positive for disabled people to be described in this way?

iv. How do people (family, friends, teammates) see you when manipulating your AT now and when you were not? *Prompt: anything changed?*

v. Having used assistive technology for sports, has it changed how you view yourself? How? Probe: 'abled' 'normal' 'abnormal'.

Appendix 6: Interview Guide (Photo Elicitation)

i. Why did you choose this photo?
ii. What is significant to you in this photo?
iii. What is it about the picture that you like in particular and what does it represent?
iv. Could you tell me a little about the things in this photo?
v. What does the AT in this photo remind you about?
vi. What did the AT help you to do on this day?
vii. What does the picture mean to you?
viii. Describe your role on this day.
ix. Describe your feelings in this photo.