Assistive technology outcomes and impacts among students with disabilities in higher education

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Declaration

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of Doctor of Philosophy (PhD) is entirely my own work, and that I have exercised reasonable care to ensure that the work is original, and does not to the best of my knowledge breach any law of copyright, and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work.

Signed: Aoife McNicholl ID No.: 17212312 Date: 29/08/2022

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List of Abbreviations

AT	Assistive technology
SWD	Students with disabilities
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNCRPD	United Nations Convention on Rights of Persons with Disabilities
EPSEN	Education for Persons with Special Educational Needs
NCSE	National Council for Special Education
AHEAD	Association for Higher Education Access and Disability
ISO	International Organization for Standardization
WHO	World Health Organisation
ICF	International Classification of Functioning, Disability and Health
GATE	Global Cooperation on Assistive Technology
GAATO	Global Alliance of Assistive Technology Organisations
AAC	Augmentative and alternative communication
MPT	Matching Person and Technology
MMAT	Mixed methods appraisal tool
HEI	Higher education institution
SU	Students’ union
HMR	Hierarchical multiple regression
LQR	Longitudinal qualitative research
UDL	Universal design for learning

Abstract

Thesis Title: Assistive technology outcomes and impacts among students with disabilities in higher education

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Research on assistive technology (AT) outcomes and impacts is lacking in higher education, despite the potential of AT to widen participation and improve students with disabilities (SWD) overall educational experience. A systematic review highlighted the need to examine AT and educational engagement more holistically, the effects of AT on psychosocial outcomes and the impact of AT on identity. This mixed methods study consisted of two phases; a cross sectional survey with SWD (n= 111), which explored the effects of AT on educational engagement and psychosocial outcomes, and a longitudinal qualitative research study consisting of two interviews with SWD (n=14), which explored the impact of AT in student and disability identities and if/how this changes over time. Those with met AT needs scored significantly higher than those with unmet AT needs on 4 educational engagement subscales, well-being and academic self-efficacy. AT use also had a positive psychosocial impact on competence, adaptability and self-esteem. Feeling valued was identified as the driver in the negotiation of identity change/continuity over time across three themes; feeling autonomous and competent, claiming disability and feeling like you belong. Also highlighted was the indirect impact of AT in feeling valued, the strategic use of AT in managing identities and how and why meanings attached to AT change over time. Overall, this thesis demonstrates the significance of meeting AT needs in promoting educational engagement and a positive mindset, the bi-directional relationship between AT and feeling valued, how AT can be considered both an identity threat and means of embracing and managing identity, and the integral role of AT as an enabler and instigator for involvement in collective spaces. This research has significant policy and AT provision implications and highlights the instrumental role of feeling valued in creating an environment where students are comfortable using their AT in higher education.

Chapter 1: Introduction

1.1 Introduction

Over recent years, increasing numbers of SWD are accessing higher education across Ireland, the United Kingdom, the USA, Canada and Australia (Association of Higher Education Access and Disability (AHEAD), 2021; Hubble & Bolton, 2021; Human Resources and Skills Development Canada, 2013; Koshy, 2018; National Center for Education Statistics, 2018). However, despite this promising trend, SWD are still considerably underrepresented in higher education in comparison to non-disabled peers (Central Statistics Office, 2016; Hubble & Bolton, 2021). In addition, these students can face many barriers and challenges throughout their higher education journey such as the need to expend additional effort to achieve academic goals (Järkestig Berggren et al., 2016; Mullins & Preyde, 2013), experience of social isolation and identity issues (Barnard-Brak et al., 2010; Claiborne et al., 2011; Lourens & Swartz, 2016) and limited engagement in extracurricular activities (Sachs & Schreuer, 2011). Despite the potential for AT to increase participation and improve outcomes for those with disabilities across the life course in a variety of contexts (MacLachlan et al., 2018), research on the role of AT for SWD in higher education is limited. Thus, increased knowledge and understanding of AT outcomes and impacts among SWD in higher education is warranted to help inform higher education policy, widen participation and enhance the overall educational experience of this underrepresented group at third level. This chapter provides an overview of the higher education context for SWD, brings together existing literature on unmet AT needs, AT outcomes and impacts for those with disabilities and models of device use and acceptance and lastly, examines AT and disability in the context of identity literature, theories and frameworks. Salient theories are also outlined in this introductory chapter, such as the Matching Person and Technology Model, Social Identity Theory, Self-Categorisation Theory and Social Identity Performance, which were integral to guiding the research and meaningfully understanding and interpreting the findings.

1.2 Students with disabilities and higher education

Over recent years, the inclusion of SWD in mainstream education has been prioritised internationally through the introduction and adoption of legislation and policies. The United Nations Educational, Scientific and Cultural Organisation (UNESCO) Salamanca Statement (1994), which was agreed by 92 governments and 25 international organisations, paved the way for inclusive mainstream education for all stating the importance of inclusive education practices in combatting stigma and creating an equal society. The World Education Forum built on this work in Dakar 2000, declaring that education for all must be cognisant of the needs of marginalised groups such as ethnic minorities, children affected by conflict and those with disabilities and special educational needs (UNESCO, 2009). The Dakar Framework for Action was drawn up to set goals and address challenges faced within various regions worldwide (UNESCO, 2000). In addition, the United Nations Sustainable Development Goal of ‘Quality Education’ also advocates for equal opportunity for all, with a particular target of providing education facilities and learning environments which are accessible and effective for those with disabilities by 2030 (United Nations, 2015). The United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) provides further international support for inclusive education systems obliging member states to “ensure an inclusive education system at all levels” (p. 14). Article 24 of the Convention further states that individuals with disabilities should have access to education on an equal basis to peers and must be provided with the appropriate accommodations and supports to enable their full participation (United Nations General Assembly, 2006). Equity of access to education is also at the forefront of the European Strategy for the Rights of Persons with Disabilities 2021-2030 (European Commission, 2021). One of the key objectives of the strategy is “inclusive and accessible education” which calls on member states to implement Article 24 of UNCRPD and details the commitment of the European Commission to provide disability related training and support to teachers and educational establishments to promote inclusive practices.

In Ireland, a number of key legislations are central to promoting the inclusion of SWD in mainstream education. The Education Act (1998) stipulates that schools must dedicate appropriate resources to support and meet the requirements of SWD. The introduction of the Equal Status Act (2000) and the Disability Act (2005) promote equal participation and prohibit discrimination. The Equal Status Act (2000) protects against the discrimination of SWD in any educational establishment in terms of admission or access to courses or facilities. The Disability Act (2005) states that all public buildings must be accessible, that SWD are entitled to a needs assessment and must be provided with the resources to meet their educational needs. The Education for Persons with Special Educational Needs (EPSEN) Act (2004) goes one step further in promoting equality in education stating that where possible SWD should be educated in an inclusive environment alongside non-disabled peers. The National Council for Special Education (NCSE), which is concerned with improving the delivery of educational services to those with special educational needs, was also established through the EPSEN Act. The NCSE has been central to the co-ordination of support services to SWD in school, dealing with over 22,000 applications for additional supports in 2019/2020 (NCSE, 2021). In addition, the National Disability Inclusion Strategy 2017-2021 stipulates that all public services meet accessibility and universal design requirements, which includes public schools and universities, to promote access for all. This includes the provision of disability awareness training, the design of websites in line with universal design principles and ensuring that physical infrastructure meets accessibility standards. The strategy also focuses on education and how SWD can be enabled to reach their full potential. One action is specifically concerned with increasing participation in higher education for those with disabilities (Department of Justice and Equality, 2017).

Policies and funding specific to the higher education context in Ireland have also promoted participation of SWD over recent years. Equity of access and ensuring equality of opportunity for all is highlighted as a strategic theme in the Higher Education Authority 2018 – 2022 Strategic Plan (Higher Education Authority, 2018a). In this light, the National Plan for Equity of Access in Higher Education outlined specific participation targets for SWD (Higher Education Authority, 2015) which have been surpassed with regards to new entrants with disabilities and cohorts of students with a physical disability, hearing impairment and visual impairment in higher education (Higher Education Authority, 2018b). There has also been significant investment in funding, with over 10,000 higher education students supported in 2014/15 by the Fund for Students with Disabilities, with some students stating that admission and progression through university would not have been possible without this support (Higher Education Authority, 2017).

Due to the above changes at national and international level, increasing numbers of SWD are accessing higher education. European figures show that the percentage of students studying in higher education who indicated they had a disability or impairment was 25% or above in the Netherlands, Lithuania and Ukraine (Hauschildt et al., 2015). In the UK, participation rates have been steadily rising with SWD comprising 17.3% of all home students (i.e. students studying in their own country) in 2019/20 which reflected an increase of 47% since 2014/15 (Hubble & Bolton, 2021). A similar trend has been observed in the USA, with undergraduate participation rates rising from 11.1% of the total undergraduate population in 2011/12 to 19.4% in 2015/16 (National Center for Education Statistics, 2018, 2022). In Ireland, SWD represented 6.3% of the total student population in 2019/20, a 7% increase in the figures recorded in 2017/18 and a 220% increase compared to eleven years ago (AHEAD, 2021). Yet, despite these positive trends, SWD are still significantly underrepresented in higher education relative to non-disabled peers. In Ireland, only 37% of those with disabilities aged 15-50 completed tertiary education in comparison to 53.4% in the general population (Central Statistics Office, 2016). Similar trends have been observed in England with only 17.8% of those with disabilities enrolled in higher education aged 19 compared to 47.3% in the general population in 2018/19 (Hubble & Bolton, 2021). Those with more severe forms of impairment are further disadvantaged, with completion rates among this group significantly lower than non-disabled peers (58.2% versus 81.6% for women, 50% versus 86.7% for men) according to the Canadian Survey on Disability 2017 (Morris et al., 2018). A severity of disability score was calculated based on the intensity of difficulties experienced and the frequency of activity limitations (Cloutier et al., 2018).

The wider benefits of access to higher education are significant. Research has shown that those who participate in higher education experience better physical and mental health, greater life satisfaction, are less likely to engage in unhealthy behaviours (i.e. excess drinking and smoking), have longer life expectancy, greater civic engagement, are less likely to be unemployed and are more likely to receive higher earnings (Department for Business, Innovation and Skills, 2013). The employment rates of those who progress through higher education in Ireland is also high, with 76% of graduates found to be in secure employment in 2014 (Central Statistics Office & Higher Education Authority, 2018). This highlights the importance of increasing access to higher education for SWD. However, these students still face significant challenges on enrolment in third level compared to their non-disabled peers. SWD are more likely to drop out and take longer to complete their programme of study (OECD, 2011). One study conducted in the United States found that 24.6% of students with disabilities failed to reach their second year (Mamiseishvili & Koch, 2011), while in England 10.7% of students with disabilities dropped out after their first year in comparison to 9.8% of those without a disability in 2018/19 (Hubble & Bolton, 2021). Factors such as accessibility issues, stigmatising attitudes and low socioeconomic status have been highlighted as having a negative impact on SWD persistence through higher education in Europe (Quinn, 2013). SWD are also more likely to struggle with coursework, have lower grades, drop out of, and fail modules in comparison to non-disabled peers (Foreman et al., 2001; Mullins & Preyde, 2013; Sachs & Schreuer, 2011). Many also report lower academic self-efficacy and greater concerns over their capabilities to achieve the same grades as non-disabled peers (Hall & Webster, 2008). Furthermore, some SWD in higher education report lower quality of life and more anxiety in comparison to non-disabled peers (Herts et al., 2014; Mullins et al., 2017).

Other challenges SWD face are exacerbated by the organisational and structural characteristics of higher education environments such as large volumes of students in noisy lecture theatres and buildings with poor accessibility (Hadjikakou et al., 2010; Mullins & Preyde, 2013; Shevlin et al., 2004). As a result, increased effort is needed on the part of SWDs in order to achieve their academic goals (Järkestig Berggren et al., 2016; Mullins & Preyde, 2013; Sachs & Schreuer, 2011). SWD also have lower levels of participation in extracurricular activities in higher education (Sachs & Schreuer, 2011); in some cases, the extra time expended in academic endeavours limits opportunities for social interactions outside of the classroom (Mullins & Preyde, 2013). Social stigma is also a major challenge to integration within tertiary institutions and is exacerbated by a lack of understanding of disabilities by the wider higher education population. This can increase an individual's sense of isolation and reduce their willingness to disclose their disability in an attempt to "fit in" among their peers (Barnard-Brak et al., 2010; Claiborne et al., 2011; Järkestig Berggren et al., 2016; Lourens & Swartz, 2016; Mullins & Preyde, 2013; Shevlin et al., 2004).

It is clear from the above, that SWD face many challenges in higher education and a significant gap in participation still exists relative to non-disabled peers. There is an evident need to research ways in which we can increase participation, inclusion and accessibility for this group in the higher education sector. Access to appropriate and suitable AT is one way that this can be achieved.

1.3 Overview of AT and unmet needs

An assistive product is defined as “any product (including devices, equipment, instruments, and software), either specially designed and produced or generally available, whose primary purpose is to maintain or improve an individual’s functioning and independence and thereby promote their wellbeing” (Khasnabis et al., 2015, p. 2229). Other definitions include the one outlined in the Assistive Technology Act of 2004, defining an AT device as “any item, piece of equipment, or product system, whether acquired commercially, modified, or customised, that is used to increase, maintain, or improve functional capabilities of individuals of disabilities (Assistive Technology Act of 2004, 2004, p. 1710). The above two definitions are positively phrased in the way they view AT as important for enabling individuals to reach their potential and improve performance. However, other definitions of AT focus more on how AT can prevent restrictions and loss of function. For example, the International Organization for Standardization (ISO) (2016) defines an assistive product as “any product (including devices, equipment, instruments and software), especially produced or generally available, used by or for persons with disability for participation, to protect, support, train, measure or substitute for body functions/structures and activities, or to prevent impairments, activity limitations or participation restrictions” (p. 1). Some definitions specifically refer to AT within the educational context. The Ministry of Education in New Zealand defines AT as “the specialised equipment and technology that assists students to access and participate in learning” (Ministry of Education, 2020). In Ireland, the NCSE defines AT as “any item of equipment that can be used to improve the functional capability of a student with special educational needs and is of direct educational benefit to them” (NCSE, 2013, p. 121). The definition put forward by Khasnabis et al. 2015 is the one adopted for the current thesis. This definition was chosen as it views AT as tool of empowerment, is sufficiently broad to encompass a multitude of outcomes and specifically references the positive psychological implications arising from AT use. While many definitions have been put forward, there is a lack of consistency over the terminology used for AT within the literature with papers using language such as AT, assistive product, assistive aid, assistive device, assistive technology device, assistive equipment and self-help device.

Classification systems are useful in establishing the scope of AT and ensuring that users and professionals can easily access information in an organised and structured way when selecting a suitable device. The two main classifications of AT are the ISO 999 and the International Classification of Functioning, Disability and Health (ICF). The ISO 999 (ISO, 2016) is a related member of the World Health Organisation (WHO) Family of International Classifications and adopts some of the terminology used in the ICF. The ISO 999 (ISO, 2016) organises AT devices using three classification levels. One-level outlines overall classes generally describing the functionality of the product more broadly. For example, assistive products for self-care activities and participation in self-care is a class at one-level classification. In total, the ISO 999 has twelves classes of ATs at one-level. Two-level breaks each of the twelve classes down further into subclasses. These subclasses describe a specific function of the AT. For example, "assistive products for eating and drinking" is a subclass of "assistive products for domestic activities and participation in domestic life". Three-level outlines divisions in which the description is even more specific. For example, a respirator is a division of the subclass "assistive products for respiration" which falls under the class "assistive products for measuring, supporting, training or replacing body functions".

A classification for AT was also developed from the ICF (WHO, 2001). The ICF takes into account biological, individual and social perspectives on health and disability. It comprises of two parts; 1) functioning and disability which includes body functions and structures and activities and participation; and 2) contextual factors which includes environmental and personal factors. These components form a complex relationship between an individual's health condition, personal factors and external factors in explaining outcomes for a person with a disability. Within the ICF, AT is classified in the environmental factors section under chapter 1 "products and technology". Environmental factors refer to the role of social, attitudinal and physical factors in individuals' day to day environment. These interact with the Body Functions and Structures component and the Activities and Participation component of the ICF as either a barrier or facilitator. Under the domain "products and technology", fourteen levels or broad categories are outlined (e110 – e199). For example, "products and technology for communication" is one such broad category. The majority of these broad categories are broken down further by subcategories. For example, "assistive products and technology for education", which details devices such as specialised computer software which facilitate learning, is a subcategory of “products and technology for education”. An ICF-based AT classification was developed from this where AT device categories were assigned to the ICF components of body functions and structures, activities and participation and environmental factors (Bauer & Arthanat, 2010). AT device categories included; 1) AT devices for body function and structure, 2) AT devices for activity, 3) AT devices for participation and 4) contextual AT. The contextual AT category consists of the fourteen levels under the “products and technology” domain in the ICF. Thirteen ATD categories were listed under body function and structure, fourteen under activity and fourteen under participation. Within the higher education context, classification systems such as the ISO 999 and ICF are useful for disability/AT offices in identifying what devices may be most suitable for students with a variety of diagnoses to support their educational engagement.

However, higher education is only one context and period of time in an individual’s life during which AT may be required. With global prevalence of disability rising year on year (Jette, 2021), there is an immediate need to ensure availability of AT across the life course. The WHO establishment of the Global Cooperation on Assistive Technology (GATE) demonstrates a commitment to making quality, affordable AT available worldwide. The GATE initiative maintains that AT is relevant to any person who experiences impairments at any stage across the lifespan (MacLachlan et al., 2018). Adopting a life course approach to AT provision acknowledges that AT may be needed on a short or long term basis (MacLachlan et al., 2018). For some individuals, AT may only become required and beneficial in the latter years of life to help negotiate functional decline associated with the aging process (Joyce & Loe, 2010) whereas others may require and need AT from a young age due to a congenital disability or acquired disability (Blake & Bodine, 2002; Borgestig et al., 2017; Dudgeon et al., 1997).

AT is in high demand worldwide with an estimated 2.5 billion people requiring assistive aids (WHO, 2022). This figure is expected to increase exponentially by 2050 to over 3.5 billion due to a rise in the aging population (WHO, 2022). The UNCRPD has identified access to AT as a right in an attempt to promote equal opportunities to those with disabilities (United Nations General Assembly, 2006). At present, 185 countries have ratified the UNCRPD. Despite this, the recent Global Report on Assistive Technology has highlighted that the prevalence of the population worldwide that need AT is 31.3%. In addition, access to AT is as low as 3% in certain countries and spectacles are the devices most needed out of all AT in the countries surveyed. Access to AT also varied by human development index score, with countries with very high scores reporting significantly greater access to AT including spectacles (87.7%) in comparison to countries with low scores (10.7%). Higher scores on the human development index was indicative of longer lifespan, higher level of education and higher gross national income (WHO, 2022). However, unmet needs also exist in high income countries such as Ireland where 1,231 disability service users identified through the National Ability Supports System Annual Report in 2020 required one or more AT devices. In addition, an unmet need was identified for a total of 2,177 AT devices at present or within the next five years. The highest level of unmet need was for furnishing, fixtures and other assistive products for supporting activities in indoor and outdoor human-made environments (n= 770), followed by assistive products for communication and information management (n= 420), and assistive products for activities and participation relating to personal mobility and transportation (n= 361) (Casey et al., 2021). Similarly, lack of access to AT was identified in the Canadian Survey on Disability 2017 with 44.9% of those with disabilities reporting an unmet need for at least one AT device and 13% of those with physical disabilities indicating they did not have access to AT they required (Choi, 2021).

The WHO (2022) attribute the high rates of global unmet needs to factors such as lack of affordability, awareness and availability of AT devices, a scarcity of trained AT professionals and insufficient AT-related governmental funding and policies. The expensive nature of devices is a significant barrier in accessing AT for those with disabilities who may be unable to work because of their impairment, and thus, find themselves below the poverty line (WHO, 2021). In addition, concerns regarding stigmatisation when using AT, particularly for those with invisible impairments, was identified as a significant contributor to unmet needs in a scoping review by the WHO (WHO, 2021). Other barriers contributing to lack of access and/or unmet needs for those with disabilities include poor device usability and reliability, lack of involvement in device selection, lack of training for the AT user, negative attitudes towards AT and insufficient support from family members to use AT, as evidenced in a recent systematic review (Howard et al., 2020). It is important that these barriers are addressed as a matter of urgency to allow those with disabilities to take advantage of the potential benefits of AT use, as discussed in the section that follows.

1.4 AT outcomes and impacts for those with disabilities

The Global Alliance of Assistive Technology Organisations (GAATO) refers to outcomes as finite and measurable changes which occur in response to an intervention, such as AT (GAATO, 2022a). Previous research has investigated AT outcomes for those with disabilities focusing on functional abilities across age groups, disability types and a variety of AT devices. The WHO define functional ability as a person having the capacity to “meet their basic needs, learn, grow and make decisions, be mobile, build and maintain relationships, and contribute to society” (WHO, 2020). Studies have shown that mobility aids, such as wheelchairs, prostheses and walking frames, and wearable AT devices, such as exoskeletons and electrical stimulation devices, have increased functional performance in activities of daily living for those with a range of mobility impairments (Algood et al., 2005; Gandolla et al., 2020; Theeven et al., 2011; Wright & Jutai, 2006). Mainstream technology solutions such as personal digital assistants, and web based interventions have also resulted in significant improvements in functional performance for those with multiple sclerosis and cognitive impairments (Gentry, 2008; Kirsch et al., 2004). Some reviews of the literature have focused specifically on children, with augmentative and alternative communication (AAC) significantly promoting abilities to communicate for those with intellectual and developmental disabilities (Crowe et al., 2022), while significant improvements in domains such as mobility, communication, postural stability and feeding have also been observed across disability and AT types for children (Henderson et al., 2008). Functional abilities within the higher education environment include engagement in reading, writing, notetaking, test-taking and studying, with AT significantly promoting performance in these areas across disability types (Malcolm & Roll, 2017a).

AT is also instrumental in promoting social participation, one’s sense of autonomy and quality of live. GAATO refers to these as impacts, broader changes occurring within the community, organisation, society or environment as a result of outcomes. Impacts have been described as difficult to determine, predict and measure (GAATO, 2022a). Some of the social benefits of devices which support communication, such as AAC and hearing aids, include maintaining and strengthening friendships, a wider social circle, greater inclusion in social events and increased participation in social groups and activities (Caute & Woolf, 2016; Dawes et al., 2014; Dietz et al., 2013; Hynan et al., 2014). Equally, other AT devices, whose primary function is not to facilitate communication, can promote social participation and independence. These include mobility aids such as adapted vehicles, wheelchairs and prosthetic limbs. For those with lower limb loss, adapted vehicles and/or prosthetic limbs gave them the freedom and independence to participate in valued social activities (Dunne et al., 2015), travel and spend more time with family and friends (Murray, 2009). However, wheelchair use restricted the sense of autonomy for some as they were reliant on accessible transport such as wheelchair taxis to get around (Dunne et al., 2015). Others with physical disabilities report that wheelchair use can greatly promote social participation (Rousseau-Harrison et al., 2009), can increase engagement in leisure activities and promote greater control and freedom over day to day activities (Rousseau-Harrison et al., 2012). Similarly, a variety of AT devices have increased social participation for SWD in higher education, but have predominantly focused on promotion of social interactions in the classroom or engagement in course related discussions (Foley & Masingila, 2015; Kuzu, 2011; Lartz et al., 2008), rather than engagement in extracurricular activities. Social participation of those with disabilities can also be affected by a wide range of factors other than AT such as accessibility, societal attitudes, dependence on others, psychological factors and impairment related factors such as pain and presence of comorbidities, as evidenced in a recent systematic review (Smith et al., 2016). This demonstrates the importance of examining personal, social and environmental factors when assessing impacts and outcomes for those with disabilities.

AT also significantly impacts on quality of life across disability types. The role of AT in quality of life refers to the way in which it enables the individual to gain satisfaction from and take advantage of an array of possibilities over their lifetime (Renwick et al., 1994). Studies have demonstrated the positive quality of life implications observed for those with visual impairments who used computer based AT (Rosner & Perlman, 2018), prelingually deaf individuals after implantation of a cochlear implant (Klop et al., 2007) and those with neuromuscular diseases who used wheelchairs (Pousada García et al., 2015). Those who used power chairs reported a greater positive psychosocial impact in comparison to those who used manual chairs. These differences are thought to be attributed to the amount of independence the wheelchair affords to the individual, with those who had a greater sense of independence reporting greater quality of life (Pousada García et al., 2015). Computer based AT devices have also significantly improved quality of life outcomes for those with spinal cord injuries regardless of the severity of impairment or type of AT device being used, as evidenced in a recent systematic review (Baldassin et al., 2018). Within the higher education environment, research exploring the implications of AT use for quality of life is limited, with only two studies demonstrating that AT significantly improved quality of life for SWD (Craddock, 2006; Marschark et al., 2018). While the above literature demonstrates the positive quality of life impacts associated with AT use, the relationship between AT and quality of life is complex and open to change over time (Scherer, 1996, 2005).

It is clear from the above that AT can have significant positive implications for those with disabilities in the areas of functional abilities, social participation and quality of life. However, models such as the Matching Person and Technology Model emphasise the need for a person-centred approach to device selection and highlight key factors which must be considered in order to maximise device use and effectiveness.

1.5 The Matching Person and Technology Model

The Matching Person and Technology (MPT) Model (Scherer, 2005) is designed to assist in the selection of the most appropriate AT for a person. It identifies the complex interaction of environmental, technology and person factors in device use or non-use. For device use, it distinguishes between optimal use and partial use while for non-use a distinction is made between avoidance and abandonment. Environmental factors refer to the setting where the AT device will be used. This includes the accessibility of the environment for device use, the availability of support from others, the availability of funding for AT, the expectations of device effectiveness from others and cultural values and norms. Technology factors refer to aspects of the AT device itself. This includes perceived ease of use, device design and aesthetics, the provision of training and the functional performance of the device in carrying out the desired task. Person factors refer to the individual preferences and personality characteristics of the AT user. This includes the expectations of the device held by the user, level of motivation to use the device, skills needed to effectively use the device, prevalence of personality and temperament characteristics which would be conducive (i.e. cooperative, optimistic) or inhibitory (i.e. withdrawn, uncooperative, resistant) to device use and how the AT device impacts on self-image. The MPT Model has led to the development of a number of different instruments, some specific to a particular context such as education or the workplace, which aim to identify barriers to optimal use and how these can be addressed, and identify additional resources which could facilitate use (Scherer et al., 2005). Once an individual has acquired a suitable device, the MPT instruments are re-administered to capture changes in functional capabilities and psychosocial domains such as quality of life, self-esteem and social participation (Scherer, 2017). Testing of one of the instruments developed, the Assistive Technology Device Predisposition Assessment, has demonstrated its effectiveness in identifying personal factors which influence device use, irrespective of disability type or age. These factors are ideographic and specific to the individual’s circumstances and context (Scherer et al., 2011). Person factors, such as self-image, can significantly influence an individual’s propensity to use AT as device use can alter how a person view themselves or how others view them.

1.6 AT, disability and identity

AT can have significant impacts on identity for those with disabilities. Identity has been described as “the subjective concept of oneself as a person” (Vignoles et al., 2006, p. 309) AT devices increase the visibility of one’s impairment and have the potential to increase stigmatisation (Lund & Nygård, 2003; Parette & Scherer, 2004). Some report that others treat them differently when they notice the AT such as taking pity on them, staring, teasing or treating them as if they have some form of cognitive impairment (Carneiro et al., 2015; Ellington & Lim, 2013; Hersh, 2013; Lund & Nygård, 2003; Shinohara & Wobbrock, 2016). In this way, negative social feedback from others about AT use can draw unwanted attention to the disabled person, highlight them as different, cause feelings of embarrassment and shame, reduce self-esteem and force them to re-evaluate self-perceptions of ‘normality’ (Ellington & Lim, 2013; Pape et al., 2002; Shinohara & Wobbrock, 2011). Embarrassment about using a device is also highlighted as a person factor in the MPT model which can result in not accessing AT in the first instance and device abandonment (Scherer, 2005). The increased visibility of AT use can be particularly difficult for those with invisible disabilities who have the option of ‘passing’ as able bodied if they so wish (Shinohara & Wobbrock, 2011). As a result, some individuals may choose not to use their AT device in order to fit in with peers and maintain their ideal of ‘normalcy’ (Lund & Nygård, 2003; Shinohara & Wobbrock, 2016). This can result in individuals having to give up once valued activities, thus increasing their sense of isolation (Lund & Nygard, 2003).

Aside from reactions of others towards AT use, the negotiation of personal meanings associated with devices can have implications for identity. A review of the literature has identified that meanings can vary by disability type and are open to change over time in response to deteriorations in impairment. Those with acquired disabilities may have a more negative view of their AT viewing it as threat to their ideal of 'normalcy' and a reminder of their disability and functions they have lost. In contrast, those with congenital disabilities may be more inclined to view their AT as a tool of empowerment (Pape et al., 2002). Others worry that the AT may become the defining feature of their personality and how others identity them, with devices such as a white cane being viewed as particularly stigmatising (Shinohara & Wobbrock, 2011). Labelling as a result of AT use can clash considerably with an individual's preferred self-image and how they want to be viewed by others and thus, can result in non-use (Hersh, 2013; Shinohara & Wobbrock, 2011). Others incorporate AT into their identity as a tool of empowerment, acknowledging the positives associated with device use such as increased independence, self-efficacy, self-confidence and a means of transforming negative perceptions of others (Shinohara & Wobbrock, 2011, 2016). Embracement of AT as part of their identity is also evident among those who customise their device to express their personality. For these individuals, their device is viewed as an extension of themselves (Profita et al., 2016). Others report feeling more "complete" as a person due to the way in which AT enables participation in valued activities on an equal basis to peers and helps them to regain a sense of "normality" following trauma for those with acquired disabilities (Folan et al., 2015; Lund & Nygård, 2003). However, while some acknowledge the benefits of device use, they find it difficult to accept their need for AT in the first instance. These individuals continue to use their device but struggle in negotiating identity issues in the process (Lund & Nygard, 2003). Within the higher education environment, research exploring AT and identity is limited. While some studies have shown that increased visibility and negative social feedback associated with AT can cause identity concerns and impact on use (Bell et al., 2016; Goode, 2007; Kendall, 2016), no study to date has explicitly explored the impact of AT on identity in this context and if or how it changes over time.

The above demonstrates that personal meanings can vary across disability types and from person to person. However key factors have been implicated in how a person views their AT such as the degree to which disability is incorporated into one's identity, desired self-image, cultural values and norms, social reactions from others and identification with other AT users (Hersh, 2013; Pape et al., 2002)

1.6.1 Social identity approach

This section will detail the social identity approach and an extension of this approach, social identity performance, consider their application to those with disabilities and whether previous research has considered these theories in light of AT use.

The social identity approach encompasses two main theoretical perspectives, social identity theory (Tajfel & Turner, 1979) and self-categorisation theory (Turner et al., 1987). This approach defines a social identity as “that part of an individual’s self-concept which derives from his knowledge of his membership in a social group (or groups) together with the value and emotional significance attached to that membership” (Tajfel, 1981, p. 255). Social identity theory puts forward a theory of identity from a group membership perspective, focusing on how individuals behave as members of particular social groups, why they are motivated to engage in group processes and how they might manage a stigmatised group identity. Self-categorisation theory differs from social identity theory in that it explains how individuals self-categorise as members of a particular group in the first instance, and how an individual can view themselves as a prototype or exemplar of a particular group which can govern their thoughts and behaviour. The two theories also differ in how they view personal and social identities; social identity theory views these as distinct whereas self-categorisation theory maintains that the social is a part of the individual identity.

According to social identity theory (Tajfel & Turner, 1979), individuals seek out and categorise themselves as members of particular social groups. During social categorisation, people tend to emphasise the similarities among in-group members (i.e. those in the group to which they belong) and emphasise the differences between themselves and out-group members (i.e. those not in their group); this is known as the accentuation principle. When a group becomes psychologically salient, a person engages in other processes such as social comparison, where they compare their in-group to the relative out-group. The desired outcome from social comparison is to achieve positive distinctiveness. This is where the individual emphasises perceived differences between the groups, in particular, on dimensions which the in-group performs well. Social comparison can also have implications for self-esteem, whereby self-esteem is promoted if the in-group outperforms the outgroup on dimensions of importance, but is threatened if the in-group is inferior on these dimensions. When self-esteem is threatened, an individual may engage in an array of strategies such as social mobility, social creativity and social competition in order to try increase self-esteem (Branscombe & Ellemers, 1998). Social mobility involves leaving the in-group and joining the out-group. Social creativity encompasses a number of strategies such as shifting the comparison group to a more favourable alternative, re-evaluating stigmatised dimensions or focusing on other positive attributes that the in-group possesses which distinguishes them from the out-group. Finally, social competition involves fighting for higher status for the in-group through political action, for example. The strategy that is chosen is determined by subjective belief structures, in other words the perceived relationship between the in-group and out-group. These comprise beliefs about status (i.e. the social standing of the group relative to other groups), stability (i.e. the stability of the power dynamic between groups), legitimacy (i.e. the legitimacy of the power dynamic between groups), permeability (i.e. are group boundaries permeable to allow passing from one group to another) and cognitive alternatives (i.e. can a different intergroup relationship be perceived) (Ellemers, 1993; Hogg & Abrams, 1988).

According to self-categorisation theory (Turner et al., 1987), an individual self-categorises as a member of a particular social group depending on the accessibility and fit of the category. The accessibility refers to the readiness and ease at which a category can be invoked; categories can be chronically accessible over an extended period of time or accessible if primed in a particular situation (Hornsey, 2008). The relative accessibility of the category can be determined by past experiences and current motivations, the centrality (i.e. importance) of the social identity for the individual’s self-concept and societal norms and ideals (Dirth & Branscombe, 2018; Turner et al., 1987). Fit refers to how accurately the category reflects the individual’s current situation. It encompasses two aspects, comparative fit and normative fit. Comparative fit maintains that an individual will self-categorise within a particular group if they perceive the differences between themselves and other group members to be smaller than the differences between categories. Comparative fit can determine the level of abstraction that an individual self-categorises; the superordinate, intermediate or subgroup level (Turner et al., 1987). For example, rather than someone self-categorising at a superordinate level (e.g. human being), it may be more meaningful for them to categorise at the intermediate level or social identity (e.g. student) or subgroup level (e.g. science student) depending on the context and perceived comparative fit. Normative fit refers to the extent to which the individual's current circumstances or behaviour matches stereotypical norms associated with a social identity. Another central tenet of self-categorisation theory is the concept of depersonalisation, whereby an individual engages in self-stereotyping viewing themselves from the perspective of their social category rather than their unique characteristics as an individual (Turner et al., 1987).

Social identity performance, an extension of the social identity approach, is described as the deliberate expression of suppression of signs, actions, behaviours or symbols which are typically associated with a social identity (Klein et al., 2007). It is carried out for the purposes of identity consolidation, that is to secure a person's status as a member of a particular social group, or identity mobilisation, instigating action for an important political cause relating to the social group. The purpose of engaging in social identity performance strategies may change depending on the audience which is perceiving the behaviours (Klein et al., 2007). For example, among in-group members, the consolidation function may serve the purpose of gaining acceptance from others whereas among out-group members the aim may be to change stigmatising attitudes towards the in-group. With regards to the identity mobilisation function, among in-group members this may involve garnering support from others to fight for a cause relating to the social identity, whereas among outgroup members the aim may be to gain their support and trust in fighting for the cause. A number of factors have also been identified which influence engagement in social identity performance (Klein et al., 2007). Firstly, the individual must identify as a member of a particular social group, the group must be salient within the particular context and there must be an audience present to perceive the signs, symbols or behaviours associated with the group. Secondly, in order for an individual to engage in identity consolidation, the legitimacy of their status as members of the social group must be in question. Thirdly, in order for an individual to engage in identity mobilisation, there must be an unhappiness with the current social standing of the group and a recognition that the actions of the group need to be co-ordinated to achieve the goal. Finally, visibility has been highlighted as playing a key role. Actions and behaviour that are visible to other in-group members can provide motivation and promote confidence, while in situations where an individual is only visible to out-group members, they may deliberately suppress behaviours associated with their subordinate identity and pass into the higher status group.

Dirth and Branscombe (2018) highlight the importance of the social identity approach for disability research and equally the value of examining disability for the social identity approach. They propose that the social identity approach can advance psychological research in the area of disability through utilising well established theoretical frameworks to understand disability experiences. Exploring disability through the social identity framework allows for disability to be normalised as a sociopolitical issue and acknowledges that disability identity influences the experiences of those with disabilities but equally is defined by those with disabilities themselves. Equally, disability identity offers a unique identity category for social identity research given the variability in how one enters the category (i.e. congenital vs acquired impairment), the intersection of disability with other marginalised identities and the multiplicity of impairment related issues (e.g. prognosis and potential for rehabilitation, visibility of condition, psychological, physical and social impairment effects). It also provides opportunities to explore the complex relationships between the disabled minority group and non-disabled majority group, such as the use of personal assistance services, support from family members with regards to day-to-day activities and advocating on their behalf, and allyship from out-group members on disability issues.

Both social identity theory (Tajfel & Turner, 1979) and self-categorisation theory (Turner et al., 1987) have been applied to those with disabilities. Social identity theory maintains that those with disabilities will engage in a variety of strategies such as social mobility, social creativity, or social competition to avoid or address stigma and protect self-esteem (Dirth & Branscombe, 2018). Social mobility strategies can include seeking medical intervention to try and cure their disability, downplaying the significance of disability in their lives or trying to overcome their impairment and meet normative standards through refusing accommodations or support (Bell et al., 2016; Nario-Redmond et al., 2013; Olney & Brockelman, 2003); these strategies allow the individual to pass as non-disabled or a majority group member. Social creativity strategies in the context of disability can include changing the reference group for comparison to others with disabilities or those who are perceived to be more limited or restricted by their impairment than them, which would facilitate downward social comparison. This offers greater opportunities for individuals to enhance self-esteem relative to using the non-disabled majority as the main frame of reference, as this group may outperform those with disabilities on important dimensions. Other social creativity strategies can include redefining stigmatising attributes such as claiming the term crip as a source of disability pride or viewing disabled bodies as beautiful. Alternatively, individuals may focus on valued qualities which the group possesses in abundance such as empathy or compassion which separates them from the non-disabled majority (Dirth & Branscombe, 2018). Social competition strategies are where individuals view themselves as being oppressed or discriminated against by the non-disabled majority and fight and advocate for equal rights and higher status for their group (Nario-Redmond et al., 2013). Factors such as disability identification, visibility and length of time living with an impairment can influence the type of strategy an individual adopts. Those who strongly identify as disabled, have visible impairments and have been living longer with their impairment are more likely to adopt social competition strategies in comparison to social mobility strategies (Nario-Redmond et al., 2013; Nario-Redmond & Oleson, 2016).

The relevance of self-categorisation theory has also been highlighted among those with disabilities. Individuals who defined themselves in terms of their social category (i.e. person with an illness/disability) reported more severe impairment related symptoms than those who didn't categorise in this way (St. Claire et al., 2008); this supports the concept of depersonalisation where the individual is conforming to the salient norms of the social category rather than defining themselves as a unique individual (Turner et al., 1987). Other research has demonstrated that the disability category has increased salience and fit in contexts where a disabled person's autonomy and competence is undermined such as when they do not have access to appropriate accommodations (Aamlid & Brownfield, 2019). In these instances, the individual's circumstances match external categorisations and stereotypes of disabled people in society such as dependence and incompetence (Nario-Redmond, 2010), thus increasing the normative fit of the disability category.

Social identity performance has also been investigated among those with disabilities. Previous research has shown that individuals consolidate and secure their identity as disabled through openly disclosing their impairment to promote feelings of solidarity with others with disabilities and challenging stigmatising attitudes and ableist policies (Miller et al., 2019; Taub et al., 2004). Personalisation of AT devices, which increases the visibility of their AT and impairment, is another way that individuals have claimed their disability and secured their identity as disabled in previous research (Hutcheon & Wolbring, 2012), but equally this served the purpose of self-expression of their personality (Ellington & Lim, 2013; Profita et al., 2016). AT has also been purposively used by individuals to transform negative attitudes of others towards disability, through demonstrating their strengths and capabilities (Lupton & Seymour, 2000; Pedersen et al., 2019). Others try to consolidate a 'normal' identity through deliberately hiding impairment related symptoms (e.g. seizures) from others (Jacklin, 2011) or purposively concealing or refraining from using their AT (Bell et al., 2016; Ellington & Lim, 2013; Kendall, 2016; Shinohara & Wobbrock, 2016). The complexity of identity performance has also been noted when there are multiple identities at play, with the individual strategically choosing how they will "show up" in different contexts, with one identity sometimes taking precedence over the other (Abrams & Abes, 2021; Amer, 2020; Miller et al., 2019).

Dirth and Branscombe (2018) note that gaps still exist in utilising the social identity approach to understand disability experiences. For example, it is suggested that more research is needed to understand how technological intervention, such as AT, can impact on psychological outcomes. While some studies within the higher education context identified non-use or concealment of AT in the performance of identities (Bell et al., 2016; Kendall, 2016), they failed to uncover the psychological implications of this for the student. In addition, there is a dearth of research examining how contexts may impact on self-categorisation (Dirth & Branscombe, 2018). For example, within the higher education context, do those involved in disabled communities and disabled sports clubs differ in the meanings attached to the disability category or in how they self-categorise in comparison to students with disabilities not involved in these spaces? While some studies have applied a social identity approach to understand disability experiences within the higher education context (Bell et al., 2016; Jodrell, 2010; Olney & Brockelman, 2003), they have not addressed the aforementioned nuances or complexities.

1.6.2 The negotiation of identity over time

Social identities are not static and are open to continuous negotiation and renegotiation. Deaux and Ethier (1998) describe identity negotiation as an ongoing process which requires constant adaptation and adjustment in response to environmental demands. In this way, the individual is engaging in active work to maintain existing identities and adjust to new identities. The negotiation of social identities can occur in response to changes within the individual's context or life situation and can result in identification with new social groups, re-evaluating how they define themselves as members of particular groups or changing reference or comparison groups. Two forms of negotiation strategies for social identities have been outlined; identity negation and identity enhancement (Deaux & Ethier, 1998). Identity negation strategies involve distancing oneself from a social identity and aligns with the social mobility strategies mentioned in section 1.6.1. Identity enhancement strategies refer to the strengthening of an existing identity and aligns with the social creativity and competition strategies mentioned in section 1.6.1. The way in which individuals negotiate identity over time is influenced by identity motives and informs how one manages identity change. This section will review existing literature on identity motives and identity change and provide a critical overview of studies exploring identity over time among those with disabilities.

1.6.2.1 Identity motives

Identity motives are described as drivers which propel an individual towards or away from certain identities (Vignoles et al., 2006). Identification of the driving force(s) in the negotiation of identity over time is important in understanding when and under what circumstances an individual is likely to embrace or conceal identities, depending on whether they satisfy or frustrate their identity motive(s) (Vignoles, 2011). In addition, when identity motives are undermined in some way, it can result in the experience of an identity threat (Breakwell, 1986). A number of identity motives have been identified in the literature such as self-esteem, continuity, distinctiveness, belonging, efficacy and meaning (Vignoles et al., 2006) and have been linked to personal, social and collective identities (Thomas et al., 2017). However, the most prominent and extensively researched of these motives is self-esteem, having been implicated in numerous identity theories (Abrams & Hogg, 1988; Beach & Tesser, 1995; Breakwell, 1986; Greenberg et al., 1997; Leary & Baumeister, 2000; Sedikides & Strube, 1997; Steele, 1988). The self-esteem motive states that an individual is motivated "to maintain and enhance a positive conception of oneself" (Gecas, 1982, p. 20). It is proposed that self-esteem can be promoted through self-enhancement and self-improvement (Sedikides & Strube, 1997), self-verification (Cast & Burke, 2002) or through intergroup relations, as previously outlined in the 'social identity theory' section 1.6.1.

Motivated identity construction theory posits that identity motives have implications for identity elements such as centrality and enactment, and social identities (Vignoles, 2011). It suggests that identities which satisfy motives have greater centrality, are enacted more frequently and result in greater positive affect than those which do not satisfy motives. Identity centrality refers to aspects of identity which are viewed as particularly important and self-defining. Identity enactment refers to how individuals present or act out various aspects of their identity to others (Vignoles, 2011). Vignoles et al. (2006) found that identity elements, regardless whether they are operating on an individual, relational or group level, are viewed as more central to the self-concept when they satisfy the motives of self-esteem, continuity, distinctiveness and meaning. In addition, self-esteem, belonging and efficacy significantly predicted identity enactment. This study also highlighted the relationships between identity motives demonstrating that efficacy and belonging operated indirectly on identity centrality through self-esteem (Vignoles et al., 2006). This suggests that in some situations or contexts other identity motives, such as efficacy and belonging, may operate as a means of achieving self-esteem, rather than a driver of identity processes in their own right. This is evident in sociometer theory (Leary & Baumeister, 2000), which states that individuals feelings of belonging and acceptance from others operate as a function of self-esteem. Rejection or exclusion from the group can negatively impact on self-esteem and cause individuals to respond in such a manner to re-establish feelings of acceptance and belonging. According to sociometer theory, individuals are motivated to promote their relational value (i.e. desire to feel valued by others) and self-esteem serves as a measure of the effectiveness of their actions in achieving this (Leary, 2005). Self-esteem has been noted as both a driver in the negotiation of identity but also an outcome which is positively or negatively impacted on as a result of identity processes (Heppner & Kernis, 2011).

Identity motives have also been examined with regards to social identities. The motives of self-esteem, belonging and efficacy influenced changes in identification with interpersonal networks, while meaning, self-esteem and distinctiveness influenced changes in identification with a social category over time (Easterbrook & Vignoles, 2012). Other studies which have examined social identification, distinguish between personal identity motives, social identity motives and collective identity motives in predicting identification with a sports team. The key personal identity motives implicated were self-esteem, distinctiveness, meaning and efficacy, social identity motives were sense of belonging, meaning and continuity, while the collective identity motive of distinctiveness was identified as important in socially identifying with the sports team (Thomas et al., 2017). To date, there is a dearth of research on identity motives among those with disabilities and how they influence identity over time. Identification of such motives can help uncover the underlying determinant(s) of the embracement or concealment of identities, and how AT is implicated in this, over time and across contexts for those with disabilities.

1.6.2.2 Identity change

Four different forms of identity change have been identified in the literature; changes in the meanings attached to an identity (Burke, 2006), changes in the perceived salience of an identity (Shamir, 1991), acquirement of a new identity and abandonment of an existing identity (Mortimer et al., 1982). Burke (2006) defines identity change as “changes in the meaning of the self: changes in what it means to be who one is as a member of a group, who one is in a role, or who one is as a person” (p. 92). In Identity Control Theory (Burke, 2007), an identity is considered as a group of meanings which form an identity standard. This standard encompasses what it means to carry out a particular role such as athlete or student. Changes in meanings can occur in two ways; changes in which dimensions are considered important for a particular identity (e.g. considering academic performance as more important for student identity than social engagement) or changes in how important an individual considers a particular dimension to be (e.g. how academically focused a student is) (Burke, 2006). Another form of identity change is a change in the perceived salience of an identity. Identity salience is defined as “as the importance of an identity for self-definition, relative to other identities held by the individual” (Shamir, 1991, p. 417). If an identity is considered as important or salient, an individual is more likely to enact the identity. They are also more likely to seek out opportunities and situations which will allow them to enact the identity if it is viewed as high in salience in comparison to other identities which are considered less salient (Shamir, 1991). Changing circumstances can result in an individual considering an identity as less or more important for their self-concept (Deaux & Ethier, 1998). The last types of identity change are considered a structural change. This where an individual abandons or acquires a new identity (Mortimer et al., 1982).

Sources of identity change have also been identified in the literature. With regards to changes in meanings attached to identities, this is proposed to occur for a number of different reasons (Burke, 2006; Stets & Burke, 2014b). Firstly, it is proposed that this can result from a discrepancy in the identity standard (i.e. what it means to fulfil a particular role) and meanings in the social situation of what constitutes a particular identity which is implied by a person's behaviour. In an individual's pursuit of self-verification, that is ensuring there is consistency between the identity standard and meanings in the social situation, they can respond to this discrepancy in the following ways. The individual can adapt or change their behaviour in the situation to alter reflected appraisals, that is the person's perception of how others view them, in order to eliminate the discrepancy between the identity standard and meanings in the social situation. However, if this is not successful and the discrepancy persists, an individual may alter the identity standard over time or the meanings they attach to a particular identity in order to achieve self-verification. This is proposed to take place gradually over time and is a much slower process than changing one's behaviour to eliminate the discrepancy (Burke & Cast, 1997). Another source of identity change is when two identities which share the same dimensions are activated simultaneously, but the meanings in the social situation, implied through the person's behaviour, are compatible with the identity standard for one identity but not the other. In this situation, a discrepancy exists and must be rectified in order to achieve self-verification. Identity Control Theory suggests that if this occurs, the identity standards of both identities will shift until they align and consistency is reached on the dimension which they share (Burke, 2006). Other theories highlight the importance of identity motives such as self-esteem, self-efficacy and authenticity, with identity change occurring when there is a discrepancy between achievement of these motives and one's current self-conception. Factors implicated in undermining these motives include stressful life events, negative social comparisons, negative reflected appraisals and reduced feelings of competence (Kiecolt, 1994). With regards to changes in the salience of an identity, it is proposed that environments which allow more choice on which identities are enacted are more likely to result in changes in salience in comparison to environments which do not allow choice (Serpe, 1987). The last forms of identity change to consider are abandonment or acquirement of an identity. From a social identity perspective, abandonment of an identity may occur in order to protect self-esteem and pass as a majority group member (Branscombe & Ellemers, 1998). Acquirement of a new identity can occur in response to significant life events such as an illness (Hoogerdijk et al., 2011) or taking on a new role, such as becoming a mother (Laney et al., 2015).

Previous qualitative research has explored identity change over time for people with disabilities. Some longitudinal qualitative studies have explored changes to identity after experiencing a stroke (Ellis-Hill et al., 2000) or acquired brain injury (Glintborg, 2015). These events can cause an individual to reconstruct their identity as they move through rehabilitation (Glintborg, 2015) and pose challenges in trying to come to terms with a body which is impaired and limited or adjust to unfamiliar environments where individuals lack understanding (Ellis-Hill et al., 2000). Key factors implicated in triggering identity change for those with traumatic brain injuries include changes in functioning and abilities, memory loss, inability to engage in valued roles and meaningful activities and experience of stigma and rejection from others, as evidenced in a recent systematic review of qualitative studies (Villa et al., 2021). Other studies among those with chronic illness have identified an experience of loss in relation to personalities and how they viewed themselves pre-illness but also with regards to their capacity to carry out certain roles such as being an employee or roles within the family. Some participants responded to these identity issues by engaging in denial, others redefined goals in their lives over time, others sought out support from family and friends, while others reconsolidated their identities viewing their disability as an opportunity for growth over time (Gibson et al., 2005).

Within the higher education environment, four studies to the author's knowledge explored identity changes and continuities for SWD over time (Cunnah, 2015; Hadley, 2009; Kranke et al., 2013; Riddell & Weedon, 2014). Cunnah (2015) aimed to explore the impact of disability identity within higher education and on work-based placements through a longitudinal case study methodology with five students over a six-year period. Results showed that some participants experienced a more positive sense of disability identity over time through achieving academically and demonstrating their capabilities to themselves and others on placement. Hadley (2009) conducted yearly focus groups and interviews with students with a specific learning difficulty over a four year period. One of the research questions addressed how these individuals perceive themselves as students. Students indicated wanting to be viewed as hardworking throughout their studies and highlighted the fluctuating nature of their disability identity depending on the context; sometimes they viewed it as an issue, while other times they did not experience identity concerns. However, this study did not identify factors which instigated change or resulted in identity continuity. Kranke et al. (2013) interviewed SWD at four time points over a two-year period to examine if perspectives on disclosure in university changed over time. Three disclosure pathways were identified; immediate disclosure, delayed disclosure and no disclosure. Changes or continuities for specific students were highlighted in each of these pathways and the factors implicated in these such as striving for normality, pursuit of autonomy, supportive lecturers and deterioration in impairment. Riddell and Weedon (2014) examined how understandings of disability and identification as disabled evolved and changed over time through interviewing a student with dyslexia at five time points over a four-year period. Findings illustrated how the student identified as disabled in university but did not embrace this identity while on work placement due to stigma and negative reactions from others. While the above research sheds some light on the experience of identity change and continuity over time for SWD in higher education it is limited in its scope. Some of the studies specifically focus on identity changes/continuities for students who were undertaking work placements as part of their course (Cunnah, 2015; Riddell & Weedon, 2014). Other studies focus solely on changes or continuities in disclosure or non-disclosure of a disability identity (Kranke et al., 2013), while others highlight identity changes/continuities for those with a specific learning difficulty but fail to identify factors important in identity change/continuity (Hadley, 2009). In addition, only one study uncovers the processes of identity change/continuity (i.e. unfolding pathways of identity change/continuity with a focus on how and why they unfold the way they do) (Kranke et al., 2013), despite this being highlighted as a crucial and fundamental element of LQR (Neale, 2021). Thus, there is a real need to extend our knowledge on the experience of identity over time and identification of key factors important in identity change/continuity for SWD in a higher education context. In addition, no study to date has explored the impact of AT in identity over time for SWD in higher education, despite the significant impacts it can have on identity and the potential for meanings attached to AT to evolve over time, as outlined in section 1.6.

1.7 Rationale and overview for the present study

As outlined in section 1.2, over recent years increasing numbers of SWD are accessing higher education across Europe, in the UK and the USA (AHEAD, 2021; Hauschildt et al., 2015; Hubble & Bolton, 2021; National Center for Education Statistics, 2022). Despite these positive trends, SWD are still significantly underrepresented in higher education in comparison to non-disabled peers (Central Statistics Office, 2016; Hubble & Bolton, 2021), and those who do attend third level face many challenges such as stigma, isolation, the need to exercise additional effort in academic endeavours and fewer opportunities to engage in extracurricular activities (Järkestig Berggren et al., 2016; Mullins & Preyde, 2013; Shevlin et al., 2004). Thus, there is a real need to research ways in which we can widen participation in higher education for SWD and improve their overall educational experience from an academic, social and psychological perspective.

Access to appropriate and suitable AT is one such way that this can be achieved. As outlined in section 1.3, the WHO have highlighted the importance of ensuring AT needs are met as a global priority, given the rise in the ageing population and increased numbers of people that will require AT in the coming years. The significance of meeting AT needs is further exemplified in section 1.4, with the positives associated with AT use noted in domains such as functional abilities, social participation and quality of life across AT classifications and disability diagnoses. Some of these domains (e.g. functional abilities) are considered AT outcomes, as they are finite and measurable. Other domains (e.g. quality of life and identity), are better considered as AT impacts as they are difficult to define, predict and measure (GAATO, 2022a). However, the positives associated with AT cannot be taken for granted. Careful consideration of person, environmental and technology factors is also needed to maximise device use and effectiveness, according to the MPT model (Scherer, 2005) (see section 1.5). Despite the significant positive implications of AT, research exploring the effects of AT within a higher education context is limited. Notable gaps exist in relation to AT educational and psychosocial outcomes among SWD in higher education, as highlighted in section 1.4 and discussed in greater detail in Chapter 2.

As discussed previously in section 1.6, AT also has significant impacts on identity for those with disabilities. For some, AT can be viewed as a stigmatising device which can disrupt self-perceptions of normality (Kent & Smith, 2006; Pape et al., 2002). Devices can serve as a reminder of limitations and functions that the individual has lost or viewed as representative of feebleness and dependency (Hersh, 2013; Pape et al., 2002). For others, AT can be viewed as a tool of empowerment allowing individuals to demonstrate their capabilities to others and regain a sense of normality in their lives through promoting participation in valued activities (Folan et al., 2015; Lund & Nygård, 2003). It has also been acknowledged that meanings attached to AT are not static and can change over time (Kirk, 2010; McDonald et al., 2020; Pape et al., 2002). Despite the considerable body of research which has examined AT and identity in other contexts, little research has explored this among SWD in a higher education context.

In light of the above, the overall aim of this thesis is to explore AT outcomes and impacts among SWD in higher education. This thesis aims to bring together available evidence on AT outcomes and impacts for SWD in higher education in 'Chapter 2: Systematic Review' before examining gaps in AT outcomes and impacts for this cohort through a quantitative phase and longitudinal qualitative research (LQR) phase. The aim of the quantitative phase is to explore the effects of AT on the educational engagement and psychosocial outcomes of SWD in higher education. The LQR phase aims to explore the impact of AT in student and disability identities and if/how this changes over time.

1.8 Thesis Conspectus

This thesis comprises eleven chapters. Chapter two details a systematic review on the impact of AT for SWD in higher education, highlighting gaps in the literature which informed the current study. Chapter three is the overall methodology chapter for the current study detailing the aims and objectives of the quantitative phase and LQR phase, the philosophical foundations for the study and the design of the current mixed methods study. Chapter four details the methodology for the quantitative phase including the recruitment strategy, measures used and analyses employed. Chapter five presents the findings from the quantitative phase and any gaps arising from this phase which subsequently informed the LQR phase. Chapter six outlines the discussion for the quantitative phase and highlights any gaps arising from the research which subsequently informed the LQR phase. Chapter seven outlines the methodology for the LQR phase, providing a detailed overview of both the longitudinal analysis across cases and longitudinal analysis within cases which was employed. Chapter eight presents the findings of the longitudinal analysis across cases and within cases. Chapter nine details the discussion for the LQR phase. Chapter ten outlines the integration of findings from the quantitative phase and LQR phase followed by an integrative discussion of the overall key findings for this mixed methods study. Lastly, Chapter eleven presents the original contributions of the current study in relation to theoretical knowledge, empirical evidence, methodological approaches, research context and practical implications. The implications arising from this research in the areas of AT provision, policy and future research are also outlined in this concluding chapter.

Chapter 2: Systematic Review

2.1 Introduction

For people with disabilities, AT has the potential to improve functioning, reduce activity limitations, promote social inclusion, and increase participation in education, the labour market and civic life. Traditionally, the benefits or outcomes of AT have been viewed as self-evident by funding bodies and those who provide AT services (Fuhrer et al., 2003). This has resulted in a relative gap in evidence for the impact of AT on key outcomes such as participation and quality of life (Lenker et al., 2005) but there is also growing acknowledgement that research needs to focus on impacts in user-valued domains (Lenker et al., 2013). Given the increasing numbers of SWDs participating in higher education, the significant challenges that these students face and the potential for AT to improve participation and the overall educational experience (see section 1.2), there is a clear need for a better and more comprehensive understanding of the impact of AT in higher education. To date, systematic reviews have only focused on examining the impact and use of specific AT devices or have considered AT broadly but among specific user groups, rather than within specific contexts (de Joode et al., 2010; Kagohara et al., 2013; Lorah et al., 2015). Whilst two systematic reviews have explored AT within higher education settings, these systematic revies have been specifically among students with learning disabilities and dyslexia, respectively (Perelmutter et al., 2017; Pino & Mortari, 2014). Consequently, the aim of the current systematic review is to examine the evidence of the impact of AT use on educational and psychosocial outcomes among SWDs in higher education. By synthesising the research evidence and considering the weight of this evidence across diagnostic boundaries and AT classifications, this systematic review will provide a state-of-the-art and comprehensive description of the impact of AT use on educational and psychosocial outcomes among SWD in higher education. This is not only important in terms of identifying priority research areas, but systematically identifying the potential benefits of AT in these areas could have important implications for the AT user themselves, while also informing AT-related funding, practices and policy in higher education.

2.2 Methods of the Systematic Review

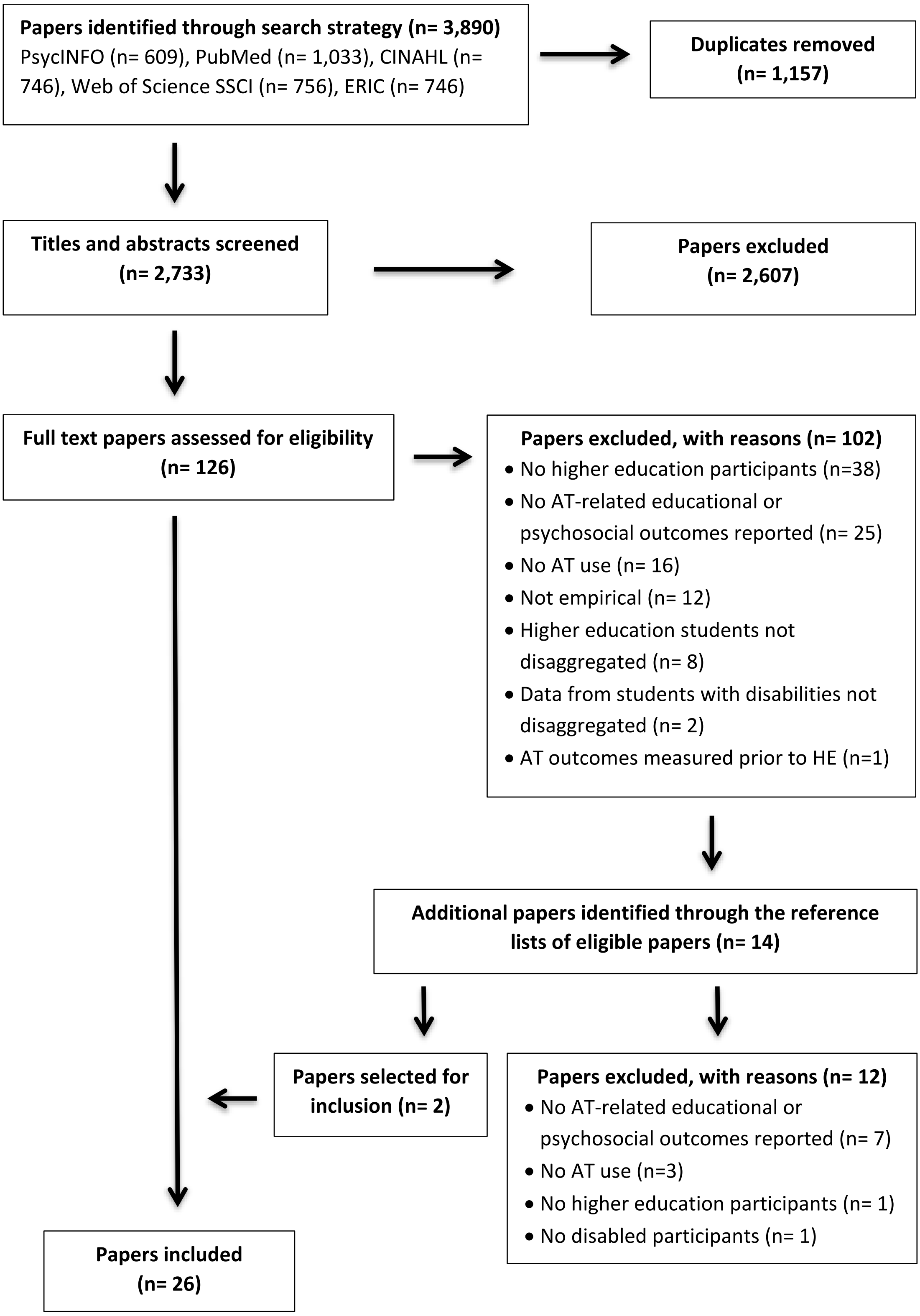
2.2.1 Search Strategy

In accordance with PRISMA guidelines (Moher et al., 2009), a systematic search of the literature on the educational and/or psychosocial impacts of AT use for those with disabilities in higher education was conducted. Five databases were searched: PsycINFO, PubMed, CINAHL, ERIC and Web of Science (Social Sciences Citation Index; SSCI). Four were searched using a combination of indexed and free text terms (i.e. PsycINFO, PubMed, CINAHL and ERIC). Web of Science (SSCI) was searched using free text terms only. See appendices for detailed search strategies: PsycINFO (Appendix A.1), PubMed (Appendix A.2), CINAHL (Appendix A.3), ERIC (Appendix A.4) and Web of Science (SSCI) (Appendix A.5). The reference lists of eligible papers were also searched.

Searches were limited to English language, peer-reviewed papers during the time period 1st January 2007 to 26th January 2018. The review was restricted to this period given the changing profile of higher education enrolments, the rapid technological developments of the past decade, the increasing availability and affordability of AT, and the landmark publication of the United Nations Convention on the Rights of Persons with Disabilities which opened for signatories in 2007. Details on the number of papers present at each phase of the review process can be seen in figure 2.1.

Figure 2.1

PRISMA diagram of the number of papers present at each stage of the systematic review process



2.2.2 Selection criteria

For the purposes of this review, disability is defined as "a state of decreased functioning associated with disease, disorder, injury, or other health conditions, which in the context of one's environment is experienced as an impairment, activity limitation, or participation restriction" (Leonardi et al., 2006, p. 1220). AT was defined as "any product whose primary purpose is to maintain or improve an individual's functioning and independence and thereby promote their wellbeing" (Khasnabis et al., 2015, p. 2229). Papers were deemed eligible for inclusion if they examined the impact of AT on at least one educational or psychosocial outcome. Educational outcomes were defined as any variables related to a student's academic engagement in a higher education setting. Psychosocial outcomes were defined as any variables relevant to an individual's psychological and/or social functioning within a higher education context. See table 2.1 for detailed information on inclusion and exclusion criteria.

Table 2.1

Inclusion/exclusion criteria for papers

Inclusion Criteria	**Exclusion Criteria**
Participants have a disability (any type), require and/or use any type of AT and are current higher education students (or where data for this group could be clearly disaggregated from other reported data)	Absence of disability among participants
	Absence of AT use or requirement
	Non-current students of a higher education institution
AT-related educational and/or psychosocial outcomes are examined	No AT-related educational or psychosocial outcomes reported
Qualitative, quantitative or mixed method papers	AT outcomes measured prior to higher education
Papers in the English language	
Empirical, peer reviewed	

2.2.3 Data Extraction and Synthesis

Screening of titles and abstracts of eligible papers was undertaken by two reviewers. Full texts of remaining papers were then read by two reviewers and agreement was reached to exclude further papers that did not meet inclusion criteria. For all stages, any differences in opinion were resolved through consensus or discussion with a third and fourth review author. The reasons for exclusions at the full-text stage were recorded (see figure 2.1). The following was extracted from each paper: author and country of origin; study design; sample size, disability type, and AT type; and results relevant to the research question (see Table 2.2).

Given the complexity and diversity of data within mixed-method systematic reviews, there is no one gold standard synthesis design or method of analysis. Multiple approaches can be taken and are often informed by the research question and type of data extracted from primary studies (Frantzen & Fetters, 2016; Gough et al., 2017; Heyvaert et al., 2013). A data-based convergent design was adopted in this study; all quantitative and qualitative data were analysed using the same synthesis method, namely thematic synthesis (Thomas & Harden, 2008). The suitability of this type of synthesis for diverse forms of evidence has been noted in the literature (Dixon-Woods et al., 2005; Hong et al., 2017).

Thomas and Harden's (2008) 3-staged approach to thematic synthesis was followed. Firstly, data relevant to the research question from the results sections of all studies were coded line by line. In the case of quantitative data, codes were developed from the narrative descriptions of statistical analyses. Next, similar codes were organised together into descriptive themes. The final stage involved the development of the descriptive themes into analytic themes.

Table 2.2

Overview of included studies

Author [Ref]	**Country of origin**	**Study design**	**Sample size**	**Disability and AT type**	**Main Findings**
Ashby and Causton-Theoharis (2012)	USA	Qualitative	14	Autism Facilitated Communication	Importance of a PA to facilitate AT use. Greater sense of inclusion after others became familiar with disabled student and their AT needs. Facilitated communication enabled students to socially interact with others in the college environment.
Bhardwaj and Kumar (2017)	India	Mixed Method	95	Visually impaired Wide variety of AT	Significant association between knowledge of braille and increased academic performance.
Christ (2008)	USA	Mixed Method	5 SWD	Visual impairment (n=1), visual & fine motor impairment (n=1), rest unclear Wide variety of AT	Increased academic performance since using AT. AT use also promoted self-confidence and a greater sense of autonomy in completing academic tasks.

Author [Ref]	**Country of origin**	**Study design**	**Sample size**	**Disability and AT type**	**Main Findings**
Floyd and Judge (2012)	USA	Mixed Method	6	Specific learning disability Classmate reader	For some students, using the classmate reader device greatly improved reading comprehension while others only showed slight improvements. Beneficial in terms of increasing reading rate and retention, enhancing learning and promoting independence.
Foley and Masingila (2015)	Kenya	Qualitative	20	Visual impairment iOS devices (iPod and iPad mini) with built in accessibility features	Reading, note taking and written assignments completed more easily and efficiently using iOS device. AT increased participation in class discussions and enabled students to independently engage in coursework. Promoted opportunity for social interactions with peers and resulted in the formation of a social group of AT users.
Hadjikakou et al. (2010)	Cyprus	Qualitative	10	Mobility impairments Computer	Computer enabled student to produce written text quickly which was beneficial in exam situations

Author [Ref]	**Country of origin**	**Study design**	**Sample size**	**Disability and AT type**	**Main Findings**
Hanafin et al. (2007)	Ireland	Qualitative	16	Physical disability (n=4), hearing impairment (n=2), hearing and physical disability (n=1), visual impairment (n=2), dyslexia (n=7) Speech recognition software	Inadequate training in how to use speech recognition software resulted in poor exam performance.
Harshman et al. (2013)	USA	Qualitative	1	Visual impairment Wide variety of AT	Limited screen display on the braillenote device made it difficult for student to complete written work. Multiple sources of competing information resulted in student becoming overwhelmed and choosing not to attend to their screen reader. The presence of a teaching assistant enabled student to effectively use their AT.
Heiman and Shemesh (2012)	Israel	Quantitative	363 with LD, 601 without LD	LD AT not specified	AT use was significantly correlated with hope scores for those with LD.

Author [Ref]	Country of origin	Study design	Sample size	Disability and AT type	Main Findings
Hendricks et al. (2015)	USA	Quantitative	56	Traumatic brain injury Cognitive support technology- iPads with apps	AT use was significantly associated with students becoming more sociable, independent and positive.
Kernohan (2008)	Canada	Mixed Method	10 SWD - survey, 3 SWD - interview	Visual impairment (n=1), mental illness (n=1), Attention Deficit Disorders (n=1), hearing impairment (n=2), brain injuries (n=2), LD (n=4) (one student had two disabilities) Wide variety of AT.	Kurzweil enabled one student to read at a faster rate and improved comprehension of test questions. Inaccuracies of Dragon software caused frustration and led to infrequent use.
Kuzu (2011)	Turkey	Mixed Method	12	Hearing impairment Personal digital assistant	Personal digital assistants were beneficial in terms of communicating with peers about course related difficulties, facilitating expression of opinions, accessing educational material and note taking in class.

Author [Ref]	Country of origin	Study design	Sample size	Disability and AT type	Main Findings
Lartz et al. (2008)	USA	Qualitative	9	Hearing impairment Wide variety of AT.	AT promoted active participation in class, social interactions between students and academic staff, enhanced learning, increased self-confidence, independence and access to educational materials for SWD. PowerPoint was also identified as beneficial for students without disabilities and lecturers alike which promoted a sense of inclusion for SWD. Multiple sources of competing information limited the efficacy of AT.
Malcolm and Roll (2017b)	USA	Quantitative	353	LD (37.6%), mental illness (10.8%), visual deficit (8.6%), central nervous system damage (7.7%), cognitive-perceptual deficit (7.0%), attention deficit disorder or attention deficit hyperactivity disorder (6.6%), other (6.2%), mobility deficit (5.7%), pain (3.5%), autism spectrum disorder (3.3%), unspecified (3.1%) AT not specified	AT use was significantly related to an increase in performance of academic tasks such as reading, writing, note taking, test taking and studying. AT also increased academic performance and assisted students in continuing in their course.

Author [Ref]	Country of origin	Study design	Sample size	Disability and AT type	Main Findings
Malcolm and Roll (2019)	USA	Quantitative	187	LD (n= 74), Autism Spectrum Disorder (n= 5), Attention Deficit Disorders (n= 17), Other Cognitive/Behavioural (n=9) AT not specified	AT use was significantly associated with increased performance of academic tasks such as reading, writing, note taking, test taking and studying.
Malcolm and Roll (2017a)	USA	Quantitative	455	LD (37.6%), mood disorder (10.8%), visual deficit (8.6%), CNS damage (7.7%), mental/ behavioural disorder (16.9%), mobility deficit/pain (9.2%) and unspecified (9.2%). AT not specified	AT use was associated with a significant increase in performance of academic tasks such as reading, writing, note taking, test taking and studying regardless of one's disability type.
Mosia and Phasha (2017)	Lesotho	Qualitative	11 SWD	Visual impairment (n=5), hearing impairment (n=1), physical disability (n=5). Wide variety of AT.	Lack of training in how to use AT hindered exam performance. Inadequacies of AT made it difficult for students to access important educational materials online and study information from lectures.

Author [Ref]	Country of origin	Study design	Sample size	Disability and AT type	Main Findings
Nelson and Reynolds (2015)	USA	Qualitative	5	Language based LD (n=1), ADHD (n=1), ADHD & psychological condition (n=1), Cerebral Palsy & ADHD (n=1), Dyslexia (n=1) Speech recognition software (Dragon)	Dragon software allowed students to produce written text more quickly, reduce spelling errors and increase vocabularies. This promoted self-expression, self-confidence and in turn motivation to pursue career goals.
Rice et al. (2015)	USA	Quantitative	39	Physical disabilities. Traumatic injury (n=17), non-traumatic (n=22). Manual or power wheelchair	Manual wheelchair use promoted a greater sense of mobility and independence in comparison to power wheelchair use. Self-esteem was not associated with type of wheelchair use or years spent using a wheelchair.
Sachs and Schreuer (2011)	Israel	Quantitative	170 SWD, 156 without disability	Neuromuscular diseases (n= 61), sensory (n= 65), psychiatric disabilities (n= 39), multiple disabilities (n= 5) Computer	Computer users reported enhanced writing experiences and increased engagement in college clubs, societies and organisations compared to non-computer users

Author [Ref]	**Country of origin**	**Study design**	**Sample size**	**Disability and AT type**	**Main Findings**
Schmitt et al. (2012)	USA	Quantitative	3	Reading disability (n=2), Reading disability and language disorder (n=1). Reading pen	Students deemed AT to be beneficial for their reading comprehension. Efficacy was mixed according to statistical analysis.
Seale et al. (2008)	UK	Qualitative	54	Majority with dyslexia (no exact figures). AT not specified.	AT use positively impacted on grades for one dyslexic student.
Smith-Osborne (2014)	USA	Mixed Method	35- 6 SWD	Disability type not specified. Personal electronic response systems (clickers)	Clickers promoted active participation in the class by all students, not just SWD. However, the clicker was only beneficial if student completed adequate training in how to use it.
Stinson et al. (2009)	USA	Quantitative	48	Hearing impairment Speech to text technology	No significant difference between retention of information from a lecture after using speech to text technology compared with interpreting services.
Tanners et al. (2012)	USA	Mixed Method	1	LD iPod (text-to-speech software)	Increased confidence in reading abilities and enabled student to read at a much faster rate.

Author [Ref]	**Country of origin**	**Study design**	**Sample size**	**Disability and AT type**	**Main Findings**
Wessel et al. (2015)	USA	Qualitative	10 SWD	Mobility impairments Wheelchair	Wheelchair use increased one's sense of autonomy and gave students the freedom to move freely around the college campus. Residing with other wheelchairs in college facilitated a sense of inclusion and belonging.

Abbreviations: LD, learning disability.

2.2.4 Quality Appraisal

All 26 papers were quality appraised using the Mixed Methods Appraisal Tool (MMAT-Version 2011) (Pluye et al., 2011). The MMAT was specifically designed for use in systematic mixed studies reviews and allows the appraisal of quantitative, qualitative and mixed method papers using one tool (Pluye & Hong, 2014). This tool has demonstrated good reliability and efficiency and was shown to be the most consistent when compared with other tools which allow appraisal of multiple study types (Pace et al., 2012; Taylor & Hignett, 2014). It has also been used widely in other systematic mixed studies reviews (Chan et al., 2014; Dahan-Oliel et al., 2012; Frantzen et al., 2016)

In the MMAT, the first stage involves assessing all papers suitability for further appraisal using two screening questions; whether the paper has clear research questions and if the data collection method was appropriate to answer these research questions. There are three response categories; ‘Yes’, ‘No’, ‘Can’t tell’. If both screening questions meet the criteria (‘Yes’ response), then further appraisal is considered appropriate. The next stage involves assessing the paper using the checklist relevant to the study design. The qualitative component and quantitative components each contain four criteria for assessing the paper while the mixed method component contains three criteria. Every criterion is assessed using the response categories ‘Yes’, ‘No’ or ‘Can’t tell’ and an overall score calculated for each paper ranging from 0% (no criteria met) to 100% (all criteria met). In the case of mixed method papers, the mixed method component is used in addition to the qualitative component and appropriate quantitative component and an overall score calculated.

2.3 Results of the Systematic Review

2.3.1 Study and Sample Characteristics

Twenty six papers describing twenty five studies were deemed eligible for inclusion. Sixteen papers were from the USA, two papers from Israel and one paper from Cyprus, Canada, India, Ireland, Kenya, Lesotho, Turkey and the UK, respectively. The studies included quantitative (n= 8), qualitative (n= 10) and mixed method (n= 7) designs.

Sample size varied across studies ranging from 1 to 964 participants. Some papers focused on singular but broad categories of diagnoses such as those with learning disabilities (n= 5), those with visual impairments (n= 3), those with hearing impairments (n= 3), those with physical disabilities (n= 3), those with autism (n= 1) and those with traumatic brain injury (n= 1). Other papers included participants with a variety of diagnoses (n= 8); two did not specify the types of disabilities experienced by all participants. AT use also varied widely with some papers focusing on a specific category of AT such as iOS devices with accessibility features and/or apps (n=3), wheelchairs (n= 2), speech recognition software (n= 2), reading devices (n= 2), computers (n= 2), facilitated communication (n= 1), captioning software (n= 1), personal electronic response systems (n= 1) and personal digital assistants (PDA) (n= 1). Other papers reported on a variety of different ATs (n= 6) and some did not specify what type of AT was used (n= 5).

2.3.2 Quality Assessment

The quality appraisal of included papers are outlined in Table 2.3 below. Seven papers met 100% of the criteria, seven papers met 75% of the criteria, eleven papers were of adequate quality meeting 50% of the criteria and one paper was poor quality only meeting 25% of the criteria. Generally, the quality of mixed method papers was quite low with all studies failing to consider the limitations associated with integration. The majority of qualitative papers did not address reflexivity of the researcher.

Table 2.3

Quality scores for included studies using the mixed methods appraisal tool

Study Design	Criteria met[a]	Criteria not met / can't tell[a]	Overall MMAT Score
Quantitative non-randomised			
Heiman and Shemesh (2012)	3.1, 3.2, 3.3, 3.4		100%
Hendricks et al. (2015)	3.1, 3.3[b]	3.2, 3.4	50%
Malcolm and Roll (2017b)	3.1, 3.2, 3.3[b], 3.4		100%

Study Design	Criteria met[a]	Criteria not met / can't tell[a]	Overall MMAT Score
Malcolm and Roll (2019)	3.1, 3.2, 3.3[b], 3.4		100%
Malcolm and Roll (2017a)	3.1, 3.2, 3.3[b], 3.4		100%
Sachs and Schreuer (2011)	3.1, 3.2, 3.3, 3.4		100%
Schmitt et al. (2012)	3.1, 3.2, 3.3[b], 3.4		100%
Stinson et al. (2009)	3.2, 3.3[b]	3.1, 3.4	50%
Quantitative descriptive			
Rice et al. (2015)	4.1, 4.3	4.2, 4.4	50%
Qualitative			
Ashby and Causton-Theoharis (2012)	1.1, 1.2, 1.3	1.4	75%
Foley and Masingila (2015)	1.2, 1.3, 1.4	1.1	75%
Hadjikakou et al. (2010)	1.1, 1.2, 1.3	1.4	75%
Hanafin et al. (2007)	1.1, 1.2, 1.3	1.4	75%
Harshman et al. (2013)	1.1, 1.2, 1.3	1.4	75%
Lartz et al. (2008)	1.1, 1.2, 1.3	1.4	75%
Mosia and Phasha (2017)	1.1, 1.2, 1.3	1.4	75%
Nelson and Reynolds (2015)	1.1, 1.3	1.2, 1.4	50%
Seale et al. (2008)	1.1, 1.2	1.3, 1.4	50%
Wessel et al. (2015)	1.1, 1.2, 1.3, 1.4		100%
Mixed method			

Study Design	Criteria met[a]	Criteria not met / can’t tell[a]	Overall MMAT Score
Bhardwaj and Kumar (2017)	1.3, 4.1, 4.2, 5.1	1.1, 1.2, 1.4, 4.3, 4.4, 5.2, 5.3	25%
Christ (2008)	1.2, 1.3, 4.1, 4.2, 5.1, 5.2	1.1, 1.4, 4.3, 4.4, 5.3	50%
Floyd and Judge (2012)	1.1, 1.2, 1.3, 3.1, 3.2, 3.3[b], 3.4, 5.1	1.4, 5.2, 5.3	50%
Kernohan (2008)	1.1, 1.2, 1.3, 1.4, 4.1, 4.4, 5.1, 5.2	4.2, 4.3, 5.3	50%
Kuzu (2011)	1.1, 1.2, 1.3, 1.4, 4.1, 4.3, 5.1, 5.2	4.2, 4.4, 5.3	50%
Smith-Osborne (2014)	1.2, 1.3, 3.2, 3.3[b], 3.4, 5.1	1.1, 1.4, 3.1, 5.2, 5.3	50%
Tanners et al. (2012)	1.2, 1.3, 3.1, 3.2, 3.3[b], 3.4, 5.1, 5.2	1.1, 1.4, 5.3	50%

[a] Full list of criteria can be downloaded from Pluye et al. (2011).

[b] Criterion 3.3 was not applicable to some papers so instead another criterion was created as per Pluye et al. (2011) guidelines. These papers were judged on the criterion ‘is the statistical analysis appropriate to answer the research question?

2.3.3 Synthesis of results

Using the process of thematic synthesis (Thomas & Harden, 2008), four analytic themes were identified in the data. These were ‘AT as an enabler of academic engagement’, ‘Barriers to effective AT use can hinder educational engagement’, ‘The transformative possibilities of AT from a psychological perspective’ and ‘AT as an enabler of participation’. Each of the themes is outlined in detail below.

2.3.3.1 Theme 1: AT as an enabler of academic engagement

AT has the potential to support SWD engagement with their academic work. This includes enabling SWD to perform common academic tasks more easily, allowing SWD to access and engage with educational material related to their course, increase their learning and promote improved academic performance. In some papers, AT was not only beneficial to SWD but also to students without disabilities and lecturers alike. In relation to academic engagement, AT was seen as an enabler but not as a driver of change across the papers; it made engagement easier rather than initiating it. It was viewed in a positive sense as an 'enhancer' consistent with a right based universal model.

AT enabled SWD to complete common academic tasks more easily and efficiently. Two studies measured the impact of different types of AT devices and found that AT use, in general, was associated with increased performance of educational tasks such as note taking, test taking, studying, reading and writing for SWD (Malcolm & Roll, 2017b, 2019), regardless of one's disability type (Malcolm & Roll, 2017a). Other studies focused on the impact of specific AT devices on students' performance of academic tasks (Ashby & Causton-Theoharis, 2012; Bhardwaj & Kumar, 2017; Christ, 2008; Floyd & Judge, 2012; Foley & Masingila, 2015; Hadjikakou et al., 2010; Hanafin et al., 2007; Harshman et al., 2013; Kernohan, 2008; Kuzu, 2011; Nelson & Reynolds, 2015; Sachs & Schreuer, 2011; Schmitt et al., 2012; Tanners et al., 2012). Computers significantly improved writing experiences for SWD in two studies (Hadjikakou et al., 2010; Sachs & Schreuer, 2011), as did speech recognition software in one paper, in terms of enabling students to produce written text more quickly, reducing spelling errors and promoting the use of wider vocabularies (Nelson & Reynolds, 2015). Reading pens, iPads (with text to speech feature enabled), Kurzweil, a classmate reader device and an iPod (with text to speech feature enabled) all positively impacted on students' reading ability in some way, with certain devices improving comprehension (Floyd & Judge, 2012; Schmitt et al., 2012), while others increased reading rate and/or ease at which reading tasks could be completed (Floyd & Judge, 2012; Foley & Masingila, 2015; Kernohan, 2008; Tanners et al., 2012). The use of specific AT devices such as an iPad and PDA made note taking and subsequently revising for exams or completing assignments more convenient (Foley & Masingila, 2015; Kuzu, 2011).

AT also enhances learning and promotes engagement of SWD both inside and outside the classroom. Two papers found that the AT provided a visual representation of learning material which promoted active participation in the class (Lartz et al., 2008; Smith-Osborne, 2014). Three papers found that AT enhanced learning (Lartz et al., 2008; Sachs & Schreuer, 2011; Floyd & Judge, 2012); in two of these papers AT increased retention of information (Floyd & Judge, 2012; Lartz et al., 2008). One paper found no significant difference in information retention following a lecture between those who used speech-to-text services compared to those who used an interpreter (Stinson et al., 2009). Three papers found that SWD were able to access educational materials easily and conveniently through the use of iPads, PDAs and Mallard system which also facilitated their learning (Foley & Masingila, 2015; Kuzu, 2011, Lartz et al., 2008).

Increased academic performance was another advantage of AT use for SWD. Eight papers reported that AT improved grades or enabled the SWD to perform better (Bhardwaj & Kumar, 2017; Christ, 2008; Harshman et al., 2013; Lartz et al., 2008; Malcolm & Roll, 2017b; Nelson & Reynolds, 2015; Seale et al., 2008; Tanners et al., 2012), while the majority of SWD in one paper report that AT enabled them to persist in their course of study (Malcolm & Roll, 2017b).

AT is not only beneficial for SWD, but also for students without disabilities and academic staff. The use of PowerPoint and clickers was considered to be advantageous for all students regardless of whether they had a disability or not (Lartz et al., 2008; Smith-Osborne, 2014). One paper also mentioned the benefits of AT for facilitating a lecturer's engagement with the topic (Lartz et al., 2008). While the other papers did not explicitly mention the benefits of AT for those without disabilities, many of the papers examined the use of generic devices as AT, which have the potential to be used by anyone for educational purposes.

2.3.3.2 Theme 2: Barriers to effective AT use can hinder educational engagement

Predominantly, AT use was positive for SWD academic engagement as described above. However, there were certain situations identified across the papers when AT could not be used effectively by SWD and this hindered their educational engagement. These included inadequate training for SWD, inadequacies of devices themselves, difficulty in negotiating multiple sources of competing information, and the unavailability of appropriate support from others to facilitate effective AT use.

Inadequate training in how to effectively use the AT was a significant barrier which hindered the educational engagement of SWD. Two papers reported that students were not adequately trained or familiar with the AT and as a result performed poorly in exams (Hanafin et al., 2007; Phasha & Mosia, 2017). Two other papers found that the AT is only beneficial for educational engagement if the student completes adequate training (Nelson & Reynolds, 2015; Smith-Osborne, 2014).

Inadequacies of ATs were another factor which hindered students' learning and performance. These included limited screen displays, outdated programmes, poor quality recordings, inability to selectively choose a portion of the recording to listen to and inaccuracies when using the device. Such inadequacies resulted in students using the device infrequently (Kernohan, 2008) and limited students' ability to complete written assignments quickly and efficiently, study information from lectures and access relevant educational materials online (Harshman et al., 2013; Nelson & Reynolds, 2015; Phasha & Mosia, 2017).

Multiple sources of competing information was another factor that hindered the efficacy of AT devices. Two papers reported students becoming overwhelmed by multiple information sources and having difficulties concentrating, thus choosing not to attend to their screen reader (Harshman et al., 2013) or depending on their interpreter to indicate the usefulness of PowerPoint during a lecture (Lartz et al., 2008).

The presence of an individual to facilitate AT use was an essential factor in three papers (Ashby & Causton-Theoharris, 2012; Harshman et al., 2013; Lartz et al., 2008). The unavailability of appropriate support from a personal assistant, teaching assistant or interpreter made it difficult if not impossible for some SWD to engage in the academic task using the AT device (Ashby & Causton-Theoharris, 2012; Harshman et al., 2013; Lartz et al., 2008). This was dependent on the nature and severity of disability.

2.3.3.3 Theme 3: The transformative possibilities of AT from a psychological perspective

AT has the potential to facilitate positive psychological change for SWD. Across a number of papers, AT use was found to significantly contribute to psychological variables such as hope, confidence, motivation, sense of autonomy, self-expression and sense of belonging. In a number of papers, it was seen as the driver of positive psychological change; SWD were more autonomous, motivated and confident as a result of AT use. When AT was viewed in a positive sense as a tool of empowerment, it also had a positive effect on the mind-sets of those without disabilities, changing perceptions and reducing stigma. However, this seems to be contingent on the familiarity of others with the person with a disability and their AT use.

AT use empowers SWD to be more positive, confident and motivated. AT promoted hope and positivity for SWD in two papers (Heiman & Shemesh, 2012; Hendricks et al., 2015). The use of Powerpoint, smartboard, iPads, iPods, speech recognition software and screen reading software all increased the confidence of SWD in some way, with some devices enabling participation in class discussions (Lartz et al., 2008; Foley & Masingila, 2015), one device increasing confidence in one’s reading abilities (Tanners et al., 2012), while others promoted academic performance which resulted in greater self-confidence (Christ, 2008; Nelson & Reynolds, 2015). In one paper, this sense of confidence was linked to increased motivation to continue writing and pursue career goals (Nelson & Reynolds, 2015). One paper found no significant relationship between type of wheelchair use or years spent using a wheelchair and self-esteem (Rice et al., 2015).

AT use also had a significant positive impact on participants’ sense of autonomy. The use of PowerPoint, iPads, the classmate reader device and computer programmes enabled SWD to independently engage with and complete coursework (Christ, 2008; Floyd & Judge, 2012; Foley & Masingila, 2015; Lartz et al., 2008); iPads additionally afforded students with visual impairments a degree of privacy in their personal communications (Foley & Masingila, 2015). In one paper, this newfound sense of independence, afforded by speech recognition software, enabled SWD to easily self-express creatively while writing (Nelson & Reynolds, 2015). AT use also promoted feelings of independence and control in day to day college activities (Christ, 2008; Hendricks et al., 2015; Rice et al., 2015; Wessel et al., 2015). Two papers looked specifically at wheelchair use; one paper reported that manual wheelchair use promoted higher levels of cognitive independence and mobility compared with power wheelchair use (Rice et al., 2015); while the other found that wheelchair use in general gave SWD a sense of freedom and autonomy to decide what they wanted to do and where they wanted to go (Wessel et al., 2015).

AT use also affected participants' sense of belonging within the higher education environment. Feelings of inclusion were dependent on how others viewed SWD and their AT use. In one paper, SWD were an integral part of the college campus due to residing and integrating with others who also used wheelchairs (Wessel et al., 2015). The fact that these students had common, shared experienced because of their AT use probably facilitated this sense of belonging. Similarly, in another paper where both students with and without disabilities used the same AT device, SWD report feeling more included in the class (Lartz et al., 2008). In this case, SWD did not feel different because of their AT use as this device was viewed as being beneficial to all. Familiarity of others with the SWD and AT use seemed to be key in relation to creating an inclusive environment. Two papers reported that perceptions of others towards SWD and AT use became more positive once they were accustomed to the SWD and their AT (Ashby & Causton-Theoharis, 2012; Foley & Masingila, 2015), which in turn facilitated feelings of inclusion in the college campus (Ashby & Causton-Theoharis, 2012). In one paper where SWD used facilitated communication, some reported feeling socially isolated from their classmates in the beginning, while others were considered incompetent by university staff due to a lack of understanding of their AT needs, hampering their inclusion within their academic course (Ashby & Causton-Theoharis, 2012).

2.3.3.4 Theme 4: AT as an enabler of participation

AT use was shown to increase social interactions, provide opportunities for learning support, promote active engagement with peers in course related discussions, promote engagement in clubs or groups and encourage the creation of a social group of AT users across a number of papers. However, for those who depended on AT for communication purposes, the efficacy of interactions depended on the group size and personal assistants giving students personal space.

AT empowered SWD to interact more with others and engage with peers in course-related discussions. Five papers found that SWD became more sociable in general within the higher education environment due to AT use (Ashby & Causton-Theoharis, 2012; Foley & Masingila, 2015; Hendricks et al., 2015, Rice et al., 2015; Wessel et al., 2015), with one paper specifying that it enabled the student to greet fellow classmates in the corridors (Ashby & Causton-Theoharis, 2012), while another stated that AT use enabled SWD to make friends through social networking sites (Foley & Masingila, 2015).

In two papers, SWD routinely used their AT for learning support in terms of communicating with their lecturers about problems they were experiencing (Lartz et al., 2008) or asking peers for help in relation to their coursework (Kuzu, 2011). One paper reported the usefulness of AT for dating purposes for a deaf student, but also as a convenient way of communicating with both peers and academic staff through instant messaging and email as most were not trained in sign language (Lartz et al., 2008). For course-related discussions, AT use facilitated students in expressing their opinions both in class (Lartz et al., 2008) and online (Foley & Masingila, 2015; Kuzu, 2011).

However, social interaction and group discussion was not as easy and straightforward for all SWD, as highlighted in one study (Ashby & Causton-Theoharis, 2012). Non-verbal autistic students, who used facilitated communication, found social integration difficult and often experienced social isolation. The requirement for a personal assistant to be close by to support communication also restricted the development of natural peer interactions. However, these students reported that small group discussions facilitated interaction with peers, giving students an opportunity to express their opinions through facilitated communication (Ashby & Causton-Theoharis, 2012).

Another advantage of AT use was increased involvement in clubs and groups or the creation of new social groups. One paper found that computer users had more involvement with college clubs, societies and organisations than non-computer users (Sachs & Schreuer, 2011). AT users have shared experiences and something in common by virtue of the fact they use AT, which also creates the potential for a social group of AT users. This group could facilitate the inclusion of SWD, through identifying with others who are in a similar situation. Two papers refer to this, the first mentioning the social integration of wheelchair users within the same institution (Wessel et al., 2015), the second referring to a social group of visual impaired students who use iPads daily in college (Foley & Masingila, 2015). In one paper, the social group of AT users not only enhanced students' social participation but also served as peer learning support for new AT users (Foley & Masingila, 2015).

2.4 Discussion of the Systematic Review Findings

This systematic review is the first to synthesise existing evidence on the impact of AT use by SWD in higher education across diagnostic boundaries and AT classifications. It is clear that AT has significant positive impacts on academic engagement, psychological well-being and social participation, as evidenced across the four themes; 1) AT as an enabler of academic engagement, 2) Barriers to effective AT use can hinder educational engagement, 3) The transformative possibilities of AT from a psychological perspective, and 4) AT as an enabler of participation.

AT use was found to improve SWD performance of academic tasks, increase learning and engagement with educational materials and increase academic performance. However, many of the quantitative papers predominantly focused predominantly on the impact of AT in the performance of academic tasks or grades (Christ, 2008; Malcolm & Roll, 2017b; Nelson & Reynolds, 2015; Schmitt et al., 2012). Future quantitative research should examine the impact of AT on educational engagement more holistically such as in the areas of class participation or involvement in extra-curricular activities. Some papers also reported the benefits of AT for students without disabilities and academic staff. This demonstrates a shift in how AT should be viewed. AT is predominantly considered in relation to someone with a disability or impairment; as a device which can alleviate the burden or challenges associated with one's disability (Algood et al., 2005; Frank et al., 2010; Hwang et al., 2014; Theeven et al., 2011; Wright & Jutai, 2006). However, as a society, we need to re-evaluate this perception. AT is a powerful tool not only for SWD, but for students without disabilities and academic staff alike. With advances in technologies over recent years, we are seeing a significant shift in what we term 'AT', with mainstream devices now offering accessibility features (Enable Ireland, 2016; GDI Hub, 2018). The papers included in this systematic review exemplify this with eight papers examining the use of more generic devices, such as iPods, iPads, computers, PowerPoint etc. as AT for educational engagement (Foley & Masingila, 2015; Hadjikakou et al., 2010; Kuzu, 2011; Lartz et al., 2008; Mosia & Phasha, 2017; Sachs & Schreuer, 2011; Smith-Osborne, 2014; Tanners et al., 2012). Moving forward, we need to integrate a universal design for learning approach with individual AT needs, to maximise the benefits for all, not just the SWD (Messinger-Willman & Marino, 2010; Rose et al., 2005). By doing this, AT can become more 'normalised' within an academic setting, facilitating SWD desire to 'fit in' with their peers (Barnard-Brak et al., 2010; Järkestig Berggren et al., 2016; Lourens & Swartz, 2016; Mullins & Preyde, 2013).

The second theme found that barriers to effective AT use can hinder educational engagement. Such barriers included inadequate training, inadequacies of technologies themselves, difficulty in negotiating multiple sources of competing information and lack of appropriate support from others in using AT. These barriers can be understood with reference to the Matching Person and Technology (MPT) Model (Scherer, 2005). The MPT Model postulates that AT use depends on interactions between contextual (e.g. adequate training), person (e.g. functional abilities, personal preferences) and technology (e.g. capabilities of the device) factors. Careful attention to each of these factors is needed to optimise AT use. In particular, ensuring that the environment/context is supportive of AT is critical. Disability support services within the higher education environment are of utmost importance to SWD in promoting a sense of acceptance and belonging and ensuring the appropriate supports are received (Mullins & Preyde, 2013; O'Shea & Kaplan, 2018). However, institutional policies and procedures can make it difficult for SWD to acquire the AT they need in a timely fashion (Hitchcock & Stahl, 2003; Mullins & Preyde, 2013) and unaccommodating lecturers can also inhibit AT use (Claiborne et al., 2011). One significant challenge for SWD is the expectation for them to adapt and 'fit in' to the existing learning environment regardless of individual requirements (Hitchcock & Stahl, 2003; Mullins & Preyde, 2013). Adopting a Universal Design for Learning approach concurrently with supporting individual AT needs can help address this challenge by exposing students to a curriculum which is flexible to their preferences while also taking into account specific AT needs (Hitchcock & Stahl, 2003; Messinger-Willman & Marino, 2010). AT officers in higher education institutions (HEIs) who are cognisant of the interplay between contextual, person and technology factors, as outlined in the MPT, can ensure that the AT device is appropriate to individual needs and can be used effectively.

The third theme discusses how AT promotes positive psychological change for SWD. AT empowers SWD to be more confident, autonomous and motivated. AT is portrayed more as the driving force of psychological change, a tool of empowerment rather than enablement for SWD. However, more research is needed to further our understanding of the relationship between AT and other psychological outcomes in higher education such as well-being and quality of life. In addition, when AT is viewed in a positive sense by others rather than as a tool to alleviate the burden of disability, it can facilitate inclusion and a sense of belonging in the higher education environment. AT viewed in this way was found to reduce stigma and change perceptions. This again points to the importance of 'normalising' AT use, making it acceptable and realising its potential benefits for all, in order to reduce stigma and facilitate inclusion (Perry et al., 2009). It was surprising that the systematic review failed to identify any papers which explicitly explored the impact of AT on identity. Research outside the higher education context has highlighted the potential for AT to be viewed as a stigmatising device which can have significant implications for identity such as serving as a reminder of disability and limitations associated with one’s impairment (Hersh, 2013; Lund & Nygård, 2003). For others, AT is integral in promoting a positive sense of identity through increasing competence and enabling engagement in valued tasks for those with disabilities (Folan et al., 2015). Future research should explore the impact of AT on identity for SWD in higher education.

The fourth theme identified AT as an important enabler of participation in the higher education environment. AT facilitated peer related discussions surrounding course material, provided a means by which SWD could resolve course related problems, promoted engagement in clubs and societies and provided the opportunity to form social groups of AT users. One key recommendation by AT experts and users alike is the creation of social networks of users. Potential benefits include opportunities to exchange AT-related knowledge and reduce the risk of social isolation (GDI Hub, 2018). As identified from the systematic review, AT provides an opportunity for the formation of these social groups. However, these social groups of AT users need not exclusively consist of SWD. If we as a society can outline and promote the benefits of certain AT for all, it may not only enhance performance of academic tasks and learning, but may also provide additional opportunities for integration and more diverse social interactions. The increase in the availability of mainstream devices with accessibility features promotes universal access to assistive products (Desmond et al., 2018), further promoting opportunities for social integration among all users of these devices. This is something which HEIs should focus on as a means of enhancing SWD overall educational experience as at present SWD report poorer quality of life than non-disabled peers and often experience isolation (Claiborne et al., 2011; Herts et al., 2014; Mullins & Preyde, 2013; Shevlin et al., 2004).

This is the first systematic review to consider the educational and psychosocial outcomes of a broad variety of AT across diagnostic boundaries for SWD in a higher education context. This systematic review has identified important directions for future research and potential ways in which HEIs should consider and integrate AT into the learning environment in order to optimise social and educational benefits for all. However, there are some limitations which must be considered. The review consists only of papers published in the English language. Thus, it is possible that some relevant papers may have been overlooked. In addition, we chose to only include papers which dealt with the views or experiences of current higher education students who are AT users; peers and academic staff may have additional useful information related to the impact of AT on SWD in higher education.

2.5 Conclusion

In conclusion, this systematic review highlighted the benefits of AT for SWD in higher education from an educational and psychosocial perspective. It also identified important directions for future research. There is a clear need to consider educational outcomes beyond the performance of academic tasks and grades, such as in the areas of class participation or involvement in extracurricular activities. This is important given that SWD are at risk of experiencing social isolation (Francis et al., 2019; Shevlin et al., 2004), and often have to dedicate more time to their studies (Järkestig Berggren et al., 2016; Mullins & Preyde, 2013) which can preclude them from engaging in extracurricular activities (Mullins & Preyde, 2013). Further understanding of the psychological outcomes of AT is also warranted given that some SWD report lower quality of life and greater anxiety in comparison to non-disabled peers (Herts et al., 2014; Mullins et al., 2017). In addition, more research is needed to explore the impact of AT in identity for SWD in higher education. Self-image is a significant factor which has been implicated in device use and acceptance (Scherer, 2005) and thus, could have important implications for SWD and the extent to which they can harness the potential benefits of AT in higher education. The current systematic review demonstrates that there is a clear need to extend our knowledge on AT outcomes and impacts among SWD in higher education.

Chapter 3: Overview of the current study

3.1 Introduction

This chapter firstly outlines the study aims and specific objectives. An overview is then given of mixed methods research, the approach which this study is adopting, the advantages and disadvantages of this approach and the rationale for implementing it. The philosophical roots of the study will then be discussed, namely pragmatism. Finally, an outline of the specific study design, explanatory sequential design, will be given and its relevance to addressing the aims and objectives of the research.

3.2 Study Aims

The overarching aim of this mixed methods study is to explore AT outcomes and impacts among SWD in higher education. Aims pertinent to specific phases of the mixed methods study are as follows:

1) Explore the effects of AT on the educational engagement and psychosocial outcomes of SWD in higher education (phase one)

2) Explore the impact of AT in student and disability identities of those in higher education and if/how this changes over time (phase two)

3.2.1 Phase One Objectives

1) To explore differences between those who report met and unmet AT needs in educational engagement, academic self-efficacy and well-being.
2) To explore if AT needs (met vs unmet) predicts educational engagement when the effects of gender, well-being and academic self-efficacy are controlled for.
3) To examine the psychosocial impact and anticipated impact of AT use and the influence of demographic (age, gender, category of disability) and AT characteristics (frequency of use) on this.

3.2.2 Phase Two Objectives

1) To explore AT experiences and meanings attached to AT and how they influence student and disability identities
2) To explore if the meanings attached to AT change over time and the factors important in these changes
3) To examine students' experience of identity changes/continuities relating to their student and disability identities over time
4) To identity the factors important in instigating or maintaining these identity changes/continuities over time

3.3 Mixed Methods Research

3.3.1 Overview of mixed methods research

Mixed methods research has been described as the third methodological movement and has gained increasing popularity over recent years (Doyle et al., 2009). It is an approach which focuses on addressing the line of enquiry rather than being confined by data collection methods inherent to traditional approaches (Creswell, 1994). Many definitions have been put forward for mixed methods research. Early definitions focused on the mixing of methods being used, quantitative and qualitative (Tashakkori & Teddlie, 1998). More recent definitions have emphasised consideration of a wide range of elements such as collecting, analysing and integrating both quantitative and qualitative data to answer research questions, establishing specific research designs which enable the collection of data in a logical and coherent way and applying philosophical traditions to guide the research process (Creswell & Plano Clark, 2018).

There are a number of reasons why researchers adopt a mixed methods approach. One important consideration when conducting mixed methods research is its appropriateness to answer the research questions that are being addressed. Some researchers may choose a mixed methods approach to obtain more comprehensive and corroborated results. Both qualitative and quantitative approaches used in isolation have several advantages. For example, qualitative research allows the researcher to give voice to individuals in natural settings, to observe and analyse behaviour within a specific context and is flexible and conducive to a data driven approach (Hammersley, 2013). On the other hand, quantitative research can allow researchers to make claims about the generalisability of findings, operates within the realms of procedural objectivity and enables the creation of a setting in which extraneous variables can be controlled for (Hammersley, 2013). However, use of one of these approaches without the other may be insufficient in answering complex research questions. Mixed methods research can address these concerns by enabling researchers to sufficiently address both exploratory and confirmatory research questions together, for example, by allowing the generation and testing of theory in the one study (Lund, 2012). A mixed methods approach also can give a more comprehensive understanding of complex problems and identify inconsistencies in the data that otherwise may not have been discovered using just one approach (Creswell & Plano Clark, 2018; Lund, 2012). This can lead to deeper reflection on the part of the researcher, revision of aims and objectives and stimulate further research and debate within the area (Lund, 2012).

Other reasons for choosing a mixed methods approach include the need to further explain initial findings. When conducting quantitative research, often the meanings and factors at play behind statistical relationships are not evident. Using a mixed methods approach can enable a better understanding of quantitative results by following up the initial study with a qualitative phase, which can uncover new insights and interpretations (Creswell & Plano Clark, 2018). Conducting studies using a mixed methods approach can also be useful for our knowledge and understanding if similar results are obtained in the quantitative and qualitative phase. This can lead to greater validity and verification of the results found and conclusions drawn than employing just one approach (Lund, 2012). A mixed methods approach was deemed most suitable to explore AT outcomes and impacts for SWD in higher education, the overall aim of this thesis. A quantitative or qualitative approach used in isolation would be insufficient in uncovering the complexities inherent in using AT and would fail to address this aim comprehensively. In the context of this thesis, while a quantitative phase may highlight significant and non-significant relationships between AT and educational engagement and psychosocial outcomes, it doesn’t address how or why these relationships exist and what other factors might be at play which can support or inhibit AT use. Equally, while a qualitative phase might highlight how AT impacts on student and disability identities, it fails to identify whether identity concerns have a significant influence on AT use/non-use across disability diagnoses and AT classifications.

3.3.2 Challenges of mixed methods research

Despite the promise and usefulness of mixed methods research as described earlier in this chapter, it has faced a number of criticisms. The language and terms used within mixed methods research is an ongoing challenge. There is debate over whether a new language specific to the field is needed in order to distinguish it from qualitative and quantitative approaches. Issues have also been raised in relation to the terms used and how mixed methods research is defined. Many different terms have been proposed to describe mixed methods research such as multiple methods, mixed research and mixed methodology. There is also no clear consensus on a definition of mixed methods research with many variants being proposed. This lack of clarity poses issues when comparing studies which adopt a mixed method design. Thus, it is argued that a common vocabulary is needed for the field to progress (Teddlie & Tashakkori, 2010).

Practical challenges inherent with mixed methods research have also been raised. Studies with a sequential design, wherein data from one approach (e.g. quantitative) is collected first and data from the other approach (e.g. qualitative) is collected subsequently, can take a considerable amount of time and resources. Concerns have also been raised in relation to the skillset of the researcher themselves with a significant amount of knowledge and understanding needed in both quantitative and qualitative domains to ensure the research which is conducted is of a high quality (Doyle et al., 2009). However, throughout my academic career so far, I have gained significant experience in both qualitative and quantitative domains through graduate training and research internships to give me the confidence to undertake mixed method research. Problems in getting mixed methods studies published has also been highlighted due to their lengthy nature and the tendency for some journals to prioritise either quantitative or qualitative findings (Bryman, 2007; Malina et al., 2011).

Another issue concerns the incompatibility thesis and the rejection of mixing quantitative and qualitative components due to differences in their ontological and epistemological foundations (Doyle et al., 2009). This comes from the purist stance which states that paradigms determine the way in which studies are carried out (Rossman & Wilson, 1985). This stance assumes incommensurability of paradigms; that research must follow the principles imposed by its philosophical tradition whether it is positivism, constructivism or some other monolithic paradigm. Others who advocate for a mixed method approach argue against this stance, stating that claims of incompatibility are unsupported and that combining both quantitative and qualitative approaches is possible (Creswell & Plano Clark, 2018; Denzin, 2010).

3.3.3 Pragmatism

Pragmatism is an alternative philosophical paradigm which acknowledges the presence of both singular and multiple realities when engaging in empirical inquiry. It focuses on how to practically solve real world problems and collects data using numerous methods (Creswell & Plano Clark, 2018). In that way it is eclectic and pluralistic, acknowledging different theories and perspectives and how these may sometimes be conflicting (Johnson & Onwuegbuzie, 2004). The primary concern within this paradigm is to appropriately answer the research question(s) posed by the study and thus, does not confine the researcher to using specific methods (Creswell & Plano Clark, 2018). Empirical inquiry within the pragmatist approach does not focus on accurately representing reality but instead views research as a means of establishing utility or what is useful for us (Rorty, 1999), and acknowledges that truths and knowledge are dynamic and open to change over time (Johnson & Onwuegbuzie, 2004). Both inductive and deductive thinking are used within pragmatism as researchers take advantage of quantitative and qualitative approaches (Creswell & Plano Clark, 2018). Pragmatists are considered anti-dualists who believe the epistemological and ontological origins of qualitative and quantitative research have much in common and thus, they do not believe in the dichotomy of positivism and constructivism (Hanson, 2008; Johnson & Onwuegbuzie, 2004). Some shared commonalities between the two paradigms include using empirical observations to address the aims and objectives of the research and taking appropriate steps to minimise the risk of biases influencing study outcomes. Consensus has also been reached over recent years in acknowledging that more than one theory can be applied to a given data set and that researchers implicitly have their own biases, expectations and experiences which they bring to the research process (Johnson & Onwuegbuzie, 2004).

Pragmatism has been adopted as the philosophical foundation of the current study and is the guiding philosophy in many mixed methods research studies. It is deemed particularly useful in this study given the flexibility it affords in addressing complex research questions and its promotion of reflection and abductive reasoning when iteratively considering findings from quantitative and qualitative data collection which may reveal anomalies or inconsistencies (Feilzer, 2010; Johnson & Onwuegbuzie, 2004).

From an ontological perspective, pragmatism acknowledges both single and multiple realities. This allowed me to test specific hypotheses pertaining to AT-related educational and psychosocial outcomes but equally allowed me to explore the impact of AT in identity through interviews with participants. As a philosophical approach, it also fits well with the longitudinal qualitative phase of the current study allowing the combination of different analysis techniques (see section 7.10) to sufficiently answer the research question. This type of approach is promoted in LQR designs, with researchers warned against unthinking alignment with one particular tradition as it may inhibit their ability to uncover the complexities and nuances in longitudinal qualitative data (Neale, 2021).

3.4 Current Study Design

The current study will implement an explanatory sequential mixed methods design which consists of two phases: a quantitative phase (phase one) and a longitudinal qualitative phase involving data collection at two time points (phase two). The quantitative phase involves a cross-sectional online survey exploring the effects of AT on educational engagement and psychosocial outcomes of SWD in higher education. The longitudinal qualitative phase involves interviewing SWD in higher education, at two points over the academic year, to explore the impact of AT in student and disability identities and if/how this changes over time. The findings from each phase will firstly be reported separately before integration is carried out.

3.4.1 Rational for an explanatory sequential design

The decision to implement an explanatory sequential design was reached after consideration of the aims and objectives of the study, the types of design available for mixed methods research, the timing of phases, the weighting of phases and how and where data integration will be carried out. Further information on these topics is detailed in the sections that follow.

3.4.1.1 Mixed Method Research Typologies

Three core designs for mixed methods research have been outlined: 1) the convergent design; 2) the exploratory sequential design; and 3) the explanatory sequential design (Creswell & Plano Clark, 2018). The convergent design involves collecting quantitative and qualitative data at the same time and comparing and combining the results from both. Results from the quantitative and qualitative elements are first analysed separately and are then merged together. It usually addresses one overarching research question and is used to give a more complete understanding of phenomena, with researchers hoping for convergence in results. Another mixed method research typology is the exploratory sequential design. Within this design, qualitative data is collected first. This can be for several reasons such as the unavailability of suitable instruments, the lack of a theory to guide the research, or the need to develop measures that are context specific for the population of interest. The results from the qualitative phase inform the development of a quantitative element, such as a survey instrument or intervention. The subsequent testing of this quantitative element allows the further development of qualitative results and gives greater understanding to the area through capturing participant experiences and perspectives. Lastly, there is the explanatory sequential design. Within this design, quantitative data is analysed and collected first followed by the collection and analysis of qualitative data. The quantitative phase informs the qualitative phase; the purpose of the qualitative phase is to elaborate on or offer insight into findings from the quantitative phase. The final stage involves integrating the results from both phases and determining in what ways the qualitative results build on the quantitative findings.

After consideration of the above designs, the explanatory sequential design was deemed most appropriate for the current study with phase one, the cross-sectional survey of SWD in higher education, informing phase two which will explore the impact of AT in student and disability identities over time through interviews at two time points. Phase two will build upon the findings from phase one and address gaps in the research that are identified through the systematic review and phase one results. The rational for selecting a sequential design and the weighting given to each phase are outlined in the sections that follow.

3.4.1.2 Timing of Phases

The timing of phases is a key consideration in selecting the study design. The decision was made to select a sequential design (i.e. one phase of data collection and analysis is completed before initiating the next phase) over a concurrent design (i.e. both quantitative and qualitative data collection are completed at the same time). More specifically, an explanatory sequential design was selected for the purposes of this study. The collection of quantitative data first was informed by the conclusions drawn from the systematic review outlined earlier in this thesis. Significant gaps were highlighted with regards to the relationship between AT and psychosocial outcomes and the broader facets of educational engagement within a higher education setting. Thus, a quantitative design was considered most appropriate to address these gaps in knowledge. It aimed to explore if there are differences between those who report met and unmet AT needs on educational engagement, academic self-efficacy and well-being. It also aimed to examine if AT needs was predictive of educational engagement, the psychosocial impact and anticipated impact of AT use and if demographic and AT characteristics influence this relationship. AT specific outcome measures like the Psychosocial Impact of Assistive Devices Scale were also available to use, as well as validated and reliable measures of academic self-efficacy, well-being and educational engagement for use within a higher education environment.

Following the quantitative phase with a qualitative phase allowed the researcher to further explain quantitative findings of interest related to the effects of AT in higher education and explore any unusual or unexpected results. It also gave a deeper level of understanding to the findings by eliciting the mechanisms and factors at play behind the statistical relationships. The researcher also had greater flexibility, as the emerging quantitative findings and gaps identified in the systematic review helped shape the design of the qualitative phase, meaning the aims of phase two were dynamic and open to change up until that point. This allowed phase two to focus more specifically on the impact of AT on student and disability identities, given that this was an area overlooked according to the systematic review, and an area which required further exploration based on the quantitative results.

3.4.1.3 Weighting of Phases

Weighting refers to the priority given to the quantitative and qualitative phases. Some factors taken into consideration when deciding this include the primary objectives of the research, the range of research questions addressed in the quantitative and qualitative phases, how the different phases are designed, the stakeholders for which the research is intended and the orientation of the researcher (Creswell, 2003; Morgan, 1998). Generally, in an explanatory sequential design, priority is given to the quantitative phase, but equal priority can also be given to both phases (Ivankova et al., 2006). For the current study, it was decided that each phase should be weighted equally as both address important research questions which are integral to furthering our understanding of AT outcomes and impacts among SWD in higher education and both phases are envisaged to reveal highly relevant, novel findings within the field.

3.4.1.4 Data Integration

The process of integration involves combining qualitative and quantitative approaches together in one study (Creswell & Plano Clark, 2018). Meaningful integration allows researchers to see the holistic implications of the study by appreciating that the whole is more informative than looking at the findings of each phase separately (Fetters & Freshwater, 2015). Integration was carried out at two places in the current study; at the method level and at the interpretation and reporting stage. Integration at the methods level is known as building where the data collected from the quantitative phase helps shape the aims and objectives of the qualitative phase (Fetters et al., 2013). In the current study, the qualitative findings helped explain and give context to some of the quantitative results. Integration at the interpretation and reporting level involves implementing an approach to combine results and explain and discuss the findings from both phases collectively. Three different approaches of integration for mixed methods research have been outlined: following a thread, producing a mixed methods matrix and triangulation (O’Cathain et al., 2010). Following a thread takes place at the analysis stage and involves selection of a key theme or research question which is examined across all phases of the mixed methods study. Similarly, integration is carried out at the analysis phase when producing a mixed methods matrix. This is where quantitative and qualitative data is examined and displayed for cases within a matrix table. Triangulation, unlike the other approaches outlined above, takes place at the interpretation phase following the separate analysis of both quantitative and qualitative data. This was the approach chosen for the current study with the analysis of the cross-sectional survey and longitudinal qualitative data taking place before integration was carried out. Integration, using the triangulation protocol, offered a more comprehensive and holistic perspective on the AT outcomes and impacts for SWD in higher education, combining both the quantitative and qualitative findings. The approach taken for triangulation in the current study, which is informed by O’Cathain et al. (2010) and Farmer et al. (2006), involved the examination of the data for convergence, complementarity, silence and dissonance. Convergence refers to agreement or consistency in findings, complementarity refers to differing perspectives on the same phenomena of interest which can extend and build upon individual results, silence refers to presence of a theme in one set of results but absence from another set of results and dissonance refers to findings which are contradictory (Farmer et al., 2006; Heale & Forbes, 2013). The integrative discussion critically reviews the meta themes developed from the integration of findings across the quantitative and longitudinal qualitative phase. The findings of the mixed methods integration and the integrative discussion are outlined in Chapter 10.

3.5 Conclusion

In conclusion, this chapter presents an overview of the current study mixed methods study which employs an explanatory sequential design. Detailed methods for phase one and phase two are outline in chapters 4 and 7 respectively.

Chapter 4: Phase One: Quantitative Method

4.1 Introduction

This chapter presents an overview of phase one, the quantitative phase of this mixed methods study. It details the rationale for phase one, the aim and objectives and an overview of the methods including study design, recruitment processes, data collection procedure, survey design, data analysis and ethical considerations.

4.2 Rationale for phase one

Findings from the systematic review (see chapter 2), indicated that AT use can support ability to perform academic tasks, engagement with educational materials, and academic performance. Psychological and social benefits of AT use included increased self-confidence and sense of autonomy, changing negative perceptions of others, and better interactions with peers and lecturers, both inside and outside the classroom. Gaps and limitations in the research literature included emphasis on performance of specific academic tasks (Malcolm & Roll, 2017b; Schmitt et al., 2012), without consideration of more holistic educational engagement. Further, no previous research had considered AT use broadly across a diverse sample of students with various disabilities and its relationship with multiple facets of educational engagement.

Gaps also existed in the literature in relation to the psychosocial benefits of AT use in higher education for SWD. The association between AT use and academic self-efficacy had been explored among high school SWD (Chiang & Jacobs, 2009). These findings may not be generalizable to higher education settings given differences in organization and cultures. SWD in higher education may face challenges such as finding suitable, accessible accommodation to enable independent living, the need to self-advocate for supports, and organizing and managing personal assistants (Getzel & Thoma, 2008; Wessel et al., 2015). Previous research explored the relationship between AT use and quality of life among higher education SWD (Craddock, 2006; Marschark et al., 2018). However, it may also be useful to examine the influence of personal and contextual factors such as age, category of disability and frequency of AT use on quality of life-related outcomes within higher education, given their potential to moderate the relationship (Jimenez Arberas et al., 2021; Nordström et al., 2014; Pousada García et al., 2015; Saunders & Jutai, 2004).

Furthermore, previous studies have focused on AT use rather than met versus unmet AT needs and its relationships with outcomes in higher education. According the MPT model (Scherer, 2005), the extent to which an individual's technological needs and preferences are met, in addition to personal and environmental needs, can significantly influence the effectiveness of using devices and indeed if they are used at all. This highlights the importance of differentiating between those with met and unmet AT needs, rather than focusing on AT use, when exploring outcomes. Measuring AT in this way is also in line with national and international practices by the WHO's Global Report on Assistive Technology, the National Disability Survey in Ireland and the National Physical and Sensory Disability database in Ireland who similarly highlight the impact of met/unmet AT needs in their reports (Carew & Doyle, 2012; Cullen et al., 2015; WHO, 2022). Phase one will address the aforementioned gaps in the literature.

4.3 Restatement of Aim and Objectives for Phase One

4.3.1 Aims of Phase One

The aim of phase one was to explore the effects of AT on the educational engagement and psychosocial outcomes of SWD in higher education.

4.3.2 Objectives for Phase One

Specifically, phase one addressed the following objectives:

(1) To explore differences between those who report met and unmet AT needs in educational engagement, academic self-efficacy and well-being.

(2) To explore if AT needs (met vs unmet) predicts educational engagement when the effects of gender, well-being and academic self-efficacy are controlled for.

(3) To examine the psychosocial impact and anticipated impact of AT use and the influence of demographic (age, gender, category of disability) and AT characteristics (frequency of use) on this.

4.4 Quantitative Study Design

Phase one of this mixed methods explanatory sequential design was a cross-sectional survey among SWD in higher education in Ireland.

4.5 Eligibility Criteria

Individuals who were aged 18 years or over, were current students in a HEI in Ireland, had any form of disability and used or could have potentially benefited from any form of AT were eligible to participate. A HEI in Ireland referred to the universities, Institutes of Technology and other institutions governed by the Higher Education Authority. For the purposes of this study, disability was defined as "a state of decreased functioning associated with disease, disorder, injury, or other health conditions, which in the context of one's environment is experienced as an impairment, activity limitation, or participation restriction" (Leonardi et al., 2006) (p. 1220). Assistive technology was defined as "any product whose primary purpose is to maintain or improve an individual's functioning and independence and thereby promote their wellbeing" (Khasnabis et al., 2015, p. 2229). A lay definition of AT was provided to potential participants in the plain language statement; "any device which enables individuals to complete tasks more easily".

4.6 Procedure

4.6.1 Ethical approval

Ethical approval was obtained from the DCU Research Ethics Committee, Ref: DCUREC/2018/129 (see appendix B.1) prior to data collection for Phase One.

4.6.2 Recruitment

In order to maximise study reach and recruitment, multiple routes and platforms were used for study dissemination and participant recruitment:

Route 1: Recruitment through Disability/AT Officers/Students' Union Representatives/Student Societies in HEIs

Dissemination of the study information and invitation to participate was primarily through the disability/AT officers in HEIs in Ireland. Of the 25 higher education authority HEIs identified through AHEAD's report from 2016/17 (AHEAD, 2018) and contacted, disability/AT officers in thirteen of the HEIs agreed to distribute details about the study and the survey link by email to students registered with disability support services. Disability officers in two of the HEIs indicated that they were not in a position to distribute the survey link by email but agreed to display study posters (see Appendix C.1) in the disability offices within their institutions. Disability officers in two institutions declined to disseminate the study information, indicating that it would not be possible due to the high volume of requests they receive to circulate surveys. No response was obtained from eight HEIs.

The email circulated by disability/AT officers to potential participants (see Appendix C.2) detailed that the study had received ethical approval from the DCU Research Ethics Committee and that participation in the online survey was entirely voluntary and anonymous. If participants decided they wanted to take part, they could click on the hyperlink attached in the email which directed them to the online Qualtrics platform where they could access the plain language statement (see appendix D.1), informed consent form (see appendix D.2) and survey (see appendix E.1 – E.6). Reminder emails were sent to potential participants by disability/AT officers one month and three months after the original email was sent. The Students' Union (SU) in 25 HEIs were also contacted and asked to disseminate study information. The Disability Officer in the SU within six of these HEIs agreed to share the study link and information about the study through SU weekly updates or social media sites. This enabled dissemination of study information within two institutions which could not be accessed through the disability/AT officer. Thus, in total 15 out of the 25 HEIs contacted disseminated study information. One student-led disability society distributed details about the study and the Qualtrics link to the survey by email to their members.

Route 2: Recruitment through disability groups/organisations

Another source of dissemination was through disability organisations such as Muscular Dystrophy Ireland (MDI), National Council for the Blind Ireland (NCBI), Dyspraxia Ireland, Association for Higher Education Access and Disability (AHEAD), Enable

Ireland, Independent Living Movement Ireland (ILMI), the Disability Federation of Ireland (DFI) and Central Remedial Clinic (CRC). Organisations included a piece about the research in their newsletters (see Appendix C.3) and/or shared the study poster/link through their Facebook and twitter accounts.

Route 3: Recruitment through social media sites

Facebook and Twitter accounts dedicated to the study were also set up. Posts were regularly made to these accounts containing details about the study and the Qualtrics link. The study twitter account was also used to tweet the disability offices in the HEIs requesting them to retweet the survey link to their followers. In order to maximise the reach of the Facebook page to the target population (i.e. those with a disability, who are 18 years or older, current higher education students in Ireland and use or could benefit from AT), paid Facebook advertising was used. This advert appeared on the side of the Facebook profile of those in the target population. If an individual clicked on the study advert, it directed them to the study Facebook page. The Facebook page has 131 likes, the most popular post reached over 7,800 users and had 178 post clicks and 73 reactions, comments and shares. The twitter page has 63 followers, tweets earned 20,500 impressions and 89 retweets, with the most popular tweet having 71 engagements.

4.6.3 Data Collection

Participation in this study was in the form of completing the survey through the Qualtrics online platform. Participants were able to access the survey via computer, phone, laptop or any smart device. The survey design ensured that it met accessibility requirements which were checked using the survey accessibility features on Qualtrics. In addition, the accessibility of the survey was checked by an AT officer in one institution before the final version went live. The presentation of all survey questions were compatible, for example, with screen reading software such as JAWS. When participants clicked on the Qualtrics link, they were directed to the plain language statement (see Appendix D.1) and informed consent form (see Appendix D.2). Participants were required to give active consent by endorsing all statements which confirmed their eligibility to participate. Participants who met the eligibility criteria proceeded to the survey. Those who did not were thanked for their time and directed off the Qualtrics platform. The survey took approximately 30 minutes to complete. All participants had the right to withdraw up until the point of submitting their data at the end of the survey.

4.7 Survey Design

The survey (see Appendix E.1-E.6) comprised of a background information and AT profile questionnaire and a number of pre-existing psychometrically validated measures including the College Learning Effectiveness Inventory (CLEI) (Newton et al., 2008), the Student Course Engagement Questionnaire (SCEQ) (Handelsman et al., 2005), the Self-Efficacy for Learning Form Abridged (SELF-A) (Zimmerman & Kitsantas, 2007), the Psychosocial Impact of Assistive Devices Scale (PIADS) (Day & Jutai, 1996) and the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) (Tennant et al., 2007). Details of each of the assessments are outlined below.

4.7.1 Background Information and AT Profile

The background information and AT profile questionnaire (see Appendix E.1) collected the following information: gender, age, disability type, profile of AT use including the type of AT, frequency of use, satisfaction with AT and any unmet needs (for current users), profile of AT requirement including reasons for not currently using AT and unmet AT needs (for non-current users), requirement for a personal assistant in higher education, profile of course of study including type of programme, discipline of study, year of study and profile of HEI including province which it is located in and type of HEI (i.e. university, institute of technology or other).

4.7.2 Educational Engagement Measures

Educational engagement was defined as engagement in all aspects of college life including academic, social and extra-curricular for the purposes of this research.

The College Learning Effectiveness Inventory (CLEI) (Newton et al., 2008) (see Appendix E.2) examines attitudes, behaviours and dispositions important for academic success. It consists of 50 items across six subscales; (1) academic self-efficacy; (2) organisation and attention to study; (3) stress and time press; (4) involvement with college activity; (5) emotional satisfaction and (6) class communication. Each item is rated on a 5-point Likert scale (1= *never* and 5= *always*). The academic self-efficacy subscale (14 items) captures confidence in one’s academic abilities and expectations of success within the college environment. Higher scores indicate greater confidence in personal abilities to succeed. The organisation and attention to study subscale (8 items) captures students’ ability to effectively time manage and organise their academic work to achieve goals. Higher scores indicate greater time management and organisation skills in relation to their studies. The stress and time press subscale (6 items) measures how students cope with time pressures and the demands of their academic workload. Higher scores indicate ability to deal with pressure in an adaptive way thus rarely experiencing high levels of stress. The involvement with college activity subscale (9 items) captures engagement and participation in extra-curricular college clubs, societies and events. Higher scores are indicative of active engagement in college organisations and events. The emotional satisfaction subscale (7 items) measures interest and emotional reactions to college life. Higher scores indicate interest in and positivity towards college life. The class communication subscale (6 items) captures verbal and non-verbal effort to participate in course discussions or activities. Higher scores indicate greater confidence in expressing ideas with peers and lecturers in class. A raw mean score is produced for each subscale which can range from 1.0 (lowest possible score) to 5.0 (highest possible score). The CLEI has demonstrated adequate reliability and predictive validity (Krumrei-Mancuso et al., 2013; Newton et al., 2008). It has also been used among graduate and undergraduate students with a wide range of disabilities in a public university in the USA (Ramsdell, 2014).

The Student Course Engagement Questionnaire (SCEQ) (Handelsman et al., 2005) (see Appendix E.3) measures academic engagement in a course of study. It consists of 23 items across four subscales; (1) emotional engagement; (2) participation/interaction engagement; (3) performance engagement and (4) skills engagement. Each item is rated on a 5-point Likert scale (1= *not at all characteristic of me* and 5= *very characteristic of me*). The emotional engagement subscale (5 items) measures emotional involvement with academic material. Higher scores indicate greater application of the course to one’s everyday life. The participation/interaction engagement subscale (6 items) measures student interactions with peers and lecturers and involvement in class activities. Higher scores indicate greater participation and interactions with academic staff and peers in the classroom. The performance engagement subscale (3 items) measures academic performance within the course. Higher scores indicate greater self-efficacy in achieving academic success. The skills engagement subscale (9 items) captures engagement through the practicing of skills. Higher scores indicate greater personal effectiveness in engaging in educationally relevant behaviours. Scores for each subscale are calculated by adding up scores for each individual item within the subscale. Total scores are calculated by adding up scores for all items. The SCEQ was designed for use among students in higher education and has demonstrated good internal consistency, as well as convergent and discriminant validity through its association with measures of student learning and motivation (Brown et al., 2017; Handelsman et al., 2005).

4.7.3 Psychosocial Measures

The Self-Efficacy for Learning Form – Abridged (SELF-A) (Zimmerman & Kitsantas, 2007) (see Appendix E.4) measures the self-regulation processes of students when carrying out common academic tasks. It assesses the perceived self-efficacy of students to perform tasks such as note-taking, test preparation and studying. It is a unidimensional measure consisting of 19 items in total. Students respond to each item by selecting a score from 0 to 100 (0= *definitely cannot do it* and 100= *definitely can do it*). Higher scores indicate greater confidence in learning. The SELF-A is scored by getting the mean of all the items. The SELF-A has demonstrated strong reliability and predictive validity among a higher education student population (Zimmerman & Kitsantas, 2007). It has also been used previously among college students with learning disabilities and/or ADHD (Fleming & Wated, 2016).

The Psychosocial Impact of Assistive Devices Scale (PIADS) (Day & Jutai, 1996) (see Appendix E.5) assesses the impact of assistive device use on the functional independence, well-being and quality of life of users. Respondents currently using AT, were asked to consider the assistive device(s) which impact on their educational engagement when completing the PIADS. Respondents not currently using AT, were asked to consider the anticipated impact of assistive device(s) on their educational engagement. The PIADS consists of 26 items across three subscales; (1) competence; (2) adaptability and (3) self-esteem. Each item is rated on a 7 point scale from -3 (maximum negative impact) to +3 (maximum positive impact). A score of 0 indicates no perceived impact. The competence subscale (12 items) assesses perceived efficacy and competence. Higher scores indicate greater efficiency and competence in completing tasks. The adaptability subscale (6 items) measures willingness to take risks and engage in new activities. Higher scores indicate greater adaptability to change and willingness to try new things. The self-esteem subscale (8 items) assesses emotional health and happiness. Higher scores indicate greater self-efficacy and confidence in abilities. Detailed information of the scoring of each subscale can be found at Day and Jutai (1996). The PIADS has demonstrated good internal consistency, test-retest reliability, construct and concurrent validity (Day & Jutai, 1996) and has also been used previously among a student population (Borgestig et al., 2013).

The Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) (Tennant et al., 2007) (see Appendix E.6) is a 14 item unidimensional measure which assesses key concepts of mental well-being such as positive affect, satisfaction with interpersonal relationships and positive functioning. Participants are asked to consider their experience over the last two weeks when responding. All items in the scale are positively worded and each item is rated on a 5-point Likert scale (*1= none of the time* and *5= all of the time*). Scores range from 14 to 70. Higher scores indicate higher mental well-being (Tennant et al., 2007). Investigations into the psychometric properties of the WEMWBS have demonstrated good face and content validity and good internal consistency (Tennant et al., 2007). The WEMWBS has been used previously among higher education students (Bore et al., 2016; Goodwin et al., 2016).

4.8 Data Analysis

The IBM statistical software package SPSS (Version 24) was used to analyse the data. Normality testing was carried out on all variables. Normality was assumed if the histogram was approaching a bell-shaped curve and if skewness values were between +/-1. Parametric (t-tests) and non-parametric (Mann Whitney U-tests, Kruskal-Wallis tests) tests were conducted as appropriate to examine differences between AT needs groups (i.e. those reporting met AT needs vs unmet AT needs) in educational engagement and psychosocial measures and the influence of personal factors (i.e. gender, disability category) and AT characteristics (frequency of use) on psychosocial impact as measured by PIADS. Pearson correlations were conducted to examine the relationship between age and psychosocial impact. The disability categories used for analyses were taken from the Higher Education Authority (2019), namely sensory impairment, physical condition, specific learning difficulty, psychological/emotional condition and other, with the addition of a multiple disabilities category. This was done to allow for meaningful comparisons across groups as some categories used in the survey only consisted of one participant.

In preparation for hierarchical multiple regression (HMR) analyses, gender was binary coded to represent female (=1)/male (=0). ‘Other’ gender was not included for analyses given the small number of cases. ‘AT needs’ was binary coded to represent met AT needs (=1)/unmet AT needs (=0). For HMR analyses, only educational engagement subscales which demonstrated significant univariate relationships with AT needs were retained as outcomes (see table 5.4).

In each regression model, gender was entered in block 1, well-being (WEMWBS) and academic self-efficacy (SELF-A) in block 2 and AT needs in block 3. Gender was entered at block 1 as it previously was highlighted as a significant predictor of educational engagement (Kinzie et al., 2007; Mooney et al., 2010; Myint & Khaing, 2020), and thus, it was envisaged to account for the most variance. Well-being and academic self-efficacy were entered at block 2 as both have been found to influence educational engagement (Cole & Korkmaz, 2013; Geertshuis, 2019; Krumrei-Mancuso et al., 2013; Wang & Kennedy-Phillips, 2013), and it was thought these variables would account for next most amount of variance. Entering AT needs at block 3 allowed examination of its unique contribution on the outcomes after controlling for gender, well-being and academic self-efficacy. *A priori* decision was made to exclude the academic self-efficacy subscale of the CLEI as an outcome due to potential multicollinearity with the SELF-A (see table 4.1 below for intercorrelations between scales). Preliminary analyses confirmed the data did not violate the assumptions of normality, linearity, multicollinearity, homoscedasticity and independence of residuals for any of the models; no multivariate outliers were present. The significance level (α) was set at 0.05.

Table 4.1

Pearson Correlations between all educational engagement, well-being and academic self-efficacy outcome measures

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. ASE subscale	1	.532**	.479**	.319**	.581**	.486**	.674**	.592**	.544**	.386**	.654**	.619**	.419**
2. OAS subscale	.532**	1	.541**	.117	.413**	.330**	.697**	.769**	.536**	.316**	.459**	.565**	.337**
3. STP subscale	.479**	.541**	1	.231*	.515**	.473**	.443**	.424**	.293**	.251**	.447**	.605**	.513**
4. ICA subscale	.319**	.117	.231*	1	.470**	.176	.283**	.160	.197*	.382**	.162	.360**	.421**
5. ES subscale	.581**	.413**	.515**	.470**	1	.472**	.580**	.385**	.543**	.517**	.443**	.629**	.517**
6. CC subscale	.486**	.330**	.473**	.176	.472**	1	.541**	.278**	.418**	.595**	.562**	.543**	.463**
7. SCEQ total	.674**	.697**	.443**	.283**	.580**	.541**	1	.864**	.831**	.728**	.697**	.686**	.497**
8. SE subscale	.592**	.769**	.424**	.160	.385**	.278**	.864**	1	.608**	.389**	.538**	.592**	.341**
9. EE subscale	.544**	.536**	.293**	.197*	.543**	.418**	.831**	.608**	1	.541**	.495**	.560**	.381**
10. PIE subscale	.386**	.316**	.251**	.382**	.517**	.595**	.728**	.389**	.541**	1	.389**	.468**	.460**
11. PE subscale	.654**	.459**	.447**	.162	.443**	.562**	.697**	.538**	.495**	.389**	1	.548**	.459**
12. SELF-A	.619**	.565**	.605**	.360**	.629**	.543**	.686**	.592**	.560**	.468**	.548**	1	.593**
13. WEMWBS total	.419**	.337**	.513**	.421**	.517**	.463**	.497**	.341**	.381**	.460**	.459**	.593**	1

Abbreviations: ASE, academic self-efficacy; OAS, organisation and attention to study; STP, stress and time press; ICA, involvement with college activity; ES, emotional satisfaction; CC, class communication; SE, skills engagement; EE, emotional engagement; PIE, participation/interaction engagement; PE, performance engagement. $*p < 0.05$, $**p < 0.01$

4.9 Ethical Considerations

The main ethical issues in this phase were confidentiality, anonymity and the potential risk of harm due to participants' involvement in the research. Every effort was made to ensure that participants remained anonymous and their data confidential. No personal identifiers were collected in the survey. Also, the name of the institution which participants attended was not named. Participants were however asked to indicate what types of AT they used and how often, which could potentially pose a risk to participant anonymity. Data were appropriately aggregated to ensure that individual participants could not be identified.

Risk of harm to participants due to participation in this study was minimal. The topic being investigated was low risk as it did not explore any highly sensitive issues. Many participants were using AT on a regular basis and were already experiencing associated benefits and challenges. However, appropriate contact details for support services were provided to participants in the plain language statement in the unlikely event they did experience some upset.

4.10 Conclusion

The chapter has presented an overview of the quantitative method employed for phase one of this mixed methods study. The results of phase one are provided in the subsequent chapter.

Chapter 5: Phase One: Quantitative Results

5.1 Introduction

This chapter presents the results of the quantitative study. Firstly, sample and AT characteristics are presented, followed by descriptive statistics, group difference analyses and hierarchical multiple regression analyses.

5.2 Sample Characteristics

A total of 111 participants completed the survey, 32 of which were male, 77 female and 2 identified as other. Participants ranged in age from 18 to 67 years (mean age= 28.59 years, SD= 12.75). Thirty-nine participants reported having multiple disabilities; the disabilities of 21 respondents were categorized as "other" (which included Aspergers/Autism, ADD/ADHD, Developmental Coordination Disorder – Dyspraxia/ Dysgraphia, a significant ongoing illness and a speech and language disability); 21 respondents reported a specific learning difficulty. Multiple disabilities were defined as having at least two or more comorbid conditions (see Appendix F.1 for a full breakdown of multiple disabilities of participants). Most participants were registered with the disability office within their HEI (93.7%). In relation to academic characteristics, the majority of participants attended university (73%), followed by an institute of technology (21.6%), with fewest attending an institution labelled as 'other' (5.4%). The disciplines of study represented were; Education and Training, Humanities and Arts (31.5%), Science, Maths, Computing, Engineering, Manufacturing & Construction (25.2%), Social Science, Business and Law (23.4%), Other (15.3%) and Agriculture and Veterinary, Health and Welfare, Services (4.5%). The largest proportion of the sample were in the first year of their course (37.8%) at the time of completing the survey, while only 12.6% were in their fourth year. A full breakdown of sample characteristics is presented in table 5.1.

Table 5.1

Demographic and academic characteristics of participants

	N	%
Total	111	
Gender		
Males	32	28.8%
Females	77	69.4%
Other	2	1.8%
Category of Disability		
Sensory impairment	11	9.9%
Physical condition	11	9.9%
Specific learning difficulty	21	18.9%
Psychological / emotional condition	8	7.2%
Other disability	21	18.9%
Multiple disabilities	39	35.1%
Registration with Disability Office		
Yes	104	93.7%
No	7	6.3%
Type of HEI		
University	81	73%
Institute of Technology	24	21.6%
Other	6	5.4%
Province of HEI		
Leinster	51	45.9%
Munster	39	35.1%
Connaught	17	15.3%
Ulster	4	3.6%
Type of programme		
Advanced certificate / higher certificate / ordinary bachelor degree	23	20.7%
Honours bachelor degree / higher diploma	68	61.3%
Postgraduate taught programme	16	14.4%
Research degree	3	2.7%
Year of study		
1	42	37.8%

	N	%
2	24	21.6%
3	28	25.2%
4	14	12.6%
Type of student		
Full time	96	86.5%
Part time	15	13.5%
Discipline of study		
Science, Maths, Computing, Engineering, Manufacturing & Construction	28	25.2%
Social Science, Business and Law	26	23.4%
Education and Training, Humanities and Arts	35	31.5%
Agriculture and Veterinary, Health and Welfare, Services	5	4.5%
Other	17	15.3%

5.3 AT Profiles

5.3.1 AT characteristics of users

A total of 82 participants, (73.9%) of the full sample (n= 111), reported that they currently used AT. The most commonly used AT by this sample of 82 participants was educational AT (n= 50), followed by the use of multiple ATs (n= 18). Multiple ATs were defined as the use of at least two or more assistive devices. Fewest participants reported solely using mobility aids (n=1) or visual aids (n=1). The use of app based AT was reported by 32.9% of participants who currently used AT. In relation to frequency of AT use, 78% reported they used AT every day for general needs, with 41.5% reporting being extremely satisfied and 52.4% being somewhat satisfied with their AT. 65.9% reported using AT every day which was specific to their educational engagement and most reported being either extremely satisfied (39%) or somewhat satisfied (53.7%) with this AT. In relation to those who used their AT for educational engagement, participants who used their AT every day were categorised as frequent AT users (n= 54), while those who used their AT once or twice a week, every couple of weeks, once or twice a month or rarely/not at all were categorised as non-frequent users (n= 28). A full breakdown of the AT characteristics of users is provided below in table 5.2.

Table 5.2

AT profile of users

	N	%
Total	82	73.9%
Types of AT used		
Educational AT	50	61%
Aids to hearing	4	4.9%
Visual aids	1	1.2%
Mobility aids	1	1.2%
Other	8	9.8%
Multiple ATs	18	22%
Use of AT apps		
Yes	27	32.9%
No	55	67.1%
Types of AT required		
Educational AT	7	8.5%
Aids to hearing	1	1.2%
Mobility aids	1	1.2%
Communication aids	2	2.4%
Other	4	4.9%
Multiple ATs	2	2.4%
No requirement	64	78%
Frequency of use for general needs		
Everyday	64	78%
Once or twice a week	11	13.4%
Every couple of weeks	5	6.1%
Once or twice a month	2	2.4%
Satisfaction with AT for general needs		
Extremely satisfied	34	41.5%
Somewhat satisfied	43	52.4%

	N	%
Neither satisfied nor dissatisfied	5	6.1%
Frequency of AT use for educational engagement		
Everyday	54	65.9%
Once or twice a week	15	18.3%
Every couple of weeks	7	8.5%
Once or twice a month	1	1.2%
Rarely/not at all	5	6.1%
Satisfaction with AT for educational engagement		
Extremely satisfied	32	39%
Somewhat satisfied	44	53.7%
Neither satisfied nor dissatisfied	4	4.9%
Somewhat dissatisfied	2	2.4%

5.3.2 AT characteristics of non-users

A total of 29 participants, (26.1%) of the sample, reported that they were not currently using AT. The majority of these participants (82.8%) reported that they had never previously used AT. Stigma/embarrassment was the most common reason for non-use of AT, reported by 24.1% of participants. 20.7% of participants gave multiple reasons for non-use and 20.7% indicated other reasons such as being unaware of the availability of AT, not having sufficient time to complete AT training or not feeling comfortable registering with the disability support services in their HEI. A full breakdown of AT characteristics for non-users is provided in table 5.3 below.

Table 5.3

AT profile of non-users

	N	%
Total	29	26.1%
Previously used AT		
Yes	5	17.2%

	N	%
No	24	82.8%
Main reasons for not currently using AT		
Device unsuitable / inappropriate	2	6.9%
Stigma / embarrassment	7	24.1%
Can’t access the AT	5	17.2%
Don’t need it	3	10.3%
Other	6	20.7%
Multiple reasons	6	20.7%
AT needs		
I require AT but don’t have the AT I need	6	20.9%
I can manage without AT but I feel I could benefit from AT use	21	72.4%
I don’t require or need AT	2	6.9%
Types of AT needed		
Educational AT	12	41.4%
Aids to hearing	2	6.9%
Communication aids	3	10.3%
Other	3	10.3%
Multiple ATs	7	24.1%

5.3.3 AT needs

The term AT needs distinguishes between two groups: 1) those whose AT needs are fully met (n= 64) and 2) those who have unmet AT needs (n= 44) including those currently using AT who have further requirements and those not currently using AT but require it. Fully met AT needs referred to those who reported that they had ‘no requirement’ when asked to indicate if there was any AT that they required but did not currently have. The majority of current AT users (78%, n=64) reported that they had no further requirement for AT (i.e. their AT needs were fully met). Of the current users who had further AT requirements (n= 17), the highest need was for educational AT (n= 7) (see table 5.2). Most participants who were non-users (n=27) indicated a potential need or requirement for AT. Of these participants, the highest need was for educational AT (n= 12), followed by a need for multiple ATs (n= 7) (see table 5.3).

5.4 AT needs and educational engagement outcomes

As table 5.4 shows, students who indicated their AT needs were fully met scored significantly higher than students with unmet AT needs on the CLEI academic self-efficacy, stress and time press (i.e. ability to cope and deal with demands) and class communication subscales; and the SCEQ performance engagement subscale. Mann Whitney U-tests revealed that scores were significantly higher for academic self-efficacy for those who reported their AT needs were fully met (*Mdn* = 4.57) compared to those who reported unmet AT needs (*Mdn* = 4.18), $U = 955$, $Z = -2.84$, $p < 0.01$. Independent sample t-tests revealed a significant difference between the groups on the stress and time press subscale $t(106)= 2.83$, $p < 0.01$ and class communication subscale $t(106)= 2.39$, $p < 0.05$. Stress and time press scores were significantly higher for those who reported their AT needs were fully met (M= 3.05, SD= 0.78) compared to those who reported unmet AT needs (M= 2.59, SD= 0.89). For the class communication subscale, scores were significantly higher for those who reported met AT needs (M= 3.38, SD= 0.81) compared to those who reported unmet AT needs (M= 3.01, SD= 0.75). Mann-Whitney U-tests revealed that scores were significantly higher for those who reported met AT needs (*Mdn* = 12) compared to those who reported unmet AT needs (*Mdn* = 11) on the performance engagement subscale, $U = 1{,}013.50$, $Z = -2.21$, $p < 0.05$. No significant differences between groups were found for the SCEQ total score and remaining CLEI and SCEQ subscales, all p’s > 0.05.

Table 5.4

Group difference analyses for AT needs and educational engagement measures

AT needs (met vs unmet)	**N**	**Test statistic t or U**	**P value 2-tailed**
College Learning Effectiveness Inventory (CLEI)			
Academic self-efficacy subscale mean score	108	955 (U)	.005**
Organisation and attention to study subscale mean score	108	1.33 (t)	.188

AT needs (met vs unmet)	**N**	**Test statistic t or U**	**P value 2-tailed**
Stress and time stress subscale mean score	108	2.83 (t)	.006**
Involvement with college activity subscale mean score	108	.87 (t)	.388
Emotional satisfaction subscale mean score	108	1,298 (U)	.490
Class communication subscale mean score	108	2.39 (t)	.019*
Student Course Engagement Questionnaire (SCEQ)			
Total scale score	106	1,084.50 (U)	.082
Emotional engagement subscale total score	106	1.35 (t)	.180
Participation/interaction engagement subscale total score	106	.06 (t)	.949
Performance engagement subscale total score	106	1,013.50 (U)	.027*
Skills engagement subscale total score	106	1,116.50 (U)	.125

*p < .05 **p < .01

5.5 AT and psychosocial outcomes

5.5.1 AT needs and academic self-efficacy and well-being

Those who reported their AT needs were met (M= 61.41, SD= 17.72) scored significantly higher on academic self-efficacy for completing educational tasks, as measured by the SELF-A, than those who reported unmet AT needs (M= 53.74, SD= 16.96) (t(101)= 2.20, p < 0.05). Well-being scores (WEMWBS), were significantly higher for those who reported met AT needs (*Mdn* = 49) compared to those who reported unmet AT needs (*Mdn* = 44.50) (*U* = 956, *Z* = -2.07, p < 0.05).

5.5.2 Psychosocial impact for current AT users

AT had a positive psychosocial impact for SWD as measured by the PIADS. Students who used AT experienced the greatest positive impact in the area of competence (M= 1.74, SD= 0.95, range= 5.50 [-2.50 – 3.00]), followed by adaptability (M= 1.30, SD= 1.22, range= 6 [-3 – 3]. AT use also had a positive impact on self-esteem (M= 1.12, SD= 1.00, range= 4.50 [-1.50 – 3.00]), but to a lesser extent than on competence or adaptability.

Kruskal-Wallis test results revealed no significant differences on the competence [X^2= 0.52, (5, N=81), $p > 0.05$], adaptability [X^2= 1.77, (5, N=81), $p > 0.05$], or self-esteem subscale [X^2= 3.39, (5, N= 81), $p > 0.05$] between any of the categories of disabilities (i.e. sensory, physical, specific learning difficulty, psychological/emotional, other or multiple). There was no significant correlation between age and the competence (r= 0.002), adaptability (r= 0.111), or self-esteem subscale (r= 0.194). In relation to gender, no significant differences were found between males and females on competence, adaptability or self-esteem subscale scores. For frequency of AT use, scores were significantly higher for frequent AT users (*Mdn*= 2.17) compared to non-frequent AT users (*Mdn*= 1.38) on the competence subscale *U*= 451.50, *Z*= -2.89, $p < 0.01$. There were no significant differences in adaptability or self-esteem between frequent and non-frequent users.

5.5.3 Anticipated psychosocial impact for non-current AT users

There was a positive psychosocial impact for non-current AT users as measured by PIADS. Students anticipated the greatest positive impact of AT use on adaptability (M= 1.73, SD= 0.95, range= 5.50 [-2.50 – 3.00]), followed by competence (M= 1.65, SD= 0.72, range= 2.92 [0.08 – 3.00]. Students anticipated AT use to also have a positive impact on their self-esteem (M= 1.11, SD= 0.96, range= 4.00 [-1.00 – 3.00], but to a lesser extent than on adaptability or competence.

Kruskal-Wallis test results revealed no significant differences on the competence [X^2= 6.25, (5, N= 29), $p > 0.05$], adaptability [X^2= 5.54, (5, N= 29), $p > 0.05$], or self-esteem subscale [X^2= 2.98, (5, N= 29), $p > 0.05$]. between any of the categories of disabilities. A significant moderate positive was found between age and the competence subscale (r= 0.479), but no significant correlations were found with the adaptability (r= 0.307) or self-esteem subscale (r= 0.330). In relation to gender, Mann-Whitney U tests revealed no significant differences were between males and females on competence, adaptability or self-esteem subscale scores.

5.6 Regression analyses

HMRs were carried out to examine the unique contribution of AT needs (met/unmet) in predicting the performance engagement subscale score of the SCEQ and the stress and time press and class communication subscales of the CLEI, when controlling for the effects of gender, well-being and academic self-efficacy (see table 5.5). Only educational engagement outcomes which had significant univariate relationships with AT needs were included in the HMRs.

Gender was entered into the model at Step 1, explaining 0% of the variance in performance engagement scores [F(1, 100)= .001, $p > 0.05$]. Well-being and academic self-efficacy were entered at Step 2 and accounted for 32.8% of the variance in performance engagement scores [F(3, 98)= 15.98, $p < 0.05$]. The second set of predictors accounted for an additional 32.8% of variance and significantly contributed to the model [R squared change= 0.328, F change (2, 98)= 23.97, $p < 0.05$]. Finally, AT needs was entered as a predictor at step 3. At this step the model accounted for 33.3% of the variance in performance engagement scores [F(4, 97)= 12.09, $p < 0.05$]. AT needs accounted for an additional 0.4% of variance but did not significantly contribute to the model [R squared change= 0.004, F change (1, 97)= 0.60, $p > 0.05$]. In the final model, academic self-efficacy was the only predictor that significantly contributed to the model (B= 0.06, $p < 0.001$).

For the stress and time press subscale, gender was entered at Step 1, explaining 5% of the variance [F(1, 100)= 5.31, $p < 0.05$]. Well-being and academic self-efficacy were entered at Step 2. At this Step, the model accounted for 44% of the variance in stress and time press scores [F(3, 98)= 25.71, $p < 0.05$]. The second set of predictors accounted for an additional 39% of variance and significantly contributed to the model [R squared change= 0.39, F change (2, 98)= 34.15, $p < 0.05$]. AT needs was entered as a predictor at step 3, with the model accounting for 45.6% of the variance in stress and time press scores at this step [F(4, 97)= 20.34, $p < 0.05$]. AT needs accounted for an additional 1.6% of variance but did not significantly contribute to the model [R squared change= 0.016, F change (1, 97)= 2.80, $p > 0.05$. In the final model, three of the predictors significantly contributed to the model; academic self-efficacy (B= 0.02, $p < 0.001$); well-being (B= 0.01, $p < 0.05$); and gender (B= -0.36, $p < 0.05$). Being female was predictive of lower scores on ability to deal with pressure and demands in comparison to males.

For the class communication subscale, gender was entered at Step 1, explaining 3.1% of the variance in scores [F(1, 100)= 3.21, $p > 0.05$]. The predictors well-being and academic self-efficacy were entered at Step 2. At this Step, the model accounted for 34.7% of the variance in class communication scores [F(3, 98)= 17.39, $p < 0.05$]. The second set of predictors accounted for an additional 31.6% of variance and significantly contributed to the model [R squared change= 0.316, F change (2, 98)= 23.75, $p < 0.05$]. AT needs was entered at step 3, with the model accounting for 35.7% of the variance in class communication scores at this step [F(4, 97)= 13.49, $p < 0.05$]. AT needs accounted for an additional 1% of variance but did not significantly contribute to the model [R squared change= 0.01, F change (1, 97)= 1.51, $p > 0.05$. In the final model, academic self-efficacy was the only predictor which significantly contributed to the model (B= 0.02, $p < 0.001$).

Table 5.5

Summary of HMR models predicting the SCEQ and CLEI subscale scores

PE					STP					CC				
Variable	B	SE	*β*	R^2	Variable	B	SE	*β*	R^2	Variable	B	SE	*β*	R^2
Step 1				0.00	Step 1				0.05*	Step 1				0.03
Step 2				0.33**	Step 2				0.44**	Step 2				0.35**
Step 3				0.33**	Step 3				0.46**	Step 3				0.36**
(C)	5.21**	1.02			(C)	1.10**	0.29			(C)	1.70**	0.29		
Gender	0.16	0.49	0.03		Gender	-0.36*	0.14	-0.20		Gender	-0.26	0.14	-0.15	
Well-being	0.05	0.02	0.21		Well-being	0.01*	0.01	0.19		Well-being	0.01	0.01	0.18	
ASE	0.06**	0.02	0.41		ASE	0.02**	0.00	0.46		ASE	0.02**	0.01	0.41	
AT needs	0.36	0.46	0.07	R^2 change: 0.004	AT needs	0.22	0.13	0.13	R^2 change: 0.016	AT needs	0.17	0.13	0.10	R^2 change: 0.010

Abbreviations: PE, performance engagement; STP, stress and time press; CC, class communication; (C), constant, ASE, academic self-efficacy.

*p < 0.05, **p < 0.01

5.7 Summary of quantitative findings

In conclusion, findings from the quantitative phase highlight that AT is beneficial across a diverse sample of students with various disabilities in terms of their educational engagement in certain domains and psychosocial outcomes including academic self-efficacy, well-being, competence, adaptability and self-esteem. This demonstrates the wide-reaching benefits of AT beyond simply enabling students to engage more easily in academic tasks such as reading and writing.

Chapter 6: Phase One: Quantitative Discussion

6.1 Introduction

This chapter outlines the discussion for the quantitative study. This was the first study to examine the relationship between AT needs and multiple facets of educational engagement, and the relationship between AT needs and psychosocial outcomes broadly across a diverse sample of students with various disabilities using a wide variety of AT in higher education.

6.2 AT needs and educational engagement

Some key findings from this phase were the benefits of AT for educational engagement beyond performance of academic tasks, something which is largely ignored in previous research. Results found that those whose AT needs were fully met scored significantly higher on certain aspects of educational engagement such as academic self-efficacy, stress and time press and class communication on the CLEI compared to those with unmet AT needs. This highlights the importance of AT in these areas among a diverse sample of students with various disabilities, demonstrating that AT can be beneficial and should be considered for a wide variety of SWD in higher education. This furthers previous research which exclusively focused on the benefits of AT for class participation (Foley & Masingila, 2015; Kuzu, 2011; Lartz et al., 2008) and increasing efficiency when completing tasks (Floyd & Judge, 2012) among students within a specific disability category such as those with sensory impairments or those with learning disabilities. On the SCEQ, those whose AT needs were fully met scored significantly higher on performance engagement compared to those with unmet AT needs, which is in line with previous research that AT use significantly improves grades (Bhardwaj & Kumar, 2017; Christ, 2008; Malcolm & Roll, 2017b; Nelson & Reynolds, 2015). Surprisingly, no significant difference was found between those with met and unmet AT needs on the skills engagement subscale of the SCEQ, which contradicts previous research (Malcolm & Roll, 2017b, 2019; Schmitt et al., 2012). However, within this study a wide variety of AT was included, some of which may not be particularly relevant for the performance of academic tasks. For example, among those with unmet needs, a smaller number indicated a need/requirement for educational AT (n= 19) versus other types of assistive devices (n= 25). So, for the majority of students with unmet needs in this study, their performance of academic tasks may not have been affected by not having access to the appropriate AT. It was also surprising that there was no significant difference between those with met and unmet AT needs on the participation/interaction engagement subscale of the SCEQ, given that significant differences were found on the class communication subscale of the CLEI. While these subscales are similar, the class communication subscale is more focused on expression of ideas or opinions while the participation/interaction subscale puts more emphasis on providing/receiving help in relation to coursework. Thus, it seems from the results that AT may be more salient for expressing opinions or participating in class discussions.

Another key finding was that AT needs was not predictive of educational engagement in any of the HMR models. This again may be because a wide variety of AT was included in this study, some of which may not be particularly relevant for students' educational engagement. AT needs was also entered as a predictor at block 3 of the models to examine unique variance explained on the outcomes. Thus, a significant amount of the variance may already have been accounted for by gender, well-being and academic self-efficacy variables. Gender accounted for little variance in each model and was only a significant predictor of stress and time press. This was surprising given it has been highlighted as a significant predictor of educational engagement in previous studies (Kinzie et al., 2007; Mooney et al., 2010; Myint & Khaing, 2020). However, this may be explained by failure to account for gender composite (i.e. the proportion of males/females in academic majors). Previous research has highlighted that gender composite can moderate the relationship between gender and student engagement in higher education (Tison et al., 2011).

6.3 AT and psychosocial outcomes

Results from this phase demonstrate the importance of AT for psychosocial outcomes. Those whose AT needs were fully met scored significantly higher on self-efficacy for completing academic tasks (SELF-A), and well-being (WEMWBS), compared to those with unmet AT needs. In looking at this in a diverse sample of students with various disabilities, this furthers previous quantitative research which found AT use to be related to hope and positivity among higher education students with a specific category of disability such as learning disabilities (Heiman & Shemesh, 2012) and acquired brain injuries (Hendricks et al., 2015). This study was the first to explore the relationship between AT needs and academic self-efficacy for completing educational tasks among higher education SWD. Consequently, further research is needed to explore how AT promotes confidence in academic abilities.

Another key finding of this study is the positive psychosocial impact of AT use in the areas of competence, adaptability and self-esteem for current and non-current AT users. Research exploring the relationship between AT and self-esteem within a higher education population is limited, with only two studies to the author's knowledge investigating this (Craddock, 2006; Rice et al., 2015). More research is needed to explore how AT influences self-esteem among SWD in higher education. Socio-demographic variables such as gender and category of disability did not have a significant influence on PIADS scores for current or non-current users. This is perhaps because students were asked to consider the ATs which impact on their educational engagement when completing the PIADS, thus students could have reflected on a wide range of different ATs. In previous research where socio-demographic variables were found to influence PIADS scores, individuals reflected on a specific type or category of AT device (Jimenez Arberas et al., 2021; Nordström et al., 2014; Pousada García et al., 2015). In contrast, frequency of AT use was found to have a significant influence on PIADS scores for current users. Frequent AT users scored significantly higher on the competence subscale of the PIADS compared to non-frequent AT users, supporting previous research (Saunders & Jutai, 2004), but no differences were found on the adaptability or self-esteem subscales. It should be noted however, that frequency of AT use does not always equate with importance. Some students may use their AT less frequently but for specific important tasks. These findings are highly relevant for anyone who provides services to SWD in higher education, as it demonstrates that when AT needs are met significant positive impacts beyond educational outcomes in areas such as academic self-efficacy and well-being can accrue. However, more quantitative studies are needed in this area to add weight to the evidence base on the benefits of AT for higher education SWD from a psychosocial perspective. For example, studies which implement a longitudinal design could examine the well-being, quality of life and academic self-efficacy of students before and after integrating AT. This would help determine whether a causal relationship exists between AT and psychosocial outcomes which could have significant implications for funding allocations to AT in educational environments.

Another noteworthy finding in this study was that stigma/embarrassment associated with AT was the most common reason reported by students for non-use of AT. This supports the Matching Person and Technology Model (Scherer, 2005) which states that self-consciousness about using a device, among other factors, can result in avoidance. Previous research in higher education has highlighted that some students deliberately hide their AT from others to avoid stigmatisation and/or maintain a 'normal' identity (Bell et al., 2016; Thompson-Ebanks & Jarman, 2018) and will forgo using AT so they can keep their disability hidden from others (Kendall, 2016). However, to date, no study has explicitly explored the impact of AT in the student and disability identities of those in higher education. More research is needed in this area to uncover how AT impacts on student and disability identities, if this changes over time and how students manage identity concerns.

6.4 Strengths and limitations

There are a number of strengths to this study. It is the first to examine differences between those who report met and unmet AT needs in educational engagement and psychosocial outcomes. Previous studies among SWD in higher education have focused on AT use rather than AT needs. This is an important distinction given that the extent to which an individual's technological needs and preferences are met, in addition to their personal and environmental needs, can influence the effectiveness of using AT and the continued use of devices, according to the MPT model (Scherer, 2005). It is also the first study to use PIADS scale among SWD in higher education, which asked students to think of all the AT which is important for their educational engagement when responding. This scale could be used in future research in higher education to assess the psychosocial impact of AT use for students who are using more than one AT device for their educational engagement. Other strengths included highlighting the importance of meeting AT needs for academic self-efficacy, class communication and ability to cope with academic demands; these are areas which have previously been overlooked in quantitative research among SWD in higher education.

There are some limitations to this study including complexity in measuring AT outcomes. The context specific nature of some ATs can be problematic. Students may find a particular device useful for completing one particular task (e.g. reading) but not for others (e.g. writing) (Smith, 2000). Equally, some students may just require use of their AT for their educational engagement occasionally or at specific times (e.g. leading up to exams) while others may require it on a day-to-day basis. As a result, the full extent of the effects of AT may not have been captured within a cross-sectional study design. In addition, the CLEI, SCEQ, SELF-A and WEMWBS are not AT specific outcome measures. This means that they may not be sensitive enough to detect changes which are specific to AT use and may fail to differentiate the subtleties of AT use or non-use among those with disabilities. This was one of the fundamental reasons for including the PIADS, an AT-specific psychosocial measure, over other generic psychosocial measures (Day et al., 2002). Thus, there is a clear need to develop validated AT specific outcome measures for educational engagement. These measures would ask individuals to consider the impact of their AT when completing items and thus be more sensitive to the effects of AT use, like other AT specific measures such as the PIADS (Day & Jutai, 1996). This would enable consistency in the measurement of the effects of AT for SWD and enable comparison across countries and cultures, something which is lacking from the literature at present (Edyburn & Smith, 2004). This is a fundamental step in moving towards the development of evidence based AT practices in higher education.

Other limitations include asking students to self-report AT requirements and the representativeness of the sample. While asking participants to self-report additional requirements for AT may be considered a strength, it could also be considered a weakness. Some participants may perceive their AT needs to be fully met and indicate they have no additional requirement for AT but this may be due to a lack of awareness of certain technologies and their potential benefits. With regards to the sample, it is possible that highly engaged students may be more likely to come forward and participate in research compared to students who are less engaged, making it hard to detect differences in educational engagement. In addition, only seven participants who were not registered with the disability support services within their institutions took part despite employing a comprehensive recruitment strategy. Individuals who refrain from registering may not identify as disabled or fear stigmatisation as a result of disclosing their disability and thus, are prevented from accessing specialised supports or accommodations within the HEI (Kendall, 2016; Thompson-Ebanks & Jarman, 2018). Alternatively, individuals may simply prefer using assistive features on mainstream devices to meet their needs

(Shinohara & Wobbrock, 2016) and may have no requirement for registration with disability services. It is possible that the effects of AT use may be different for these students versus those who openly disclose their disability and AT use. Future research should explore perspectives and experiences regarding AT among students who have decided not to register with disability services.

6.5 Conclusion and implications for the longitudinal qualitative research phase

Overall, the quantitative phase of this mixed methods study contributes a number of novel insights in the area. It is the first study to highlight the significance of meeting AT needs for educational engagement in certain domains, academic self-efficacy and well-being. It is also the first study to highlight a significant positive relationship between AT and academic self-efficacy for SWD in higher education. Furthermore, it investigated for the first time the effects of AT on multiple facets of educational engagement across disability diagnoses and AT classifications. This highlighted the positive implications of AT in areas which have previously been overlooked in quantitative research such as class communication and ability to cope with academic demands. Other important insights were the reasons why SWD chose not to use their AT in higher education. Stigma/embarrassment was highlighted as the main reason for non-use.

Findings from phase one have also highlighted important avenues for exploration in phase two. Phase one found that stigma/embarrassment relating to AT was the most common reason for non-use of AT by SWD in higher education, highlighting it as a considerable identity concern for this population. Yet, to date, no study has explicitly explored the impact of AT in student and disability identities and if this changes over time. This was the primary aim of phase two of the current study, the LQR phase. Phase one also highlighted the importance of AT for competence, adaptability, self-esteem, academic self-efficacy and well-being. However, more research is needed to establish how or why AT promotes positive outcomes in these psychosocial domains. Through exploring the impact of AT in student and disability identities, and the meanings attached to their AT devices in phase two, the mechanisms and factors at play behind the statistical relationships in phase one can be uncovered.

Chapter 7: Phase Two: Longitudinal Qualitative Research Method

7.1 Introduction

This chapter presents an overview of phase two, the longitudinal qualitative research (LQR) phase of this mixed methods study. It details the rationale for phase two, the aim and objectives and an overview of the methods including LQR designs, recruitment and data collection procedures and the analyses employed across cases and within cases.

7.2 Rationale for phase two

Identity has been described as "the subjective concept of oneself as a person" (Vignoles et al., 2006, p. 309). Previous research outside of the higher education context has highlighted that AT can have significant implications for identity, increasing the risk of stigmatisation (Carneiro et al., 2015; Ellington & Lim, 2013; Hersh, 2013; Lund & Nygård, 2003) and threatening self-perceptions of normality (Kent & Smith, 2006; Pape et al., 2002). These identity concerns can negatively impact on device use and result in abandonment or avoidance (Lund & Nygård, 2003; Shinohara & Wobbrock, 2016). However, AT has also been shown to have a positive impact on identity allowing those with disabilities to demonstrate their capabilities to others (Shinohara & Wobbrock, 2011, 2016), and regain a sense of normality through enabling participation in valued activities (Folan et al., 2015; Lund & Nygård, 2003). Some studies within the higher education environment have noted that AT can be viewed as an identity threat, increasing the visibility of their impairment and resulting in stigmatising reactions from others (Bell et al., 2016; Goode, 2007; Kendall, 2016; Thompson-Ebanks & Jarman, 2018). However, no study to date has explicitly explored the impact of AT in identity for SWD in higher education, as highlighted in the systematic review (see chapter 2).

Previous research outside the higher education context has also highlighted how the meanings attached to AT are open to change over time (Gibson et al., 2012; Kirk, 2010; McDonald et al., 2020; Pape et al., 2002). Some individuals can move from viewing AT as a reminder of their disability and limitations to viewing it as a tool of empowerment over time (Pape et al., 2002). For others, they can reconceptualise their

AT as a part of them rather than an indicator of difference over time (McDonald et al., 2020). Others note that the meanings attached to AT are constantly in flux depending on the social context and how the individual is perceived by others in that context (Gibson et al., 2012; Kirk, 2010). A myriad of factors have been identified which influence meanings attached to AT such as the degree to which disability is incorporated into one's identity, desired self-image, social reactions from others, norms and cultural values and identification with other AT users (Hersh, 2013; Pape et al., 2002). Factors which have been implicated in changing perceptions towards AT over time include a deterioration in one's impairment, embracement of a disability identity and early intervention (McDonald et al., 2020; Pape et al., 2002). However, no research to date within a higher education context has explored how or why meanings attached to AT change over time among SWD. This is important to explore as it will allow the identification of factors, specific to a higher education environment, which are important in changing students' perceptions surrounding AT and provide greater understanding of ways in which HEIs can facilitate students viewing their AT in a positive light rather than an identity threat. This will have important implications for accessing AT in the first instance, as research has shown that many students forego accessing supports and accommodations through the disability office in their university until later in their programme of study (AHEAD, 2021; Lightner et al., 2012), with some noting identity issues as the reason (Lightner et al., 2012). Findings from phase one further emphasise the importance of understanding the meanings attached to AT, and how these might change over time, given that that stigma/embarrassment was reported as the main reason for non-use of AT.

Another area that warrants further investigation is SWD experience of identity change/continuity over time in higher education. SWD face many identity issues in higher education such as deciding if/when to disclose, a desire to fit in and be a 'normal' student and anticipated or enacted stigma due to their disability (Barnard-Brak et al., 2010; Järkestig Berggren et al., 2016; Mullins & Preyde, 2013). Many of the above issues are not static and are open to change depending on personal factors such as sense of disability identity and visibility of impairment, social factors such as familiarity/relationship with others and environmental factors such as academic demands and university culture surrounding disability (Abes & Wallace, 2018; Bell et al., 2016; Blockmans, 2015; Cole & Cawthon, 2015; Miller, 2015). However, research exploring how SWD negotiate identity change/continuity over time, and the factors important in this, is limited. Some studies specifically focus on identity changes/continuities for students who were undertaking work placements as part of their course (Cunnah, 2015; Riddell & Weedon, 2014). Other studies focus solely on changes or continuities in disclosure or non-disclosure of a disability identity (Kranke et al., 2013), while others highlight identity changes/continuities for those with a specific learning difficulty but fail to identify factors important in identity change/continuity (Hadley, 2009). In addition, only one study uncovers the processes of identity change/continuity (i.e. unfolding pathways of identity change/continuity with a focus on how and why they unfold the way they do) (Kranke et al., 2013), despite this being highlighted as a crucial and fundamental element of LQR (Neale, 2021). Thus, there is a real need to extend our knowledge and understanding on SWD negotiation of identity change/continuity over time in higher education, with a specific focus on uncovering the processes of change/continuity. Phase two will address the aforementioned gaps in the literature.

7.3 Restatement of Aim and Objectives for Phase Two

7.3.1 Aim of Phase Two

The aim of phase two was to explore the impact of AT in student and disability identities of those in higher education and if/how this changes over time.

7.3.2 Objectives for Phase Two

Specifically, phase two addressed the following objectives:

(1) To explore AT experiences and meanings attached to AT and how they influence student and disability identities
(2) To explore if the meanings attached to AT change over time and the factors important in these changes
(3) To examine students’ experience of identity changes/continuities relating to their student and disability identities over time
(4) To identity the factors important in instigating or maintaining these identity changes/continuities over time

7.4 Longitudinal Qualitative Research Designs

A LQR design was used in phase two to explore the impact of AT in student and disability identities of those in higher education and if/how this changes over the course of an academic year. LQR is an evolving methodology which is designed to capture and understand change and continuity through time using an in-depth qualitative lens (Neale, 2020; Tuthill et al., 2020). The foundational principles of LQR include duration, time and change (Saldaña, 2003). While there is contention on what meets the criterion of 'longitudinal', it is proposed that a LQR design consists of collecting data at two or more time points using qualitative methods within a pre-determined time frame (Saldaña, 2003; Tuthill et al., 2020). There is no set duration to a LQR study, but it is proposed that there is sufficient time between data collection points to allow for and observe change, if it is present (Vogl et al., 2018).

Within LQR, time is built into the research process to focus on the experience of change, or stability over time; including causes and consequences (Calman et al., 2013). Hence, LQR is driven by the desire to understand what change happens, why change occurs, and how participants experience and manage change over time (Calman et al., 2013; Carduff et al., 2015). Saldaña (2003) notes that time is a fluid, ever changing concept, is situated within an individual's cultural context and open to an individual's experiences and interpretations. It is only through time that we can untangle change and continuity, the processes at work within an individual's social context, and the interactions between temporal and cultural dimensions (Neale, 2020; Neale & Flowerdew, 2003). LQR thus captures a 'movie' rather than a 'snapshot' of experiences and allows an in-depth exploration of how the lives of individuals or small groups unfold through time (i.e. the processes of change/continuity) (Neale, 2020).

The concept of change however is less well-defined in the literature (Saldaña, 2003). Four types of change that can occur in LQR have been outlined (Lewis, 2007). First is narrative change, the way that an individual's story unfolds over time. Stories are often non-linear or out of sequence and critical events may be mentioned in later interviews rather than the time they occurred. Second is re-interpretation by the participant, where they may reflect back and experience changes in perceptions around particular issues as the study progresses. Third is reinterpretation by the researcher and acknowledgement that each encounter with participants can shape perceptions and understanding and cause revisions of pre-existing thoughts and notions. Reflexivity on the part of the researcher recording feelings, thoughts and perceptions after each interview and throughout the research process is key to capturing this type of change and an integral part of LQR (Carduff et al., 2015; McLeod, 2003). The last type is absence of change. It is important to recognise cases where there has been no change or where change was expected and did not occur and why this may be the case.

In the context of the current study, a LQR design allowed exploration into the causes, consequences and processes of identity change/continuity for SWD in higher education and the impact of AT in this over the course of an academic year. For the purposes of the current study, identity change was defined as any change in the importance of, or meanings attached to, an identity.

7.5 Sampling and Inclusion Criteria

SWD who were 18 years or older, had a disability, use or could benefit from AT and were current students in one of the 25 Higher Education Authority funded HEIs were purposively sampled. Disability was defined as "a state of decreased functioning associated with disease, disorder, injury, or other health conditions, which in the context of one's environment is experienced as an impairment, activity limitation, or participation restriction" (Leonardi et al., 2006).

7.6 Ethical approval

Ethical approval was obtained from the DCU Research Ethics Committee, Ref: DCUREC/2019_151 (see appendix G.1) prior to data collection for Phase Two.

7.7 Recruitment

The Disability Officers in six of the 25 HEIs contacted, distributed details of the study by email (see Appendix H.1) to students registered with the disability support services. Disability Officers in the SU of two HEIs also distributed details of the study by email to students; this allowed the dissemination of study information to one additional institution not captured through the institutional disability offices. Disability and AT groups and organisations including Muscular Dystrophy Ireland, Association of Higher Education Access and Disability, FreedomTech and Central Remedial Clinic also shared the study poster (see Appendix H.2) with members via social media. Facebook and Twitter accounts dedicated to the research called “EnableStudy” were also used to share details about the study.

7.8 Data Collection

Data collection involved conducting semi-structured interviews with SWD at two time-points over the academic year. Participants were also asked to complete a short socio-demographic questionnaire (see Appendix I.1). The first interview was conducted at the end of the first semester (November/December 2019) and the second interview was conducted at the end of the second semester (May/June 2020). In the intervening period, COVID-19 was declared a worldwide pandemic. The impact of this on the way the research was conducted is discussed in greater detail below in section 7.8.1.

7.8.1 Conduct of the interviews

For the first interview, which was conducted at the end of the first semester, participants could choose between a face-to-face interview or telephone/zoom interview. In total, ten interviews were conducted face-to-face, in a study room within the institution the participant was attending, and four interviews were conducted via telephone. Before commencement of the interview, the participant was given/emailed a copy of the plain language statement (see Appendix J.1), informed consent form (see Appendix J.2) and socio-demographic questionnaire and had the opportunity to ask any questions about the study. The informed consent form and socio-demographic questionnaire was completed by the participant and returned to the researcher either in person or by email before commencement of the interview. At the start of each interview participants were asked to “tell me a little bit about yourself” to make them feel comfortable and put them at ease (Smith et al., 1995) before moving through specific AT and identity related questions. Duration of interviews ranged from approximately 40 minutes to 90 minutes in length. All interviews were recorded electronically using a Dictaphone and transcribed verbatim. Detailed field notes and reflections were also taken following each of the interviews.

All of the second interviews were conducted remotely, due to the restrictions imposed by the COVID-19 pandemic, and took place at the end of the second semester of term. At this point, all participants were engaged in remote learning. Four participants opted for a telephone interview while the remaining nine participants opted to complete their interview via zoom. Those who completed their interview through zoom had the option to leave their camera off and were informed that only audio of the conversations would be retained. One participant could not be reached to complete the second interview. In advance of the interview, the plain language statement and consent form were completed by participants and returned by email. Before starting the second interview, participants were provided with a brief summary of key topics covered in the initial interview. Throughout all of the second interviews, participants were reminded of previous perspectives and thoughts surrounding areas of interest and asked how they felt now and if their perspectives had changed. Duration of these interviews ranged from approximately 30 minutes to 120 minutes in length. All interviews were recorded electronically using a Dictaphone and transcribed verbatim. As with initial interviews, detailed field notes and reflections were recorded following each of the second interviews.

7.8.2 Interview guide for first interview

The interview guide developed for the first interview was designed to capture student's current thoughts and feelings towards AT and how it impacted on how they viewed themselves as a person with a disability and as a student. It contained two separate sections based on AT status; one set of questions were developed for students who were currently using AT and the other for students who were not currently using AT but could potentially benefit from it (see Appendix I.2). Questions were open ended wherever possible to elicit detailed and elaborate responses (McIntosh & Morse, 2015). The topic guide and questions were developed through reference to the literature on AT and identity and through consultation with my research supervisors. The topic guide was flexible but questions within the guide covered key areas such as disability experiences, AT experiences, reactions from others and personal meanings around AT and the self. Scripted and unscripted prompts were used if needed to elicit more detailed responses (McIntosh & Morse, 2015).

7.8.3 Interview guide for the second interview

The topic guide for the second interview revisited the same key areas from the first interview but was focused on change, how this was experienced and potential consequences of change (see Appendix I.3). Additional questions were also added depending on what was uncovered in the first interview with each participant, to allow further exploration of issues or interesting insights. This iterative approach to data collection is common in LQR and is one of the strengths of this study design (Nevedal et al., 2019).

7.9 Field Notes

Detailed field notes were made following each interview, usually immediately after the interview was completed. They included a summary in my own words of key findings and important insights from the interview, my own reflections on how the interview went and the sense I got from the participant throughout the interview (i.e. questions they were comfortable with, questions they struggled with answering and their mood on the day). I also noted any pre-conceptions, thoughts or feelings I had about the participant and how this may or may not have changed following the interview. Field notes from the first interview with each participant also noted areas of interest which required further exploration in the second interview.

7.10 Reflexivity

It is important to consider my own contribution and involvement in the construction of meanings in this study. I am a PhD student with a congenital physical impairment. I have used AT from a young age both in the educational context and in other settings such as at home, in the community and for recreational activities, such as sport. I am also a disability advocate and have, for example, fronted campaigns for the Irish Wheelchair Association on accessible housing. I view disability from a social model lens as constructed through the systemic barriers in the environment, including physical, structural and attitudinal, which prevent full participation in all aspects of society. My passion and interest in conducting research in the area of AT for SWD in higher education is partly informed by my personal experiences, and desire to understand and improve things for students moving forward.

I view my own personal experiences, knowledge and background as a strength in conducting this research. I agree with sentiments outlined by a fellow disability scholar, who advocates for disability research agendas that are emancipatory and empowering and calls for greater representation of disabled researchers (Oliver, 1992). Equally, disabled participants themselves note the potential to not fully disclose experiences to non-disabled researchers due to shame or embarrassment, thus highlighting the importance of scholarly work being conducted by disabled researchers (Kitchin, 2000). However, I do acknowledge the importance of remaining reflexive throughout the research process and making explicit any values, thoughts or observations which may influence the research. While being a disabled student myself facilitated building rapport and trust with participants, I was conscious of not relating their experiences to that of my own. Throughout my time in education, my experiences using AT have been largely positive but I made a deliberate effort to ensure that throughout the interviews I paid equal attention to the negative as well as positive experiences that students had with AT. I also recorded information about my own judgements, thoughts and perceptions in field notes, as outlined in section 7.9 above, before and after each interview. This provided transparency and ensured that I was aware and conscious of how I may have been impacting on the research and any interpretations arising.

7.11 Ethical Considerations

7.11.1 Ongoing consent

Ensuring participants gave ongoing consent throughout the research was an important ethical consideration given the longitudinal nature of the research (Holland et al., 2006). I had a duty to ensure that the participant did not feel coerced or under pressure to continue participating until completion of the LQR study, and thus adopted the following approach. Consent was given at the outset of the first interview in written form, through the signing of the consent form, and verbally before starting the interview. Consent to contact participants about the second interview was incorporated into the consent form at time 1 and also confirmed verbally on completion of the first interview. I made it clear to participants that they had the right to withdraw from the study at any stage without providing any reason for doing so.

I contacted participants by email to arrange a date and time for the second interview. In the email, I made it clear to participants that there was no obligation to complete the second interview and asked them specifically if they were still happy to proceed. Consent was again given by each participant verbally before commencing the second interview. Once again, I reminded them before beginning the second interview that they could withdraw from the study at any point without giving a reason for doing so.

7.11.2 Anonymity and confidentiality

Protecting the identity of participants and maintaining confidentiality was an ongoing challenge in the study and has been highlighted as a difficulty encountered in other LQR studies (Calman et al., 2013; Holland et al., 2006). Efforts included using participant numbers or pseudonyms and removing key identifying information such as place of residence, university they were attending and the names of Disability/AT officers they were in contact with, throughout transcriptions, analyses and reporting. However, the tracking of changes within participants across time using case histories (see section 7.12.2.2 for longitudinal analysis within cases), where detailed information was provided on their journey and key events that took place, made it difficult to guarantee anonymity (Neale, 2021; Thomson, 2007). In constructing these case histories, I avoided mentioning any specific medical condition that the participant lived with and specific names of AT devices they were using, as these could be unique identifying characteristics. Instead, their impairment and AT was classed within a category such as ‘physical disability’ or ‘speech-to-text’ software in an attempt to maintain confidentiality.

Other efforts were made to protect anonymity and maintain confidentiality in relation to data storage and sharing. I created a password protected file to link participant names to participant numbers which only I had access to. This was stored separately to all other data. Participant numbers were then subsequently used for labelling all audio recordings, transcriptions, socio-demographic questionnaires and Nvivo files for each participant as well as throughout analyses and reporting. All files were password protected on an encrypted laptop. Signed hardcopy consent forms were stored in a locked filing cabinet in my office separate to hardcopy socio-demographic questionnaires. Email addresses and phone numbers were dealt with in a manner compliant with GDPR guidelines (European Union, 2016).

7.11.3 Maintaining professional boundaries

Maintaining professional boundaries can be another challenge encountered in LQR studies (Calman et al., 2013). In the current study, participants asked for my advice on how to deal with certain AT-related issues they encountered and recommendations for

AT that may be suitable for their needs. I was conscious that I may not have the relevant experience or expertise to advise on such matters and thus, pointed them towards relevant support services within their institution which may be in a position to help. Some participants also asked for my personal perspective on some of the questions posed due to the fact that I was also a SWD who used AT. In these situations, I was conscious not to lead the participant or influence their thoughts or perspectives. I generally responded with a generic statement like "that's a tough one" or "it's hard to know" and re-directed the question back to the participant.

However, in other cases, the participant seemed unaware of where they could access relevant AT supports and conveyed this to me in the interview. It seemed unethical to withhold such information from participants, especially if accessing such supports could be beneficial. Thus, I informed participants on the general requirements for accessing such services.

7.12 Data Analysis

There is no gold standard approach to longitudinal qualitative data analysis; it is influenced by the type of methods used, the orientation of the researcher, theoretical assumptions or foundations and the research questions that are being addressed (Holland et al., 2006). Longitudinal qualitative analysis may best be considered as a recursive, cyclical like loop, with the researcher constantly moving back and forth between the waves of data collected to facilitate new insights to emerge (Neale, 2021). It has been proposed that analysis should capture what is happening at each time point within and across cases, as well as capturing change and continuity over time specific to individuals as well as across the group (Ivankova & Stick, 2007; Vogl et al., 2018). This allows identification of specific causes and consequences of change for individual participants as well as the experience of change or continuity and the processes at play which are common or different across cases. Analysing the data in this way combines case, thematic and processual analysis to ensure depth, breadth and temporal understanding of the data and thus, presentation of a comprehensive picture of findings over time (Neale, 2021). This was the approach adopted in the current study.

LQR can involve using different analysis techniques to adequately answer the research question (Holland et al., 2006). While a cross-sectional analysis technique, such as thematic analysis, is necessary to capture an in-depth insight into experiences at each time point, it is not sufficient to capture the causes, consequences and processes of change over time (Calman et al., 2013; Kneck & Audulv, 2019). In order to forge a longitudinal account of change across cases over time, the use of matrices and Saldana's 16 questions to guide longitudinal analysis were employed (Miles et al., 2014; Saldaña, 2003). Change within cases over time was captured through constructing case histories (Thomson, 2007; Thomson & Holland, 2003). The longitudinal analysis within and across cases built upon and extended the cross-sectional thematic analysis by identifying emblematic themes of identity change/continuity which spanned across time. Emblematic themes are focused around capturing processes over time, that is trajectories of change/continuity (Neale, 2021). Each of these analysis techniques is described in detail in the subsequent sections.

7.12.1 Cross-sectional analysis

Cross-sectional analysis of the data was completed at each time point using thematic analysis (Braun & Clarke, 2006, 2012; Terry et al., 2017). Thematic analysis uncovers patterns and meanings across a data set. It is primarily concerned with revealing experiences and meanings which are common across the group rather than unique or specific to any one individual. These shared experiences or perspectives, however, must be meaningful in the context of the specific research questions posed by the study (Braun & Clarke, 2012). Reflexive thematic analysis, which is a specific type of thematic analysis, was employed in the current study. It focuses on an inductive approach where themes are produced through an iterative process of coding and interpretation. Unlike other types of thematic analysis which follow a structured codebook or depend on inter-rater reliability between coders, reflexive thematic analysis allows an organic, flexible approach to coding and embraces the subjective skills of the researcher and what they bring to the process (Braun & Clarke, 2020). Reflexive thematic analysis is an appropriate form of analysis for addressing research questions surrounding lived experiences, factors important in understanding experiences and participant thoughts or perceptions on an area of interest (Braun & Clarke, 2019). Thus, it was deemed suitable for cross-sectional analysis in the current study given the fact I was interested in exploring experiences with and meanings attached to AT and its influence on identity. The flexibility afforded in data collection and analysis as well as its lack of epistemological determinism also makes it appropriate to use in this LQR study (Terry et al., 2017).

Terry and colleagues (2017) outline six steps involved in thematic analysis which were followed in this study; 1) familiarisation with the data, 2) generating codes, 3) constructing themes, 4) reviewing potential themes, 5) defining and naming themes, and 6) producing the report. **Step one** involved immersing myself in the data. At this stage, I read and re-read the interviews, listened to the audio recordings and took notes of any thoughts, reflections or observations that came to mind. For **step two**, I generated codes throughout the data set. A code is described as a label which is assigned to a particular piece of text that conveys some sort of meaning (Terry et al., 2017). I engaged in open coding throughout, where all segments that were relevant to the research question were identified and labelled (see Appendix K.1). Coding was a cyclical and iterative process; I revised and refined initial codes as the analysis progressed. **Step three** involved constructing themes. In this stage, I grouped similar codes together which conveyed a pattern of meaning in the data set and was represented by an overarching theme. At this point, the themes were provisional and open to change. I organised this information visually using mind mapping software to clearly display candidate themes and what codes they represented. For **step four**, I reviewed the themes, how they worked in relation to one another and how well they represented the codes, within the context of the research questions. Reviewing involved multiple iterations and reworking of themes and associated codes until it was deemed that all suitable information was appropriately captured and represented. For **step five**, I defined and named the themes and subthemes in a clear and concise manner. I constructed a short description for each theme detailing what it represented. For **step six**, I wrote up the results of the findings from the thematic analysis. The approach I took involved using quotations from the data in both an illustrative and analytic way, the former providing examples of particular experiences, while the latter linked experiences and perceptions to literature and important theoretical ideas. I followed the above six-step approach for thematic analysis for the cross-sectional analysis at time 1 and time 2. The coding frame developed for time 1 was the starting point for time 2, to ensure consistency and try to avoid the repetition of codes. However, there was also the possibility to identify new codes and themes at time 2 through following the six steps outlined above.

The cross-sectional thematic analysis at time 1 and time 2 was an essential step in capturing participant experiences at both time points and informing the subsequent longitudinal analysis. The impact of AT in student and disability identities and if/how this changes over time was identified through the longitudinal analysis; this was the central focus of this phase of the study and as such, it is the longitudinal analysis that is presented as the key research findings in chapter 8. See Appendix K.2 for an overview of cross-sectional themes and subthemes at time 1 and time 2. The approach to longitudinal analysis is outlined in detail in the subsequent sections.

7.12.2 Longitudinal analysis

The longitudinal analysis consisted of two parts: the longitudinal analysis across cases and the longitudinal analysis within cases. Each of these is described in further detail below.

7.12.2.1 Longitudinal analysis across cases

A trajectory approach to longitudinal analysis was employed to explore change/continuity for individual participants over time and identify what was common or different across cases. This involved the use of matrices, to highlight what was happening at each time point and capture key changes for each participant over time, in addition to the use of Saldana’s 16 questions to guide longitudinal analysis, which ensured a processual understanding was at the fore (Grossoehme & Lipstein, 2016; Miles et al., 2014; Saldaña, 2003). Saldana’s questions include framing, descriptive and interpretive questions (see table 7.1 below) which help to identify what change occurred or the absence of change, the key factors and processes at play and common threads which can tie changes together over time (Saldaña, 2003). A trajectory approach was preferable to a recurrent cross-sectional approach as while the latter can identify broad changes over time at the level of the whole group, it may fail to capture comprehensively the processes of change or important factors at an individual level (Fadyl et al., 2017; Grossoehme & Lipstein, 2016).

Step one involved the creation of a conceptually clustered matrix to capture key themes at time 1 and time 2 and each participant’s experience within these themes, providing an ‘at a glance’ descriptive summary (Miles et al., 2014). Participants were placed down along the Y-axis and key themes (drawn from the cross-sectional analysis at each time point) across the X-axis, with a summary column at the end to outline closing remarks on each participant’s experiences at that particular time point (see Appendix L.1). This gave a clear overview of individual experience at each time point when reading across the rows and an indication of experience across cases, within a given theme, when reading down the columns. Additional information was added under relevant themes from reviewing codes related to each theme and re-reading each participant's interview at each time point.

Step two involved capturing change/continuity related to identity from time 1 to time 2; all instances of change/continuity were coded at time 2 (Saldaña, 2003) and identified through comparison of the overview formed for each participant in the conceptually clustered matrix at both time points. At this point, Saldaña's (2003) framing and descriptive questions for longitudinal data analysis were also used to identify change and continuity, and the processes at play, between time 1 and 2 (see table 7.1 below). These questions focus on change over time across the whole data corpus but also consider how participants may differ from one another at each time point. Framing questions are concerned with identifying change and the factors and processes at play, and contextualising this within participants' environment. Descriptive questions are concerned with the types of change occurring or what remains unchanged or missing through time. Key identity changes/continuities took the form of three broad-brush emblematic themes, which were embedded in processes and temporal in nature. These themes are called 'emblematic' because they are focused around capturing trajectories of change/continuity over time (Neale, 2021).

Step 3 involved the creation of a time ordered sequential matrix for each of the three emblematic themes, which ensured the timing and sequence of events are at the forefront (Miles et al., 2014). Within the matrix, participants were placed on the Y-axis and time point on the X-axis, along with reasons for change/continuity column and a summary column at the end outlining closing remarks on change/continuity over time for each participant (see Appendix L.2). The matrix was populated through the information gathered at step 2. In addition, codes related to each theme at time 1 and 2 were reviewed to identify any further differences/continuities in perspectives for each participant, with relevant information being added to the matrix. Reading across the rows captured change/continuity over time for the individual participant within the emblematic theme, while reading down the time 1, time 2 or reasons column outlined experiences / factors influencing change/continuity across cases. Any idiosyncrasies identified at step 2 from Saldana's question "what is idiosyncratic through time?" was also colour coded in each time ordered sequential matrix at this stage. Idiosyncrasies refers to the emergence of patterns in the data that are unusual, erratic and unpredictable (Saldaña, 2003).

Step 4 involved the creation of an overall summary matrix which captured participant change/continuity from time 1 to time 2 across the three emblematic themes. Participants were placed along the Y-axis and themes across the X-axis. Reading across the rows highlighted changes/continuities experienced for each participant within each theme, while reading down the columns highlighted changes/continuities across cases within each emblematic theme (see Appendix L.3). This allowed the identification of participants with similar trajectories of change/continuity within each theme (Kneck & Audulv, 2019), which was key for the subsequent write up.

Step 5, the final step, involved returning to Saldana's (2003) questions to guide longitudinal analysis, namely the analytic and interpretive questions. These questions encourage the researcher to dive deeper into the data and identify common threads which can tie changes over time together. For example, one question asks "which changes interrelate through time?" Any interrelationships identified were colour coded in the time ordered sequential matrices outlined in step 2, highlighting linkages between emblematic themes. A key focus in this final step was the identification of a through line for the study, Saldana's last analytic and interpretive question (see table 7.1). A through line is described as a phrase, word or sentence which connects and illuminates participant change through time. It is a way of analysing and/or interpreting the significance and underlying meaning of changes observed (Saldana, 2003). In some studies, this has taken the form of a core theme which captures change, continuity and associated process through time across all participants in the data set (Grossoehme et al., 2012; Saldaña, 1995). The through line was central in the negotiation of identity changes/continuities over time for participants in the current study.

Table 7.1

Questions to guide the analysis of longitudinal data (taken from Saldaña, 2003)

Framing questions:

1. What is different from one pond or pool of data to the next?[a]
2. When do changes occur through time?
3. What contextual and intervening conditions appear to influence and affect participant changes through time?
4. What are the dynamics of participant changes through time?

5. What preliminary assertions about participant change can be made as data analysis progresses?

Descriptive questions:

1. What increases or emerges through time?
2. What is cumulative through time?
3. What kinds of surges or epiphanies occur through time?
4. What decreases or ceases through time?
5. What remains constant or consistent through time?
6. What is idiosyncratic through time?
7. What is missing through time?

Analytic and interpretative questions:

1. Which changes interrelate through time?
2. Which changes oppose or harmonise with natural human development or constructed social processes?
3. What are participant or conceptual rhythms through time?
4. What is the through-line of the study?

[a] Pool refers to time point. Pond refers to a subdivision of pool such as analysing by gender, treatment group, trajectory etc.

7.12.2.2 Longitudinal analysis within cases

A form of case analysis, namely the construction of case histories, was used to capture the causes, consequences and experience of identity change/continuity for individual participants, presenting a detailed road map of their journey through time (Thomson, 2007; Thomson & Holland, 2003). Case analysis is a useful way of condensing large amounts of data in a meaningful way, while maintaining the integrity of idiographic information (Neale, 2021). Two case histories are presented, one detailing the journey of a postgraduate student with a visual impairment and the other an undergraduate student with a mental health difficulty. These case histories detail a rich account of the journey of each individual over the LQR study, focusing on key events in their trajectory, identity changes/continuities across the three emblematic themes and the central role of the through line in negotiating identity over time. This complements the longitudinal analysis across cases by providing insight into the complexity and nuances in an individual's experience which could not be otherwise captured in the cross-case analysis. In essence, the case histories give an in-depth understanding of the experience of change/continuity over time for the two participants, adding to the breadth of understanding which was captured in the longitudinal analysis across cases. The two case histories were chosen on the basis of the quality or richness of the data (i.e. they offered significant insights), similar to previous LQR studies which employed case histories (Carduff, 2013; Thomson, 2007). A further two case histories are presented in the appendices (Appendix M.1 and M.2) that represent the journey of a student with a physical disability and a student with a hearing impairment over time.

Construction of a case history involved analysing each interview inductively before trying to forge a longitudinal narrative account of change and continuity for a participant over time (Thomson, 2007). The first step involved analysing each interview in its own right to create a case profile for each participant at each time point. A case profile provided a summary of the participant's experiences at that particular time point. Identity changes/continuities were identified through comparing the case profiles for each participant for time 1 and 2 and were also informed by information gathered in the time ordered sequential matrices (see step 3 above in the longitudinal analysis across cases). This resulted in identity changes/continuities taking the form of three emblematic themes in each case history, as was the case with the longitudinal analysis across cases. The writing of each case history was structured around these three emblematic themes, mirroring the approach taken by Thomson (2009). The through line was used to connect and illuminate change for each participant through time. In order to ensure each case history formed a coherent narrative, the processual questions posed by Neale (2021) were considered (see table 7.2). These questions were used instead of Saldana's 16 questions to guide longitudinal analysis as the latter approach has limited applicability in considering the journey of an individual participant over time; instead its strengths lie in examining change/continuity over time across cases (Carduff, 2013; Saldaña, 2003). Throughout the construction of each case history, my own interpretations, thoughts and feelings about the participant and their experiences, which were recorded in my field notes after each interview, were incorporated. This ensured that changes in my own interpretations and perceptions were captured in the case history, one of the types of change outlined by Lewis (2007) which can occur in LQR, and a key aspect in construction of case histories identified by Thomson and Holland (2003) and Henderson and colleagues (2012). Once case histories are created for participants, it is suggested that cases be brought into conversations with one another, or compared, so similarities and differences can be identified (Thomson, 2007). However, in the context of the current LQR study, it was deemed that this would be repetitious and unnecessary as similarities and differences between cases is already outlined in the longitudinal analysis across cases.

One challenge in constructing a case history is capturing the true order and sequence of events (Henderson et al., 2012; Neale, 2021). At times, participants recounted experiences in their second interview which occurred before the first interview. Some participants also moved swiftly between past, present and future when talking about a particular experience. Equally, some participants reinterpreted or revised how they felt about incidents which they spoke about previously at the initial interview. In order to present key events and experiences from participants journey in a clear and coherent way, a diagrammatic timeline was created for each participant which presented information in chronological order. This helped structure their journey and ensure there was a clear sequence in how events and experiences unfolded.

Table 7.2

Questions for constructing a processual narrative for a case (taken from Neale et al., 2021)

- What happened (events, practices, processes)?
- When and where did it happen/over what space of time (setting, timeframes)?
- Who was involved (agents)?
- How was it done/how did things evolve (agency)?
- Why was it done (purpose, motives, aspirations)?
- What triggered and propelled the process (multiple influences, impetus)?
- What meaning did it hold for those involved (lived experience)?
- Did these meanings and perceptions shift over time (recursive understandings)?
- Was the path straightforward, or were there detours along the way (pathway)?
- What (if any) were the effects or impacts at different points in time (effects)?

7.13 Conclusion

In summary, this chapter presents an overview of LQR designs, the data collection procedures employed, and the analysis undertaken across cases and within cases for phase two. The next chapter presents the findings from the LQR phase.

Chapter 8: Phase Two: Longitudinal Qualitative Research Findings

8.1 Introduction

This chapter outlines the findings from phase two of this mixed methods study which involved conducting interviews with SWD at two time points over the course of an academic year. This was carried out to achieve the aim of phase two, that is to explore the impact of AT in student and disability identities of those in higher education and if/how this changes over time. A description of the sample is presented first, followed by the findings from the two types of analysis that were undertaken; the longitudinal analysis across cases and the longitudinal analysis within cases.

8.2 Sample Description

A total of 14 participants were recruited to participate in this LQR study. While all 14 completed the first interview, one participant could not be reached to complete the second interview. At time 1, ten interviews were conducted face-to-face and four were conducted via telephone. At time 2, all 13 interviews were conducted remotely due to the restrictions imposed by the COVID-19 pandemic. Four participants opted to complete their second interview via telephone while the remaining nine participants completed it via zoom. The sample characteristics and AT profile sections below will detail information for all 14 participants (see table 8.1). However, the findings from the longitudinal analysis across cases is based on the data from 13 participants, who all completed two interviews and thus, longitudinal analysis could be performed to identify changes/continuities over time.

8.2.1 Sample characteristics

Four males and ten females participated in this LQR study. Participants ranged in age from 19 to 58 (*M*= 28.93, *SD*= 12.04). The types of disabilities that participants lived were quite diverse with six having multiple disabilities, three a visual impairment, two a physical disability, one a hearing impairment, one a mental health condition and one Autism Spectrum Disorder. All students were registered with the disability office in their HEI. In relation to academic characteristics, the majority of participants were undergraduate students (n= 12) with two participants completing postgraduate programmes. The disciplines of study represented were; Education and Training, Humanities and Arts (n= 5), Science, Maths, Computing, Engineering, Manufacturing & Construction (n= 5), Social Science, Business and Law (n=2) and Agriculture and Veterinary, Health and Welfare, Services (n= 2).

8.2.2 AT profile

All participants were currently using AT. The majority of participants were using educational AT (n= 8), followed by multiple AT devices (n= 5) and visual aids (n= 1). Nine participants indicated that their AT needs were fully met while five participants indicated that they had unmet AT needs.

Table 8.1

Sociodemographic and AT characteristics for participants in phase two

Participant number / pseudonym[a]	Age	Gender	Disability Type	AT used / AT needs (met vs unmet)	Programme of study
P001	58	Female	Physical disability, significant ongoing illness	Educational AT / unmet needs	UG
P002	41	Female	Visual impairment	Educational AT / unmet needs	UG
P003 / Anna	21	Female	Hearing impairment	Aids to hearing, educational AT / met needs	UG
P004	22	Male	Specific learning difficulty, speech & language disability, significant ongoing illness	Educational AT / unmet needs	UG
P005 / Rachel	20	Female	Mental health condition	Educational AT / met needs	UG
P006	21	Female	Dyspraxia, specific learning difficulty	Educational AT / met needs	UG
P007[b]	19	Male	Dyspraxia, specific learning difficulty	Educational AT / met needs	UG

Participant number / pseudonym[a]	Age	Gender	Disability Type	AT used / AT needs (met vs unmet)	Programme of study
P008	22	Female	Physical disability	Educational AT, mobility aids / met needs	UG
P009	37	Female	Specific learning difficulty, mental health condition, significant ongoing illness	Educational AT / met needs	UG
P010	21	Male	Visual impairment	Educational AT, visual aids / met needs	UG
P011 / Mary	38	Female	Visual impairment	Educational AT, visual aids, mobility aids / unmet needs	PG
P012 / Aoidean	22	Female	Physical disability	Educational AT, other / unmet needs	PG
P013	21	Female	Physical disability, visual impairment	Educational AT, visual aids / met needs	UG
P014	42	Male	Autism Spectrum Disorder	Educational AT / met needs	UG

Note. UG= undergraduate; PG= postgraduate

[a] Participant numbers are provided for all participants. In addition, pseudonyms are provided for participants whose journeys over time are outlined in case histories

[b] P007 completed the first interview only and thus his data is not included in the longitudinal analysis

8.3 Findings from longitudinal analysis across cases

8.3.1 Introduction

In the longitudinal analysis across cases, the through line ‘feeling valued’ in negotiating identity changes and continuities over time is presented. The central role of this through line is then demonstrated through the three emblematic themes of identity change/continuity identified through the analysis; 1) Feeling autonomous and competent; 2) Claiming disability; and 3) Feeling like you belong. For each emblematic theme, an overview of what this theme encapsulates is presented first, followed by participant experiences at time one and then trajectories of change/continuity over time. Each trajectory also highlights key factors which influenced identity change/continuity for participants over time. Throughout the results section, direct quotations from participants are included to support the analytic narrative.

8.3.2 Feeling valued

The through line for this study is ‘feeling valued’, which was central to negotiating identity changes and continuities over time. Feeling valued captured the participant’s desire to feel like a valued, worthy person. This included feeling valued oneself but equally feeling valued by others. Maintaining a sense of value was important for the self, and when participants encountered situations or circumstances that undermined or threatened their sense of value, there was a need to re-establish a self-concept of a valued, worthy person. This was achieved through a variety of identity management strategies. In this way, feeling valued was not static and was open to ongoing consideration over time. This self-system, which centred around participants feeling like a valued, worthy person, governed the negotiation of identity changes and continuities over time across three emblematic themes; 1) feeling autonomous and competent, 2) claiming disability and 3) feeling like you belong. These emblematic themes spanned over time and demonstrated the processes of change/continuity. Processes refer to pathways of change/continuity over time with a focus on how and why they unfold the way they do. Processes incorporate “a rich tapestry of events, actions and interactions that are linked together in a meaningful way through time” (Neale, 2021, p. 249). Personal, social and environmental factors influenced identity change and continuity within each of the aforementioned emblematic themes. The conceptual model in figure 8.1 below gives a visual representation of the through line, emblematic themes and key factors of influence in this LQR study and will be discussed in detail in the sections that follow. This LQR study captures the trajectories of identity change and continuity (see figure 8.2) for participants during a specified period in time, namely over the course of an academic year. It does not attempt to represent participants’ experiences before or after this period and it is possible that participants may move between trajectories as they continue their journey.

Figure 8.1

Conceptual model of the negotiation of identity change/continuity over time across the three emblematic themes

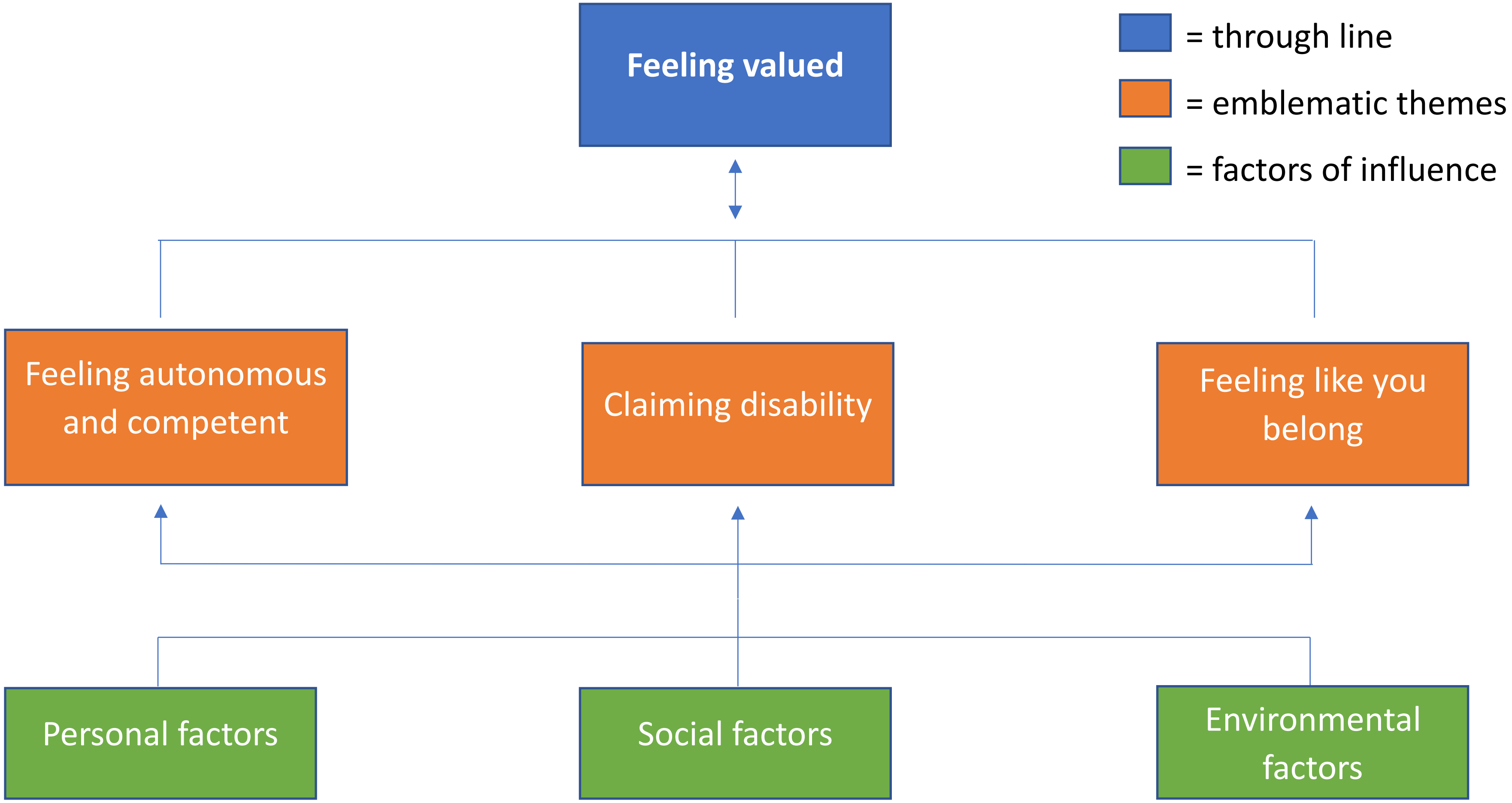
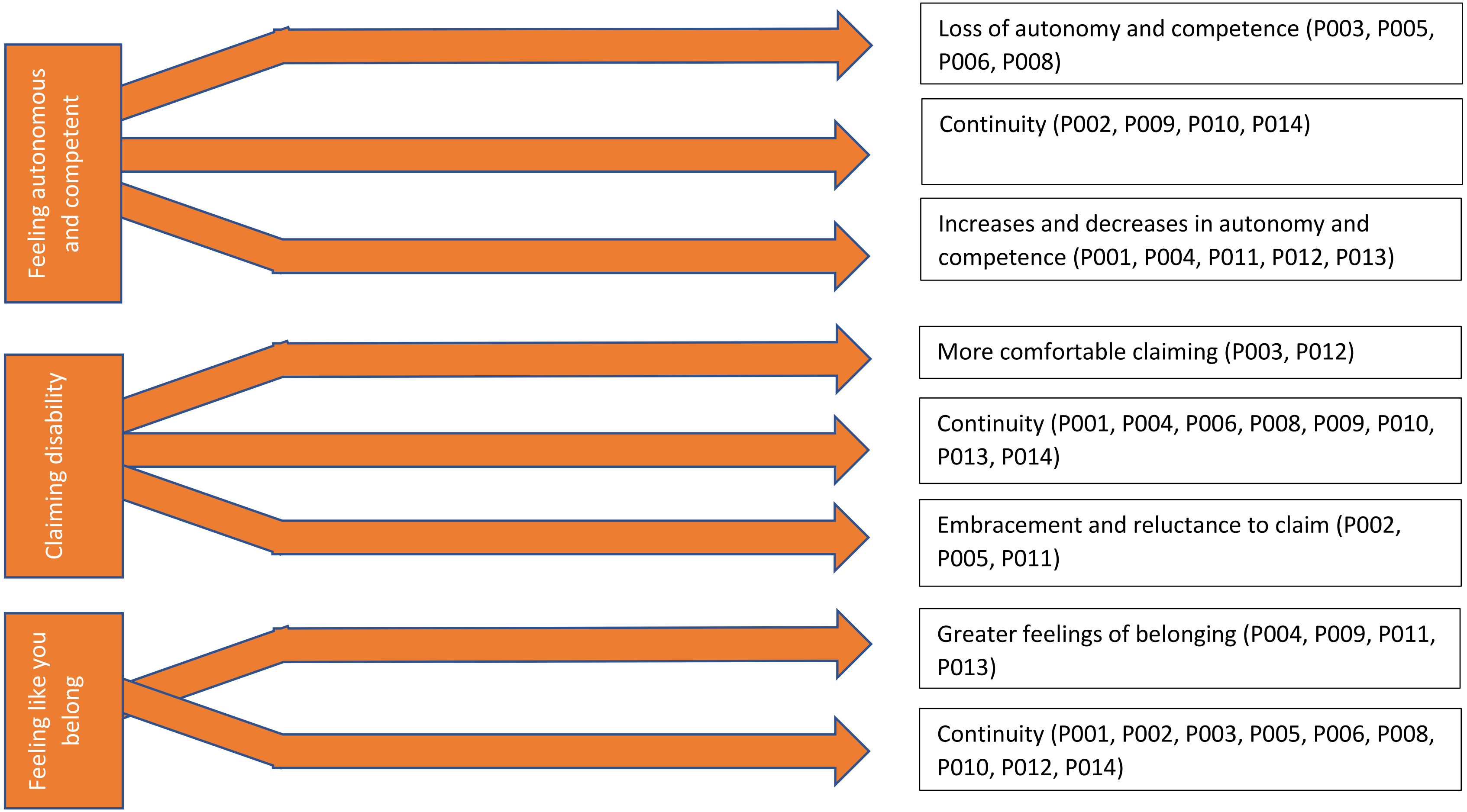


Figure 8.2

Trajectories of identity change/continuity over time across the three emblematic themes



8.3.3 Feeling autonomous and competent

This emblematic theme focuses on the extent to which participants view themselves as autonomous and competent. In relation to the higher education environment, this was concerned with feeling capable and successful as students, having the ability to independently socialise with friends and generally being able to engage on a similar basis to non-disabled peers. Outside of the academic environment, feeling autonomous and competent was concerned with being able to live a 'normal' day to day life. For many participants, their sense of value was staked on competence and others recognising them as capable individuals. Thus, the desire to feel like a valued, worthy person drove them to be as independent and competent as possible in their daily lives. Over time, stability in feelings of autonomy and competence resulted in participants continuing to feel valued. However, in cases where their autonomy and competence were undermined, this drew into question participant's sense of value.

At time 1, the majority of participants (P001, P002, P003, P005, P006, P008, P009, P010, P011, P012, P013 and P014) noted feeling autonomous and competent which promoted a sense of value. Access to AT and PA support services enabled completion of academic work, increased academic performance and promoted social interactions with others both inside the classroom, such as in class-based activities and discussions, and outside the classroom at extra-curricular college events. For some participants, access to these supports made studying at third level a possibility and increased their confidence in their abilities to complete their programme of study. Not only did this bolster personal feelings of competency, but also demonstrated to others their abilities and proficiencies. This was central to participants feeling valued themselves and valued by others.

> *"…when I do write my papers up, I've got this [AT], you know… It's just easier, everything is easier. And so, that makes me feel competent and it makes me feel like empowered and it makes me feel um, like I'm going to succeed." – P001, time 1*

> *"just like confidence. I'm happy with the support [AT]. I'm happy with what I'm submitting in college. Em, I genuinely don't think I'd have passed half my exams that I have without it." – P006, time 1*

> *“Um, in my understanding. Like if someone asked me to explain a topic I will be like confident enough that what I understand, that this like complex issue, when I like share the knowledge I have it’s right. I'm not afraid, ‘Oh, I might have this wrong,’” [as a result of use of recording device in class] – P008, time 1*

> *“Well with the likes of the hearing aid and stuff I find that just again with hearing like, I can hear better, you know if I’m at anything say with clubs and socs or anything. That if there’s something going on I can, I’m able to hear what’s going on so I can get myself more involved.” – P003, time 1*

> *“Yeah, like I had my graduation for my diploma in November, so, um, I was, like, I was proud because everyone was saying how proud they were and, like, how amazing it was that I actually could do it.” – P013, time 1*

Some participants were conscious and aware that AT increased the visibility of their impairment and highlighted them as different to others. However, it was also how they could be independent and successful within the academic environment. By renegotiating meanings attached to AT, viewing it as an enabler rather than a marker of difference, participants were able to maintain a positive sense of identity even if faced with stigma or potential stigma from others. Participants maintained a sense of value by focusing on how AT could empower them to be competent and capable students.

> *“I actually think they both [power wheelchair and recording device] make me more confident. Like I know, okay, the chair at times can, uh, make me self-conscious. People like, oh, people are looking at you because of the chair, you stand out. But that's like minimal compared to the amount of confidence it actually gives me to get out, go about, um, socialise in everything. Like I'm more confident coming across campus because I know, "Oh, I can do this myself. I can go here, I can be independent." And then like I'm definitely more confident in, um, terms of what, the material I'm submitting in exams.” – P008, time 1*

However, for one participant (P004), who did not have access to AT, such as a recording device or audiobooks, he struggled to keep up with his academic demands. This undermined his sense of value as he was not able to perform as well as his peers in tutorials. Feeling incompetent in these situations discouraged him from going to class and placing himself in situations where his sense of value as a capable student was threatened.

> *"I'd be in the library on like a Saturday or Friday and I'd be like okay I've this, I've this reading to do on a Wednesday and I'd be like. And I also have this essay to do. And for some people like the reading might only take an hour. But for me it takes like, I don't know how long because I usually never do it. But then I kind of find myself like, kind of like, oh no I should have done that and then kind of I feel down and I go into class and everyone is there discussing what they felt of the essay and then kind of the question comes to me and I'm there like oh yeah yeah. I kind of have to make something up." – P004, time 1*

In terms of trajectories from time 1 to time 2, some participants experienced a loss of autonomy and feelings of competence, for others feelings of autonomy and competence remained the same, while for others this fluctuated, ebbing and flowing between increases and decreases in these domains.

8.3.3.1 Trajectory 1: Loss of feelings of autonomy and competence

A loss of autonomy and feelings of competence over time was evident in the case of four participants (P003, P005, P006 and P008). For these individuals, moving from feeling autonomous and competent to feeling disempowered was influenced by a complex interaction of environmental factors, such as COVID-19 restrictions, a lack of accessibility of online lectures and lack of access to AT and PA supports, and social factors, such as internalisation of negative societal perceptions. The COVID-19 restrictions caused significant issues in relation to maintaining necessary support services when students were learning remotely. In person PA supports that were previously provided in the higher education environment were discontinued and some students did not have timely access to technical AT support when breakdowns or issues were encountered. As a result, P008 and P006 were rendered dependent on family members for assistance due to a lack of appropriate supports (PA and AT, respectively) but the domains affected differed; P008 lost autonomy in relation to her ability to get out socially or move around but her sense of autonomy and competence in relation to her academic work was unaffected due to continued access to AT. However, for P006, her sense of autonomy in completing academic work was affected while her ability to get around was not; this student had a specific learning difficulty and had no mobility issues. Similar to P006, an issue with using AT for academic work was encountered by P003. However, unlike P006 this was not as result of limited access to technical AT support; rather online lectures were not provided in an accessible format. Poor sound quality made her hearing aids redundant while a lack of provision of live captioning made it difficult to engage with online content. For P005, she experienced a deterioration in her mental health as a result of the uncertainty around COVID-19. This drew her competency into question surrounding her ability to manage her mental health without the need for professional support, but also undermined feelings of competency in relation to her academic engagement, something which was noted as very important to her sense of value at time 1. For all the above participants, these negative impacts on autonomy and competency threatened their sense of value.

> *"you miss having that like with having- in having a PA, there's so much, uh, more independence you have. Um, away like from family and just the independence that you kind of lose when you come back home and are relying on your family to help you through the day...Definitely not a choice I would go without." – P008, time 2*

> *"I got feedback off um, one assignment that I submitted and he said that the- I only got 57 which to me was a low grade especially for an aviation model. Um, just a low grade. And I spoke to him about it and he said that I had like all the points but I lost- I had all the like points, all the talking points he wanted me to mention. But he said that like the flow, it just didn't flow, and he said that really brought me down." [Consequence of breakdown with text-to-speech software] – P006, time 2*

Participants chose to deal with threats to their autonomy and competence in various ways in order to protect or maintain their sense of value. These strategies included minimising, problem solving, denial and avoidance. Minimising can be seen in the case of P008 who downplayed the impact of dependency on family members by noting everyone was ‘cocooning’ and going out socially was not an option anyway. Both P006 and P003 engaged in problem solving, independently sourcing alternative, easily accessible AT solutions to support engagement with academic content; for P006 this took the form of chrome plug in which supported her in proofreading essays while for P003, she used earphones which enhanced the transmission of sound while engaging with online lectures. P005 engaged in denial and avoidance, not wanting to admit to herself or others that her mental health had deteriorated and avoiding interactions with peers which could heighten her anxiety. Lack of understanding and empathy from peers was an ongoing concern which could undermine her disability experience, and thus, disclosing her mental health difficulties was actively avoided.

> *“Um, but like I haven’t been able to say that I'm anxious either to people. Do you know that kind of way? I couldn’t just. I don’t know. I wish I could just send in a message being like, “Aw right here lads, I'm not feeling great. I'm anxious.” But they're not going to get it so I don’t want to...I don’t want to admit I’m not doing okay as well.” – P005, time 2*

8.3.3.2 Trajectory 2: Continuity in feelings of autonomy and competence

Continuing to feel autonomous and competent in relation to academic work was evident for other participants (P002, P009, P010, and P014) across time. Unlike some of the students above, they experienced no change in access to supports such as AT specific to engagement in learning activities or a PA (albeit remote support) from time 1 to time 2. P002 did become more dependent and reliant on AT but this did not diminish value or self-worth as AT promoted feelings of competence. For P009 and P014, they had access to the same AT they had previously, namely recording devices, however the availability of recorded lectures for the whole class towards the latter part of the academic year negated the need to use these devices at all or as frequently as before. For these participants, while device use changed, the potential benefits associated with use remained the same. For P009 and P010, they noted how AT use promoted confidence to contribute and participate in class through increasing their understanding of lecture content. Ongoing supportive relationships with friends in the class also promoted commitment to academic endeavours for P014.

> *"It's [AT] my lifeline for, for doing- It's gonna be for the, doing the online stuff definitely. I know from, from um, doing the assessments and doing the assignments, it's like- You kind of think I'm not gonna need this as much but you realise, "Oh actually, I really do need this."… I don't know if I'd manage [without AT]. I wouldn't do as well. I wouldn't do as well in my degree." – P002, time 2*

> *"I think I'm just a lot more confident in a classroom based environment to take part uh, in regards to like questions and stuff like that [as a result of access to AT]." – P010, time 2*

8.3.3.3 Trajectory 3: Increases and decreases in feelings of autonomy and competence

It was evident for other participants (P001, P004, P011, P012 and P013), that feelings of autonomy and competence ebbed and flowed from time 1 to time 2, with participants experiencing both increases and decreases in these areas. For P001, P004, P011, P012 and P013 some changes were abrupt, while others were gradual over time, with shifts occurring in response to environmental factors such as COVID-19 restrictions, familiarity with the higher education environment and access to AT, and social factors, such as contact with others with disabilities and internalising negative societal perceptions. For P001, P011 and P012, they experienced increases in feelings of competency and autonomy because of access to AT and digital technology. P001 acquired access to specialised chairs on campus in her HEI; these chairs enabled her to sit comfortably and get up independently, something which she did not have access to at time 1 and greatly appreciated. Both P011 and P012, felt more confident and capable about pursuing further study and employment due to the positive experiences with AT and/or digital technology such as zoom since time 1, with P011 adapting to and using more AT around the home. Digital technologies removed environmental barriers such as students having to physically travel to the university campus or workplace for classes or meetings, which increased accessibility and made future goals more achievable. P011's involvement in an AT club also promoted these positive changes in perspective through upward social comparison. These positive changes in autonomy and competence increased participants' sense of value and promoted a positive sense of identity, given that autonomy and competence were areas where participants staked their self-worth.

> *"Well, it [AT], it makes you feel better about yourself in general, you know. You feel like a productive, successful person because you're, um, you're able, you know, you feel able." – P001, time 2*

> *"I'm hoping to go back, um, so it has given me some hope over what, what could be available…I suppose a PhD is four years and a lot can happen in four years…Um, and just, just being, just being tired, just being fatigued and exhausted to know that if I want to stay with my family in, in Lucan, and my family in Lucan where it's more comfortable. And you know I have a little bit more help there. Um, when I'm not feeling the best that I can tune in [virtually]." – P012, time 2*

> *"I think by using more of the assistive technology, it's making me think that I can go forward and maybe down the road, I can go into work environment and not be maybe as conscious as what I was when I was in college." – P011, time 2*

P004 and P013 similarly experienced increases in feelings of autonomy and competence but AT was not the driving force for these changes. For P004, he felt more competent and capable in his academic work due to completing a group project with another student in his class who also had a specific learning difficulty and approached work in a similar manner. This contrasts with time 1 where he viewed himself as incompetent due to not being able to keep up with his non-disabled peers when completing class work. For P004, his reference group for comparison of his academic abilities changed over time. For P013, she felt more confident and capable about navigating the higher education environment without a full-time PA at time 2. This was primarily due to being more familiar with her environment and no longer seeing the need for full-time support in the future. Experiencing increases in autonomy and competence promoted participants sense of value due to placing importance in these domains. For P013, autonomy meant doing things by and for herself wherever possible; the quotes below for P013 reflect the change in feelings of autonomy and competence across time.

> *"I try so hard to do everything myself. Like as much as I need help, I'd say, "I'll do it myself. I'll do it myself." And I do it, and I get it done even though it would be much slower and it could be wrong but, like, I'm still like trying and, like, I'd be trying and trying and trying and then eventually, I'd get it. Um, yeah, like I'd prefer not to have a PA but as much as I need her, like, I'll, I'll use her and then eventually, hopefully, someday I won't need a PA." – P013, time 1*

> *"I kinda feel probably more confident in college and I think next year I probably won't have a full-time PA. I, I just don't think I need one…I'll call and book a PA for me if I need one but. Like for like, like I don't need like a scheduled PA at certain times really." – P013, time 2*

However, there were also times since the first interview, when these participants (P001, P004, P011, P012 and P013) experienced a loss of autonomy and competence. Some of these participants (P001, P011, P012 and P013) felt disempowered and their value or self-worth was threatened due to being rendered incompetent. For P013, this was due to a functional issue with her AT, which was encountered on the day of her exam, and hindered her ability to answer a question. For other participants (P001, P011 and P012), feelings of disempowerment persisted for an extended period, with these individuals becoming more dependent on family members since the pandemic. For P001, lack of access to the specialised chairs in her HEI since returning home and engaging in online learning put increased pressure on family members as she was unable to get up without assistance. Meanwhile for P011 and P012, feelings of disempowerment was as a result of malfunctioning AT and lack of access to PA supports respectively. When faced with these challenges to their autonomy, competence and sense of value, P001, P011 and P012 internalised societal perceptions of disabled people as dependent and incompetent. This resulted in participants engaging in self-stigma, feeling like they were a burden on others and viewing the need to ask for assistance as a sign of weakness, particularly when the relationship was not viewed as interdependent. This demonstrates how a threat to competency is intrinsically linked to and can activate negative stereotypes of how disabled people are viewed in society and make participants reluctant to request disability related support. It also highlights how participants were concerned about not only their own feelings of competency but also demonstrating this competency to others to maintain a sense of value.

> *"if I spend the whole day at the university and I've been, I have been sitting comfortably in different spots and I can get up on my own and everything, it's not so bad when I get here [home] and I sit down, I was like, [family member], can you help me get up, please? It doesn't hurt me as bad. 'Cause it does. Every time I have to ask for help, it's like, oh. But, um, like right now, we're here. We're stuck here [at home]. It's like, every time I'm going to move, I have to ask someone to help me." – P001, time 2*

> *"It's hard because you're, you're trying to make sure that when you need to go on that they're around, and then if they've something it kind of- making sure like if I have a call, like I had a lecture on Friday, my mom and dad were both going off to do something because they can get out now. And I had to say to them like, "Well, like can one of you stay?"... So it's relying on them. So you kind of feel like you've, you've gotten to the point where you can use software and you're independent in the college, but now you feel like you've gone like 10 steps back because you're relying on, um, on people to kind of get you on." – P011, time 2*

In order to protect their sense of value or self-worth, some participants engaged in social mobility strategies, where they attempted to leave the in-group and join the out-group (Branscombe & Ellemers, 1998). For some, this involved trying to distance themselves from their stigmatised disability identity and appear as independent and competent as possible, while others used means such as minimisation. Some participants downplayed their disability to appear as 'normal' and not in need of support to alleviate strain on family members; P001 developed strategies and techniques to promote independence in the home and reduce the need for assistance from others, at the expense of extreme physical exertion, and P012 refrained from asking for support from family members at times even if it was needed. For P013, she engaged in minimisation, downplaying the importance of being able to answer the question on her exam- *"it was only one mark so*

I wasn't too fussed about it." P011 had no choice but to continue asking for assistance from family members if she wanted to continue her education. While she was conflicted about asking for help, as it reminded her of the autonomy she had lost, she was determined to complete her Masters degree and thus recognised the importance of enlisting support from family members.

> *"I take that shoe hook and I reach way forward and I grab the edge of the door and I pull the door, so it's perpendicular like this, and I hang on to the doorknobs and I lift myself up. It's all so painful and hard. But with that, way in the middle of the night, I don't have to bother anybody." – P001, time 2*

> *"I suppose having, having a PA even in the home I know it's, I'm going off topic but it's having, having all that stripped away from you and suddenly you're relying on your family all of the time. I have found at times I have refrained from asking certain things because and, and that's you know I shouldn't feel that way and I am not made to feel that way certainly not. But it's just when you know you have a PA you know, they're there to support you, they have to support you [laughs] or there will be trouble. They have, they have to that's what they're paid and, and you know that's what they're there to do." – P012, time 2*

> *"it's kind of hard to kind of accept that I was so independent doing things, and now you're kind of back having to ask people to get you on because technology is just not, packages just aren't working together…you just have to keep, keep going keep getting up and going each day. And then, as I say, if you need to go on, you just ask someone to click you on and then you're on for the lecture." – P011, time 2*

When relationships were viewed as interdependent, there was less reluctance about seeking out support. While P012 didn't feel comfortable asking family members for assistance as outlined above, she did ask for support from a notetaker since the move to online learning, given it was a time of high stress. This support was not needed previously and generally P012 liked to do her own notetaking, but in this instance her self-worth or value was not compromised. This may be explained through her viewing the relationship with her notetaker as interdependent; assistance was provided in exchange for payment organised through the disability office.

P004 differs from the three participants (P001, P011 and P012) outlined previously in that while he did experience a loss of autonomy from time 1 to time 2 and became more reliant on family members, this was a conscious decision he made. Although P004 had access to the same AT he used previously, he voluntarily chose to stop using it. Instead, he opted to rely on his mother for support when proofreading assignments since returning home. Unlike other participants, relinquishing his autonomy and relying more heavily on family members did not negatively impact his sense of value. One explanation for this is his negative attitudes towards technology generally which was evident at both time 1 and time 2. It seems that AT was only used as a last resort rather than first resort when proofreading his work. As a result, he did not view reliance on his mother as a negative; instead, he viewed it as a means of enlisting the best support available to him. In addition, his mother was quite involved with his academic journey from a young age and did also offer some assistance at time 1. Taking the above factors into consideration, relying on support from his mother didn't undermine his sense of value or self-worth and he was happy to ask for and receive assistance.

> *"Well actually yeah since I'm at home like um, mam would read over my assignments so I haven't been- uh I haven't like, instead of me like kinda wasting my own time trying to correct it myself, mam could just like flick through them and highlight any like sentence that was misspelled or uh like wrong or anything… I kinda stopped using the technology since I got home. Again it was kinda beneficial cause you know a person's always better than a machine." – P004, time 2*

8.3.4 Claiming disability

This emblematic theme focuses on the willingness of participants to claim their disability. Claiming disability is a component of disability pride and refers to the extent that individuals acknowledge their impairment, embrace disability as a part of who they are and exhibit a willingness to transform negative perceptions in society surrounding disability (Dunn & Andrews, 2015; Lyons et al., 2018; Putnam, 2005). The meanings attached to disability and the potential consequences of claiming disability in a given situation were important considerations for participants' sense of value. If claiming disability promoted or maintained a sense of value, participants were happy to embrace their disability as a part of who they are. However, if claiming undermined or could potentially undermine their sense of value, they were reluctant to do so. For some participants, they felt valued themselves and by others in society as they were not limited or restricted by their disability, through access to appropriate supports, and could lead the lives they wished. Thus, they were happy to embrace their disability as part of their identity. Claiming disability also promoted a sense of value when participants made positive contributions to the disabled community through advocacy work and challenged negative perceptions towards disabled people. However, in some cases, more importance was placed on meeting able bodied norms in order to feel valued oneself and by others which led to a reluctance in claiming disability. Concerns about the perceived legitimacy of disability by oneself and others also impacted on the willingness of participants to claim their disability. Feeling valued, in the context of claiming disability, was not static and was open to ongoing consideration. Participants strived to maintain a sense of value over time which resulted in continuity and in some cases, changes in willingness to claim their disability.

At time 1, the majority of participants (P001, P003, P004, P006, P008, P009, P010, P011, P012 and P014) claimed their disability and embraced it as a part of who they were. These participants felt valued as a disabled person as they were able to participate and engage on a similar basis to non-disabled peers, even if this was through unconventional means. Claiming their disability also ensured that they had access to appropriate supports such as AT, to enable them to lead the life they wanted. For some participants, AT was incorporated strongly into their identity and viewed as a part of who they are.

> *"On the whole, it's, it's, you know, it's quite doable to manage. Um, and I know people who are completely blind who, who have PhDs and you know, are, are parents and what not, you know? So it's, uh, you know, what we- if you- it's [disability] really not a limitation if you know how to go about it." – P010, time 1*

> *"I know for me to be able to do this and for me to be able to get to do things on a day to day like a normal person, I need that accessibility feature on my iPhone. I need the AT to be able to go and live like an independent life, and not be relying on others." – P011, time 1*

> *"It's [AT] the extension of my arm… it's just my thing. It's just what I do. And it's my routine." – P012, time 1*

Through claiming disability and viewing it as an important part of their identity, some of these participants placed less importance on approval and acceptance from non-disabled peers. As a result, participants were able to maintain a sense of value and positive sense of identity even if they encountered perceptions from others that were incongruent with how they viewed themselves.

> *"I used to be very like, not very open about it because of past experiences but then I kinda started to learn more like, it's who I am and I've just got to deal with it. Em, other people just have to deal with it and if they don't like it, they don't like it but I can't change [laughs] who I am so" – P003, time 1*

> *"Yeah, there's definitely lecturers and like other students that don't understand and they think it's just the way to get out of Irish when you're like, eight, but yeah, I don't really care. [laughs]. It is frustrating but at the same time like people have a lot of wrong opinions about things [laughs]. You just kind of get on with it. Em, I was actually more subconscious about it when I was younger. But I actually did my BT young scientist. I did that, um, on the benefits of Dyslexia. That definitely helped me with my confidence about it. I can talk about Dyslexia for like hours if you want [laughs]." – P006, time 1*

Some participants (P003, P006, P011) took on ambassador roles within their university where they engaged in advocacy work and tried to educate others about disability and the related supports that are available at third level. Claiming disability in this way helped participants feel valued through assisting prospective SWD.

> *“I think just when I'm talking to other students at the open day or the likes when I go out on the school visits, I like talking to them or telling them what I use. The fact that nobody really cares when you get to college in a way that you're using this [AT] like and the supports that are available in [University Name] are great. That I found and just being able to tell them my own experience and them kind of seeing their kind of sigh of relief like oh thank God I didn’t know that was there, that was available because there’s things they don’t get in school um, that they might need but when they come to college they have that opportunity to get them.” – P003, time 1*

Some participants (P003, P008, P009, P011, P012) viewed disability as a social construct resulting from stigmatising attitudes and an inaccessible, unaccommodating environment. They claimed a disability identity to transform negative perceptions of others and protect their sense of value at time 1. In some cases, this involved challenging unfair and inequitable treatment, which could place them at a disadvantage in higher education, while for others it was a means of dispelling misperceptions that they were faking their disability and ensuring validation and recognition of their impairment. AT played an important role in managing their disability identity through transforming these negative perceptions.

> *“They were like, "Oh, no we'll create a, um, a module that you'll just observe, um, another student carrying out the experiment and you'll sit and you'll watch and you can take notes on what they do but you don't do anything." And then like given the chance to speak, I was like, ‘Well, wait I can raise up [riser on wheelchair] like. This won't all be happening at my face. Like this can be happening at like waist level like everyone else when they're standing.’ So I think it just made me more determined to show them that I could do this. Like you don't need to treat me differently.” – P008, time 1*

> *“Then when I started using it [cane], like people, people who knew me from the two years, from the work I've done on campus are like, “We didn't realise it, it was this bad like now we realize that you actually have it, because you have this.” So, it was kind of showing to them as well that I had it.” – P011, time 1*

Other participants (P002, P005 and P013) at time 1 noted they were not entirely comfortable with their disability and claiming their disability was dependent on the context or situation. All three participants were happy to claim their disability when self-advocating for supports in university, as this was key to being successful as students. However, despite being able to participate and engage on a similar basis to peers, these participants also placed importance on meeting able bodied norms in feeling valued, and internalised some of the negative perceptions surrounding disability such as deviance. At times, they felt their sense of value could be undermined by not meeting able bodied norms and could result in stigmatisation. These individuals viewed disability as a personal flaw or failing rather than as a result of an inaccessible and unaccommodating environment. Thus, they were reluctant to claim their disability in certain situations and instead engaged in ‘passing’ or downplaying their disability. These were situations where they perceived that disability could be viewed in a negative light by others rather than accepted and embraced as a normal part of human diversity. For these individuals, their sense of value was being determined by perceived acceptance or approval from non-disabled people. For P013, this meant working really hard to overcome her physical disability so that she could achieve important milestones in her life and protect her sense of value.

> *“I suppose you just feel different. I feel different to people in the class as well, there’s that. You know I had a, I have the technology and I use it so you’re quite aware and people will ask you “oh what’s that for?” Em, you just feel different. Em, once you look different you know em, you don’t feel the same it’s, there’s a barrier there you know em, regardless of how much acceptance you have around what’s gone on for you…Em, I find, I suppose some people you know would be judgemental.” – P002, time 1*

> *“You don't know what anyone is gonna say. And even meeting new people in college, you kind of have to wait until things settle before you mention it [mental illness]. Which is awful to say at this stage, but it is like.” – P005, time 1*

> *"I went so far into like my future. I was like when I'm getting married or having children, I just thought about like I can't be in a wheelchair and going back to college, you're working and all that kind of stuff. And I just worked really hard, my physio- I think my physio knew how much I wanted it and eventually, like I went from a wheelchair to, um, a frame and then a frame to a rollator and then rollator to stick." – P013, time 1*

In terms of trajectories from time 1 to time 2, some participants became more comfortable in claiming disability and embracing it as a part of their identity, for others there was continuity in willingness to claim disability, while for others claiming disability was dynamic, with participants noting times where they were more comfortable with embracing their disability and equally times where they were reluctant to claim their disability. The implications of these continuities and changes for participant's sense of value will be discussed in the following paragraphs.

8.3.4.1 Trajectory 1: More comfortable claiming a disability identity

It was evident in the case of two participants (P003 and P012) that they experienced shifts in their willingness to claim their disability from time 1 to time 2. While these participants did claim a disability identity at time 1, there was an evident change in how they embraced their disability at time 2. These participants noted being less self-conscious and incorporating their disability more strongly into their identity and who they were as a person, as a result of environmental factors such as the online learning environment and access to digital technologies and social factors, such as contact with others with disabilities in an AT club. For P012, changes in perspective came about as a result of the online learning environment. Positive experiences with online learning and digital technologies such as zoom, demonstrated the possibilities of remote working for future employment and study for P012 and the feeling that "the ball is a bit more in [her] court." This in turn increased her willingness to self-advocate and challenge employers or HEIs who were not offering remote working/learning opportunities, to increase accessibility for herself and others with disabilities. This was not something she was comfortable doing at time 1, accepting situations where she had to physically turn up to class in order to receive notes from her lecturer, despite experiencing impairment related fatigue and asking that the notes were sent electronically. For P012, claiming disability now centred around fighting for inclusion and ensuring that the voices of disabled people were heard so they have more opportunity to engage in employment and study in the future.

> *"It's a shame it's taken uh, like a, like a global pandemic for people to wake up and smell the coffee. And employers, and university staff in particular. Um, so, hopefully, we can turn that into a positive… To have more, to have a bit more power in your situation, a bit more of a say. And to be saying, 'Well, actually, look, this can work, it worked for months during COVID. Um, I have a genuine reason for why.'... you know, 'why, why can I not come in even at 10:30, let's say, I work for an hour at home. I'm logged on, I will be on and I'll do whatever needs to be done, and then I'll come in.'" – P012, time 2*

Similarly, P003 demonstrated that disability was more strongly incorporated into her sense of identity at time 2. She spoke about using stickers to "add [her] own kind of stamp" to her hearing aids, teaching children on placement about hearing difficulties and setting up an Instagram page to outline her journey with her hearing impairment and AT. This is in contrast to time 1 when P003 noted that she only disclosed on a need-to-know basis, if at a disability related event or if someone asked. The driving force behind this change was joining a group of hearing aid users and being in regular contact with individuals who had a shared sense of understanding of her experiences, since the first interview. In addition, her continued involvement in her disability ambassador role in her university, since prior to time 1, had also promoted embracement of her disability, through speaking about her disability at numerous events. It is clear that she viewed her disability and AT use as a valued part of her identity at time 2 and felt compelled to share this with others and help those who may be struggling with coming to terms with their disability. For P003, claiming disability promoted a sense of value through helping others and raising awareness about disability and AT, and thus making a worthwhile contribution to the disabled community.

> *"I think I've just become, you know, more accepting of like my disability, and that like, you know, as I said, it's a part of me that I can't change, so why not use it [Instagram page] to educate others, and maybe like inspire others to share their journey, or like become more comfortable with it too." – P003, time 2*

8.3.4.2 Trajectory 2: Continuity in willingness to claim a disability identity

It was evident for other participants (P001, P004, P006, P008, P009, P010, P013 and P014) that there was continuity in willingness to claim their disability. Some participants (P001, P004, P006, P008, P009, P010 and P014) embraced their disability as a part of who they were at time 1 and this remained the same at time 2. They continued to feel valued as disabled people and were happy to claim their disability due to not being limited or restricted by their impairment in the way they lived their life, with AT playing a vital role in this for some. For P009, she just viewed her disability as a normal part of human diversity.

> *"I'm happy and I feel I'm fairly strong even though, um, even though it [impairment] like limits me in certain aspects. However, I don't feel like it completely, like it doesn't restrict me really. Um, if I want to do something I always say, there's always a way to overcome it and it mightn't be the exact way you want to do it or the exact thing you want to do but there is something that will closely resemble it or a modification you can make to achieve the same goal…I can feel more confident in myself, that I know I can do whatever really I need to do because I have, um, like this support [AT] behind me. So, maybe I suppose it would give me more confidence, um, in myself and belief in myself, um, to go out and do what I want to do." – P008, time 2*

> *"Well, I don't kind of see it as a hindrance because like everybody has their own learning- Like they learn different." – P009, time 2*

These participants placed less importance on receiving approval or acceptance from others, such as non-disabled peers. Even when they were potentially faced with negative, stigmatising attitudes from others related to their disability or AT, it did not diminish their sense of value. Some attributed this to the fact that they did not feel restricted by their disability and were able to engage in tasks deemed as important for the self. While for others, this was attributed to their strong sense of disability identity, which buffered against negative reactions having an adverse impact on their sense of self.

> *"Look, it is what it is, do you know what I mean. Um, people are going to notice [AT] and some people might comment behind my back- you know that kind of. I don't really care to be honest, as long as it gets me through college, I don't really mind." – P010, time 2*

> *"I've got autism, what the f*ck, let's get on with it. Uh, it just takes the sting out of it. This whole thing that, uh, 'What will they all say? What will they all think?' At this stage of my life, uh, am I going to fit in in college, I don't care." – P014, time 1*

Factors that facilitated continuity in embracing their disability and AT and viewing it in a positive light included personal factors, such as visibility of their impairment and early onset of impairment, social factors such as contact with others with disabilities and making friends in the class and environmental factors such as the visibility of AT and support from a psychologist. For P001, P008, P009 and P010, visibility was a key factor that influenced embracing disability as a part of their identity. For P001, the highly visible nature of her impairment facilitated claiming disability and embracing it as a part of who she is. For P008, P009 and P010, experiences using visible AT highlighted their disability to others, helping them to come to terms with it and openly embrace a disability identity if they wanted to participate. In addition, making a core group of friends helped P010 to become comfortable with and embrace his disability. These factors remained constant from time 1 to 2 and promoted continuity in participants claiming their disability as a part of who they were.

> *"I mean, all you have to do is look at me [laughs]. You can't hide it [laughs]… You can't imagine the size of my thighs. They're so big" – P001, time 2*

> *"I still feel the same way about that [disability]. Um, no, I'm happy- Yeah, I think everything has stayed the same, like I'm happy enough. Um, I see even like the wheelchair that's the big identifier nearly of like my disability but still the amount of independence that it gives me I- No, I'm happy, um, to be using that and to- I see the benefits in having it and how difficult it would be not to." – P008, time 2*

> *“The more I explained it [AT] to people the more they seem to understand it and just to kind of grow a thick skin, I suppose. But yeah, it was more, if you explain the situation, what it is, people they don't feel as alienated to it I suppose and you don't feel as alienated to them…because that way you're probably not thinking, “oh what are they thinking about that like, what are they wondering?” I suppose if you explain it to them, they are helped, I suppose it helps them to understand and for you to kind of feel a bit more comfortable at the entire, entire thing.” – P010, time 2*

P004, P006 and P014 also continued to claim their disability and view it in a positive light at time 2. For P004 and P014 contact and making friends with others with disabilities through events organised by the disability office or being surrounded by those with disabilities in the class ensured ongoing embracement of their disability, with these factors remaining static over time. These participants felt valued as a disabled person due to feeling ‘normal’ in the company of other SWD. In addition, early onset of disability for P004 promoted him viewing his impairment as part of who he was, while continuing support from a psychologist for P014 helped him to maintain a positive sense of disability identity across time.

> *“I've just lived with it for so long that it's like. It's a part- it’s just like breathing, or like, blinking now at this stage, you know and- Yeah. You know, you know yourself like it's just- you know I have a lot- anyone else who I know from the DARE [disability] scheme and the DARE [disability] open day it's the exact same… I mean, not that I'd be uncomfortable around if they didn't have a disability but for them, it's like, it's like, you don't have to explain like something, you know, it's just so normal for them as well.” – P004, time 2*

> *“I think that having a competent, um, psychologist, um, I think having a competent psychologist um, was a big plus. I think the mixture [disabled and non-disabled students] in the class was a big plus. And having the social supports. Because I always felt I went to college on my own. Now I feel that I go to college in a group.” – P014, time 2*

For P006, claiming disability was a way of challenging negative societal perceptions, something which remained important to her at both time 1 and time 2. Challenging the negative opinions of others through speaking up or demonstrating the inaccuracy of their perceptions, was key to her feeling valued. For P006, feeling valued was concerned with ensuring others didn't underestimate her abilities as a SWD. Her awareness and resistance to stereotypes, and determination to challenge others' misperceptions, remained constant over time and facilitated viewing her disability in a positive light and embracing it as a part of who she is.

> *"Like it [dyslexia] doesn't just go away. Um, people- Like I would be, I would be pretty smart and people would be like, 'No, you're not dyslexic.' And I'm like, 'Dyslexic. Dyslexia isn't a judgment of your IQ. It's about your learning abilities.'" – P006, time 1*

> *"Um, like when I tell lecturers or like other students that like I've worked with for the last three years that I have dyslexia, they kind of say oh like you'd never know. Um, so I think that's like a credit to the work that I put in when I was younger. Um, I'd get myself up to that level where it's kind of undetectable. Um, so I think it did give me like a really strong work ethic that I still have today from working really hard when I was younger." – P006, time 2*

For P013, there was equally no change in her willingness to claim disability. However, unlike the participants above, P013 did not identify as disabled at both time 1 and time 2. She only claimed her disability when she felt it could be beneficial for accessing supports and information. While she accepted that she had "difficulties or differences", she did not embrace a disability identity. The maintenance or continuity of these feelings were influenced by the internalisation of negative societal perceptions of what it meant to her to be disabled, in this case dependence. Thus, her value or self-worth would be undermined if she embraced a disability identity, so in order to protect her sense of value, she used different terminology to describe her impairments, distancing herself from being categorised as disabled. P013 viewed herself as independent rather than dependent and thus, did not feel that she fit the category of disabled.

> **P013:** *"Um, no, I'd never see myself as disabled, I'd more see myself as having difficulties or differences. I just- I wouldn't like categorise myself as disabled at all."*
>
> **Interviewer:** *"Okay, um, why is that? Could you maybe just talk a little bit more about that or why you-?"*
>
> **P013:** *"Um, because I try so hard to do everything myself. Like as much as I need help, I'd say, "I'll do it myself. I'll do it myself." And I do it, and I get it done even though it would be much slower and it could be wrong but, like, I'm still like trying and, like, I'd be trying and trying and trying and then eventually, I'd get it." – time 1*

8.3.4.3 Trajectory 3: Embracement and reluctance to claim a disability identity

For other participants (P002, P005 and P011), willingness to claim disability was dynamic and changed on a number of occasions from time 1 to time 2. Participants spoke about feeling more comfortable with embracing their disability at points but equally noting times where they were reluctant to claim their disability. These changes were driven by personal factors such as deterioration and visibility of impairment, social factors such as internalisation of negative societal perceptions and negative reactions from others, and environmental factors such as the COVID-19 restrictions and online learning.

P002, P005 and P011 noted feeling more comfortable with their disability and/or AT, embracing it as a part of who they are from time 1 to time 2. For P005 and P011, this was due to experiencing deteriorations in their condition. In both cases, this was linked to COVID-19, with the general uncertainty around the pandemic exacerbating mental health difficulties for P005, while the move to online learning and increased reliance on using screens as a result of COVID-19, was associated with a deterioration in sight for P011. This deterioration resulted in P005 feeling more deserving of AT in comparison to time 1 and P011 resigning to the fact that she may one day eventually go blind and was slowly but surely moving more towards the non-seeing world. Thus, she needed to fully embrace AT and the possibilities it could afford to her.

> *"I think I've realised that it is going to happen. That it mightn't happen today or tomorrow but that I will eventually go blind but at the moment, it's, I think it's because I've had time to think the last couple of weeks that it's kind of, I'm kind of accepting it more that ok right well what have I got at this moment could go in a couple of weeks time or a couple of months time, but at this moment I'm happy, what I have and if I start learning what the accessible and get the technology now in place or the training in place, that I will be able to move forward and I think that's kind of I have accepted it more since the last time we spoke yeah." – P011, time 2*

Meanwhile, for P002, there was a shift from feeling different because of her disability to recognising it as only one part of her identity. She wanted to start focusing on what she could achieve and others recognising her potential, rather than being viewed as inferior or subordinate. This was facilitated by the move to online learning, opting to leave her camera off when engaging in lectures and thus, not being constantly open to public appraisal. Viewing her disability in this way and focusing on her strengths and capabilities helped her to maintain a sense of value.

> *"Yeah, it's probably not there because I'm not in college, you know and people are just not seeing you. Um, I don't even turn my video on, to be honest… It doesn't define me, you know. Because I'm many other things. I'm a mother, I'm a daughter and I may have partial vision but it's not all of me…I don't work off pity. Maybe I did when I was early after having the cancer, you know. Uh, that's just a role you fit into. And I kinda want to be, I want to be merit rather than pity." – P002, time 2*

However, for each of these participants, they also noted times when they were reluctant to claim their disability. Despite P002 and P005 feeling somewhat more comfortable with their disability, and the right to access AT in the case of P005, ongoing consideration of their sense of value made it difficult to fully embrace their disability as part of who they were. They were acutely aware of how those with disabilities could be viewed as deviant or devalued in society, and in the case of P005, that a mental health difficulty may not be viewed by some as a legitimate disability. Thus, their sense of value as a disabled person was constantly under threat and P002 and P005 internalised these negative societal perceptions. P002 still noted that feeling different was a concern at times and P005 viewed others with more significant disabilities as more deserving of AT than her, despite stating that she really needed it and relied on it since experiencing a deterioration in her mental health. For P005, lack of recognition from others illegitimised her disability and made her feel unworthy of claiming a disability identity. For both P002 and P005, approval and acceptance from non-disabled people was still viewed as important for their sense of value and thus, made them reluctant to claim disability at times.

> *"Sometimes I think society is, is very designed like, 'Oh you have to be and look a certain way.' Like I wouldn't, wouldn't use social media around because I just think they're a breeding ground for, you know, for destroying self-esteem. I see it in my daughter when she's on Instagram and everyone looks this way and is this way and if you're not like that you are not good enough, you know? So I have to mind that myself because I have the uh, added kind of being different, you know? – P002, time 2*

> *"I think I do deserve it [AT]. Like if I, if my friend was in the same position I was, I would be like, 'Oh, you totally deserve it.' And it was the same in like secondary school with getting the DARE scheme. Um, like initially, I was like, 'Oh no, this isn't for me.' Do you know, that kind of way? I mean, and that's definitely like down to the stigma around mental illness, I suppose that people like don't think it deserves the help that it needs. So I do think, generally I do think I deserve it [AT], but I still feel like there's probably more people who need the system." – P005, time 2*

Negative reactions from others also played a role in willingness to claim a disability identity for P002 and P011. For P002, a negative reaction from the AT officer in her institution threatened her sense of value and self-worth by activating stereotypes of a person with a disability in society as incompetent and incapable. Instead of accepting and internalising this perception like she did above with feeling different, she claimed her disability, challenging these perceptions to try and reframe stigmatising attitudes towards those with a visual impairment. This demonstrates that different contexts and circumstances can elicit different responses from the same individual over a period of time. She also noted she would be reluctant to ask for help in the future from the same individual as she was not being treated with the respect she deserved.

> *"I also had, uh, you know, the wire for the- there's a wire on the laptop. And I had to kinda, uh, it was coming apart and it was a bit of a safety issue. Um, and I sent a picture in, and I mailed about it. And it was kind of- It was, uh, like that the reaction real- You know, 'Are you sure you haven't been stretching it?' And it's like I'm not 10. Now I'm- Look, because of the eyesight and all I wouldn't be able to be as careful with stuff as- Accidents do happen because I'm partially sighted. Um. So, it- I can only go off my past experience with them and when someone is being like that you're kinda like, I'm a grown woman, and if something is coming apart, it's coming apart." – P002, time 2*

For P011, negative reactions from others in an online panel discussion influenced her willingness to claim disability. Lack of recognition of her impairment from others illegitimised her disability experience. The organisers did not acknowledge or accept her need for accommodations while participating, such as leaving her camera turned off. P011 was surprised by this reaction and initially claimed her disability through challenging this negative opinion and her right to such accommodations. However, her efforts were unsuccessful, and the organisers failed to change their position. This particular encounter undermined her sense of value as a disabled person, through not receiving validation from others, and as a result, she was more reluctant to claim and openly disclose her disability to others for a period of time afterwards. Being cautious about disclosing was a way of trying to avoid stigmatising reactions and protect her sense of value. However, some time after this incident, P011 realised that her disability was a part of who she was and began to care less about the perceptions of others. She embraced her disability as a valued part of her identity rather than staking her sense of value on approval from others.

> *"I had to disclose it now this week for something and like I had to disclose it yesterday for something that I'm going to be doing. And I wasn't as open…I wasn't as open say as I would have been before, because this is kind of my first time I had to disclose after that happened." – P011, time 2*

> *"Once I kind of talked about it then I went do you know something. It's my disability, I'm living with it and if people are going to be like that, then it's their problem. It's not, it's not my problem. It's the other, it's other people's perceptions of what's going on. And I'm still living and I am happy to disclose, the disability is part of me." – P011, time 2*

8.3.5 Feeling like you belong

This emblematic theme focuses on the extent to which participants felt like they belonged or fit in within higher education. Membership to a particular social group such as being a college student or being a person with a disability, and feeling connected and like you belong to that group, is a dimension of social identity known as in-group ties (Cameron, 2004). A social identity is described as "that part of an individual's self-concept which derives from his knowledge of his membership in a social group (or groups) together with the value and emotional significance attached to that membership" (Tajfel, 1981, p. 255). Social identities can influence an individual's thoughts, feelings and actions in their desire to fit in and meet the expectations of a particular social group (Stets & Burke, 2003). Participants felt valued when they fit in and felt they shared common bonds with others in the higher education environment. Over time, feelings of belonging for some participants remained the same while for others, they experienced greater feelings of belonging.

Feeling like you belong or fit in within higher education was important for participants' sense of value. At time 1, some participants (P006, P008, P010, P011, P013) spoke about initially finding it difficult to fit in within higher education and to feel like they belonged as a SWD, particularly during their first year. In particular, the use of AT highlighted them as different and made it difficult to feel like they fit in with non-disabled students. Lack of understanding and awareness of AT and disability from non-disabled peers contributed to stigmatising reactions such as avoiding contact.

> *“I suppose at the start I suppose it a lot of people- It was harder for I suppose, it meant people didn’t really approach me as much as, um, they would other people. Do you know, everyone else kinda sat together with, uh- I know they were side by side obviously in a lecture while you are close with people, you start chatting to them. Whereas I was down the front more so with the camera [AT] and it took longer for me to kinda get to know people but, obviously, once I did then it was fine, do you know? But, uh, it was just, it was a slower process because people were obviously on- Yeah, they- You know, they'd obviously never seen it before so they were kinda wary of it and, uh, I think it just took bit of getting used to for everyone for, you know, for it to be part of the classroom environment.” – P010, time 1*

> *“I like, I like to talk to people and make friends and stuff, so. I like to interact and sometimes them big things [visual aid] can like, kind of like, push someone away like, they- I know like, they probably don't want to intrude on like, you doing something. But like, they're kind of like, blocking people, if you get me.” – P013, time 1*

Some of these participants used social identity performance strategies, such as reducing the visibility of AT or refraining from using it altogether, to avoid stigmatising reactions and fit in more with peers. Reducing the visibility of AT involved opting for mainstream devices with assistive features, or devices that looked similar to mainstream products, rather than using AT that was given to them by their HEI. Others dealt with this through reasoning that the benefits of AT, such as progression through higher education, outweighed the negatives such as standing out. All of the above strategies were a means of trying to maintain or protect their sense of value when they struggled to feel like they fit in with others in their class.

> *“I didn’t want to bring it [digital voice recorder] out on the desk the first few weeks in first year of college… you don’t know who you’re sitting beside… I didn't want that to be their first perception of me.” – P006, time 1*

> *"It's a pen so it looks like any other pen. I take it out of my pencil case… it doesn't draw more attention to you. Like when you're in a lecture hall and everyone's coming in and out. No one knows that you're recording the lectures to use for, for later. So, like you are like every other person in your class who is just going to the lecture and taking notes." – P008, time 1*

> *"I knew I was going to have to continue using it [AT] if I wanted to, um, continue with my education. Um, so you know, I, I, uh, didn't mind too much [visibility of AT] 'cause I wanted to be there. I wanted to be in college to learn so um, you know, I didn't go there completely- you know, I went there to learn more than to make friends." – P010, time 1*

However, all of the above participants (P006, P008, P010, P011, P013) noted during the first interview that they gradually experienced increased feelings of belonging over time and a greater sense that they fit in with others. P008 not only felt she fit in more with non-disabled students in her class but also felt like she belonged through her involvement with a disabled sports club in her university. Use of a specialised sports wheelchair made involvement in sports possible for this participant.

> *"it was just, it was a slower process [forming relationships with others] because people were obviously on- Yeah, they- You know, they'd obviously never seen it [AT] before so they were kinda wary of it and, uh, I think it just took bit of getting used to for everyone for, you know, for it to be part of the classroom environment." – P010, time 1*

> *Um, but um, now I have made a few friends outside of like lecture halls, so they would now sit at the front with me. I don't mind anymore but in first year I would have been conscious that oh, I'm sitting here by myself." – P008, time 1*

Two participants, P003 and P014, felt like they belonged and fit in from the start of their higher education journey. P003 felt like she fit in with non-disabled peers in her class but also felt connected to the disabled community in her HEI through her involvement in disability ambassador roles. Within the classroom environment, she noted how others didn’t draw attention to her AT use which facilitated feeling like she belonged. P014 noted that being surrounded by others with disabilities in his class facilitated feeling like he fit in with others. For both participants, feeling like they belonged promoted a sense of value through being accepted by others as SWD.

> *“Like I find even in my class like if people know that I'm recording lectures or have a digital voice recorder, like they've seen it but they don't really care that you have it, you know…I think you know, when you’re coming through education as well and you’re kind of in this, when your peers react positively I think that’s a big thing.” – P003, time 1*

> *“The class are fantastic. The class are all, uh, outliers or outsiders as well. They would be outside the normal click and suddenly we're all jumped in together. Now, we're in the click and the neurotypicals are on the outside [laughs]. So we have, uh [coughs] we have a couple of neurotypicals in the class… And it's a very supportive class. They make a joke about the autism then it's over. That's it. Um, there's no walking on eggshells, stuff like that. You’re accepted.” – P014, time 1*

For others (P005, P009 and P012), their ability to fit in was an ongoing concern and they were quite conscious about feeling different or struggling to feel like they belonged as a SWD, during the first interview. For these participants, having a disability made it difficult to navigate an environment within which they were the minority. P012 longed for a disabled organisation in her university where she could join and feel valued as a SWD. P005 spoke about her desire to engage in extra-curricular activities, to be like other students, but feeling reluctant to do so because of the commute and her social anxiety. However, ‘blaming it on the commute’ was a narrative that she returned to again and emphasised later in the interview to explain why she struggled fitting it. This may have been a way of protecting or maintaining her sense of value, by attributing her inability to fit in to external rather than internal factors.

> *“like you probably have people sit here and kind of say, oh like it's important to be like really social and like, get on into there. And I do see it. Like I saw and I didn't fully immerse myself in it at the start of last year, because the commute. I*

> *blamed it on the commute, but I think I was also like really socially anxious. Um, so it's probably something that I regret not doing, um, getting more involved in clubs and societies and stuff because there's things that I'm like, I'm interested in. But it's just something I wouldn't do." – P005, time 1*

Other participants (P001, P002 and P004) felt like they belonged in certain aspects of college life but still struggled with feeling different at times. Both P002 and P004 felt like they belonged through their involvement with extra-curricular activities but struggled to fit in within their class. For P001, she struggled to feel like she belonged in the wider university environment, where as a SWD she was in the minority, but she felt like she fit in when spending time in the disability suite in her university.

> *"Em, you just feel different. Em, once you look different you know em, you don't feel the same it's, there's a barrier there you know em, regardless of how much acceptance you have around what's gone on for you, you know." – P002, time 1*

> *"This is the area like this whole um setup with the disability section. This is heaven for me. This is like a sanctuary…There's kids here that have really bad anxiety, kids that are on the spectrum that nobody you know nobody wants to talk to them. There's blind people that just want to come in and do their thing. You know there's every kind of disability and there's a lot of them. But it's like a sanctuary for us because if we had to be out there with all the other kids yeah it'd be kind of hard." – P001, time 1*

In terms of trajectories from time 1 to time 2, some participants experienced greater feelings of belonging in higher education, while others experienced continuity in their feelings of belonging. Within the continuity trajectory, some participants still struggled with feeling like they belonged while others continued to feel like they fit in over time.

8.3.5.1 Trajectory 1: Greater feelings of belonging

An increase in feelings of belonging was evident for P004, P009, P011 and P013 at time 2. This was due to social factors, such as contact with others with disabilities and increased familiarity with others over time. For P004 and P011, contact with other SWD increased feelings of belonging and the sense that they fit in with others. For P004, carrying out a group project with another student with dyslexia in his class helped him feel like he belonged. He experienced an increased sense of competency, due to working with someone with similar abilities, which facilitated him feeling like he fit in. For P011, getting to know other SWD through an AT group increased feelings of belonging through the knowledge that she was not alone in her disability related struggles and others could empathise with and understand her experiences. Feeling like they fit in more with others promoted a sense of value for both participants. For P004, this was through making a worthwhile contribution to the group project, feelings which had been lacking at time 1 with regard to his academic work. For P011, it was coming to view AT as a tool of empowerment that can enable her to live the life she wants rather than a marker of difference which hinders her ability to fit in with non-disabled peers.

> *"we kind of had the same way of kind of thinking. Or like the way we laid out the, like, I don't know. It's funny how like our kind of abilities matched up. Like, um, uh, like, I dunno, it's the way we both worked together worked really well for some reason. And I think we put that down to being dyslexic…Whereas if I was working with another group and none of them were dyslexic, it would be kind of, I don't know. Like I'd feel like, I'm the odd one out. I'd feel like, 'Oh, I, uh, I have a load of work to do and I'm so behind, and I'm so like kinda drowning in work.' It just kinda worked out, how well it worked, how well we kind of fitted together as a group and we done really well on that assignment too." – P004, time 2*

> *"It's actually made me realise that, uh, even though, even though you struggle with it [AT], it's your way of having independence. So, and that you're not, I suppose for a while I thought I was the only one who was struggling with AT around college work and different things and talking to different people who are at the same, same stage as me. They're having the same struggles." – P011, time 2*

For P009 and P013, who were both in the first year of their programme, their increased sense of belonging was down to becoming more familiar with peers and lecturers and vice versa. This increased their sense of value as they felt more accepted by others and less self-conscious about their disability or AT use. For P009, greater feelings of belonging in the class promoted confidence in asking for or offering support to others. P009 also noted that the continued availability of recorded lectures post pandemic would facilitate students feeling like they belonged or fit in within the class, as they wouldn't miss out if they were sick or unwell. For these participants, their disability became less salient over time in the university environment and they began to feel like they fit in more as a college student, through others treating them the same as everyone else.

> *"Like, because the girls were starting at that time, I think, they would've been asking then but um, no I think. Like second semester like everyone was kinda more, no one, like no one was like looking at the stuff [AT] I think, I don't know. I think I just settled in I don't know, as anyone else did but it just felt like more normal and casual." – P013, time 2*

> *"Before I would be very quiet with approaching people but, since like, since we got to know, myself and the classmates got to know each other we always kind of help each other out." – P009, time 2*

8.3.5.2 Trajectory 2: Continuity in feelings of belonging

It was evident for other participants (P001, P002, P003, P005, P006, P008, P010, P012 and P014) that there was continuity in feelings of belonging from time 1 to time 2. Factors that played a role in the continuity of these feelings included personal factors such as the impact of impairment on day-to-day life and social factors such as internalisation of negative societal perceptions, contact with other SWD, involvement in ambassador roles and having a core group of friends.

Some students (P001, P003, P006, P008, P010 and P014) continued to feel like they fit in and belonged within their HEI at time 2. The continuity of these feelings for some participants resulted from continued contact with other SWD, for P001 through studying with others in the disability suite, for P008 through a wheelchair soccer team, and for P014 having friends with disabilities in his class. While P008 was no longer able to play sport as a result of the COVID-19 restrictions, she buffered against this negatively affecting her feelings of belonging and sense of value as a student athlete by actively seeking out "things to do that relate to it" [wheelchair soccer]. For P006 and P003, their feelings of belonging were promoted through involvement in ambassador roles within the university which remained constant. P006 did note however taking on a new position as a disability ambassador since time 1. Being actively involved in college life was a key part of P006's identity and her feeling valued as a student. P014 maintained contact with friends in his class through digital technologies such as Microsoft teams when COVID-19 restrictions prevented him from seeing them in person. Feeling part of the class and having continued support from disabled friends was a major source of motivation and confidence for P014, promoting feelings of value and self-worth, despite the uncertainty surrounding the pandemic.

> *"I think like I'm class rep. I was, on, involved in the aviation society. My grades wouldn't be the best. I'm average, I ranked 19 out of 40 average but, at the same time, my CV is one of the best. I'm not like gloating but like my experience my involvement in societies, my involvement in [university name] itself. Like as an ambassador giving presentations. Like, I am one of the bigger characters in the course." – P006, time 1*

> *"I'm more in contact with my classmates because I was very in contact with them but it [Microsoft teams] has kept me in contact, uh, with my classmates and it's helped morale no end. And that's been the biggest morale booster I've had this year than I ever had previously before at college." – P014, time 2*

Similarly, P010's feelings of belonging within higher education was influenced by having a core group of friends in his class, but unlike P014, these were non-disabled students. The importance of these friends were mentioned again at time 2 in relation to him fitting in as a student in the class and not feeling self-conscious about using AT.

Other students (P002, P005 and P012) struggled with fitting in and truly feeling like they belonged in higher education and these feelings remained the same at time 2. Factors that maintained these feelings over time included personal factors such as impact of impairment, and social factors such as internalisation of negative societal perceptions of disabled people and feeling part of a disabled community. For P005, her social anxiety and a long commute prevented her from getting involved in extra-curricular college life, making friends and meeting new people. As a result, she felt like an outsider in her university and these feelings remained constant over time. P005 actively tried to minimise the importance of fitting in to college at time 2 in order to try to protect her sense of value.

> *"I'm two-thirds done at college. I only have a year left. So I'm not too pushed on it at this point. Do you know? And when you were saying that back and it sounded really sad [laughs]. And I was like, 'Oh, but I really don't. [laughs] Like I don't care, so.'" – P005, time 2*

For P002 and P012, struggling to feel like they belonged was related to trying to fit in as a person with a disability, a person who belongs to a stigmatised, minority group. For P002, internalisation of negative societal perceptions of disabled people as deviant led to continuity of feeling different at time 2, despite noting that her university was generally accepting and open to people with disabilities. This continuously undermined her sense of value and ability to truly fit in as she was acutely aware that others may view her as inferior rather than an equal partner. P012 wished for a space where her disability could be embraced and viewed as the norm, rather than feeling different from others. She did not feel part of a disabled community in her university and there were few opportunities to get to know other disabled students. As a result, she felt isolated in university which undermined her sense of value and self-worth.

> *"it's kind of, uh, it's a paradox, isn't it? We all want to be different but yet we don't. You know? I want to be different than you but yet I don't want to be different than you. So yeah, you want, you wanna be different for different reasons. You don't want to be different for because I'm less than you." – P002, time 2*

> *"a sense of community and being a part of the community. I would say it's a shame. Um, maybe I hope in the next while if I go back into the university that something might start or I might see if something can start and if I can start something on myself. Um, there should be more opportunity to, to congregate and socialise and just have the craic with people you know, that know what it's like. Um, because as far as I can see, every other student who identifies in their own*

> *respective communities as they are well entitled to do. They have their, their, um, they have their space and time to congregate uh, and have fun. And I think you know, I think we should have that uh, same, same, uh, same chance." – P012, time 2*

8.3.6 Conclusion

In summary, the above section has presented the findings of the longitudinal analysis across cases which details the role of the through line, feeling valued, in the negotiation of identity change/continuity across three themes; 1) Feeling autonomous and competent, 2) Claiming disability and 3) Feeling like you belong. The next section will outline the findings from the longitudinal analysis within cases.

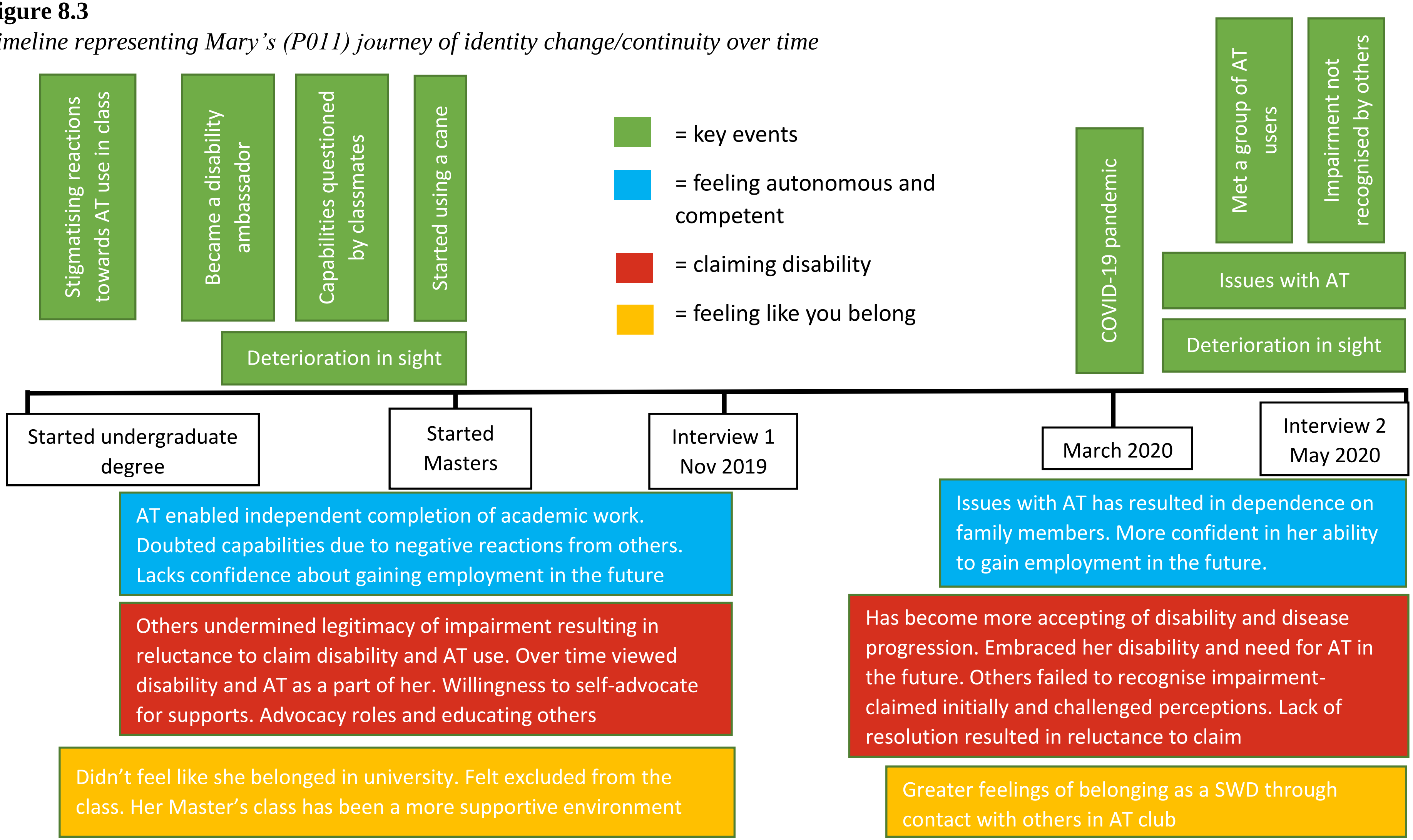
8.4 Findings from longitudinal analysis within cases

8.4.1 Introduction

Longitudinal analysis within cases involved the construction of case histories. Case histories are presented for two participants, providing an in-depth account of their experiences over time (Thomson, 2007; Thomson & Holland, 2003). This served the purpose of providing a rich and detailed insight into the complexity and nuances in an individual's journey which could not be otherwise captured in the cross-case analysis. Participants were selected for case histories on the basis of quality and richness in the data (i.e. their journeys offered significant insights). Selection of case histories in other studies has equally been based around similar criteria (Carduff, 2013; Thomson, 2007). Pseudonyms are used in depicting the case histories so that the reader can get the sense they are following the journey of a person over time. However, corresponding participant numbers are also provided which match with the ones used in the cross-case analysis. The two case histories are presented below; one depicting Mary's journey (P011), a postgraduate student with a visual impairment and the other Rachel's journey (P005), an undergraduate study with a mental health difficulty. A further two case histories are presented in the appendices for the interested reader; one depicting Anna's journey (P003), an undergraduate student with a hearing impairment (see Appendix M.1) and the other Aoidean's journey (P012), a postgraduate student with a physical disability (see Appendix M.2). Each case history is structured by the three emblematic themes: 1) Feeling autonomous and competent; 2) Claiming disability; and 3) Feeling like you belong; and demonstrates the central role of the through line 'feeling valued' in negotiating changes and continuities over time. A diagrammatic timeline is also presented for each case history detailing key events in each participant's journey and experiences within the three emblematic themes. The green boxes above the line represent key events which the participants spoke about. Coloured boxes below the line represent experiences within each of the emblematic themes over time. Blue boxes were used for feeling autonomous and competent, red boxes for claiming disability, and yellow boxes for feeling like you belong.

Figure 8.3

Timeline representing Mary's (P011) journey of identity change/continuity over time



AT enabled independent completion of academic work. Doubted capabilities due to negative reactions from others. Lacks confidence about gaining employment in the future

Others undermined legitimacy of impairment resulting in reluctance to claim disability and AT use. Over time viewed disability and AT as a part of her. Willingness to self-advocate for supports. Advocacy roles and educating others

Didn't feel like she belonged in university. Felt excluded from the class. Her Master's class has been a more supportive environment

Issues with AT has resulted in dependence on family members. More confident in her ability to gain employment in the future.

Has become more accepting of disability and disease progression. Embraced her disability and need for AT in the future. Others failed to recognise impairment-claimed initially and challenged perceptions. Lack of resolution resulted in reluctance to claim

Greater feelings of belonging as a SWD through contact with others in AT club

8.4.2 Mary’s Journey (P011)

In this section, I will explore Mary’s journey over time, a 38 year old postgraduate student with a visual impairment who was completing a Masters programme at her HEI. She was interviewed at two time points over the course of an academic year. Mary’s visual impairment is progressive and impacts on her ability to navigate her environment or complete academic work without support from AT or a personal assistant (PA). Mary was using various types of AT such as visual aid software for the computer, Voice Over on her iPhone and a cane when I first interviewed her. Her journey through higher education thus far has been difficult and challenging. She has encountered stigmatising reactions from others towards her disability and AT use, had to contend with breakdowns in AT devices and a deterioration in her visual impairment, adjust to acquiring new AT devices and adapt to learning remotely during the COVID-19 pandemic. However, she also had access to support systems through her involvement as a disability ambassador and with an AT club, and supportive relationships with friends, family members and staff in the disability office which assisted Mary in dealing with and overcoming some of the challenges she was faced with. The purpose of this case history is to explore Mary’s experience of identity changes and continuities over time across three emblematic themes; 1) feeling autonomous and competent, 2) claiming disability and 3) feeling like you belong. The importance of the through line ‘feeling valued’ in negotiating identity changes and continuities over time will be highlighted throughout. The evolving role of AT in student and disability identities is also highlighted, as Mary comes to view AT as something which empowers her and is part of who she is over time, rather than a device which highlights her as different and makes it difficult to fit in with others. Mary’s journey is one of resilience and hope, demonstrating her determination to continue her academic journey despite the obstacles she was faced with.

8.4.2.1 Feeling autonomous and competent

Viewing herself as an autonomous and competent person was important to Mary feeling valued. However, she noted at both time 1 and 2 instances where her autonomy and competence was undermined and her sense of value threatened, but equally instances when she experienced greater feelings of autonomy and competence which promoted a sense of value. Mary managed these threats to her sense of value and identity as an autonomous and competent person by enlisting social support from others.

During the first interview, Mary spoke about negative reactions from fellow classmates in the latter stages of her degree that challenged her identity as a competent and capable student. Classmates refused to work with her on a group project as they believed she wouldn't be able to contribute because of her visual impairment. This completely undermined Mary's feelings of competency and her sense of value as a SWD. This threat to her sense of competency resulted in her internalising these perceptions and engaging in self-stigma. However, supportive relationships from staff in the disability office helped Mary persevere and maintain a sense of value through insisting that she "could do it academically."

> *You know you're entitled to be in that class. You know you can do the work but because someone else starts doubting you, then you start doubting yourself on whether you can do it or not." – time 1*

Mary also noted that for large parts of her degree, she did not use AT and was dependent on her PA to do notetaking, assist her with assignments and proofread her essays before she submitted. This undermined her autonomy and competence and threatened her sense of value as a capable student as she received poor marks in the past due to failure by her PA to include the relevant material or ensure documents were formatted in the correct way, despite Mary providing her with the appropriate instructions. However, since starting her Masters, Mary has embraced AT and viewed it as an enabler to actively participating and engaging in university. AT made her feel competent in her ability to complete academic work independently and afforded her more control over the quality of work she was submitting. Thus, this increased her sense of value as a SWD in higher education. Being reliant on others was something she wanted to avoid moving forward.

> *"It's [AT] given me much more confidence. It's given me like I feel like I'm achieving something because I'm able to sit and I'm not like relying on someone." – time 1*

> *"where now I'm pulling my own materials like right, if it's not right, the only person who's to blame for that is me." – time 1*

However, despite the positive experiences with using AT during her Masters, Mary noted that she didn’t feel overly confident about getting a job in the future. She did recognise the valuable role that AT would play though if gaining employment was a possibility.

> *“So if I go on and work in the future, which I hope I do, but it’s not looking good at the moment. But if I do, AT will be a big part of my life because as it progresses, everything I will do will be through AT through the accessibility options on the phone.” – time 1*

It was evident at time 1 the important role that AT played in Mary viewing herself as an autonomous, competent student. However, at time 2, Mary experienced a breakdown with her AT device while engaging in online learning which could not be resolved remotely by her HEI. Her visual aid software crashed every time she ran it alongside Microsoft Teams and as a result, she relied on her parents to log her on to online lectures. This was something that Mary really struggled with and found hard to accept as previously she was so independent with the use of AT. Not having access to AT undermined feelings of competency in her ability to engage in academic work without support.

> *“it's kind of hard to kind of accept that I was so independent doing things, and now you're kind of back having to ask people to get you on because technology is just not, packages just aren't working together.” – time 2*

Mary was conscious that this increased reliance on her parents may have been an inconvenience for them. She was aware that she was asking them to make sacrifices in order to be available to help her. Rather than viewing herself as competent and autonomous like at time 1, this made her feel dependent and a burden on others and undermined her sense of value as a student. Yet, she had no choice but to rely on her parents if she wanted to continue engaging with the material for her Masters. Thus, despite feeling conflicted about asking for help, she recognised the importance of enlisting support from family members to ensure she completed her Masters.

> *"It's hard because you're, you're trying to make sure that when you need to go on that they're around, and then if they've something it kind of- making sure like if I have a call, like I had a lecture on Friday, my mom and dad were both going off to do something because they can get out now. And I had to say to them like, "Well, like can one of you stay?"...It's kind of making- you have to make sure and you have to say to them, "Can you stop doing whatever you're doing that morning," for say whatever time you're due to go on. So if they're needing to do stuff, then they can't." – time 2*

> *"You just have to keep, keep going keep getting up and going each day. And then, as I say, if you need to go on, you just ask someone to click you on and then you're on for the lecture." – time 2*

However, despite Mary encountering the above challenges in engaging with online lectures, she noted that she felt more confident and capable in general about gaining employment in the future. This is in contrast to time 1 where she did not feel overly optimistic about it. This change in perspective for Mary came about due to increased use and reliance on AT as a result of a deterioration in her sight, and through her involvement with an AT club. Mary noted a deterioration in her sight since time 1, partly due to progression in her impairment but also due to increased use of screens as a result of the COVID-19 pandemic and move to online learning. This resulted in Mary acquiring and adapting to new AT which made her realise that she could manage in the future, even if her sight continues to deteriorate. In addition, through her involvement in an AT club since the pandemic, she engaged in upward social comparison, taking inspiration from others who had transitioned into the workforce. Feeling more competent and capable increased Mary's sense of value as she could now see herself making an important contribution to society on completion of her third level education.

> *"I think by using the different technologies at the moment, that has given me that perspective that, Okay, right down the road I could be in employment where before I didn't think that way, I kind of felt like once I finished college, that would be it. I wouldn't move on anywhere, um, I'd just have my degree, my education and now I'm kind of seeing by using these different things through this that there*

> *is a possibility of me going further than maybe where what I thought it was." – time 2*

> *"it's great to hear like you'd hear of some people who have gone through the college experience and were struggling with different things, and now they're in a work environment and it's working really well for them. So they got through it and they got there and how they, they came out of those struggles." – time 2*

8.4.2.2 Claiming disability

Mary's willingness to claim her disability and embrace it as a part of who she is was open to change over time. Initially, when starting out on her higher education journey, Mary was reluctant to claim her disability and use AT. However, over time she embraced her disability and AT as part of her identity. Despite this, she did recount negative reactions from others at time 2 which threatened her disability identity and made her more reluctant to claim for a period of time afterwards.

Mary had a good degree of vision when she started in university, noting "I look normal, I wear glasses." At this stage in her higher education journey, she didn't need AT such as a cane when moving around campus. However, as she progressed through her degree and her sight deteriorated, she started using visual aid software in class which enlarged text that she was reading. This was not accepted or understood by Mary's classmates and some questioned the legitimacy of her impairment and need for this AT, as otherwise, Mary appeared visibly 'normal'. They maintained that Mary was exaggerating or making up her disability solely to access extra supports.

> *"And they were looking at me and they were like, 'You don't need that [visual aid software]. You're just putting this on and you're just looking for extra marks and extra support, and you're just going to get extra support because of this.'" – time 1*

Lack of recognition from others completely undermined Mary's sense of value as a disabled person and her entitlement to access disability related supports. As a result, she chose not to claim her disability and instead tried to hide it from others. This was achieved through social identity performance strategies, where Mary purposively suppressed the visibility of her AT to de-emphasise association with disability and consolidate her identity as a ‘normal’ student. She abandoned using visible AT and instead opted to use assistive features on her iPhone, if necessary, which were less obvious to others in the class. The above strategies were a way of hiding her disability and protecting herself from situations where her sense of value as a disabled person could be drawn into question.

> *“Um, like I would use my phone if I need to, like if we're doing something in the class like a quiz or something I would use my iPhone because it doesn't bring as much attention because you're using, you know, like everyone will kinda use the phone, so even if you have an earphone in, if you're using the VoiceOver and you have an earphone in, it doesn't look like anything.” – time 1*

However, over time Mary’s visual impairment deteriorated until she got to a stage where it was not safe for her to move around campus independently, without using a cane. It was at this point, in the final year of her undergraduate degree, that she had no option but to start using her cane, even though she was not fully comfortable with this at the time. Mary was conscious that up until now she could conceal her disability but was now faced with a situation where her impairment would be obvious to others.

> *“if I start showing this around campus, people who know me haven't actually known how bad my disability is. I've been able to hide it and now I have this white stick and it's going to show, it's gonna emphasize what I have.” – time 1*

While initially Mary struggled with claiming her disability and need for the cane, over time she accepted that this was essential from a safety perspective. She also started viewing the cane as a means of highlighting and thus legitimising her disability to others. In this way, the cane could validate Mary’s disability experience to others and help her feel valued as a disabled person.

> *“And then when I started using it, like people, people who knew me from the two years, from the work I've done on campus are like, “We didn't realise it, it was*

> *this bad like now we realize that you actually have it, because you have this." So, it was kind of showing to them as well that I had it." – time 1*

It was evident that Mary renegotiated the meanings attached to her AT device. She started to view her AT as a protector from harm, a means of legitimising her disability to others and a tool of empowerment rather than something that should be hidden or concealed. AT made her feel confident about being able to lead the life she wished in a similar way to non-disabled peers. As a result, she felt valued as a disabled person and was happy to claim her disability and AT use, as she did not feel limited by her impairment.

> *"It's, it's making me realise that I'm changing, um, as a person like in maybe, in first year, I wouldn't have used them, where now, I know it's a bit like the cane being a part of me. I know for me to be able to do this and for me to be able to get to do things on a day to day like a normal person I need that accessibility feature on my iPhone. I need the AT to be able to go and live like an independent life, and not be relying on others. That I can go like if, if anything happened to like my support network that I know I can be independent." – time 1*

Aside from a deterioration in her condition, Mary's involvement as a disability ambassador in her university contributed to her shift in perspective around her AT and disability, encouraging her to embrace both as a part of who she is. Within this role, Mary spoke about her disability and AT to prospective students, which gave her the confidence to self-advocate herself, something which she was not comfortable doing previously. Mary started to view her disability and AT use as a valued part of her identity and who she was a person.

> *"Then I think as well what happened was that I started working with the [disability] ambassadors. I started working as an orientation leader and through that I had to do events like I had to do open days, I had to go and tell my story, especially as a mature student with a disability, there's not many of us in here. So I went out to different schools and I had to use my voice… So I think through doing my work with them was that each event I did, my confidence and my, my voice got stronger by, by doing that, being part of that. I became more confident*

> *to talk about it because I had to talk about it so much. I think it just- it was like, it was, it was like the cane. It became part of my story." – time 1*

Despite a challenging road, Mary noted in the first interview she was now happy to claim her disability and AT as a part of who she is and wanted to pursue employment in the area of advocacy in the future. Claiming her disability in this instance served the purpose of helping others and making important contributions to the disabled community through becoming a role model, which would increase her sense of value.

> *"I'm hoping to get in and do some advocacy work for people with visual impairments and try to encourage them to kind of go and get into education and go and look for work, because a lot of people with a disability don't have role models, so they don't actually see they're capable of doing it. So that's what I kind of want to go and work in." – time 1*

At time 2, Mary noted encountering situations which challenged her disability identity and undermined her sense of value as a disabled person. However overall, she felt more accepting of her disability and more comfortable with embracing it as a part of who she was in comparison to time 1.

Mary noted two instances since the first interview where others demonstrated a lack of understanding and recognition of her impairment. One was related to a lecturer putting materials up on the learning platform in inaccessible formats when learning moved online. The other was concerned with members of an online panel failing to acknowledge the need for accommodations, such as Mary leaving her camera off, while engaging in the event. In this case, they thought that Mary was simply faking her disability so she didn't have to appear on camera. In both cases, Mary claimed her disability and challenged the negative perceptions of others and her entitlement to accommodations. However, both incidents resulted in her feeling excluded and devalued as a disabled person due to the lack of recognition of her impairment by others.

> *"the person who was hosting turned around and said, 'You can't be part of this panel because everyone needs to be on camera. And you're just you, you're just using that because you don't want to be on camera.'" – time 2*

The negative encounter with the online panel, which failed to recognise Mary's impairment, impacted on subsequent willingness to claim her disability, despite Mary strongly identifying as disabled at this point. Mary noted being more reluctant to claim her disability and openly disclose to others for some time afterwards to avoid situations where her disability could be illegitimised and her sense of value as a disabled person threatened. However, over time she placed less importance on approval and acceptance from non-disabled peers in feeling valued and was happy to embrace her disability as a part of her identity, even in circumstances when she faced negative perceptions. This demonstrates how willingness to claim disability can be contextual and open to change over time, depending on its perceived risk to one's sense of value.

> *"Once I kind of talked about it then I went do you know something. It's my disability, I'm living with it and if people are going to be like that, then it's their problem. It's not, it's not my problem. It's the other, it's other people's perceptions of what's going on. And I'm still living and I am happy to disclose, the disability is part of me." – time 2*

Mary felt that she had become more accepting and comfortable with her disability and AT use since time 1, embracing both as a part of who she is. This was due to a culmination of factors such as experiencing a deterioration in her condition, which forced her to start using additional pieces of AT, having more to time to think about how AT could benefit her in the future and having the opportunity to get used to and feel fully comfortable with AT. The pandemic and the move to online learning facilitated Mary having this extra time to dedicate to AT training and get to grips with how it functioned.

> *"I think I've realised that it is going to happen. That it mightn't happen today or tomorrow but that I will eventually go blind but at the moment, it's, I think it's because I've had time to think the last couple of weeks that it's kind of, I'm kind of accepting it more that ok right well what have I got at this moment could go in a*

> *couple of weeks time or a couple of months time. But at this moment I'm happy with what I have and if I start learning what's accessible and get the technology now in place or the training in place, that I will be able to move forward and I think that's kind of I have accepted it more since the last time we spoke yeah." – time 2*

8.4.2.3 Feeling like you belong

In the earlier stages of her degree, Mary noted times where she struggled to feel like she belonged and fit in as a SWD in her class. However, over time through supportive relationships from friends and spaces where she was surrounded by other SWD, she experienced greater feelings of belonging. Feeling like she fit in and belonged was important for Mary's sense of value as a SWD.

Mary noted that during her undergraduate degree, she struggled to fit in with others in her class due to her AT use and negative reactions from lecturers. She spoke about how her AT made her stand out and how failure by her lecturers to make accommodations undermined feeling like she belonged. This resulted in Mary feeling devalued as a student in the class and different from her non-disabled peers. Struggling to feel like she fit in with others resulted in Mary engaging in self-stigma, questioning whether she belonged in higher education as a disabled student. Support from staff in the disability office was key in preventing her from dropping out of college at this time.

> *"if you've the laptop in front of you and you're doing something [with visual aid software], it brings attention to me." – time 1*

> *"sometimes you don't feel like you're part of the class either because they say they don't have the time to be doing this for you, but they have the time to be printing out like six-- like 26, 25 other students' PowerPoints or whatever for them and all it takes is like one, one like lot of slides to be changed slide size but they're saying they're too busy to do that, but they can, they can print out other stuff for, for the rest of the class." – time 1*

> *“you look at people like all chatting and bonding together and then you walk in, you're like saying to yourself, "Should I be here? Am I entitled to be here with a disability?" – time 1*

While Mary did struggle to fit in and feel included within her undergraduate degree class, being involved as a disability ambassador offered her a safe place where she could feel like she belonged during this time. This was due to being surrounded by others with disabilities who had a shared sense of understanding and empathy.

> *“I made friends through becoming a [disability] ambassador and an orientation leader. So that was my way of getting away. So if something bad was going on in class. I had that once a week so I used to go to that and people from all different areas, all the different disabilities were going there.” – time 1*

However, Mary experienced greater feelings of belonging in her class since starting her Masters. Mary felt that fellow classmates were more mature and understanding of her disability, and willing to offer help if needed. This helped her feel valued by others in her class.

> *“where this class, like, I feel more included in it because when we said from day one what I had and explained what it was, they were like, ‘Here, whatever you need, if you need our help or you need help with this or that, let us know.’” – time 1*

At time 2, Mary noted experiencing greater feelings of belonging and the sense that she fit in as a SWD. This centred around not feeling different when using her AT. Joining an AT club since time 1 facilitated this shift in her sense of belonging as she felt that she was not alone in her struggles and others similarly experienced challenges with their AT. This promoted Mary feeling valued through reinforcing the view that AT is a tool of empowerment that can enable her to live the life she wants rather than a marker of difference which hinders her ability to fit in with non-disabled peers.

> *"It's actually made me realise that, uh, even though, even though you struggle with it [AT], it's your way of having independence. So, and that you're not, I suppose for a while I thought I was the only one who was struggling with AT around college work and different things and talking to different people who are at the same, same stage as me. They're having the same struggles."* – *time 2*

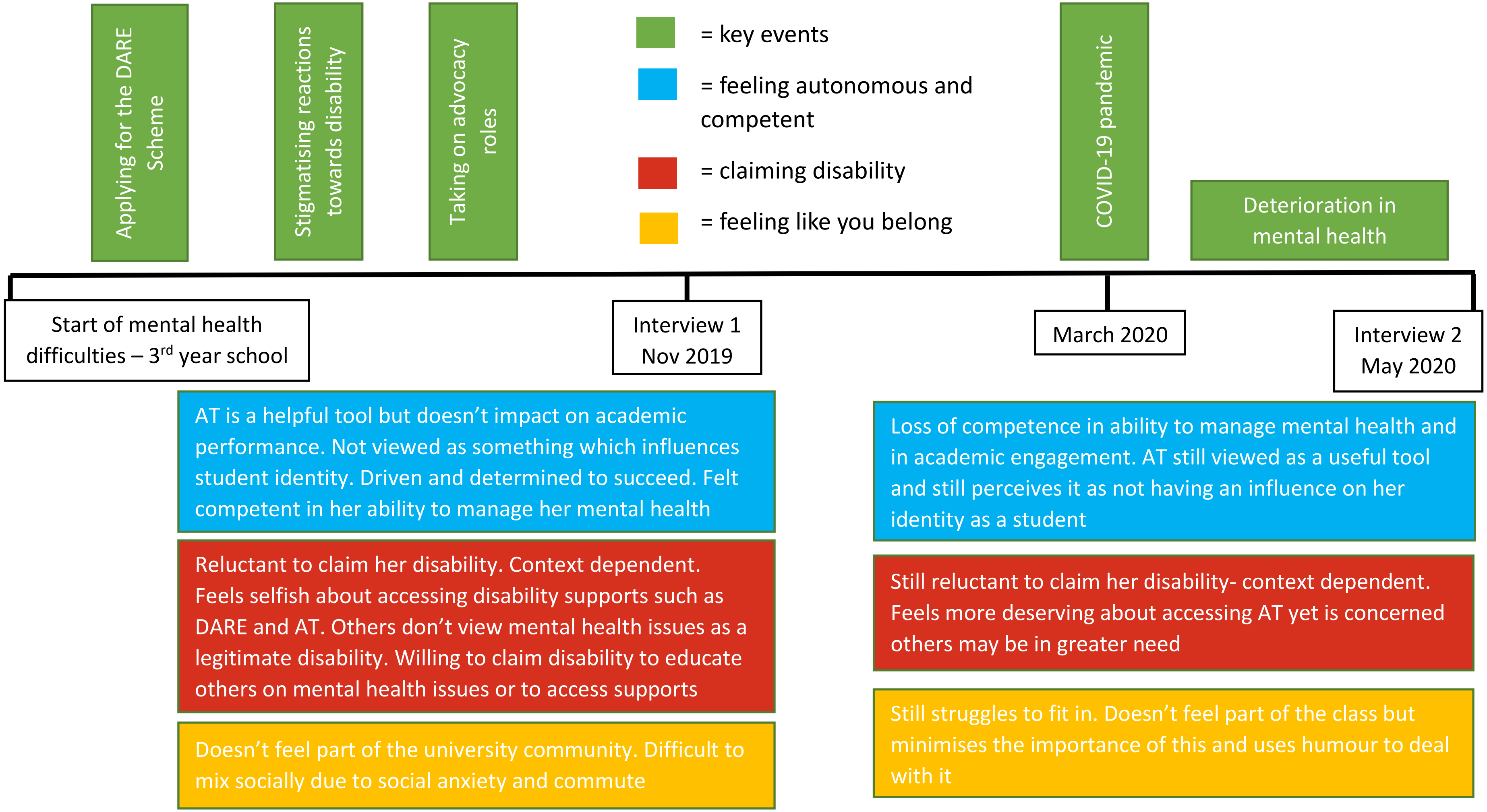
8.4.2.4 Conclusion

This case history captures Mary's experience of identity changes and continuities across three emblematic themes; 1) Feeling autonomous and competent, 2) Claiming disability and 3) Feeling like you belong. The through line of feeling valued played a central role in the way Mary negotiated identity over time. For Mary, feeling valued centred around feeling autonomous and competent in her ability to participate and engage academically and in her day-to-day life, having control over the life she lived, feeling legitimate as a disabled person, making positive contributions to the disabled community and feeling like she fit in and belonged in higher education. Mary encountered a number of challenges along her journey which undermined or threatened her sense of value such as breakdowns with her AT device, stigmatising reactions from others towards her disability and AT and the visibility of AT devices. However, Mary also had access to systems of support which promoted a sense of value such as her involvement as a disability ambassador and in an AT club. She used a variety of strategies when her sense of value was undermined to re-establish her self-concept of a valued worthy person. These included enlisting social support from others, reluctance to claim her disability and openly disclose to others in order to avoid stigmatisation, reducing the visibility of her AT or alternatively using her AT to highlight her disability to others to increase recognition and validation.

Mary's journey is one of resilience and hope. Over time, we see the transformation from a woman who is self-conscious about her disability and lacking in confidence to a woman who embraces her disability and AT as part of who she is and is willing to challenge negative perceptions of others and fight for inclusion. Her journey highlights how perceptions and meanings attached to AT are dynamic and can change over time in response to personal, social and environmental factors. We see a shift from viewing AT as a marker of difference which hinders her ability to fit in and is actively concealed or hidden, to viewing AT as a protector of harm and tool of empowerment which promotes confidence in her academic abilities and is the means by which she can highlight and legitimise her disability to others. The importance of AT for her student identity is brought into sharp focus when her visual aid software AT breaks down, undermining feelings of competency and rendering her dependent on family members. Mary’s journey highlights the impact of AT in both disability and student identities, and demonstrates the grit and determination needed to persist in higher education in the face of ableist attitudes and structures.

Figure 8.4

Timeline representing Rachel's (P005) journey of identity change/continuity over time



🟩 = key events

🟦 = feeling autonomous and competent

🟥 = claiming disability

🟨 = feeling like you belong

AT is a helpful tool but doesn't impact on academic performance. Not viewed as something which influences student identity. Driven and determined to succeed. Felt competent in her ability to manage her mental health

Reluctant to claim her disability. Context dependent. Feels selfish about accessing disability supports such as DARE and AT. Others don't view mental health issues as a legitimate disability. Willing to claim disability to educate others on mental health issues or to access supports

Doesn't feel part of the university community. Difficult to mix socially due to social anxiety and commute

Loss of competence in ability to manage mental health and in academic engagement. AT still viewed as a useful tool and still perceives it as not having an influence on her identity as a student

Still reluctant to claim her disability- context dependent. Feels more deserving about accessing AT yet is concerned others may be in greater need

Still struggles to fit in. Doesn't feel part of the class but minimises the importance of this and uses humour to deal with it

8.4.3 Rachel’s Journey (P005)

In this case history, I will explore Rachel’s journey over time, a 20 year old undergraduate student with mental health difficulties, namely anxiety and depression. She was interviewed at two time points over the course of an academic year. Her mental health difficulties affect her ability to complete academic work, particularly at pressure points in the semester, and also impacts on her ability to mix with others due to her social anxiety. Rachel was using AT to record her lectures in university at both time 1 and time 2. In Rachel’s journey through higher education so far, she has contended with highs and lows in her mental health, encountered stigmatising reactions from others, experienced feelings of isolation and faced ongoing identity issues. Her parents and close friends have played an important role in helping Rachel cope with some of the above challenges. In the sections that follow, I will outline Rachel’s experience of identity changes and continuities across three emblematic themes; 1) Feeling autonomous and competent, 2) Claiming disability and 3) Feeling like you belong. The central role of the through line ‘feeling valued’ in Rachel’s negotiation of identity over time will be highlighted throughout. Rachel continued to negotiate meanings attached to her AT over time, moving back and forth between a sense of guilt and selfishness in using her device and its necessity in supporting her academic engagement. For Rachel, the fluctuating nature of her mental health condition made it difficult to feel entitled to access and use AT, as she perceived others to be in greater need. However, she viewed AT to have little or no influence on her student identity, noting she viewed herself as competent and capable in higher education regardless of access to AT. Rachel’s case history highlights the different roles that AT can play in student and disability identities. Her journey is one of identity confusion and uncertainty, as she grapples with what her disability means for her sense of self.

8.4.3.1 Feeling autonomous and competent

For Rachel, viewing herself as autonomous and competent as a student was important for feeling valued. At time 1, Rachel noted feeling competent and capable with regards to her academic work but also in her ability to manage her mental health difficulties. However, at time 2, Rachel experienced a deterioration in her mental health which adversely affected her academic engagement and threatened her sense of value as a competent, capable student.

Rachel was a very driven and determined person and wanted to “get the 1:1” in her degree. This striving for academic excellence and the pressure she put on herself to achieve this was noted by Rachel as a key contributing factor in her experience of mental health difficulties, namely anxiety, since her school days. It was clear that feeling competent and capable as a student was important for Rachel feeling valued.

> *“I always got stressed about exams. I like to be in, like, the top of the pile. Do you know that kind of way? So, I like the- I have to do really well in school and that's complete pressure. Like my parents always said they don't care. They'd be happy- like, they'd be happy if I was happy.” – time 1*

AT played an important role in supporting Rachel to complete her academic work. Her recording device assisted her in revising and studying the material covered in lectures and ensured she didn’t miss out on anything in class. She described it as a “comfort blanket”, reducing the stress she would otherwise experience if she was trying to take notes. Rachel was aware that her use of AT did highlight her as different to others, but this wasn’t something that bothered her as it was beneficial for her academic work. However, Rachel noted viewing AT more as helpful tool and “aid to like what I do”, rather than something which was a part of her and integral to how she viewed herself as a student. Academically, she felt she could still perform well with or without AT, despite acknowledging the benefits associated with use. In addition, she felt she would still be able to access and complete third level education if it was not provided. It seems that for Rachel, AT had little or no influence on her student identity and her view of herself as a competent and capable student.

> ***Interviewer:*** *Um, and just in terms of like, say what you value or what you feel is important to you as a college student, like, do you feel that your AT use, does that influence that at all? In terms of how you view yourself as a college student?*
> ***Rachel:*** *“I don't know like, I wouldn't say so. Like, it doesn't really like impact me as a college student. It helps me. Like, it helps me a lot. In each of my lectures. But it doesn't like wouldn’t define my- do you know? I'd still probably do as well with or without it, do you know that kind of way? … I do rely on it every day but*

> *like, if it wasn't there, it wouldn't mean that I couldn't come to college. Do you know that kind of way?" – time 1*

Rachel also spoke about competency in relation to her own ability to manage her mental health difficulties. While Rachel experienced significant mental health problems during her last year in secondary school, she noted that her ability to manage her mental health had improved since starting in higher education. While she still noted that her mental health can decline at times of high stress, overall she felt more competent in her ability to cope. Being in control of her mental health problems was important to Rachel feeling valued as a student as poor management had an adverse effect on academic performance.

> *"I think well, my depression has improved, generally. I don't think it's down to coming to college [laughs] but, uh, just generally I have anxiety. Like my anxiety- Today I had an exam and I didn't feel majorly panicked or anything. Do you know that kinda way which usually I'd have a complete- Not- I'd never- I'm not one to have like a massive panic attack or anything. But usually, I get myself really wound up before an exam. But I was like no it's fine." – time 1*

> *"I'd get anxious during an exam and I'd forget everything." – time 1*

At time 2, Rachel outlined that she had experienced a deterioration in her mental health. She noted feeling increasingly anxious and depressed since the pandemic, and that she was currently in "like a wave of bad days." This undermined feelings of competency in her own ability to cope with her mental illness and she recognised she may need professional support. In addition, her decline in mental health and inability to adequately cope with this adversely affected her academic engagement. This threatened Rachel's sense of value as a competent, capable student, due to the importance she placed in excelling academically as discussed previously at time 1.

> *"So I'm dealing with things worse, and like things aren't as good. And I would've like, like I haven't been back to counselling in like a year but I'm questioning it now, do you know that kind of way? So I just like, it's just a pandemic, I suppose [laughs]. So I'm trying to cope with it the best way I can." – time 2*

> *"So it's been tricky. I've found it hard. And I've found like all of the, like all of the Zooms and all of the quizzes and all of the things like that to be very difficult." – time 2*

Instead of directly confronting and trying to resolve this threat to her sense of value as a competent student, namely her decline in mental health, Rachel instead engaged in denial, avoidance and concealment. Rachel did not want to admit to herself or others that her mental health had deteriorated and saw asking for help as a sign of weakness or regression. She also actively avoided interactions with peers that could heighten her anxiety and concealed her decline in mental health from classmates in a group project, whom she felt would not understand. Rachel noted that these strategies were preferable to seeking support from others, as the latter would be anxiety inducing and could further exacerbate her mental health difficulties.

> *"I don't want to admit that I'm not doing okay as well. Do you know that kind of way? Like, I can say to you now but it's different in the fact that I'm like- My mam has like mentioned about ringing the doctor and that kind of thing, and I don't want to because then it's kind of just admitting that I'm going backwards." – time 2*

> *"Um, but like I haven't been able to say that I'm anxious either to people. Do you know that kind of way? I couldn't just. I don't know. I wish I could just send in a message being like, "Aw right here lads, I'm not feeling great. I'm anxious." But they're not going to get it so I don't want to." – time 2*

With regards to her AT at time 2, Rachel continued to view it as important in assisting with studying, revising and relieving stress that otherwise would be experienced in a lecture if she had to take extensive notes. She still viewed it as "just a tool to help me study" (time 2) rather than something that was integral to how she viewed herself as a student. Rachel noted that this was because she can manage without AT, rather than it being something that she needs to use "all of the time", which mirrored her perspective at time 1.

8.4.3.2 Claiming disability

For Rachel, willingness to claim her disability was dynamic and open to change over time depending on the context and situation. The fluctuating nature of her mental health difficulty and potential for others to dismiss and illegitimise her disability experience made her reluctant to embrace her disability as a part of who she is and feel entitled to use AT. However, when she experienced a deterioration in her impairment, she felt more deserving of AT as perhaps she could more easily categorise herself as disabled. In situations where Rachel perceived that others would not recognise or understand her disability, claiming a disability identity could undermine her sense of value, and thus, she was reluctant to embrace her disability as part of who she is. However, in other contexts, where claiming was of personal benefit to her, such as enabling access to AT and disability related support, or could potentially assist others with mental health difficulties, she did claim disability. Claiming a disability identity in these contexts could maintain or promote her sense of value, through assisting in her studies or making important contributions to the disabled community. In addition, these were contexts that Rachel deemed to be supportive and accepting of her disability.

Rachel's mental health difficulties first started during her 3rd year in secondary school but she became increasingly anxious and depressed during her 6th year. Support from her parents, friends, office staff in her school and counselling services helped get through this difficult time. However, it wasn't until she was reviewing her options for third level education, that Rachel had to consider her mental health difficulty as a disability for the first time. Rachel applied for the Disability Access Route to Education (DARE), which is a scheme open to SWD to enable them to enter third level education on reduced points. She felt guilty about accessing supports such as DARE, or AT later on when she enrolled in university, despite recognising its importance in supporting her studies, as she felt others with more severe impairments were in greater need of it. Feeling illegitimate as a disabled person, due to the fluctuating nature of her impairment, made her reluctant to claim a disability identity and feel entitled to disability related supports. Embracing her disability as part of who she is could potentially undermine her sense of value as she doesn't "feel like [she] has a disability". For Rachel, disability was associated with a more severe level of impairment and thus, was incongruent with how she viewed herself.

> *"I'd find taking aids and even the AT that I use now to be like a bit selfish because I don't- like in one way I'm like I don't really need them but at the same time, I'm like, "Oh no," like if it was taken away now I'd be like no. Like I wouldn't know how to get through." – time 1*

> *"like I have some really good days that I don't feel like I have a disability. And even here like ticking a box saying that I have a disability, like I do in one way, but I don't see it, like I don't feel like I've a disability in a lot of other ways, you know that kind of way? Um, because I think with things like anxiety and depression, I'll know they'll always be somewhat there, but some days they're heightened and some days they're not. But, I mean, do you know, hard of hearing. It doesn't just come and go [laughs] like a mental illness would." – time 1*

For Rachel, not feeling valued and legitimate as a disabled person had consequences as she moved through her third level education. She was conscious of being judged or the legitimacy of her impairment being questioned, and as a result, claiming her disability was context dependent. Previous negative reactions from close friends who dismissed her mental health issues, lecturers who were reluctant to make accommodations and classmates who felt her AT use was unwarranted as her impairment was not visible, contributed to Rachel feeling this way. As a result, in instances where Rachel did not know someone very well or was worried they might minimise the significance of her mental health difficulty, she chose to hide her disability and pass as non-disabled. Claiming her disability in these situations could potentially reinforce feelings of illegitimacy as a disabled person, and thus, were actively avoided. The possibility of lack of recognition of her disability by others could lead to Rachel feeling devalued.

> *"People think that I'm just doing it, because I don't have a physical disability…I'm just recording the lectures for the sake of recording the lectures." – time 1*

> *"You don't know what anyone is gonna say. And even meeting new people in college, you kind of have to wait until things settle before you mention it [mental health difficulties]. Which is awful to say at this stage, but it is like." – time 1*

However, in other contexts, Rachel was willing to claim her disability. This was in situations where she perceived her disability to be accepted and recognised by others, or viewed claiming as beneficial to herself or the disabled community. Rachel was happy to claim a disability identity and openly disclose to lecturers, for example, when she had built up a relationship with them first, and was confident they would react in a positive manner. Equally, this served the purpose of her receiving accommodations which would assist with her studies. Rachel also claimed her disability to access supports through the disability/AT office, an environment where staff were understanding and empathetic towards the needs of SWD. While she did feel somewhat guilty about receiving these supports, as discussed previously, she knew it was important in assisting with her academic progression. Claiming in the above contexts did not risk undermining her sense of value as Rachel knew her disability would be accepted by others, and equally ensured she had the appropriate accommodations in place to facilitate academic success, something which was important for Rachel feeling valued.

> *"But it, like, depends, it just depends on the lecturer and whether I'll go up and talk to them [about disability]. Um, because, you know, and then as you get to know them, like, some of them are really nice you know. I'm sure most of them are really nice [laughs] but it's like as you get to know people, um, and see how they are." – time 1*

Rachel was also happy to claim her disability when it was of benefit to the disabled community. She was passionate about the importance of discussing mental health and LGBT issues with others in society and spoke publicly through her involvement with an LGBT organisation. It seems that despite Rachel not feeling fully comfortable with embracing her disability as a part of her identity, she acknowledged that claiming her disability was important for educating others and helping young people who are struggling with mental health problems. Claiming her disability through engagement in advocacy work was key in Rachel feeling valued as she felt she could make a difference for others and transform negative perceptions in society.

> *"So it's kind of you people need to respect you know, mental illness for what it is. And it's not just about having a bad day. And the more you talk probably, the more people get informed and stuff like that." – time 1*

> *"Um, so this is, the disabled thing I can, like I do have the choice to hide it. And if I don't want to say, then I might just, I don't have to. Um, but I kind of, like I would because I'm passionate about mental illness and talking like, because I wouldn't want any child to go through what I went through. Um, I think I would be more vocal about it." – time 1*

At time 2, Rachel was still reluctant to claim a disability identity and embrace it as a part of who she is, as was the case in the first interview. She also still used social mobility strategies, such as passing as non-disabled at times to avoid situations where her disability experience could be illegitimised and would undermine her sense of value. The continuity in these feelings centred around internalising societal perceptions about what is considered a disability, with mental illness largely failing to be considered as a disability in the media, according to Rachel.

> *"I still identify as queer and I still identify as disabled, kind of, but I don't know- But like, I still feel kind of selfish using that title because I don't think I am. I don't know. Because I haven't seen it, and it's like um, 'cause you don't see it in the media and that kind of thing as much." – time 2*

Yet Rachel did note how she felt more deserving of AT now in comparison to time 1. She attributes this to the fact that her mental health has deteriorated, and thus, she is more dependent on and in need of her AT. In this instance, Rachel feels more worthy of accessing disability related supports, such as AT, as perhaps she could more easily categorise herself as disabled, due to the decline in her mental health. However, it was clear that this was an ongoing internal struggle for Rachel as later in the interview she noted that others may be in greater need of AT. It seems that Rachel was constantly battling between her own internal thoughts and the internalisation of societal perceptions that mental health is less deserving of support in comparison to other disabilities. In this instance, recognition of her disability by others and entitlement to access supports played a critical role in her sense of value and willingness to claim her disability.

> *"I think if I am more anxious then I do deserve it [AT] more. If that makes sense." – time 2*

> *"Um, like initially, I was like, "Oh no, this [AT] isn't for me." Do you know, that kind of way? I mean, and that's definitely like down to the stigma around mental illness, I suppose that people like don't think it deserves the help that it needs." – time 2*

8.4.3.3 Feeling like you belong

Rachel struggled to fit in and feel like she belonged in university at both time 1 and time 2. This resulted in her feeling isolated and threatened her sense of value. Rachel used various strategies to buffer against this and maintain or protect her sense of value.

During the first interview, Rachel noted feeling lonely and socially isolated and she questioned whether she belonged in higher education and more specifically within her class. She also found it difficult to get involved in clubs and societies and mix socially with others, despite her desire to be like other students. Rachel struggled to fit in and feel like she belonged due to her social anxiety but also due to the fact she had a long commute to college, and as result was reluctant to stay on campus after her lectures had finished. 'Blaming it on the commute' was a narrative she emphasised and returned to later in the interview to try and explain why she struggled fitting in. This may have been a way of protecting or maintaining her sense of value, attributing her inability to fit in to external rather than internal factors.

> *"And you feel like you shouldn't be here. You know that kinda way that you're like intruding on someone's space" – time 1*

> *"like you probably have people sit here and kind of say, oh like it's important to be like really social and like, get on into there. And I do see it. Like I saw and I*

> *didn't fully immerse myself in it at the start of last year, because the commute. I blamed it on the commute, but I think I was also like really socially anxious. Um, so it's probably something that I regret not doing. Um, getting more involved in clubs and societies." – time 1*

At time 2, Rachel experienced continuity in her feelings of not belonging. Her social anxiety and the commute continued to be a barrier in mixing with others, either in her class or at extra-curricular college events. As a result, she still felt socially isolated but minimised the importance of this in order to protect her sense of value or self-worth.

> *"I'm two-thirds done at college. I only have a year left. So I'm not too pushed on it at this point. Do you know? And when you were saying that back and it sounded really sad [laughs]. And I was like, 'Oh, but I really don't. [laughs] Like I don't care, so.'" – time 2*

Rachel also used humour as a strategy to brush off the importance she placed on fitting in and feeling like she belonged within her class. She joked that the lack of activity in the class group chat was due to the fact a separate chat was created which she was not a part of. Making a joke out of the situation was another way in which she tried to protect her sense of value and self-worth.

> *"I kind of said, "I'm surprised no one has like, given the answers into the WhatsApp. Or like been more helpful in the WhatsApp." But then, the two of us were like, "Oh no, they probably just have their own chat." [laughs]. Like you know separate, which means that they're all like talking amongst themselves which is how they would be." – time 2*

8.4.3.4 Conclusion

This case history captures Rachel's experience of identity changes and continuities over time across three emblematic themes; 1) Feeling autonomous and competent, 2) Claiming disability and 3) Feeling like you belong. The desire to feel valued was central to the way in which Rachel negotiated her identity over time. For Rachel, feeling valued revolved around feeling competent and capable as a student in her academic work, feeling legitimate as a disabled person, making positive contributions to the disabled community and feeling like she fit in with others. Rachel faced many challenges throughout her journey which threatened her sense of self and brought her sense of value into question; a decline in her mental health, negative reactions from others and the internalisation of negative societal perceptions surrounding mental illness. In some cases, Rachel used cognitive strategies such as denial and minimising, behavioural strategies such as avoidance and social mobility strategies such as passing as non-disabled to maintain her sense of value and a positive sense of identity. Another cognitive strategy she used was self-serving biases, attributing her academic success to personal factors rather than external factors such as AT, but primarily attributing her inability to fit in within university to external factors such as a long commute rather than personal factors.

Rachel's journey highlights her experience of ongoing identity confusion and uncertainty. It is evident that she is not yet fully comfortable with her disability and who she is as a person. Feelings of illegitimacy persisted over time which made it difficult to accept and feel entitled to use AT and other disability related supports. However, a deterioration in her impairment did make her feel more deserving of AT as perhaps she could more easily self-categorise as disabled. While her use of AT interacted with her disability identity, Rachel was adamant that it had little or no influence on how she viewed herself as a student. Rachel offered two explanations for this; she felt she could perform equally well academically with or without AT and while she relied on AT, it wasn't essential to her academic engagement. For Rachel, it seems she wanted to attribute academic success and viewing herself as a competent, capable student to internal factors such as drive, determination and hard work rather than external factors such as support from AT. Additionally, the nature of her impairment and the fact she doesn't deem it to severely limit or restrict her ability to participate and engage in university seemed to play a role in feeling she could manage without AT. Rachel's journey highlights the complexities of negotiating disability and student identities over time and the varying influence that AT can have in this.

8.5 Chapter conclusion

Overall, this chapter has presented the findings of the longitudinal analysis across cases and within cases. It has demonstrated the instrumental role of the through line 'feeling valued' in governing the negotiation of identity change/continuity across three emblematic themes; feeling autonomous and competent, claiming disability and feeling like you belong. It has also highlighted key factors which influenced identity change/continuity; AT was one such factor which had a significant impact on the negotiation of student and disability identities over time.

Chapter 9: Phase Two: Longitudinal Qualitative Research Discussion

9.1 Introduction

The aim of phase two, the LQR study, was to explore, for the first time, the impact of AT in student and disability identities of those in higher education and if/how this changes over time. This chapter will outline a discussion of the key findings from this phase incorporating salient information from both the longitudinal analysis across cases and longitudinal analysis within cases (i.e. case histories). The discussion will be structured around the following key areas; how feeling valued was the driver in the negotiation of identity change/continuity over time, the impact AT in both student and disability identities over time and key factors influencing identity change/continuity. I will also highlight the strengths and limitations of this LQR study in this chapter.

9.2 Feeling valued: The driving force in the negotiation of identity

While previous LQR has explored identity over time for SWD in higher education (Cunnah, 2015; Hadley, 2009; Kranke et al., 2013; Riddell & Weedon, 2014), little is known about the processes of identity change/continuity and the underlying motives which propel students towards or away from certain identities. The current findings highlight feeling valued as the driver in negotiating identity change/continuity over time, identifies three emblematic themes of identity change/continuity (i.e. feeling autonomous and competent, claiming disability, and feeling like you belong), and identifies key personal, social and environmental factors which influence identity change/continuity. It may be useful for subsequent research to consider these findings in terms of a conceptual model of identity change/continuity over time for SWD in higher education. In addition, another notable contribution from this study is that it is the first to identify a driver in the negotiation of identity change/continuity over time for SWD in higher education.

To date, no study has put forward a conceptual model to account for the negotiation of identity change/continuity for SWD in higher education. The model arising from the findings in the current study is instrumental in understanding not only what identity changes/continuities are experienced, but also the underlying motive which guides SWD to the embrace some identities and conceal others, and the key factors which influence their negotiation of identity over time. Most previous LQR studies which have looked at identity over time for SWD in higher education fail to sufficiently capture the processes of identity change and continuity (i.e. the unfolding trajectories of identity change/continuity over time with a focus on how and why they unfold in this way). Only one study to the author’s knowledge highlighted pathways of identity change/continuity for participants; however, this is in relation to a specific task, disclosure and non-disclosure of a disability identity (Kranke et al., 2013). The current conceptual model extends findings from previous research by highlighting a driver in the negotiation of identity over time (i.e. feeling valued), pathways of identity change/continuity, and factors which influence these, across three areas of identity change/continuity; feeling autonomous and competent, claiming disability and feeling like you belong. This conceptual model offers a way of understanding the negotiation of identity over time for SWD in higher education. However, this model requires further testing to establish its validity and to determine if any additional elements are instrumental in negotiating identity change/continuity over time for SWD in higher education.

Previous LQR research has failed to identify a driving force or motive behind the negotiation of identity change/continuity for SWD in higher education. An identity motive has been described as something which influences the extent to which a person gravitates towards or away from certain identities (Vignoles et al., 2006). It is crucial to understand the motive behind the experience of identity change/continuity over time for SWD in higher education so that students can be supported in their pursuit of a positive sense of identity and are less at risk of experiencing identity conflicts. In addition, aspects of identity which satisfy identity motives have been associated with greater enactment, feelings of happiness and are viewed as more central to how a person views themselves (Vignoles et al., 2006). This study identified feeling valued as the driver in negotiating identity changes/continuities over time across three themes; feeling autonomous and competent, claiming disability and feeling like you belong. Global self-esteem has commonly been referred to in the literature as self-worth, or feeling valuable and good as a person (Stets & Burke, 2014a). Previous research has found self-esteem to be an important motive in the construction of identity (Abrams & Hogg, 1988; Beach & Tesser, 1995; Greenberg et al., 1997; Leary & Baumeister, 2000; Steele, 1988; Vignoles et al., 2006); however this is the first study to implicate this as an identity motive for SWD in the higher education context.

Participants strived to maintain a sense of value over time but sometimes faced situations or circumstances which undermined or threatened their sense of value, resulting in the need to restore feelings of self-worth. In this way, feeling valued was not static and was open to ongoing consideration over time. This can be understood in terms of contingent self-worth, which maintains that self-worth is context dependent and can fluctuate depending on successes or failures in areas deemed as important for one's sense of self (Crocker & Wolfe, 2001). This self-system, which centred around feeling valued and worthy as a person, guided the negotiation of identity change/continuity over time. Self-affirmation theory offers a partial explanation of these findings in that it proposes individuals are motivated to view themselves as adaptively and morally adequate and will try to re-affirm feelings of self-integrity after experiencing a threat to their sense of self (Steele, 1988). However, unlike self-affirmation theory which strives to maintain feelings of self-integrity, findings from the current study suggest that in particular it is feelings of value or self-worth that guide negotiation of identity over time and threats to an individual's sense of value that cause individuals to engage in behaviour which re-establishes feelings of self-worth.

With regards to their student identity, maintaining a sense of value motivated participants to be as autonomous and competent as possible over time, as these were domains where they staked their self-worth. Social identities and socialisation processes have previously been identified as having influence over the contingencies of self-worth that an individual views as important to the self (Blankenship & Stewart, 2017; Crocker et al., 2003; Crocker & Wolfe, 2001), with academic competency, among other domains, recognised as important for the self-worth of college students (Crocker et al., 2003). Equally, autonomy and a sense of empowerment has been identified as important for SWD sense of value (Hong, 2015; McIntyre et al., 2019). Some participants experienced continuities in this respect over time, still viewing themselves as autonomous and competent in their abilities to complete academic work. Others viewed themselves as more competent and capable in some respects over time such as in their ability to engage academically, navigate their university environment independently or successfully engage in further education or employment in the future on completion of their studies; for these participants, their impairment was less influential on their academic and future endeavours. While feeling competent and capable as a student in completing academic work, but equally demonstrating this competency to others, has previously been identified as important for SWD in higher education (McIntyre et al., 2019; Miller, 2015; Olney & Brockelman, 2003; Russak & Hellwing, 2019), this is the first study to demonstrate competency as a contingency of self-worth which influenced the negotiation of identity over time.

Other participants experienced a loss of autonomy and competence over time which threatened their identity as students and undermined their sense of value. Some students struggled completing academic work, while others encountered difficulties around the home or in their ability to get out socially, without access to appropriate AT and PA supports. This in turn increased dependence on family members for support. As a result of this increased reliance on others, some participants engaged in self-stereotyping, viewing themselves as dependent and incompetent and viewing the disability category as more central to their self-concept when they found themselves in these situations. The disability category refers to external categorisations of disability in society such as dependence and incompetence (Nario-Redmond, 2010) and from a social identity theory perspective is viewed as the stigmatised, minority group (Tajfel & Turner, 1979). Self-categorisation theory (Turner et al., 1987) can offer some explanation to these findings; in these circumstances, where participant’s autonomy and competence was undermined and they were more reliant on others, the disability category had increased salience and fit and thus was more accessible to participants. Similarly other studies have noted that when SWD sense of autonomy and competency is undermined, such as lack of access to appropriate accommodations, it increases the salience of the disability category (Aamlid & Brownfield, 2019). As a result of lack of access to appropriate AT and PA supports in the current study, some participants were faced with a conflict between their student and disability identities; they recognised they required assistance to support academic progression yet did not want to appear dependent or a burden on others. Similar identity conflicts have been noted within the university environment with students reluctant to seek out supports for fear of being viewed as less capable by others (Olney & Brockelman, 2003). However, findings from the current study offer insights into the intersections of home and academic supports and how perspectives towards accessing assistance may vary depending on the nature of the supportive relationship. Relationships which were viewed as reciprocal and interdependent, such as receiving support from a PA in university who was financially compensated were accepted and preferable to asking for support from family members, where participants felt like they were a burden on others. In obtaining support from a PA, participants can exercise decisional autonomy, that is having control over how they go about their daily lives, through providing appropriate instructions to their PA and demonstrating assertiveness (Palmer & Scott, 2018; Reindal, 1999). In contrast, a power imbalance was perceived by some participants in receiving and asking for support from family members. This further threatened their sense of identity as competent, capable students and drew their sense of value into question.

Participants actively engaged in strategies to try and restore feelings of value and self-worth when this was undermined. Self-affirmation theory provides partial support for this proposing that when an individual's adaptive and moral adequacy is compromised or undermined, they will aim to re-affirm the integrity of the self through directly addressing the threat or one's perception of a threat, or self-affirming in another area which they deem important to the self (Steele, 1988). Self-affirmation theory and the pursuit of self-integrity encompasses the identity motives of both self-esteem and meaning (Vignoles et al., 2006), while findings from the current study suggest that self-esteem or feeling valued is the driving force in the negotiation of identity. Participants aimed to directly address the threat or perception of threat through a variety of strategies to try and re-affirm their sense of value as a competent, capable student and reduce the likelihood of being viewed as a burden by others. In line with social mobility strategies outlined in social identity theory, where individuals attempt to leave the stigmatised minority group and join the higher status majority group (Branscombe & Ellemers, 1998; Dirth & Branscombe, 2018; Tajfel & Turner, 1979), some participants distanced themselves from the stigmatised disabled category where others may view them as dependent and incompetent. For some, this involved trying to overcome difficulties and manage without support from family members. Overcoming disability has been a strategy widely cited in the literature as a means of dealing with the stigma attached to a disability label for SWD in higher education, often foregoing much needed support or assistance in their pursuit of academic goals (Barnard-Brak et al., 2010; Goode, 2007; Grimes et al., 2019; Olney & Brockelman, 2003). However, while other studies have applied a social identity theory lens to understand experiences of SWD in higher education (Bell et al., 2016; Olney & Brockelman, 2003; Perry et al., 2022), this is the first study to do so using a longitudinal design. This allowed identification of different strategies (i.e. social mobility, social creativity or social competition) used by the same individual over time depending on the context or situation. Thus, this offers greater understanding on when and why a SWD may select one strategy over another over time.

Feeling valued also guided willingness of participants to claim their disability as part of their identity over time. Some participants experienced continuities in willingness to claim a disability identity, others became more comfortable embracing a disability identity, while for others claiming disability was contextual and open to constant change over time. Claiming disability is a component of disability pride and refers to the extent that individuals acknowledge their impairment, embrace disability as a part of who they are and exhibit a willingness to transform negative perceptions in society surrounding disability (Dunn & Andrews, 2015; Lyons et al., 2018; Putnam, 2005). Both the meanings attached to disability and the potential consequences of claiming a disability identity influenced participants' willingness to claim a disability identity. Meanings attached to disability, such as the endorsement of medical or social model views, have been implicated as important in the development of a disability identity (Darling & Heckert, 2010). Those who view disability from a medical model perspective as a personal flaw or shortcoming and a highly stigmatised status can be uncomfortable with claiming a disability identity (Griffin & Pollak, 2009; Hutcheon & Wolbring, 2012; Riddell & Weedon, 2014), as was the case for some of the participants in the study. In contrast, those who view disability as a socially constructed issue which results from an inaccessible and unaccommodating environment are likely to engage in activism to bring about social change, which is consistent with a social model perspective on disability and has been linked with self-identification as disabled (Darling & Heckert, 2010; Dunn & Burcaw, 2013; Hahn & Belt, 2004; Nario-Redmond & Oleson, 2016). With regards to consequences of claiming a disability identity, previous research has highlighted the importance of context with individuals carefully weighting the perceived risks versus benefits of embracing a disability identity in a given situation or social environment (Abrams & Abes, 2021; Priestly et al., 1999; Reeve, 2002). However, findings from the current study highlight that while meanings attached to disability and the consequences of claiming influenced willingness to claim a disability identity, it was the extent to which these promoted or undermined one's sense of value which ultimately determined whether SWD claimed disability as part of their identity. Considering embracing a disability identity from the perspective of contingencies of self-worth offers a novel way of understanding SWD willingness to claim disability in higher education. One of the contingencies of self-worth highlighted as important for college students is approval and acceptance from others (Crocker et al., 2003). For some participants, gaining approval from non-disabled peers was important for their sense of value. For others, they placed less importance on this and encountering stigmatising reactions from other did not undermine their sense of value or impact on willingness to embrace a disability identity. This supports research which found that those who viewed approval as less important for their self-worth, were less affected when they received negative feedback in comparison to those who viewed it as highly important for their self-worth (Park & Crocker, 2008). Steele's (1988) self-affirmation theory can offer another potential explanation for these participants not experiencing diminished self-worth, by proposing that they were able to re-affirm their sense of value in other areas, such as being successful in higher education.

While previous research has examined feelings of belonging among SWD in higher education (Barnes et al., 2021; Francis et al., 2019; Jacklin, 2011; Jones et al., 2015; Shevlin et al., 2004; Vaccaro et al., 2015), it has failed to examine this through an identity lens. In the current study, feeling like you belong was viewed as a dimension of social identity called in-group ties; where an individual is a member of a particular social group and feels connected and that they share common bonds with other members of that group (Cameron, 2004). Previous research has shown that feeling like you belong as part of a social group is positively related to self-worth (Carter & Marony, 2021; Martin et al., 2018). The social identity approach offers a way of understanding of why some participants felt like the belonged in higher education while others didn't. Social identity theory (Tajfel & Turner, 1979) references the importance of in-group ties in its accentuation principle. This states that during social categorisation, people tend to emphasise the similarities among in-group members (i.e. those in the group to which they belong) and emphasise the differences between themselves and out-group members (i.e. those not in their group). For some participants in the current study, they felt like they belonged and this remained the same over time. For others, they didn't feel like they belonged and no change was observed in this over time. While for others, they experienced an increased sense of belonging over time. Differences in experiences may be explained by self-categorisation theory (Turner et al., 1987) and how students self-categorised. For some participants who experienced continuity in feelings of belonging, this was due to contact with others with disabilities rather than non-disabled peers. It seems for these participants, the category of SWD was more accessible (i.e. more frequently activated) and had the greatest fit, due to the spaces they were operating in, such as in disability ambassador roles, through a disabled sports club, or contact with others with disabilities in their class. This is in line with the premise that a social identity, such as student, can have different levels of abstraction or subgroup identities, such as SWD, depending on its comparative fit (Dirth & Branscombe, 2018; Hornsey & Hogg, 2000). For others, continuity in feeling like you belong were related to feeling like they fit in with non-disabled peers in higher education. These participants spoke about feeling accepted by non-disabled peers, despite impairment related difficulties or differences, which promoted a sense of value. These participants may not have seen a need to self-categorise as a SWD as perhaps they didn't occupy spaces shared with others with disabilities in higher education or perhaps they did not perceive there to be any differences between them and other non-disabled students, due to being accepted by peers. Equally in the continuity trajectory, there were participants who did not feel like they belonged and this remained over time. These participants struggled to feel like they fit in amongst non-disabled peers, supporting findings from previous research (Abes & Wallace, 2020; Jacklin, 2011; Mullins & Preyde, 2013; Shevlin et al., 2004). This undermined their sense of value and they tried to re-establish feelings of self-worth through blaming their inability to fit in on external factors, minimising the importance of feeling like they belonged or engaging in problem solving, considering setting up their own disabled community in university where they could mix with others with disabilities. For these participants, self-categorising as a student failed to promote in-group ties with others but unlike some of the other participants, they did not occupy spaces where they were surrounded by others with disabilities. As a result, the category of student was still more accessible and had the greatest fit relative to the category of SWD. This is the first study to demonstrate how different contexts can influence self-categorisation and the potential implications of this for feeling like you belong.

It was surprising that no participants experienced decreases in feelings of belonging over time, which in turn impacted on their sense of value, given the fact that they were engaged in online learning and social contact was limited towards the latter half of the academic year due to the COVID-19 pandemic. Previous research has found that students have reported feelings of isolation and mental health difficulties due to the lack of social contact while engaged in online learning during the pandemic (Dianito et al., 2021; Khumalo et al., 2020; Zhang et al., 2020). Participants in the current study seemed to be able to buffer against reduced social interactions undermining feeling like they belonged and their sense of value by adopting other means of engaging with those in their social group. Some participants spoke about harnessing digital technologies such as zoom to stay connected with others in their class, which has been highlighted as a strategy in other studies to maintain a sense of community and solidarity with peers during the pandemic (Gabbiadini et al., 2020; Gomes et al., 2021).

9.3 The impact of AT in student and disability identities

While some studies in higher education have mentioned AT as an identity concern (Bell et al., 2016; Goode, 2007; Kendall, 2016; Thompson-Ebanks & Jarman, 2018), to the author's knowledge, no study explicitly explores the impact of AT in the identity of SWD in higher education over time. Findings from the current study extend knowledge in this respect in a number of ways by: 1) demonstrating the indirect influence of AT on feeling valued, 2) highlighting how AT can be strategically used in the performance of identities, 3) showcasing how and why meanings attached to AT evolve and change over time, and 4) highlighting the importance of AT, including digital technologies, in increasing feelings of competence in students' abilities to pursue future academic and work endeavours. The above key findings will be discussed in more detail in the sections that follow.

AT increased or decreased participants' sense of value through its influence on the three emblematic themes of identity change/continuity; feeling autonomous and competent, claiming disability and feeling like you belong. While previous research has noted that AT can indirectly influence self-esteem through promoting feelings of competence for SWD (Craddock, 2006; Schock & Lee, 2016), findings from the current study add to this research by demonstrating how AT can positively or negatively influence one's sense of value through its impact on claiming a disability identity or feelings of belonging. AT influenced claiming a disability identity, through removing students' ability to pass as non-disabled or alternatively enabling them to live their lives as they wish. With regards to feelings of belonging, AT made it difficult to fit in with others through highlighting students as different from non-disabled peers, but also promoted in-group ties with others through facilitating engagement in clubs and societies, and in AT communities, where students could share experiences and advice on using AT. The indirect impact of AT in feeling valued is discussed more extensively in the integrative discussion in chapter 10.

AT also played a critical role in the performance of identities. Students were conscious that they belonged to a stigmatised, low status group by virtue of the fact they had a disability. They employed social identity performance strategies, actively manipulating AT as a means of dealing with stigma and protecting their sense of value. Social identity performance refers to the deliberate expression or suppression of actions, behaviours, signs or symbols that are typically associated with a social identity. This is carried out for the purposes of identity consolidation, which secures their status as members of a particular social group, or identity mobilisation, which instigates action among in-group members (Klein et al., 2007). Participants in the current study were aware that use of AT could emphasise and highlight their disability to others, supporting findings from previous research (Goode, 2007; Kendall, 2016; Thompson-Ebanks & Jarman, 2018). For some, they actively tried to distance themselves from the disability category, by refraining from using AT. Similar strategies such as concealment, non-use of AT or refraining from accessing AT in the first instance have been employed by SWD in higher education in previous studies (Bell et al., 2016; Kendall, 2016). However, this study adds to previous research by demonstrating how students tactfully reduce the visibility of their AT, to consolidate the identity as a ‘normal’ student, by carefully choosing what devices they use. This was achieved through opting for mainstream devices or devices that looked aesthetically similar to mainstream products, rather than use AT that was acquired through the disability office in their HEI. In this way, students were able to manage both their disability and student identities by balancing the visibility of their AT use with its necessity for academic engagement. These findings highlight the importance of disability offices in HEIs being more flexible in the AT solutions offered to students, and providing mainstream technology where possible, to help reduce stigma and allow students to fit in more with non-disabled peers. Other students in the current study purposively used AT to emphasise and highlight their disability to others as a means of dispelling misperceptions and legitimising their impairment; this was a way of consolidating their identity as disabled. While previous research similarly notes that AT can indirectly disclose one’s disability and legitimise it to others (Miller et al., 2019), this was not purposively done to consolidate their identity as disabled, as was the case in the current study.

This study is the first to explore how the meanings attached to AT can evolve and change over time and identify factors which are key in influencing these changes in perceptions within a higher education environment. The meanings attached to AT devices over time have been examined outside the higher education context and highlight the importance of factors such as a deterioration in impairment, embracement of a disability identity and early intervention as playing a pivotal role in changing perceptions towards device use (McDonald et al., 2020; Pape et al., 2002). However, findings from the current study have highlighted additional factors specific to a higher education environment which facilitated students renegotiating the meanings attached to their AT, moving from viewing it as an indicator of difference to a tool of empowerment and part of who they are. This included involvement in disability ambassador roles and membership to an AT community in their university. Becoming a disability ambassador facilitated talking openly with others about their AT use which promoted viewing AT in a more positive light and a part of their identity. Similarly, involvement with a community of AT users in higher education promoted the sharing of advice and experiences related to AT and normalised AT use for some students. Over time, it was clear that some participants became less self-conscious about their AT and saw the valuable role it played in giving them a sense of autonomy and control over their lives and helping them to be successful in higher education, both of which were important for participant’s sense of value; this was particularly evident in the case history of Mary. In this way, findings from the current study suggest domains in which students staked their self-worth may have changed over time which facilitated changing perceptions towards AT. Participants seemed to place less importance on approval from non-disabled peers and were more concerned with feeling competent academically over time, which AT facilitated. Previous research suggests that superordinate contingencies of self-worth, such as approval from others or academic competence, are relatively stable over time but subordinate categories may be open to change (Crocker & Park, 2003). For example, it is possible that over time, while participants still viewed approval from others as important to their self-worth, this may have shifted to approval from friends and family rather than non-disabled peers. This would have allowed participants to view AT in a more positive light despite the ongoing potential for them to encounter stigmatising reactions from non-disabled peers.

Alternatively, it is possible that participants reprioritised their contingencies of self-worth, viewing academic competence as more important in feeling valued than receiving approval from others with regards to their AT use. It is clear that more research is needed to explore how exactly contingencies of self-worth may influence changing perceptions towards AT over time. However, this is the first study, to the author's knowledge, which implicates contingencies of self-worth in influencing changing perceptions towards AT over time.

The implications of online delivery during the pandemic for participant's student identity was another key finding. It was evident that AT, including digital technologies, can influence participants' view of themselves as competent and capable students with regards to future academic endeavours but equally in their abilities to gain employment. Some students noted that the positive experiences they had with AT, including digital technologies such as Zoom and Microsoft teams, made them more optimistic about their ability to engage academically, pursue further study and gain employment in the future. Digital technologies made the prospect of further study and work more achievable through removing environmental barriers such as the need to travel to the university campus or the workplace, making things more accessible for students, in particular, if they experienced a deterioration in their impairment over time. In this way, digital technologies can be considered as AT for these students, aligning with Khasnabis et al. (2015) definition of assistive products as any device which maintains or improves an individual's functioning and independence and thereby promotes their well-being. While the advantages of online delivery during the pandemic has been noted in previous studies with regards to alleviation of transport difficulties, management of pain and access to more flexible content (AHEAD, 2021; Havens, 2020; Mullins & Mitchell, 2021; National Association of Disability Practitioners [NADP], 2021; Sheppard-Jones et al., 2021), the consequences of this were not considered for a student's identity in previous research. The central role that AT plays in students' feelings of competence in their abilities to achieve in the future has important implications, given the low participation rates of those with disabilities in both higher education and employment relative to those without disabilities; only 6.3% of the total undergraduate student population and 2.5% of the total postgraduate population were SWD in higher education in Ireland in 2019/20 (AHEAD, 2021), while just 26.2% of those with disabilities were identified as in work in Ireland, one of the lowest rates in the EU (European Commission, 2019).

9.4 Key factors influencing identity change/continuity

While previous LQR has examined identity change/continuity over time for SWD in higher education (Cunnah, 2015; Hadley, 2009; Kranke et al., 2013; Riddell & Weedon, 2014), it is limited in its scope with regards to the identification of factors important in identity change/continuity. Some studies have focused on identity over time and key factors implicated in this for students engaged in work placement as part of their course (Cunnah, 2015; Riddell & Weedon, 2014). Others have identified factors but in relation to a specific task, such as disclosure or non-disclosure of a disability identity (Kranke et al., 2013). One LQR study explored identity over time but failed to identify any factors instrumental in influencing identity changes/continuities (Hadley, 2009). It has been acknowledged that there is a real need to extend our understanding of the experience of identity over time for SWD in higher education (Abes & Wallace, 2018; Miller, 2018; Shpigelman et al., 2021) and the factors important in this through LQR. The current LQR study builds upon previous research by identifying key factors implicated in identity change/continuity across three areas, feeling autonomous and competent, claiming disability and feeling like you belong, and for those engaged in study throughout the academic year. It offers novel insights into key factors influencing identity change/continuity by: 1) demonstrating the importance of ongoing access to AT over time, 2) highlighting the integral role of contact with others with disabilities in transforming negative perceptions, 3) showcasing how AT can facilitate embracement of a disability identity, and 4) demonstrating the pervasive influence of stigma over time in claiming a disability identity.

Ongoing access to AT was identified as a key factor in promoting feelings of autonomy and competence and the development of a positive sense of identity over time. While other studies have noted the importance of AT devices such as iOS devices, a reading device and speech recognition software in promoting academic competence (Foley & Masingila, 2015; Nelson & Reynolds, 2015; Tanners et al., 2012), these studies were not longitudinal in nature. In the current study, it was evident that when students did not have access to appropriate AT due to breakdowns or availability over time, it undermined their sense of autonomy and competence and threatened their sense of value. From the perspective of the MPT model (Scherer, 2005), this highlights the importance of technology and environmental factors and their role in use/non-use of AT. In particular, it demonstrates the need for ongoing support services to ensure that technology issues and malfunctions can be dealt with swiftly and efficiently regardless of whether students are on campus or engaged in remote learning. Otherwise, students are at risk of abandoning their AT as was the case with some of the participants in the current study. Notwithstanding the negative implications that this could have for the student themselves with regards to their academic and social engagement, this also presents an inefficient use of resources and funding in higher education for AT which has been highlighted as limited (Mullins & Preyde, 2013; Reed & Curtis, 2012; Shevlin et al., 2004).

Contact with others with disabilities was identified as a key factor in embracing a disability identity, promoting feelings of belonging and enhancing feelings of autonomy and competence. Previous research in higher education has identified the importance of relationships with others with disabilities for a mutual sense of understanding and sharing of common experiences (Goddard & Cook, 2021; Minotti et al., 2021; Olney & Brockelman, 2003) enhancing perceived social support (Minotti et al., 2021) and in promoting incorporation of disability into one's identity (Clouder et al., 2019; O'Shea & Kaplan, 2018; O'Shea & Meyer, 2016). However, findings from the current study also highlighted the instrumental role of contact with others with disabilities in transforming negative perceptions that students held. For some participants, it enhanced feelings of autonomy and competence and their perceived ability to be successful in the future through upward social comparison; students were exposed to what others had already achieved or had the opportunity to work collaboratively on academic work with students with the same impairment. For others, contact with students with disabilities resulted in re-evaluation of perceptions of AT from a stigmatising device which made them feel different to a tool of empowerment. These shifts in perceptions can be accounted for by social identity theory. Social creativity strategies are a group of strategies outlined in social identity theory which can involve shifting the comparison group to a more favourable alternative, re-evaluating stigmatising dimensions or focusing on positive attributes that the in-group possesses in order to enhance self-esteem (Branscombe & Ellemers, 1998). Through contact with others with disabilities, it allowed students to re-evaluate previous stigmatising dimensions associated with disability such as an inability to gain employment or feeling different due to AT use. Equally, through changing the comparison group to SWD rather than non-disabled peers, it promoted greater feelings of belonging and competence in academic abilities over time. The above findings highlight the importance of HEIs providing opportunities for SWD to connect and socialise with one another to help promote a positive sense of identity.

This study also sheds greater light on AT as a key factor in willingness to embrace a disability identity. Previous research among SWD in higher education has identified AT as an identity concern, with students conscious of the visibility of AT in drawing unwanted attention to them and their impairment (Aamlid & Brownfield, 2019; Bell et al., 2016; Goode, 2007; Miller et al., 2019; Thompson-Ebanks & Jarman, 2018). As a result, they choose not to use AT or conceal it in an attempt to maintain a 'normal' student identity (Bell et al., 2016; Kendall, 2016). While some students in the current study did view AT as an identity concern, for others using visible AT facilitated claiming a disability identity which is a novel finding within the higher education context. Using visible AT provided opportunities to discuss their impairment and device use with others which promoted embracement of a disability identity. While the MPT model (Scherer, 2005) suggests that embarrassment or self-consciousness about using a device can contribute to avoidance or abandonment of AT, these findings suggest that the visibility of AT may promote device use if it offers opportunities for students to discuss their impairment and become more comfortable with their disability.

While previous research in higher education has highlighted the pervasive influence of stigma and the internalisation of negative perceptions on claiming a disability identity, it has failed to uncover the nuances and complexities in this relationship over time. Previous studies have highlighted that feeling illegitimate as a disabled person and different because of one's impairment can result in reluctance to claim a disability identity for SWD in higher education (Grimes et al., 2020; Hutcheon & Wolbring, 2012; Olney & Brockelman, 2003; Troiano, 2003; Waite & Elliot, 2021). However, findings from the current study demonstrate that this is open to change over time depending on the context and situation. Illegitimacy can persist in contexts where others do not have awareness or understanding of disability but some participants noted that experiencing a deterioration in impairment over time made them feel more legitimate as a disabled person and thus, more comfortable in embracing a disability identity. It was also evident that in some contexts, negative attitudes and reactions from others were internalised resulting in students feeling different, while in other contexts students challenged these stigmatising attitudes and claimed their disability identity. One possible explanation for this is the type of threat posed to the individual. Perhaps threats to character, such as an individual’s competency being undermined, were more detrimental to their sense of value than threats to their physical appearance, such as standing out or feeling different to others. However, more research is needed to examine whether the type of threat posed influences willingness to claim a disability identity. The above findings highlight the complexities of the role of stigma in willingness to claim a disability over time. HEIs should endeavour to combat stigma and reduce identity issues that SWD may experience through providing disability awareness programmes for both disabled and non-disabled students and staff alike.

9.5 Strengths and Limitations

Through implementing a LQR design, this study has uncovered the processes of identity change/continuity over time, that is the unfolding pathways of identity change/continuity with a focus on why and how they evolve the way they do. Examination of the processes of identity over time has largely been ignored in previous research among SWD in higher education. The analysis undertaken is another strength of this study; the combination of both longitudinal analysis across cases and analysis within cases (i.e. case histories) ensured a depth and breadth understanding of the data. Previous research examining identity over time for SWD in higher has failed to combine both analysis approaches. This is also the first study to explore the impact of AT in the identity of SWD over time. It has identified the impact of AT in both student and disability identities, the impact of AT in feeling valued, the ways in which AT can be used to strategically manage identities and captured how and why meanings attached to AT can evolve and change over time. It is also the first study to the author’s knowledge that proposes a conceptual model of identity change/continuity over time for SWD in higher and a driver in the negotiation of identity over time for this population, namely feeling valued. The findings demonstrate how students strived to maintain a sense of value over time, which guided their negotiation of identity, and employed strategies to re-establish a self-concept of a valued, worthy person when their sense of value was undermined. Lastly, this study contributed novel insights relating to key factors which influenced identity change/continuity over time such as the importance of ongoing access to AT, the integral role of contact with others with disabilities in transforming negative perceptions, the way in which AT can facilitate embracement of a disability identity and the complexities of the influence of stigma over time in claiming a disability identity.

Notwithstanding these strengths, there are some limitations to the current study which must be acknowledged. All of the participants were using some form of AT and were registered with the disability office in their HEI. In addition, while the second interview took place for all participants towards the end of the second semester, differences in academic calendars between institutions meant that some had finished their exams and assignments but others were still engaged in lectures. As a result, those who had completed exams may have been able to offer additional insights on their experiences of using AT in these environments in comparison to those who had not yet completed exams. Future studies should focus on students who are not currently using AT but could potentially benefit from it, or who have not self-identified as disabled with the disability office in their institution, as they may have additional identity related concerns which were not captured in the current study.

9.6 Conclusion

Overall, the LQR study uncovered a number of novel insights in the area. It was the first study to identify how and why meanings attached to AT change over time for SWD in higher education, suggesting that where students stake their self-worth can influence changing perceptions towards AT. It highlights the impact of AT in feeling valued, demonstrates the pivotal role AT plays in the performance of identities and elucidates the integral role of AT in participants view of themselves as competent and capable. It also makes significant contributions in our understanding of the negotiation of identity change/continuity for SWD in higher education, proposing a conceptual model which identifies a driver in the negotiation of identity over time (i.e. feeling valued), areas of identity change/continuity (i.e. feeling autonomous and competent, claiming disability and feeling like you belong), and key personal, social and environmental factors which influence pathways of identity change/continuity in each of the identified areas. This is the first study which identifies a driver in the negotiation of identity change/continuity for SWD in higher education, namely feeling valued. Finally, this LQR has identified novel insights relating to key factors which can positively or negatively influence the identities of SWD in higher education.

Chapter 10: Integrative findings and discussion

10.1 Introduction

This chapter critically integrates the findings from phase one and phase two to achieve the overall aim of this thesis, that is to explore AT outcomes and impacts among SWD in higher education. Integrating the findings gives a more comprehensive and holistic perspective on AT outcomes and impacts in higher education and enabled a higher-level interpretation of the data which would not have been possible through the examination of phase one and two separately in isolation. A critical discussion of the overall key findings from this mixed methods study are also presented in this chapter.

10.2 Integrating the findings from phase one and two

O'Cathain et al. (2010) and Farmer et al.'s (2006) approach to triangulation was used to integrate the findings from both phases (see section 3.4.1.4). The following steps were carried out in the triangulation protocol: 1) sorting findings related to the research question from each of the phases and identifying key themes, 2) identification of similarities and differences between the phases, 3) comparison of findings to establish the degree of convergence (i.e. if the findings were convergent, complementary, silent or dissonant), 4) development of meta themes based on the integration of findings from both phases which offered a richer interpretation of the data. In the sections that follow, incidences of convergence, complementarity, silence and dissonance are outlined in this mixed methods study. The meta themes are presented towards the latter part of this chapter in the discussion.

10.2.1 Convergence

There were notable agreements across the findings of phase one and phase two with regards to AT outcomes and impacts. Outcomes refers to finite and measurable changes which occur in response to an intervention, such as AT (GAATO, 2022a). In contrast, impacts refer to broader changes occurring within the community, organisation, society or environment as a result of outcomes. Impacts have been described as difficult to determine, predict and measure (GAATO, 2022a). The effects of AT on psychosocial outcomes such as academic self-efficacy and well-being are highlighted across both phases. Secondly, both phases provide consistencies relating to the importance of AT for educational engagement outcomes in the areas of stress and time press and academic performance. Lastly, it was evident that AT impacted on identity, with students indicating concerns surrounding AT-related stigma across both phases which affected device use.

AT significantly influenced academic self-efficacy and well-being across both phases. Phase one of the study found that those who reported met AT needs scored significantly higher on academic self-efficacy and well-being than those with unmet AT needs. Phase two results corroborate and confirm these findings by highlighting the importance of AT in these areas. Students reported that AT gave them greater confidence in undertaking academic tasks such as sitting exams, reading, note taking, studying or writing assignments. In general, students reported more confidence in their academic abilities and felt more optimistic that they would succeed in higher education because of AT. For some students, this academic self-efficacy was promoted through having a greater sense of control over their coursework, such as being able to independently assess the quality or standard of their submissions, due to support from AT. In addition, phase two results provide agreement with regards to the relationship between AT needs and well-being. Some students reported feeling better about themselves due to being more productive, independent and successful in the higher education environment as a result of access to AT. Others highlighted how AT enhanced well-being more generally through promoting decisional autonomy, giving participants a sense of control over their actions and day to day activities and allowing them to lead the lives they wished.

AT promoted positive educational engagement outcomes in the areas of stress and time press and academic performance across both phases. Phase one found that those who reported met AT needs scored significantly higher than those with unmet AT needs on stress and time press (i.e. ability to cope with academic demands) and academic performance. Phase two provided further support for these findings. Use of AT devices in class such as recording devices was found to reduce stress and anxiety for students who previously struggled to take handwritten notes, supporting findings from phase one. This allowed students to keep up with non-disabled peers and reduced concerns that they would fall behind. Equally, students reported that AT, which supported their learning, significantly improved their grades. This was the case for students who used devices to proofread work before submission and students who used recording devices in class to consolidate learning and study lecture material.

Findings across both phases offered agreement on the impact of AT on identity, whereby participants across both phases highlighted concerns about stigma related to device use, and how others may view them as a result. Phase one found that stigma/embarrassment was the main reason given by students for non-use of AT, with other students indicating feeling uncomfortable registering with the disability office as a deterrent. These findings highlight the perceived negative consequences of accessing/using AT for their identity. Consistency in these findings is evident in phase two which highlights the pervasive influence of stigma. Some students reported refraining from using their AT devices, particularly towards the beginning of their higher education journey, due to fear of anticipated stigma or as a result of enacted stigma. Students were worried about being treated differently by others and wanted to fit in as a 'normal' student. As a result, they decided not to use their AT, even though it was needed and beneficial, in order to avoid stigmatising reactions from others. This highlights the use of social identity performance strategies (Klein et al., 2007), which are a means of securing an individual's status as a member of a particular social group through deliberate expression or suppression of behaviours, signs or symbols typically associated with a social identity. In this instance, participants deliberately suppressed their AT use to consolidate the identity of a 'normal' student.

10.2.2 Complementarity

There are also notable instances of complementarity in this mixed methods study, where findings from one phase extended, built upon and offered a different but complementary perspective to findings from the other phase. The integration of findings elucidated the impact of AT in the areas of competence, adaptability and self-esteem, provided greater insight into the pervasive role of stigma in AT use/non-use and greater understanding of the influence of AT on social interactions in higher education.

A greater understanding of why competence is important, how competence can be promoted and how students manage situations where their competence is undermined was gained through the integration process, with AT playing a vital role in this. Findings from phase one showed that AT use had a positive psychosocial impact in the area of competence. Phase two results build upon and extend these findings in a number of ways. Firstly, by proposing an identity motive, namely feeling valued, which guides students' pursuit of competence. Feeling valued as a person was found to guide students' negotiation of identity changes/continuities over time in phase two. This is commonly referred to as self-worth or global self-esteem in the literature (Stets & Burke, 2014a). For many participants, they staked their sense of value on competence and others recognising them as capable individuals and thus, pursued feelings of competence in their daily lives. This was the first study to highlight an identity motive, namely feeling valued, in the negotiation of identity over time for SWD in higher education.

Secondly, phase two highlighted areas in which AT promotes competence, further building upon the quantitative results identified in phase one. It was evident that AT promoted academic competence with regards to students' ability to complete coursework and engage on a similar basis to non-disabled peers but equally promoted social competence, enabling students to interact with peers. Access to digital technologies such as zoom also made students feel more competent and capable about pursuing further study or employment in the future due to removing environmental barriers that previously existed such as a lack of PA support or accessible transport options. Thus, these digital technologies can be considered as AT for these students given that they served the purpose of maintaining or improving functioning and independence and thereby promoting well-being, a definition of assistive products provided by Khasnabis et al. (2015). When students did not have access to AT, or technical support when devices broke down, this greatly undermined feelings of academic competence and made students more reliant on family members for support. This demonstrates the importance of meeting students AT needs in promoting a view of themselves as competent, capable students.

Thirdly, phase two highlighted ways in which students managed situations which undermined their competency in order to re-establish the self-concept of a valued, worthy person. Some students engaged in minimising, denial, avoidance, non-disclosure and downplaying their disability and support needs. These are considered social mobility strategies within social identity theory (Branscombe & Ellemers, 1998), whereby an individual leaves the stigmatised, minority group to join the higher status, majority group. In this instance, this involved de-emphasising association with the disability category and passing as non-disabled. Other strategies included students claiming their disability to challenge stigmatising attitudes and attempt to transform negative perceptions surrounding disability. Within social identity theory, this can be considered a social competition strategy (Branscombe & Ellemers, 1998), whereby an individual advocates for equal rights and higher status for their group. Others engaged in problem solving, sourcing their own alternative, easily accessible AT solutions. These solutions were mainstream technology options such as chrome plug ins to support reading or earphones to support engagement with online lectures. The increasing availability and use of mainstream devices as AT has been cited widely in the literature (Faucett et al., 2017; Lupton & Seymour, 2000; Pedersen et al., 2019; Shinohara & Wobbrock, 2011, 2016) and was one of the key findings from the systematic review in chapter 2, while phase one results also indicated the use of AT based apps on phones by some students. The above findings highlight how students can successfully manage and respond to threats to their identities as competent and capable students and protect their sense of value.

A greater insight into the impact of AT on adaptability was established through the integration of findings across the phases. AT had a positive psychosocial impact on adaptability in phase one, that is on participants' willingness to take risks and engage in new activities (Day & Jutai, 1996). Phase two extends these findings by highlighting areas where AT positively influenced adaptability, such as pursuing further study or gaining employment in the future. Some students noted that they had not considered these as options or possibilities prior to being exposed to digital technologies such as Zoom or Microsoft teams. Positive experiences using these AT devices during the pandemic increased willingness of participants to pursue these goals and engage in these activities in the future.

Further insights on the influence of AT on self-esteem were also identified through critically integrating the findings. Phase one highlighted that AT use had a positive psychosocial impact on self-esteem. Phase two extends these findings by highlighting the indirect impact of AT on self-esteem. Phase two identified three key emblematic themes of identity change/continuity which affected students' sense of value or global self-esteem; 1) feeling autonomous and competent, 2) claiming disability and 3) feeling like you belong. AT influenced feelings of autonomy and competence, had implications for claiming a disability identity and influenced the extent that students felt they belonged in higher education, particularly toward the beginning of their third level journey. Thus, it is evident from phase two that AT influenced student's sense of value or global self-esteem indirectly through its impact on each of the aforementioned emblematic themes of identity change/continuity.

A greater understanding of the pervasive role of stigma in AT use/non-use was also evident through the integration of findings. Stigma/embarrassment was the main reason given by students for non-use of AT in phase one. This suggests that concerns about how others may react or view students as a result of their AT use precluded them from accessing or adopting AT. Phase two results extend this finding by identifying how AT-related stigma manifests and ways students overcame AT-related stigma. Some non-disabled peers showed a lack of understanding and awareness of AT which resulted in stigmatising attitudes, such as avoiding contact with SWD initially in classroom situations. Others reacted negatively towards AT use as the student had an invisible disability and thus, their AT use was viewed as unwarranted or a means of gaining an advantage. Some participants also viewed AT as stigmatising as it removed their ability to pass as non-disabled. This was particularly an issue for those with an invisible disability who had not come to terms with their impairment or disclosed it to others at the time.

Findings from phase two also highlighted ways in which students overcame the stigma attached to AT use and/or their disability. One strategy used by students was renegotiating the meanings attached to AT devices. Rather than view AT as a device that marked them as different, students focused on how AT could empower them to engage and participate fully in higher education. While previous research has noted that students will use AT if they perceive the positives to outweigh the negatives, findings from the current study suggest that the determining factor in this is where students stake their sense of value. This can be understood from the perspective of contingencies self-worth, which states that self-worth can fluctuate depending on successes or failures in domains deemed as important to the self and that people are motivated to harness situations and circumstances which satisfy these domains (Crocker & Wolfe, 2001). For many students in the current study, they staked their sense of value on being competent, capable students, which AT facilitated. Over time for some students, this became more important to their sense of value than other domains, such as receiving approval from non-disabled peers, and thus, AT was viewed as an enabler and tool of empowerment rather than a stigmatising device. Another strategy used by some students was embracing their AT and disability as a part of who they are. Viewing devices as integral to their everyday lives and how they viewed themselves as a person facilitated viewing AT in a positive light. Again for these participants, they placed less importance on approval from others for feeling valued and thus, maintained a sense of value despite encountering stigmatising attitudes. Other ways students overcame the stigma of AT use and/or their disability was through social identity performance strategies. This refers to the deliberate expression or suppression of actions, behaviours, signs or symbols that are typically associated with a social identity. This was done for the purposes of identity consolidation, which secures a person's status as a member of a particular social group (Klein et al., 2007). Some participants refrained from using their AT, while others deliberately reduced the visibility of their AT, opting for mainstream devices or devices that looked aesthetically similar to mainstream products, instead of using devices acquired through the disability office in their institution. These actions were carried out in order to avoid stigmatisation and protect their sense of value. Suppression or non-use of AT allowed students to consolidate the identity of a 'normal' student. Other participants deliberately emphasised their AT use to demonstrate their capabilities and ability to perform on par with non-disabled peers as a SWD. This was evident in the case of a participant who used her AT to highlight her ability to participate in a lab environment and transform negative perceptions towards disability held by academic staff. For this participant, she was also consolidating the identity of a 'normal' student but for her, perceptions of 'normal' centred around being able to engage, being treated equally by others and having the same opportunities as non-disabled peers. This is in contrast to other students who at the start of their higher education journey, viewed being a 'normal' student as blending in with others and reducing the likelihood that their AT would highlight them as different. For other participants, they purposively highlighted their AT devices to others to try and increase recognition of their disability. These participants wanted to consolidate the identity of a disabled person as previously they encountered negative reactions from others which questioned the legitimacy of their disability. Another way of combatting the stigma attached to AT use highlighted in phase two was to increase familiarity of AT among non-disabled peers. When non-disabled peers became accustomed to AT use over time, they didn't draw attention to students or their AT use. This points to the importance of creating an environment in higher education where all students are aware of and educated on AT devices.

The influence of AT on educational engagement outcomes, such as class communication, was also elucidated through the integration of findings across phases. Findings from phase one highlighted that students who reported met AT needs scored significantly higher on the class communication subscale than those with unmet AT needs. This subscale measured students’ verbal and non-verbal efforts to interact with others and participate in class activities. Findings from phase two extend these findings by demonstrating that AT can both promote and inhibit social interactions in the classroom and participation in class activities. Educational AT devices which helped increase knowledge and understanding of academic material, such as recording devices, promoted confidence to contribute and participate in coursework discussions with peers and ask questions in class. Participants noted feeling more confident to interact in these spaces due to having a greater grasp of academic material. For one student, who did not have access to the AT he needed, namely a recording device and audiobooks, this negatively impacted on his willingness to contribute to class discussions as he did not feel confident in his learning. This adds further context to the quantitative findings where the vast majority of participants (60.9%) with met AT needs were using educational AT. In addition, access to digital technologies such as Zoom and Microsoft teams promoted social interactions with peers during the pandemic when face-to-face learning wasn’t possible. However, phase two findings also noted instances where AT inhibited social interactions with others in the classroom. This seemed to be an issue for students who were using large, clunky AT devices which non-disabled students may have never seen before or devices which required students to sit at the front of lectures. In either case, non-disabled peers were reluctant and wary of approaching students initially but became more accustomed to the AT over time. This again points to the importance of incorporating assistive features into mainstream technology solutions, or wider availability of more discreet devices, to reduce visibility and prevent students encountering difficulties socially integrating with others in the classroom environment.

10.2.3 Silences

There was one instance of silence noted across the phases of this mixed methods study. Phase two highlighted the ways in which AT impacted on students’ feelings of belonging or their ability to fit in with others in higher education. Students noted how AT, particularly at the start of their higher education journey, made it difficult to feel like they belonged among non-disabled peers as it highlighted them as different. However, the impact of AT use on feelings of belonging was absent from the findings of phase one. While findings from phase one highlighted reasons for non-use of AT such as stigma/embarrassment, not being able to access AT or feeling uncomfortable registering for services at the disability office, concerns about fitting in with others in higher education were not highlighted. This was surprising given the large percentage of students (50%) who were non-users of AT and in their first year of study, as phase two highlighted this to be a period where students experience greatest concern in this regard. It is unclear whether AT impacted on feelings of belonging for current users of AT in phase one as they were not asked about any concerns (past or present) they had with their AT devices. It may have been the case that for these students, AT had negative consequences on their ability to fit in and feel like they belonged but this was not captured in the administration of the cross-sectional survey.

10.2.4 Dissonance

There were a number of instances of dissonance in this mixed methods study relating to the consequences of AT use for identity, the effects of AT use on the performance of academic tasks and the role of AT in involvement in extracurricular activities. While phase one highlighted the anticipated negative consequences of AT use for identity, namely stigma/embarrassment, phase two suggests that AT use can be an effective way of combatting stigma and promoting embracement of a disability identity. This was particularly the case when AT was visible to others as it facilitated conversations around device use and disability with peers in the classroom and provided opportunities for students to share their story with others through disability ambassador roles and events organised by the disability office in their institution. For these students, AT use facilitated claiming a disability identity rather than causing identity concerns where students worried how others would react or view them because of their AT use; the visibility of their devices started a conversation about their disability and they became more accustomed to openly speaking about it to others.

Contrasting perspectives were also uncovered on the effects of AT in the performance of academic tasks such as reading, note taking and studying. While phase one found no relationship between AT needs (met vs unmet) and the skills engagement outcome, phase two found that AT played an important role in students' ability to read academic papers, write assignments, study lecture content and take exams. The inconsistency in findings across the two phases may be explained by the wide variety of AT captured in phase one, some of which may not have been relevant for the performance of academic tasks. For example, among those with unmet AT needs, there was less of a requirement for educational AT (n= 19) in comparison to other AT devices (n= 25). Thus, for the vast majority of those with unmet AT needs, their performance of academic tasks may have been unaffected by lack of access to appropriate AT. This is in contrast to those in phase two who all reported that they needed and were currently using some form of educational AT. Thus, for the students in phase two, their AT was directly relevant for their educational engagement and performance of academic tasks.

Divergent findings were also observed with regards to the role of AT in involvement with extra-curricular college activities. Phase one found no significant difference between AT needs (met vs unmet) and the involvement with college activity subscale, which measures engagement and participation in extra-curricular college clubs, societies and events. In contrast, phase two highlighted the importance of certain AT devices for engagement in clubs and societies' events in university and the integral role of access to AT in general for creating opportunities for users to come together and form their own social group. One participant noted the importance of her hearing aids in enabling her to participate and interact with others at extra-curricular events. Another participant noted the importance of a specialised sports wheelchair in enabling her to play wheelchair football with a team in her university. However, for students who solely used educational AT in phase two, they did not mention the importance of these devices for engagement in extra-curricular activities, suggesting they may play a less important role. This could account for the results observed in phase one (i.e. no significant difference between AT needs and involvement in college activities) given the fact that the vast majority of these participants (60.9%) solely used educational AT which may not have been required to engage in extra-curricular events. In addition, phase two highlighted the importance of AT and disability communities for sharing experiences and advice and feeling like you fit and belong in higher education. Some of these communities were a collection of similar AT users who organised social events and activities for members and offered a safe space where participants could feel normal and share difficulties with one another. This demonstrates that access to AT can create opportunities for extra-curricular engagement through societies within the university environment. However, not all students had access to disability/AT communities in their university, with some noting the need for these spaces to increase feelings of belonging.

10.3 Discussion of Key Findings in the Present Study

The purpose of this section is to critically review the key findings of this mixed method study, that is the meta themes that were developed from the integration process. The findings of phase one and phase two have already been discussed separately in chapters 5 and 8 respectively. This integrative discussion will critically examine the overall key findings of the present study, outlining how they add to existing literature and the implications of the research. This serves the purpose of fulfilling the overall aim of this mixed methods study, that is to explore AT outcomes and impacts among SWD in higher education. The key findings which will be outlined in this integrative discussion are 1) Positive power: AT as the driver in educational engagement and a positive mindset, 2) Experiencing self-worth: The impact of AT on feeling valued and vice versa, 3) AT: Both a threat and means of managing and embracing identity and 4) Involvement in collective spaces: AT as an enabler and instigator.

10.3.1 Positive power: AT as the driver in educational engagement and a positive mindset

This mixed methods study demonstrates the instrumental role of AT in promoting educational engagement both inside and outside the classroom and its benefits from a psychological perspective. It is the first study in higher education which highlights the significance of meeting AT needs in achieving these outcomes rather than focusing on AT use. This is an important distinction as the effectiveness of using AT and indeed, whether an individual continues to use their device, is determined by the extent to which it meets their technological needs and preferences, in addition to their personal and environmental needs, as highlighted in the MPT model (Scherer, 2005). This study also adds to previous research which predominantly focused on the effects of AT on educational engagement outcomes such as grades (Bhardwaj & Kumar, 2017; Christ, 2008) and engagement in academic activities such as reading, writing, note-taking, test-taking and studying (Floyd & Judge, 2012; Malcolm & Roll, 2017b; Schmitt et al., 2012), rather than examining educational engagement more holistically. Outside of these areas, this mixed method study highlights the importance of AT for communication in class, ability to cope with academic demands and engagement in extracurricular activities such as clubs and societies' events in university; in some cases, AT was the driver for promoting participation in these areas and ensuring students didn't feel overwhelmed by their academic workload. Consideration of the benefits of AT for educational engagement more holistically is important given the challenges that SWD face such as social isolation (Francis et al., 2019; Goddard & Cook, 2021; Shevlin et al., 2004), and the need to expend more effort than non-disabled peers in their academic endeavours (Järkestig Berggren et al., 2016; Mullins & Preyde, 2013; Sachs & Schreuer, 2011), which can preclude them from participating in extra-curricular activities (Mullins & Preyde, 2013). Findings from this study suggest that AT can address some of the aforementioned barriers and improve the overall education experience of SWD in higher education.

AT was also identified as the driver in promoting academic self-efficacy and well-being and having a positive psychosocial impact in the areas of competence, adaptability and self-esteem. While previous research has highlighted that AT can increase confidence to contribute to class discussions (Foley & Masingila, 2015; Kuzu, 2011; Lartz et al., 2008), it focused specifically on those with sensory impairments. Findings from the current study extend these findings by highlighting how AT also plays an important role for students with non-sensory impairments with regards to class discussions. AT increased understanding of academic material for these students and thus, confidence to engage in course related discussions with others. In addition, AT was instrumental in promoting a positive outlook among SWD with regards to future opportunities. While AT has previously been noted to influence persistence in higher education (Malcolm & Roll, 2017b), findings from the current study suggest that AT and digital technologies, such as zoom, can make students feel more competent and capable about pursuing further study and gaining employment in the future. The positive psychological implications of AT are important given that some SWD report lower academic self-efficacy and greater concerns about being able to perform on par with non-disabled peers (Hall & Webster, 2008). Equally, it has been noted in the literature that some SWD report lower quality of life and greater anxiety in comparison to non-disabled peers (Herts et al., 2014; Mullins et al., 2017).

10.3.2 Experiencing self-worth: The impact of AT on feeling valued and vice versa

This mixed methods study contributes novel findings with regards to the relationship between AT and feeling valued or one's global self-esteem. While previous research in higher education has highlighted that AT can promote self-esteem through feelings of competence (Craddock, 2006), the current study additionally demonstrates the indirect impact of AT on self-esteem through feeling like you belong to a particular social group and claiming a disability identity. In some instances, AT increased one's sense of value indirectly through its influence in these areas, but in other cases, decreased one's sense of value through decreasing feelings of belonging and causing identity issues with regards to their disability identity. In addition, this study demonstrates that contingencies of self-worth (Crocker & Wolfe, 2001), or domains where an individual stakes their sense of value, can influence changing perceptions towards AT over time and device use.

AT impacted on feeling valued indirectly through feelings of belonging to a particular social group. AT highlighted students as different to non-disabled peers in the higher education environment which negatively impacted on their ability to fit in and their sense of value, particularly at the start of their third level journey. While previous research in higher education similarly notes concerns about the visibility of AT devices (Aamlid & Brownfield, 2019; Goode, 2007; Miller et al., 2019), findings from the current study add to the literature by demonstrating how this in turn can undermine feelings of self-worth. However, while AT made it difficult at times for participants to feel like they belonged and fit in with non-disabled students in higher education, it equally promoted in-group ties with others in certain spaces. For example, AT increased feelings of belonging among SWD through the sharing of common experiences. This was through involvement in AT communities where students all used some form of AT and could share with each other opportunities and challenges they have encountered. This promoted a sense of value through feeling accepted by others and noting that these were safe spaces where their disability and AT use was normalised.

The indirect impact of AT on feeling valued was also evidenced through its influence on willingness to claim a disability identity. While previous research has noted the impact of AT on claiming a disability identity (Hutcheon & Wolbring, 2012; Kendall, 2016; Thompson-Ebanks & Jarman, 2018), results from the current study extend these findings by highlighting how this indirectly affected students’ sense of value within a higher education context. For some participants, AT facilitated claiming a disability identity and feeling valued as a disabled person. This was due to the fact participants did not feel limited or restricted by their disability and could lead the lives the wished, through access to appropriate AT. While previous research has highlighted the role of AT in giving individuals a sense of control over their lives (Lannan, 2019; Lupton & Seymour, 2000; Pape et al., 2002; Söderström & Ytterhus, 2010), this is the first study in higher education to demonstrate the importance of this in claiming a disability identity and promoting a sense of value. For other participants who were not comfortable with their disability identity, in particular at the start of their higher education journey, AT removed their ability to pass as non-disabled and hide their disability from others and resulted in self-stigmatisation about the necessity of AT use. For these participants, AT caused identity issues and threatened their sense of value. This supports previous research in higher education which highlights concerns over AT disrupting the identity of a ‘normal’ student (Bell et al., 2016; Kendall, 2016). However, the majority of participants were still happy to claim a disability identity in order to access AT supports in university as the perceived benefits of use, such as having a sense of control over their lives, outweighed the perceived challenges such as identity issues or stigma. Unlike previous research which highlights conceptualisations of a ‘normal’ student as concealing or refraining from using AT in order to blend in with non-disabled peers (Bell et al., 2016; Kendall, 2016), these participants instead viewed a ‘normal’ student as being able to participate and engage on a similar basis to others which was made possible through their AT use. For some participants this was a process and involved the renegotiation of meanings attached to AT over time, from viewing devices as a marker of difference to a tool of empowerment.

Contingencies of self-worth, or domains where individuals stake their sense of value, offers a potential explanation as to why some students’ perceptions towards AT changed over time. While initially students may have staked their sense of value on approval from others such as non-disabled peers, over time students seemed to view this as less important and instead were focused on feeling competent academically, which AT facilitated. Previous research suggests that the superordinate contingencies of self-worth in which an individual stakes their sense of value are relatively stable over time but subordinate categories may be open to change (Crocker & Park, 2003). This may help account for the findings observed in the current study. It is possible that while students still regarded approval from others as important for their self-worth, this may have shifted to approval from family and friends rather than approval from non-disabled peers with regards to their AT use. This may account for why students were less concerned about stigma related to their AT use as they progressed through higher education and were happy to use their devices. Alternatively, participants may have reprioritised their contingencies of self-worth, viewing academic competence as more important to their self-worth than approval from others, and thus were less concerned about the stigma attached to AT use. In addition, contingencies of self-worth offers a novel way of viewing device use and acceptance. The MPT Model (Scherer, 2005) suggests that use/non-use is influenced by a complex interaction of environmental, technology and person factors. However, findings from the current study suggest that contingencies of self-worth may influence device use/non-use depending on whether AT satisfies or frustrates domains which are deemed important to the self. Considering the MPT Model in light of this suggests that individuals who view approval from others, for example, as important for their self-worth but encounter stigmatising attitudes from peers when using their device (i.e. environmental factor), are using an AT device which is clunky and cumbersome in design and attracts unwanted attention (i.e. technology factor), and makes an individual feel self-conscious or embarrassed during use (i.e. person factor), may result in non-use or abandonment as AT fails to satisfy this contingency of self-worth. In contrast, someone who views academic competency as most important for their self-worth may be undeterred by the above if their device can be used effectively in the classroom (i.e. environmental factor), helps them to achieve their academic goals (i.e. technology factor), and meets their expectations with regards to their academic engagement (i.e. person factor). However, more research is needed in this area to establish how contingencies of self-worth may influence perceptions towards AT use and changes in perspectives over time.

10.3.3 AT: Both a threat and means of managing and embracing identity

Previous research in higher education identifies AT as a stigmatising device which can threaten a ‘normal’ student identity and significantly impact on device use (Bell et al., 2016; Kendall, 2016). Similar findings were observed in the current study with the experience of enacted or anticipated stigma resulting in some refraining from using their devices in the first instance, while others abandoned their AT in order to maintain a ‘normal’ student identity. However, findings from the current study add to existing research by demonstrating other ways in which AT can be used in the performance of identities and how AT can facilitate embracement of a disability identity.

Social identity performance strategies refer to the deliberate expression or suppression of any sign, behaviour or symbol that is typically associated with a social identity (Klein et al., 2007). While previous research has highlighted strategies such as concealment or refraining from using AT as a means of distancing oneself from their disability identity and consolidating the identity of a ‘normal’ student (Bell et al., 2016; Kendall, 2016), findings from the current study add to previous research by suggesting that students purposefully and tactfully reduce the visibility of their AT use by carefully choosing what devices they use. Some students opted for mainstream devices, such as phones for use in class, instead of recording devices or text to speech software acquired from the disability office as it was more discreet and drew less attention to them. Other students opted for devices which were aesthetically ‘normal’, or looked similar to mainstream products, rather than acquire more visible alternatives through the disability office which would highlight them as different. This highlights the need to consider AT within the universal design for learning approach to ensure everyone can take advantage of the potential benefits of AT (Messinger-Willman & Marino, 2010; Rose et al., 2005), and normalise its use within the higher education environment. Another strategy used by participants to consolidate a ‘normal’ student identity was the deliberate and purposeful use of AT to demonstrate capabilities and transform negative perceptions of others towards disability. A ‘normal’ student identity for these participants entailed being able to participate on an equal basis to non-disabled peers and being treated equally rather than blending in with others. The use of AT in this way extends findings in higher education which previously highlighted the importance of AT in transforming stigmatising attitudes others hold towards SWD (Ashby & Causton-Theoharis, 2012; Foley & Masingila, 2015), but not as a way of engaging in social identity performance. Other social identity performance strategies involved using AT to consolidate their identity as disabled. Participants deliberately highlighted their AT use to others in order to validate their disability experience and dispel misperceptions that they were faking their disability. While previous research in higher education identifies AT as a means of indirectly disclosing their disability to others and legitimising their impairment (Miller et al., 2019), this was not purposefully done to consolidate a disabled identity.

Another novel insight from the current study was the way in which AT facilitated embracement of a disability identity in higher education. Some participants noted that using visible AT in class invited questions from non-disabled peers and facilitated open conversations with others concerning their disability, why they required AT, the device itself and how it functioned. Other students noted that their experiences using AT formed an important part of the talks they delivered through their disability ambassador role in university. In both cases, talking more openly about their disability and AT use facilitated embracement of a disability identity. In addition, AT helped initiate conversations, educate and raise awareness of disability and AT use which is integral to combatting stigma.

10.3.4 Involvement in collective spaces: AT as an enabler and instigator

The importance of AT for involvement in collective spaces in higher education is highlighted in this mixed methods study, extending previous research which examined engagement in social events/activities outside the classroom. Research on the role of AT in involvement in extracurricular activities in higher education is limited. One study found that students who used computers were more involved in college clubs, societies and organisations than non-users of computers (Sachs & Schreuer, 2011). However most studies focus on the impact of sports participation for SWD rather than the role of AT in this (Campbell, 2018; Dysterheft et al., 2018; McIntyre et al., 2019; Wessel et al., 2011). The current study extends these findings by demonstrating how devices which can promote the execution of sporting activities or devices which support communication enable engagement in clubs and societies events in university. Educational AT didn’t seem to play as central a role in this regard, as highlighted in phase one. Devices such as a hearing aid enabled one participant to fully immerse herself in extracurricular activities by facilitating communication with peers. Another student spoke about the importance of a specialised sports wheelchair in enabling her to play wheelchair football with a team in her university. While findings from the current study point to the importance of AT in promoting involvement in clubs and societies in university, more research is needed in this area to uncover how AT supports participation before, during and after the event/activity.

AT was also an instigator for students occupying collective spaces with other SWD who used AT. AT initiated the formation of AT communities in some universities where students shared experiences, information and advice with regards to AT use, supporting findings from previous research (Clouder et al., 2019). However, findings from the current study extend previous research by demonstrating the importance of these AT communities for upward social comparison and normalising AT use. Students felt more competent about successfully progressing through higher education and gaining employment in the future through seeing what other members of the AT community had achieved. Equally, students noted feeling more comfortable about using their AT and less self-conscious through their involvement with the AT community. In addition, experiences of using AT facilitated becoming a disability ambassador in some universities where students shared experiences relating to their disability and AT use. Involvement in these roles was instrumental in embracing a disability identity and feeling more comfortable about disability and AT use, supporting findings from previous research (Kimball et al., 2016).

10.4 Conclusion

This chapter critically discusses the key findings from this mixed methods explanatory sequential study design, which achieve the overall aim of this thesis, that is to explore AT outcomes and impacts among SWD in higher education. It highlighted for the first time the indirect impact of AT on feeling valued through its influence on claiming disability and feeling like you belong and the importance of contingencies of self-worth in changing perceptions towards AT over time. It also offered a new way of viewing device use, through the lens of contingencies of self-worth, and thus and a potential way of advancing the MPT Model (Scherer, 2005). It also advances our knowledge on the benefits of AT for educational engagement and psychosocial outcomes through examining AT needs rather than AT use and exploring areas which have been largely overlooked in previous research. Furthermore, it offers new insights on the impact of AT on identity, through highlighting its use in social identity performance strategies and as a facilitator to embracing a disability identity. Lastly, this thesis advances our knowledge on the role of AT both as an enabler in participating in clubs and societies' events in university and as an instigator in SWD involvement in collective spaces. The last chapter of this PhD thesis will outline the original contributions of this research and the implications arising.

Chapter 11: Conclusions

11.1 Introduction

This chapter outlines the original contributions of the present study in the areas of theoretical knowledge, empirical evidence, methodological approaches, research context and practical implications. The implications of the research will then be considered with regards to AT provision, policy and future research.

11.2 The original contributions of the present study

The current study has made contributions in the areas of theoretical knowledge, empirical evidence, methodological approaches, research context (i.e. the setting where the research was conducted) and practical implications (i.e. relevance of findings in applied settings) (see table 11.1).

In relation to theoretical knowledge, the LQR study provides original contributions to the field by proposing for the first time a conceptual model of the negotiation of identity change/continuity over time for SWD in higher education. This model identifies a driver in the negotiation of identity change/continuity (i.e. feeling valued), three emblematic themes of identity change/continuity (i.e. feeling autonomous and competent, claiming disability and feeling like you belong), trajectories within each of these themes, and personal, social and environmental factors of influence on identity for SWD over the course of an academic year. This study also advances theoretical knowledge relating to the MPT model (Scherer, 2005), social identity theory (Tajfel & Turner, 1979), self-categorisation theory (Turner et al., 1987) and social identity performance (Klein et al., 2007). Contingencies of self-worth offer a new way of considering device use/non-use which could build upon the existing MPT model after further testing. This is the first time social identity theory has been applied to a LQR design for SWD in higher education which allowed identification of different strategies (i.e. social mobility, social creativity or social competition) used by the same individual over time, depending on the context or situation. This study also advances self-categorisation theory by highlighting for the first time how different contexts can influence the self-categorisation of SWD in higher education and the implications of this for feeling like you belong. Lastly, it offers novel insights for social identity performance by highlighting strategies used by students to consolidate a ‘normal’ student identity or disabled identity which previously have not been identified for SWD in higher education.

The current study provides several novel contributions to empirical evidence in the area. Findings from phase one highlight for the first time the significance of meeting students AT needs for promoting educational engagement and psychosocial outcomes among SWD in higher education. It also highlights for the first time a positive relationship between AT and academic self-efficacy for completing educational tasks in higher education. Findings from the LQR study identify for the first time a driver (i.e. feeling valued) in the negotiation of identity change/continuity over time for SWD in higher education. Maintaining a sense of value was important for the self, and when students encountered situations or circumstances which undermined or threatened their sense of value, there was a need to re-establish a self-concept of a valued and worthy person. The integration of findings across the phases highlighted novel insights relating to the impact of AT in feeling valued. Findings suggest that AT indirectly impacts on students’ sense of value or global self-esteem through its influence on feelings of autonomy and competence, willingness to claim a disability identity and feeling like you belong. While previous research has noted the indirect impact of AT on self-esteem through promoting feelings of competence (Craddock, 2006), this is the first study in higher education to highlight AT as indirectly influencing self-esteem through willingness to claim a disability identity and feeling like you belong. Students also engaged in a variety of social identity performance strategies (Klein et al., 2007) when their sense of value was undermined in an attempt to re-establish their self-worth and consolidate their identity as either a ‘normal’ student or a disabled person. This thesis highlighted novel ways students engaged in social identity performance in higher education such as purposively reducing the visibility of AT (i.e. through selection of mainstream products or products that looked aesthetically ‘normal’) or emphasising their AT to demonstrate their capabilities, as means of consolidating a ‘normal’ student identity. In addition, this study also highlights the purposeful use of AT to consolidate their identity as disabled, through deliberately emphasising their AT to legitimise their impairment. Given the importance of maintaining a sense of value in the current study for experiencing a positive sense of identity, these findings are imperative in understanding the ways in which AT can contribute to this.

The study also contributes novel findings with regards to the identification of factors which influence changing perceptions of AT over time. While research outside a higher education context has noted that factors such as deterioration in impairment, embracement of a disability identity and early intervention as important in influencing perceptions of AT over time (McDonald et al., 2020; Pape et al., 2002), the findings from this LQR study identified additional factors specific to the higher education environment, namely involvement in disability ambassador roles and access to a community of AT users. Disability ambassador roles gave students the opportunity to talk openly about their AT use with others, while AT communities normalised AT use for students and helped address concerns around feeling different because of AT use. In addition, findings from the LQR study suggest that changing perceptions of AT use over time and device use/non-use may be influenced by where students stake their self-worth. Changes in prioritisation of contingencies of self-worth or alternatively shifts in subordinate categories may account for shifts in perspectives observed in the current study, such as viewing AT as a tool of empowerment rather than a marker of difference. Viewing changes in perspectives towards AT through the lens of contingencies of self-worth is a novel contribution to empirical evidence in the current study.

The LQR study also offered novel contributions relating to key factors which influenced identity change/continuity over time for SWD in higher education. It highlighted the importance of ongoing access to AT over time for feelings of autonomy and competence, demonstrated the integral role of contact with others with disabilities in transforming negative perceptions, showcased how AT can facilitate embracement of a disability identity and demonstrated the nuances and complexities in the pervasive role of stigma in claiming a disability identity over time. These findings build upon previous research which identified factors such as stigma as instrumental in the negotiating a disability identity over time (Riddell & Weedon, 2014) but failed to uncover the complexities in this relationship. In addition, previous research on factors influencing identity change/continuity over time for SWD in higher education is limited in scope focusing on factors implicated in identity experiences for those engaging in work placements as part of their course (Cunnah, 2015; Riddell & Weedon, 2014), or in relation to a specific task such as disclosure/non-disclosure of a disability identity (Kranke et al., 2013). The current study extends these findings by highlighting factors implicated across three areas of identity change/continuity, namely feeling autonomous and competent, claiming disability and feeling like you belong, and for those engaged in study throughout the academic year.

In relation to methodological approaches, this was the first study to systematically review the impact of AT on educational and psychosocial outcomes for SWD in higher education across diagnostic boundaries and AT classifications. It was also the first study to implement a LQR design to explore the impact of AT in student and disability identities over time in higher education. This design allowed the exploration of the evolving role of AT in student and disability identities over time and identification of key factors which influenced changes/continuities, which would not have been possible through implementation of a cross-sectional qualitative design. In addition, the use of both within case and across case analysis ensured that processes of change (i.e. unfolding pathways of change and continuity with a focus on how and why they unfold the way they do) were embedded in the analysis. It is also the first study to use PIADS scale among SWD in higher education, which asked students to think of all the AT which is important for their educational engagement when responding. This scale could be used in future research in higher education to assess the psychosocial impact of AT use for students who are using more than one AT device for their educational engagement. Finally, it is the first study which measured AT needs (met vs unmet) rather than AT use versus non-use when assessing educational and psychosocial outcomes quantitatively in higher education. This decision was made given that the extent to which an individual's technological needs and preferences are met, in addition to personal and environmental needs, can significantly influence the effectiveness of using devices and indeed if they are used at all, according to the MPT model (Scherer, 2005). Measuring AT in this way is also in line with national and international practices by the WHO's Global Report on Assistive Technology, the National Disability Survey in Ireland and the National Physical and Sensory Disability database in Ireland who similarly highlight the impact of met/unmet AT needs in their reports (Carew & Doyle, 2012; Cullen et al., 2015; WHO, 2022).

Regarding the research context, this is the first study internationally, to the author's knowledge, to explore the impact of AT in student and disability identities for those in higher education. It also represents the first Irish study to explore SWD' negotiation of identity change/continuity over time within a higher education context.

In relation to contributions to knowledge of practice, the current study highlights key insights which have significant implications for AT provision and policy within higher education. With regards to AT provision, findings demonstrate the need for greater availability and choice in AT selection in higher education. Findings from the LQR study point to the importance of providing mainstream technology solutions with built in accessibility features to reduce visibility and counteract stigma attached to AT use. While these solutions may not be suitable or appropriate to everyone, they should be offered to students alongside individualised AT devices and recommended where appropriate. Findings from the current study also highlight the multitude of benefits of AT use for students' educational engagement and psychosocial functioning. This emphasises the importance of AT provision for SWD and points to the need for greater funding to be allocated to AT services in higher education. In relation to policy, findings from the LQR study highlight the importance of HEIs creating an environment where SWD feel valued in order to promote a positive sense of identity and reduce the risk of students encountering identity issues. In addition, findings highlighted the importance of AT and digital technologies in increasing access and participation in higher education. Policy relating to SWD in higher education should incorporate ways in which HEIs can promote a sense of value for this population and provide more flexible modes of engagement. Finally, AT-related policy in higher education should highlight ways in which HEIs can address stigma attached to AT use and initiatives which can help students to view AT in a positive light, based on the findings from the current study. The implications of the current study are outlined in greater detail in the section below.

Table 11.1

Original contributions of the present study

Domains of contribution	Supported	Developed	New
Theoretical knowledge	*Provides theoretical support for:* • The MPT Model (Scherer, 2005) • Social identity theory (Tajfel & Turner, 1979) • Self-categorisation theory (Turner et al., 1987) • Social identity performance (Klein et al., 2007) • Self-affirmation theory (Steele, 1988)	*Advances theoretical knowledge relating to:* • The MPT Model (Scherer, 2005) • Social identity theory (Tajfel & Turner, 1979) • Self-categorisation theory (Turner et al., 1987) • Social identity performance (Klein et al., 2007)	*Creates new theoretical support for:* • A conceptual model of the negotiation of identity change/continuity over time for SWD in higher education
Empirical evidence	*Supports existing empirical evidence relating to:* • The benefits of AT for educational engagement and psychosocial functioning • The consequences of stigma for AT use • The identity implications of AT	*Develops upon empirical evidence by:* • Highlighting the role of AT in multiple facets of educational engagement • Demonstrating the psychosocial impact of AT use in competence, adaptability and self-esteem in higher education • Highlighting first year in higher education as an	*Creates new empirical evidence relating to:* • Significance of meeting AT needs for promoting educational engagement and psychosocial outcomes in higher education • The positive relationship between AT and academic self-efficacy for completing educational tasks in higher education

Domains of contribution	Supported	Developed	New
		important period for stigma concerns relating to AT - Demonstrating the ways in which AT can facilitate embracement of a disability identity in higher education - Highlighting the use of social identity performance strategies as ways of managing identity and dealing with stigma attached to AT in higher education	- The role of feeling valued in guiding the negotiation of identity change/continuity for SWD - The impact of AT in feeling valued - The role of contingencies of self-worth in changing perceptions towards AT over time and device use/non-use - Factors which influence changing perceptions of AT over time for SWD in higher education - Factors which influence identity change/continuity for SWD over time
Methodological approaches	*Supports methodological approaches employing:* - Mixed methods research to explore AT outcomes and impacts		*Contributes new methodological approaches via:* - Systematically reviewing the impact of AT for SWD in higher education across AT classifications and diagnostic boundaries - Employing a LQR design to explore the impact of AT in

Domains of contribution	Supported	Developed	New
			student and disability identities over time in higher education - The use of the PIADS scale in higher education for AT users and non-users - Measuring AT needs (met vs unmet) when assessing educational and psychosocial outcomes quantitatively in higher education
Research context	*Supports research in the following contexts:* - Research on AT-related educational and psychosocial outcomes in higher education	*Further develops research in the following contexts:* - Research on the impact of AT in identity for SWD	*Signifies unique research context by:* - Representing the first study (internationally) to explore the impact of AT in student and disability identities over time in higher education - Representing the first study in an Irish higher education context which explores SWD' negotiation of identity change/continuity over time
Practical implications	*Supports practical implications for:* - The need for disability/AT awareness training for staff	*Further develops practical implications for:*	*Provides the following unique practical implications:* - Relating to the importance of creating an environment in

Domains of contribution	Supported	Developed	New
	and students in higher education	• The need for AT-specific policy and funding in higher education • The need for online and flexible ways for students to engage and participate in higher education	higher education where SWD feel valued to promote a positive sense of identity and a space where they feel comfortable using AT

11.3 Implications

The current study encompasses a thorough investigation of AT outcomes and impacts for SWD in higher education. The findings arising from this study have significant implications for AT provision, policy and research.

11.3.1 AT provision implications

The findings from the current study can help inform evidence based AT practices in higher education. Access to and funding for AT in the higher education sector is limited (Mullins & Preyde, 2013; Reed & Curtis, 2012; Shevlin et al., 2004), with only 11% of total funding under the Fund for Students with Disabilities allocated to AT in 2014/15 in Ireland (Higher Education Authority, 2017). Findings from the current study underscore the importance of meeting SWD' AT needs, and ensuring that appropriate funding is allocated for this essential support, in order to maximise the potential educational and psychosocial benefits that students will experience as a result of AT use. The wide-reaching opportunities and advantages that AT affords, identified through this study, points towards the need for ring-fenced funding for AT provision, separate to the Fund for Students with Disabilities in Ireland. This fund should be extended to include mainstream AT solutions and apps as well as individualised AT devices, given the increasing use and availability of mainstream technology identified through the systematic review in Chapter 2 and the preference for mainstream solutions by some students in phase two. This would provide greater flexibility and choice with regards to access to AT and may alleviate some of the stigma concerns relating to AT identified in this study by reducing the visibility of devices.

11.3.2 Policy implications

This study also has significant implications for policy in higher education. Goal 3 of the National Plan for Equity of Access to Higher Education 2015-2021 in Ireland highlights the importance of collecting data and evidence to inform future policy relating to underrepresented target groups, such as SWD (Higher Education Authority, 2015). Results from the LQR study highlight the importance of creating an environment where SWD feel valued to promote a positive sense of identity among this population and reduce the risk of identity issues. HEIs could take a number of steps in achieving this and incorporate promoting a sense of value among SWD as a core element of their disability policy. Areas of focus should include 1) promoting feelings of autonomy and competence among SWD through access to appropriate and flexible AT and PA services to support students online and on campus, 2) provision of advocacy and ambassador opportunities to allow students to make positive contributions to the disabled community, 3) disability awareness programmes for all staff and students to reduce stigmatisation, increase validation and understanding of impairments and thus, promote willingness to claim disability, and acceptance and feelings of belonging among non-disabled peers, 4) the creation of AT and disabled communities to increase feelings of belonging among SWD through sharing mutual experiences related to disability with others, 5) the provision of a disability course to all students and staff, organised and ran by the disability office in the HEI, which is grounded in the social model of disability to challenge individuals to reconsider medicalised conceptualisations of disability.

In addition, findings from the LQR study highlight the importance of providing flexible modes of engagement for SWD to increase access and participation in higher education. In particular, access to digital technologies for engaging with lecture content during the pandemic removed environmental barriers that students otherwise would have experienced, such as a lack of accessible transport or lack of access to PA supports. This also facilitated students feeling more competent and capable about pursuing further study or gaining employment in the future, if these flexible options were available. This has important implications given the low participation rates of those with disabilities in both higher education and employment relative to those without disabilities. Those with disabilities accessing disability services in higher education in Ireland represent only 6.3% of the total undergraduate student population and are greatly underrepresented in postgraduate studies, representing just 2.5% of the total postgraduate student population in 2019/2020 (AHEAD, 2021). Equally, the employment rate of those with disabilities in Ireland is one of the lowest in the EU with just 26.2% at work compared to 48.1% in the EU (European Commission, 2019). These findings are also instrumental in informing policy documents such as the National Plan for Equity of Access in Higher Education which specifically outlines participation targets for those with disabilities (Higher Education Authority, 2015). Equally, these findings support the strategic theme of Digital Transformation, identified in the Higher Education Authority's 2018-2022 Strategic

Plan, which advocates for greater flexibility in the delivery of academic content through online resources to increase participation (Higher Education Authority, 2018a). However, findings from the current study emphasise the importance of flexible delivery specifically for SWD, and in this light, provisions must be made to ensure online delivery meets accessibility requirements for this population. This is in line with a Universal Design for Learning (UDL) approach which maintains that learning goals and materials, pedagogy methods and assessments should be accessible to all students regardless of age, ability, socioeconomic background or nationality (AHEAD, 2017). UDL is a key principle which informs the National Plan for Equity of Access to Education (Higher Education Authority, 2015), and specific consideration of how AT can be used alongside a UDL approach has been highlighted as a priority in higher education in Ireland (AHEAD & Disability Advisors Working Network, 2018).

Finally, findings from this study have significant implications for AT policy in higher education. Stigma associated with AT was a big concern for students. This is something that must be addressed in AT policy in higher education to increase comfort in using AT devices and reduce the likelihood of students foregoing accessing much needed accommodations, such as AT, through the disability office. This thesis has identified a number of ways in which HEIs can tackle the stigma associated with AT use. Areas of focus should include 1) increasing the availability of and funding for AT based apps and mainstream technology solutions with built in accessibility features which would reduce the visibility of devices and potential for stigmatising reactions, 2) organising ‘technology for all’ sessions which promote AT as something which is potentially beneficial to everyone and not exclusive to those with disabilities, 3) the formation of AT communities in higher education where students can share experiences and AT use can be normalised, 4) facilitating open conversations around AT through events ran by the disability office and disability ambassadors or initiatives such as an AT/disability awareness day on campus and 5) introducing a short AT/disability awareness module, delivered through the university’s online learning platform, that all students/staff are advised to take as part of their course introduction/continued professional development. The above initiatives serve the purpose of increasing comfort in using AT for the SWD themselves but equally address the lack of knowledge and understanding of AT from non-disabled staff and students which can contribute to stigmatising reactions.

11.3.3 Research implications

This thesis highlights promising avenues for future research in the area. With regards to the cross-sectional survey in phase one, it highlighted the need to develop validated AT specific outcome measures for educational engagement. The CLEI and SCEQ which were used to measure educational engagement may not be sensitive enough to detect changes specific to AT. Development of AT specific outcome measures would ensure that individuals are considering their AT when responding to statements regarding their educational engagement, and thus, be more sensitive in capturing the effects of AT on educational engagement. It would also enable consistency and comparability in the measurement of AT outcomes for educational engagement. The fragmented nature of existing research on AT outcomes has been highlighted as a significant global challenge and identified as a priority that needs to be addressed by GAATO through their Grand Challenges Project (GAATO, 2022b). Secondly, findings from the cross-sectional survey highlighted the importance of AT for educational engagement and psychosocial outcomes in specific areas. However, quantitative studies in higher education which implement a longitudinal research design are needed to establish if a causal relationship exists between AT and psychosocial outcomes such as well-being, academic self-efficacy and quality of life by assessing outcomes before and after integrating AT.

Findings from the LQR study also highlighted avenues for future research. The conceptual model of identity change/continuity that was developed needs further testing to establish the validity of the model in accounting for identity change/continuity for SWD in higher education and whether additional elements need to be included. First year in higher education was also found to be an important period where students experience identity concerns relating to their disability and AT use. Research is needed to explore why this is the case and identify the factors which contribute to these increased identity concerns during this period. Findings from the LQR study also suggest that domains where students stake their self-worth influence changing perceptions towards AT over time and device use/non-use. However, more research is needed to establish how exactly contingencies of self-worth influence perceptions of AT over time, if students reprioritise areas where they stake their sense of value or alternatively, if individuals experience shifts in subordinate categories of self-worth or both. Subordinate categories of self-worth are subdomains of the superordinate category. For example, approval from friends or approval from family are subordinate categories of approval from others (i.e. the superordinate category of self-worth). More research is also needed to establish the role of contingencies of self-worth in device use/non-use and if it is a potential way of advancing the MPT model (Scherer, 2005). In addition, all students in the current LQR study were using some form of AT and registered with the disability office in their HEI. Future research should explore the impact of AT in identity for students who have not registered with the disability services in their institution. These students may have additional identity related concerns, given they have not self-identified as disabled to access supports, and could offer additional insights with regards to the impact of AT in identity. It may also be interesting to explore the impact of AT in identity for non-current users who could potentially benefit from AT. These individuals may have additional identity related concerns which inhibit them from accessing AT in the first instance. Findings from the current study also identified the importance of certain types of AT for engagement in extracurricular activities. However, more research is needed on the role of AT in involvement in extracurricular activities such as clubs and societies events in higher education and how it influences participation before, during and after these activities.

11.4 Strengths and Limitations

There are a number of strengths to the current mixed methods study. Firstly, conducting a systematic review on the impact of AT for SWD in higher education collated important information relating to the educational and psychosocial benefits of AT use. This was the first systematic review which considered AT use broadly among a diverse group of students with various different impairments in higher education. This systematic review also highlighted a number of gaps in the literature, such as exploring the importance of AT for educational engagement more holistically (i.e. beyond grades and the performance of academic tasks), and the dearth of research explicitly exploring the impact of AT in identity, both of which were subsequently addressed in phases one and two respectively. Strengths of phase one, the cross-sectional survey, include highlighting, for the first time, the importance of meeting students AT needs in higher education for educational engagement in certain domains and psychosocial outcomes such as academic self-efficacy and well-being; it was also the first study to quantitatively explore the relationship between AT and academic self-efficacy in higher education. Examining the effects of AT needs rather than AT use on outcomes was a key strength of this study. According to the MPT model (Scherer, 2005), the extent to which an individual's technological needs and preferences are met, in addition to personal and environmental needs, can significantly influence the effectiveness of using devices and indeed if they are used at all. This highlights the importance of differentiating between met and unmet AT needs rather than focusing on AT use when exploring outcomes. There were also notable strengths from the LQR study. Findings led to the development of a conceptual model on the negotiation of identity change/continuity over time for SWD in higher education. This model identified a driver in the negotiation of identity over time (i.e. feeling valued) identity motive, areas of identity change/continuity (i.e. feeling autonomous and competent, claiming disability and feeling like you belong), and key personal, social and environmental factors which influenced pathways of identity change/continuity in each of the identified areas. This is the first study to identify a driving force in the negotiation of identity over time for SWD in higher education. This has important implications for disability policy in higher education, highlighting the need for HEIs to consider ways in which they can make SWD feel valued to promote a positive sense of identity among this population. In addition, findings from the LQR study suggest that domains where students stake their self-worth may influence perceptions towards AT and changing perceptions towards their devices over time. Considering perceptions towards AT through the lens of contingencies of self-worth is a novel finding and has significant implications for AT policy in higher education and existing models of device use/acceptance such as the MPT model (Scherer, 2005). In addition, the current study applied social identity theory (Tajfel & Turner, 1979) for the first time in a LQR design among SWD in higher education which allowed identification of different strategies (i.e. social mobility, social creativity or social competition) used by the same individual over time, depending on the context or situation. It also advances self-categorisation theory (Turner et al., 1987) by demonstrating for the first time how different contexts can affect how SWD self-categorise in higher education and the consequences of this for feeling like you belong. Furthermore, it extended knowledge relating to social identity performance strategies (Klein et al., 2007) among SWD in higher education by identifying unique ways in which participants consolidated their identity as a 'normal' student and as a disabled person. Finally, the integration of findings in this mixed methods study gave further context and insight into the findings of phase one and two and allowed overall conclusions to be drawn on AT outcomes and impacts among SWD in higher education. This higher-level interpretation of the data would not have been possible without implementation of a mixed methods design.

There are also some limitations to the current mixed methods study which must be acknowledged. With regards to the cross-sectional survey, the full extent of the impacts of AT may not have been captured. This is due to the complexity in measuring AT outcomes with the possibility that some students find AT useful in completing one particular task but not another (Smith, 2000). Others may only require AT for their educational engagement on a sporadic basis such as in times of high stress or the lead up to exams whereas other students may require it daily. Another limitation with the cross-sectional survey was the use of measures such as the CLEI, SCEQ, SELF-A and WEMWBS which are not AT-specific in nature. It is possible that these measures may not be sensitive enough to detect changes which are specific to AT. In addition, while measuring AT needs was considered a strength in the current study it could also be considered a weakness. Through asking students to self-report if their AT needs are fully met or if they have additional requirements, it is possible that some students may have unmet AT needs which they did not report due to being unaware of the range of technologies available and how they could potentially benefit from them. In addition, the sample size for the cross-sectional survey was too small to meaningfully examine if differences existed on educational and psychosocial outcomes depending on the type of AT students were using. Some limitations have also been identified in the LQR study with regards to the sample. All participants were using some form of AT and were registered with the disability office in their institution. Students who are not currently using AT but could potentially benefit from it, or who have not self-identified as disabled with the disability office in their institution, may have additional identity related concerns which were not captured in the current study. Thus, investigating the impact of AT on identity in the aforementioned populations is a promising avenue for future research.

11.5 Conclusion

This PhD thesis presents a thorough exploration of AT outcomes and impacts for SWD in higher education. The systematic review is the first to collate information regarding the impact of AT on educational and psychosocial outcomes in higher education across diagnostic boundaries and AT classifications. A sequential explanatory design was then carried out to: 1) explore the effects of AT on the educational engagement and psychosocial outcomes of SWD in higher education; and 2) explore the impact of AT in student and disability identities of those in higher education and if/how this changes over time. The current study provides original contributions to knowledge by demonstrating the importance of meeting students' AT needs for educational engagement and psychosocial outcomes, proposing a conceptual model of identity change/continuity for SWD in higher education, identifying feeling valued as the driver in the negotiation of identity over time, highlighting the indirect impact of AT on feeling valued and suggesting the importance of contingencies of self-worth in device use/non-use and changing perceptions towards AT over time. This thesis offers advancements to existing theories and models such as MPT model, social identity theory, self-categorisation theory and social identity performance. Considering device use/acceptance through the lens of contingencies of self-worth offers a novel way of viewing some of the personal, technology and environmental factors identified in the MPT model and their subsequent influence on use/non-use of AT. Applying social identity theory to a LQR design for the first time among SWD in higher education showcased the use of different identity management strategies (i.e. social mobility, social creativity and social competition) by the same individual over time depending on the context. Furthermore, this thesis highlighted for the first time differences in how SWD in higher education self-categorise depending on the context and the subsequent impact of this on feelings of belonging. In relation to social identity performance, this thesis highlighted novel ways in which SWD in higher education consolidate a 'normal' student identity and disability identity. The findings of the present study have important implications for AT provision, policy and future research and highlight the instrumental role of feeling valued in creating an environment where students are comfortable and happy to use their AT in higher education.

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Appendices

Appendix A.1

PsycINFO Search Strategy

1. DE "Assistive Technology" OR DE "Medical Therapeutic Devices" OR DE "Artificial Pacemakers" OR DE "Hearing Aids" OR DE "Cochlear Implants" OR DE "Optical Aids" OR DE "Contact Lenses" OR DE "Prostheses" OR DE "Cochlear Implants" OR DE "Augmentative Communication" OR DE "Synthetic Speech" OR DE "Mobility Aids"

2. assistive N1 technol* OR assistive N1 equipment OR assistive N1 product* OR assistive N1 aid* OR assistive N1 device* OR self-help N1 device* OR disability N1 aid* OR empowering N1 technology OR technical N1 aid* OR sensory N1 aid* OR communication N1 aid* OR audiovisual N1 aid* OR cognitive N1 aid* OR memory N1 aid* OR mobility N1 aid* OR electronic N1 aid* OR electronic N1 assistive

3. S1 OR S2

4. DE "Disabilities" OR DE "Developmental Disabilities" OR DE "Specific Language Impairment" OR DE "Learning Disabilities" OR DE "Dyslexia" OR DE "Multiple Disabilities" OR DE "Deaf Blind" OR DE "Reading Disabilities" OR DE "Dyslexia"

5. DE "Syndromes" OR DE "Addisons Disease" OR DE "AIDS" OR DE "Autism Spectrum Disorders" OR DE "Balint's Syndrome" OR DE "Battered Child Syndrome" OR DE "Capgras Syndrome" OR DE "Chronic Fatigue Syndrome" OR DE "Cornelia De Lange Syndrome" OR DE "Creutzfeldt Jakob Syndrome" OR DE "Crying Cat Syndrome" OR DE "Culture Bound Syndromes" OR DE "Cushings Syndrome" OR DE "Delirium Tremens" OR DE "Down's Syndrome" OR DE "Fetal Alcohol Syndrome" OR DE "Fragile X Syndrome" OR DE "Irritable Bowel Syndrome" OR DE "Kleine Levin Syndrome" OR DE "Klinefelters Syndrome" OR DE "Kluver Bucy Syndrome" OR DE "Lennox Gastaut Syndrome" OR DE "Locked-In Syndrome" OR DE "MELAS" OR DE "Menieres Disease" OR DE "Metabolic Syndrome" OR DE "Neuroleptic Malignant Syndrome" OR DE "Organic Brain Syndromes" OR DE "Posterior Reversible Encephalopathy" OR DE "Prader Willi Syndrome" OR DE "Premenstrual Syndrome" OR DE "Rett Syndrome" OR DE "Senile Dementia" OR DE "Testicular Feminization Syndrome" OR DE "Turners Syndrome" OR DE "Wernicke's Syndrome" OR DE "Williams Syndrome"

6. DE "Congenital Disorders" OR DE "Agenesis" OR DE "Cleft Palate" OR DE "Drug Induced Congenital Disorders" OR DE "Hermaphroditism" OR DE "Microcephaly" OR DE "Prader Willi Syndrome" OR DE "Spina Bifida"

7. DE "Physical Disorders" OR DE "Blood and Lymphatic Disorders" OR DE "Cachexia" OR DE "Cardiovascular Disorders" OR DE "Chronically Ill Children" OR DE "Digestive System Disorders" OR DE "Endocrine Disorders" OR DE "Genetic Disorders" OR DE "Health Impairments" OR DE "Immunologic Disorders" OR DE "Infectious Disorders" OR DE "Metabolism Disorders" OR DE "Musculoskeletal Disorders" OR DE "Neonatal Disorders" OR DE "Neoplasms" OR DE "Nervous System Disorders" OR DE "Nutritional Deficiencies" OR DE "Respiratory Tract Disorders" OR DE "Sense Organ Disorders" OR DE "Sensory System Disorders" OR DE "Skin Disorders" OR DE "Toxic Disorders" OR DE "Urogenital Disorders" OR DE "Vision Disorders"

8. DE "Neuromuscular Disorders" OR DE "Cataplexy" OR DE "Muscular Dystrophy" OR DE "Myasthenia Gravis" OR DE "Myopathy" OR DE "Paralysis" OR DE "Tourette Syndrome"

9. DE "Spinal Cord Injuries" OR DE "Whiplash"

10. DE "Cerebral Palsy"

11. DE "Hearing Disorders" OR DE "Deaf" OR DE "Deaf Blind"

12. DE "Vision Disorders" OR DE "Balint's Syndrome" OR DE "Blind" OR DE "Deaf Blind" OR DE "Eye Disorders" OR DE "Amblyopia" OR DE "Cataracts" OR DE "Color Blindness" OR DE "Glaucoma" OR DE "Nystagmus" OR DE "Refraction Errors" OR DE "Strabismus" OR DE "Tunnel Vision" OR DE "Hemianopia"

13. DE "Communication Disorders" OR DE "Language Disorders" OR DE "Aphasia" OR DE "Echolalia" OR DE "Mutism" OR DE "Specific Language Impairment" OR DE "Speech Disorders" OR DE "Articulation Disorders" OR DE "Dysphonia" OR DE "Stuttering"

14. DE "Cognitive Impairment"

15. S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14

16. disab* OR impair* OR "deficit"

17. S15 OR S16

18. DE "Higher Education" OR DE "Graduate Education" OR DE "Postgraduate Training" OR DE "Undergraduate Education" DE "College Students" OR DE "College Athletes" OR DE "Community College Students" OR DE "Education Students" OR DE "Junior College Students" OR DE "Nursing Students" OR DE "ROTC Students" OR DE "Postgraduate Students"

19. AB college* OR AB "university" OR AB "universities" OR AB third N1 level OR AB third level N1 education OR AB "post-secondary" OR AB post N1 secondary OR AB "postsecondary" OR AB higher N1 education OR AB undergraduate N1 student* OR AB postgraduate N1 student* OR AB college N1 student* OR AB university N1 student* OR AB student* OR AB "pupil" OR AB "pupils" OR AB "education"

20. S18 OR S19

21. S3 AND S17 AND S20

Appendix A.2

PubMed Search Strategy

1. Self-Help Devices [Mesh] OR Speech Recognition Software [Mesh] OR Sensory Aids [Mesh] OR Eyeglasses [Mesh] OR Orthotic Devices [Mesh] OR Artificial Limbs [Mesh] OR Canes [Mesh] OR Walkers [Mesh] OR Dependent ambulation [Mesh]
2. assistive technol* OR assistive aid* OR "assistive equipment" OR assistive product* OR assistive device* OR self-help device* OR disability aid* OR "empowering technology" OR technical aid* OR sensory aid* OR communication aid* OR audiovisual aid* OR cognitive aid* OR memory aid* OR mobility aid* OR electronic aid* OR "electronic assistive technology"
3. #1 OR #2
4. Disabled Persons [Mesh] OR Mobility Limitation [Mesh] OR Spinal Cord Injuries [Mesh] OR Spinal Dysraphism [Mesh] OR Cerebral Palsy [Mesh] OR Neuromuscular Diseases [Mesh] OR Neurobehavioural Manifestations [Mesh] OR Neurodevelopmental Disorders [Mesh] OR Cognition Disorders [Mesh] OR Hearing Disorders [Mesh] OR Vision Disorders [Mesh]
5. disab* OR impair* OR "deficit"
6. #4 OR #5
7. Universities [Mesh] OR Students [Mesh]
8. college* [tiab] OR "university" [tiab] OR "universities" [tiab] OR "third level" [tiab] OR "third level education" [tiab] OR "post-secondary" [tiab] OR "post secondary" [tiab] OR "postsecondary" [tiab] OR "higher education" [tiab] OR undergraduate student* [tiab] OR postgraduate student* [tiab] OR college student* [tiab] OR university student* [tiab] OR student* [tiab] OR "pupil" [tiab] OR "pupils" [tiab] OR "education" [tiab]
9. #7 OR #8
10. #3 AND #6 AND #9

Appendix A.3

CINAHL Search Strategy

1. (MH "Assistive Technology") OR (MH "Assistive Technology Devices+") OR (MH "Orthopedic Equipment and Supplies+") OR (MH "Sensory Aids+") OR (MH "Eyeglasses+") OR (MH "Prostheses and Implants+") OR (MH "Alternative and Augmentative Communication")
2. assistive N1 technol* OR assistive N1 equipment OR assistive N1 product* OR assistive N1 aid* OR assistive N1 device* OR self-help N1 device* OR disability N1 aid* OR empowering N1 technology OR technical N1 aid* OR sensory N1 aid* OR communication N1 aid* OR audiovisual N1 aid* OR cognitive N1 aid* OR memory N1 aid* OR mobility N1 aid* OR electronic N1 aid* OR electronic N1 assistive
3. S1 OR 2
4. (MH "Disabled+") OR (MH "Neurobehavioral Manifestations+") OR (MH "Sensation Disorders+") OR (MH "Child Development Disorders, Pervasive+") OR (MH "Neuromuscular Manifestations+") OR (MH "Neurodegenerative Diseases+") OR (MH "Paralysis+") OR (MH "Spinal Cord Injuries+") OR (MH "Cerebral Palsy") OR (MH "Spina Bifida") OR (MH "Cognition Disorders+")
5. disab* OR impair* OR "deficit"
6. S4 OR S5
7. (MH "College Graduates") OR (MH "Students, College") OR (MH "Colleges and Universities+") OR (MH "Students, Undergraduate") OR (MH "Students, Graduate")
8. AB college* OR AB "university" OR AB "universities" OR AB third N1 level OR AB third level N1 education OR AB "post-secondary" OR AB post N1 secondary OR AB "postsecondary" OR AB higher N1 education OR AB undergraduate N1 student* OR AB postgraduate N1 student* OR AB college N1 student* OR AB university N1 student* OR AB student* OR AB "pupil" OR AB "pupils" OR AB "education"
9. S7 OR S8
10. S3 AND S6 AND S9

Appendix A.4

ERIC Search Strategy

1. MAINSUBJECT.EXACT.EXPLODE("Assistive Technology") OR MAINSUBJECT.EXACT("Augmentative and Alternative Communication") OR MAINSUBJECT.EXACT.EXPLODE("Audiovisual Aids") OR MAINSUBJECT.EXACT.EXPLODE("Language Aids") OR MAINSUBJECT.EXACT.EXPLODE("Autoinstructional Aids")
2. (assistive NEAR/1 technol*) OR (assistive NEAR/1 equipment) OR (assistive NEAR/1 product*) OR (assistive NEAR/1 aid*) OR (assistive NEAR/1 device*) OR ('self help' NEAR/1 device*) OR (disability NEAR/1 aid*) OR (empowering NEAR/1 technology) OR (technical NEAR/1 aid*) OR (sensory NEAR/1 aid*) OR (communication NEAR/1 aid*) OR (audiovisual NEAR/1 aid*) OR (cognitive NEAR/1 aid*) OR (memory NEAR/1 aid*) OR (mobility NEAR/1 aid*) OR (electronic NEAR/1 aid*) OR (electronic NEAR/1 assistive)
3. 1 OR 2
4. MAINSUBJECT.EXACT.EXPLODE("Disabilities")
5. disab* OR impair* OR "deficit"
6. 4 OR 5
7. MAINSUBJECT.EXACT.EXPLODE("Colleges") OR MAINSUBJECT.EXACT.EXPLODE("College Students") OR MAINSUBJECT.EXACT.EXPLODE("Special Needs Students")
8. AB(college*) OR AB("university") OR AB("universities") OR AB(third NEAR/1 level) OR AB(third AND (level NEAR/1 education)) OR AB("post-secondary") OR AB(post NEAR/1 secondary) OR AB("postsecondary") OR AB(higher NEAR/1 education) OR AB(undergraduate NEAR/1 student*) OR AB(postgraduate NEAR/1 student*) OR AB(college NEAR/1 student*) OR AB(university NEAR/1 student*) OR AB(student*) OR AB("pupil") OR AB("pupils") OR AB("education")
9. 7 OR 8
10. 3 AND 6 AND 9

Appendix A.5

Web of Sciences (SSCI) Search Strategy

1. TOPIC: ((assistive NEAR/1 technol*) OR (assistive NEAR/1 equipment) OR (assistive NEAR/1 product*) OR (assistive NEAR/1 aid*) OR (assistive NEAR/1 device*) OR ('self help' NEAR/1 device*) OR (disability NEAR/1 aid*) OR (empowering NEAR/1 technology) OR (technical NEAR/1 aid*) OR prosthesis OR orthotic* OR (sensory NEAR/1 aid*) OR (communication NEAR/1 aid*) OR facilitated communication OR augmentative communication OR (audiovisual NEAR/1 aid*) OR (visual NEAR/1 aid*) OR (hearing NEAR/1 aid*) OR (cognitive NEAR/1 aid*) OR (memory NEAR/1 aid*) OR (mobility NEAR/1 aid*) OR wheelchair* OR cane* OR walker* OR (electronic NEAR/1 aid*) OR (electronic NEAR/1 assistive))
2. TOPIC: (reading disability OR learning disability OR intellectual impairment OR autism spectrum disorder OR cognitive deficit OR memory disorder OR physical disability OR paralysis OR cerebral palsy OR spinal dysraphism OR spinal cord injury OR sensory dysfunction OR communication disorder OR visual impairment OR hearing impairment OR disab* OR impair* OR deficit)
3. TOPIC: (college* OR "university" OR "universities" OR (third NEAR/1 level) OR (third AND (level NEAR/1 education)) OR "post-secondary" OR (post NEAR/1 secondary) OR "postsecondary" OR (higher NEAR/1 education) OR (undergraduate NEAR/1 student*) OR (postgraduate NEAR/1 student*) OR (college NEAR/1 student*) OR (university NEAR/1 student*) OR student* OR "pupil" OR "pupils" OR "education")
4. #1 AND #2 AND #3

Appendix B.1

Ethical Approval Letter for Phase One

Ollscoil Chathair Bhaile Átha Cliath
Dublin City University

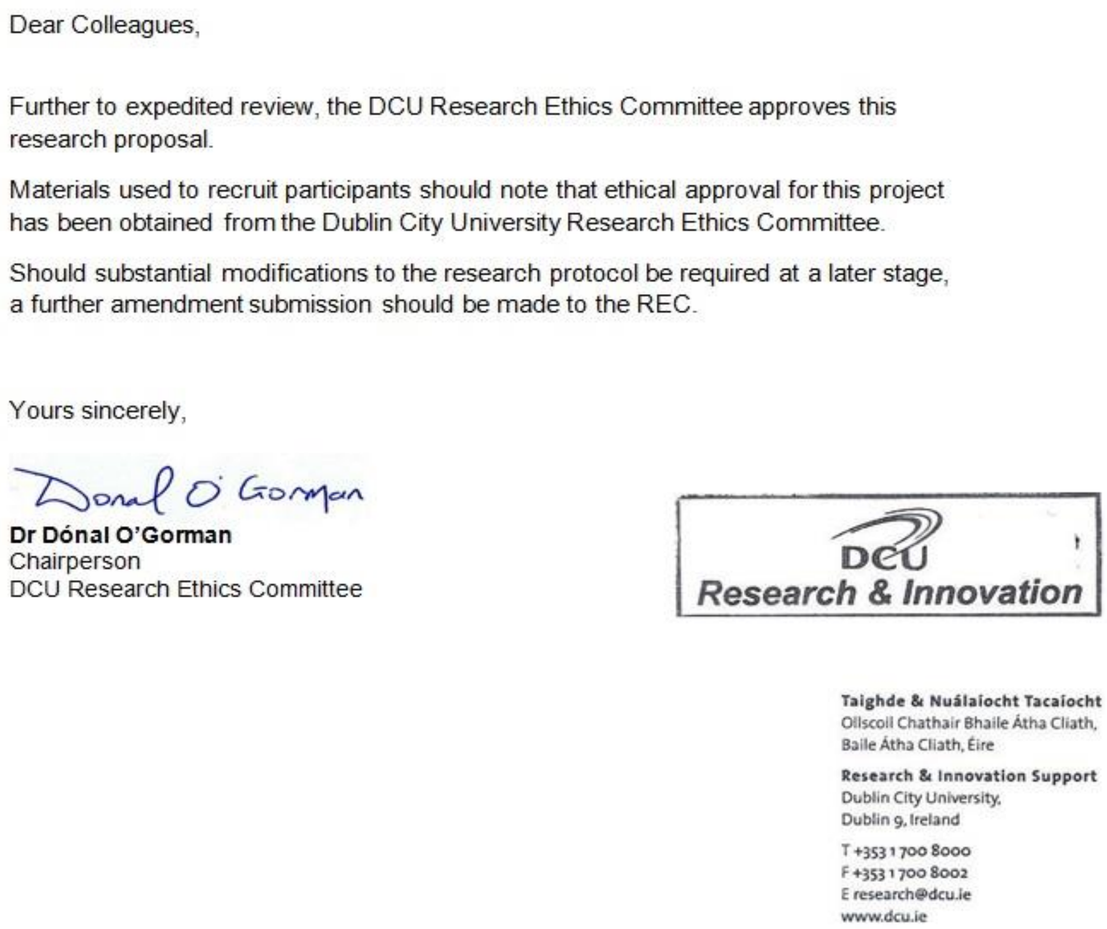
Ms Aoife McNicholl
School of Nursing and Human Sciences

6th July 2018

REC Reference: DCUREC/2018/129

Proposal Title: ENABLE: **E**ducational e**N**gagement, **A**ssistive technologies, well-**B**eing and quality of **L**ife of students with disabilities in higher **E**ducation

Applicants:	**Ms Aoife McNicholl, Prof. Pamela Gallagher & Dr. Deirdre Desmond**



Dear Colleagues,

Further to expedited review, the DCU Research Ethics Committee approves this research proposal.

Materials used to recruit participants should note that ethical approval for this project has been obtained from the Dublin City University Research Ethics Committee.

Should substantial modifications to the research protocol be required at a later stage, a further amendment submission should be made to the REC.

Yours sincerely,

Donal O' Gorman

Dr Dónal O'Gorman
Chairperson
DCU Research Ethics Committee

DCU
Research & Innovation

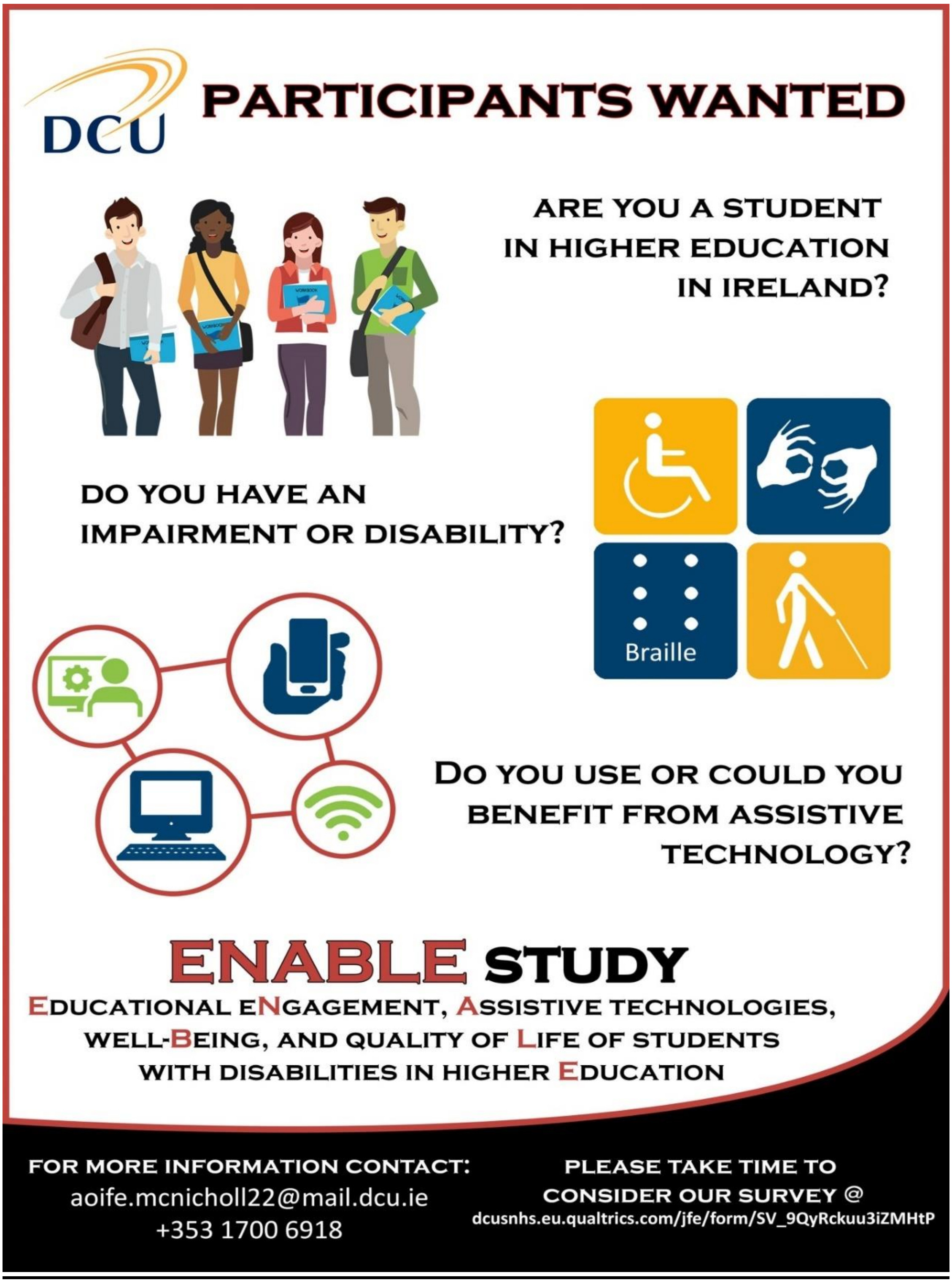
Taighde & Nuálaíocht Tacaíocht
Ollscoil Chathair Bhaile Átha Cliath,
Baile Átha Cliath, Éire

Research & Innovation Support
Dublin City University,
Dublin 9, Ireland

T +353 1 700 8000
F +353 1 700 8002
E research@dcu.ie
www.dcu.ie

Appendix C.1

Phase One Recruitment Poster



PARTICIPANTS WANTED

ARE YOU A STUDENT
IN HIGHER EDUCATION
IN IRELAND?

DO YOU HAVE AN
IMPAIRMENT OR DISABILITY?

DO YOU USE OR COULD YOU
BENEFIT FROM ASSISTIVE
TECHNOLOGY?

ENABLE STUDY

EDUCATIONAL ENGAGEMENT, ASSISTIVE TECHNOLOGIES,
WELL-BEING, AND QUALITY OF LIFE OF STUDENTS
WITH DISABILITIES IN HIGHER EDUCATION

FOR MORE INFORMATION CONTACT:
aoife.mcnicholl22@mail.dcu.ie
+353 1700 6918

PLEASE TAKE TIME TO
CONSIDER OUR SURVEY @
dcusnhs.eu.qualtrics.com/jfe/form/SV_9QyRckuu3iZMHtP

Appendix C.2

Phase One email circulated to students by Disability/AT Officers

Dear student,

You are invited to participate in a research study entitled 'ENABLE: **E**ducational e**N**gagement, **A**ssistive technologies, well-**B**eing and quality of **L**ife of students with disabilities in higher **E**ducation. The study is being conducted by myself Aoife McNicholl, a research student in Dublin City University (DCU), Professor Pamela Gallagher (Professor of Psychology, DCU) and Dr. Deirdre Desmond (Senior Lecturer in Psychology, Maynooth University). The study has received ethical approval from the DCU Research Ethics Committee.

The overall aim of this study is to examine the experience and effects of assistive technology use among students with disabilities in higher education. Assistive technology can be described as any device which enables individuals to complete or engage with tasks more easily. Participation will involve completing an online survey which will take approximately 30 minutes to complete. You are eligible to participate in this research if you are aged 18 years or older, have a disability, use **or** could potentially benefit from assistive technology and are a current student in a higher education institution in Ireland.

If you wish to take part or would like more information, you can access the plain language statement and the survey through the following link:

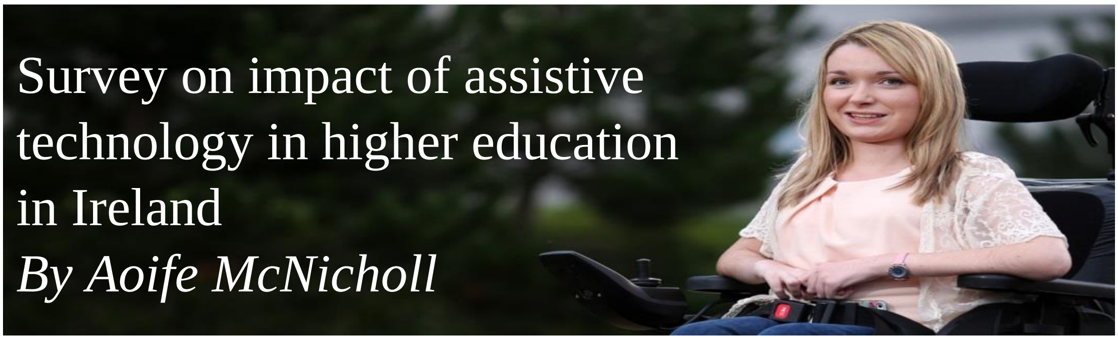
https://dcusnhs.eu.qualtrics.com/jfe/form/SV_9QyRckuu3iZMHtP

If you have any questions on this study, please do not hesitate to contact me at aoife.mcnicholl22@mail.dcu.ie . Your participation in this study would be greatly appreciated. Thank you.

Kind regards,
Aoife McNicholl.

Appendix C.3

Advertisement in newsletter of disability organisations



Survey on impact of assistive technology in higher education in Ireland

By Aoife McNicholl

My name is Aoife McNicholl. I am a research student in DCU working with Prof. Pamela Gallagher (DCU) and Dr. Deirdre Desmond (Maynooth University).

My research aims to explore the impact of assistive technology use in higher education for students with disabilities. I just recently launched an online survey to investigate this which can be accessed through the following link: https://dcusnhs.eu.qualtrics.com/jfe/form/SV_9QyRckuu3iZMHtP

If you are 18 years or over, a current student in higher education in Ireland, have any form of disability and currently use or could potentially benefit from any form of assistive technology then you are eligible to participate in this research.

Assistive technology refers to any device which enables an individual to engage in a task more easily. Examples could include screen readers, visual aids, wheelchairs etc.

Your participation in this research would be greatly appreciated. If you have any questions or queries please contact aoife.mcnicholl22@mail.dcu.ie

Thank you.

PARTICIPANTS WANTED

ARE YOU A STUDENT
IN HIGHER EDUCATION
IN IRELAND?

DO YOU HAVE AN
IMPAIRMENT OR DISABILITY?

DO YOU USE OR COULD YOU
BENEFIT FROM ASSISTIVE
TECHNOLOGY?

ENABLE STUDY

EDUCATIONAL ENGAGEMENT, ASSISTIVE TECHNOLOGIES,
WELL-BEING, AND QUALITY OF LIFE OF STUDENTS
WITH DISABILITIES IN HIGHER EDUCATION

FOR MORE INFORMATION CONTACT:
aoife.mcnicholl22@mail.dcu.ie
+353 1700 6918

PLEASE TAKE TIME TO
CONSIDER OUR SURVEY @
dcusnhs.eu.qualtrics.com/jfe/form/SV_9QyRckuu3iZMHtP

Appendix D.1

Phase One Plain Language Statement

Title of Research Study: ENABLE: **E**ducational e**N**gagement, **A**ssistive technologies, well-**B**eing and quality of **Li**fe of students with disabilities in higher **E**ducation

Principal Investigator: Ms. Aoife McNicholl. Email: aoife.mcnicholl22@mail.dcu.ie

Co-investigators: Prof. Pamela Gallager. Email: pamela.gallagher@dcu.ie
Dr. Deirdre Desmond. Email: deirdre.desmond@mu.ie

Introduction: Thank you for taking the time to find out more about this study. You are being invited to participate in an online survey which will form part of the principal investigator's, Aoife McNicholl, Masters by research project which is being conducted in the School of Nursing and Human Sciences in Dublin City University (DCU). Please read the information below carefully before making an informed decision on whether you would like to participate or not. If you have any questions, concerns or queries please do not hesitate to contact one of the researchers through the information provided above.

This research has received ethical approval from the Research Ethics Committee (REC) in DCU.

Background and aims of the study:
Assistive technology (AT) can be described as any device which enables individuals to complete tasks more easily. Despite growing numbers of individuals with disabilities enrolling in higher education each year, AT use is yet to be examined in higher education institutions in Ireland. Thus, the aim of this study is to examine the experience and effects of AT use among students with disabilities in higher education in Ireland. In particular, we are interested in the exploring the relationship between assistive technology use and educational engagement and quality of life.

Am I eligible to take part?
If you have a disability, are 18 years or older, use or could benefit from assistive technology and are a current student in a higher education institution in Ireland then you are eligible to participate in this study.

What does participation in the study involve?
Participation in this study is entirely voluntary. If you agree to participate, you will be asked to fill out an online survey which will ask questions related to social demographic information, assistive technology use, participation in day to day college life, your confidence in completing academic tasks, well-being and quality of life. You will not be asked to provide any personally identifiable information such as names or addresses. The survey will take no more than 25 minutes to complete. All information you provide will be kept confidential and only the research team and examiners of the MSc. by research will have access to the data.

Are there any risks associated with the study?
We do not anticipate any risks, however, if at any stage you become upset during the study, you are free to withdraw without penalty, and without providing any reason for doing so. You can also contact the local counselling service in your higher education institution or Samaritans on 116 123. If you would like information or support related to assistive technologies, please contact the disability officer at your higher education institution.

Are there any benefits (direct or indirect) to my involvement in the study?
The information you provide will be valuable in terms of determining the usefulness of assistive technology for people with disabilities in higher education. It could also be beneficial in relation to developing best practices for assistive technology in higher education in the future, which could have implications for policy and funding in third level.

How will the information I provide be protected? How will my identity be protected?

The online survey is anonymous and entirely voluntary. You will not be asked to provide any personally identifiable information at any stage such as names or addresses. Findings from this study may be published in peer-reviewed journals and/or presented at national or international conferences but will not contain any identifiable information. You must be aware that confidentiality of information can only be protected within the limitations of the law.

What will happen to the data?
The data collected in this study will be analysed, summarised and reported on in a Masters by research thesis. Findings may also be published in peer reviewed journals and presented at national or international conferences. All data used will be anonymised and will not contain any identifiable information. Information will be stored confidentially for a period of ten years on password protected files on an encrypted laptop. After this point, the electronic data will be permanently destroyed. A summary of results can be made available to you following completion of the study if you contact the principal investigator through the details above.

What if I want to withdraw from the study?
Participation in this study is entirely voluntary. You have the right to withdraw, without penalty, up until the point of submitting your data, and without providing any reason for doing so.

What to do if you have any questions or concerns about the study:
If you have any questions about this study, please contact the principal investigator, Ms Aoife McNicholl, email: aoife.mcnicholl22@mail.dcu.ie

If you have any concerns about this study or the way in which it is being carried out please contact one of the co-investigators, Prof. Pamela Gallagher email: pamela.gallagher@dcu.ie, Dr. Deirdre Desmond email: deirdre.desmond@mu.ie.

Alternatively, if you wish to contact an independent person, please contact: The Secretary, Dublin City University Research Ethics Committee, c/o Research and Innovation Support, Dublin City University, Dublin 9. Tel 01-7008000, e-mail rec@dcu.ie

What should I do now?
If you wish to partake in this study, please continue to the Informed Consent Form.

Appendix D.2

Phase One Informed Consent Form

Title of research study: ENABLE: **E**ducational e**N**gagement, **A**ssistive technologies, well-**B**eing and quality of **L**ife of students with disabilities in higher **E**ducation

Principal Investigator: Ms. Aoife McNicholl. Email: aoife.mcnicholl22@mail.dcu.ie

Co-investigators: Prof. Pamela Gallagher. Email: pamela.gallagher@dcu.ie
Dr. Deirdre Desmond. Email: deirdre.desmond@mu.ie

Background and aims of the study: Assistive technology can be described as any device which enables individuals to complete tasks more easily. Despite growing numbers of individuals with disabilities enrolling in higher education each year, AT use is yet to be examined in higher education institutions in Ireland. Thus, the aim of this study is to examine the experience and effects of AT use among students with disabilities in higher education in Ireland. In particular, we are interested in the relationship between assistive technology use and educational engagement and quality of life.

Please complete the following (Tick Yes or No for each question):

I am aged 18 years or older ☐ Yes No ☐

I have a disability ☐ Yes No ☐

I use or could benefit from assistive technology ☐ Yes No ☐

I am a current student in a higher education institution in Ireland ☐ Yes No ☐

I confirm that I have read and understood the plain language statement ☐ Yes No ☐

I am aware of who I can contact to ask questions about the study ☐ Yes No ☐

I understand that my participation is entirely voluntary ☐ Yes No ☐

I understand that I am free to withdraw up until the point of submitting my data and without giving a reason for doing so ☐ Yes No ☐

I understand that my data will be kept confidential within the confines of the law ☐ Yes No ☐

I give my consent to participate in this study ☐ Yes No ☐

By clicking on the 'Next' button, you are giving your consent for the information you provide to be used for the purpose of this research.

[NEXT]

Appendix E.1

Background information and AT Profile Questionnaire

Q1. How old are you? (in years)	_____________
Q2. What gender do you identify with?	Male Female Other
Q3. Please indicate if you have the following disability (select all that apply)	Physical disability [ ] Hearing impairment [ ] Visual impairment [ ] Aspergers/Autism [ ] ADD/ADHD [ ] DCD- Dyspraxia/Dysgraphia [ ] Specific learning disability [ ] Speech and language disability [ ] Mental health condition [ ] Significant ongoing illness [ ] Other [ ] For each that is selected, please specify your disability.
Q4. Do you currently use assistive technology?	Yes No
Please note: Anyone who indicates they currently use assistive technology in Q4 is directed to Q5a – Q12a.	
Q5a. Please indicate if you use the following type(s) of assistive technology (select all that apply)	Educational assistive technology [ ] Aids to hearing [ ] Visual aids [ ] Mobility aids [ ] Communication aids [ ] Other [ ] For each that is selected, please specify the assistive technology you use.
Q6a. Do you use assistive devices which are app-based?	Yes No
Q7a. Please rank in order of importance, the top 3 assistive technology devices that are of greatest importance to your educational engagement (1= most important, 3= least important):	_______ drop down 1-3 _______ drop down 1-3 _______ drop down 1-3

Please note: Educational engagement refers to engagement in all aspects of college life including academic, social and extra-curricular.	
Q8a. Please indicate if there are any of the following assistive technology types that you require but do not currently have (select all that may apply)	Educational assistive technology [ ] Aids to hearing [ ] Visual aids [ ] Mobility aids [ ] Communication aids [ ] Other [ ] No requirement [ ] For each that is selected, please specify the assistive technology you require
Q9a. In a typical college month, how often do you use assistive technology (consider AT use in general) ?	Every day Once or twice a week Every couple of weeks Once or twice a month Rarely/not at all
Q10a. How satisfied are you that your assistive technology use meets your general needs?	Very satisfied Satisfied Not sure Unsatisfied Very unsatisfied
Q11a. In a typical college month, how often do you use assistive technology which is specific to your educational engagement?	Every day Once or twice a week Every couple of weeks Once or twice a month Rarely/not at all
Q12a. How satisfied are you that your assistive technology use meets your educational engagement needs?	Very satisfied Satisfied Not sure Unsatisfied Very unsatisfied
Please note: Those who indicate they don’t currently use assistive technology in Q4 will be directed to Q5b, Q6b, Q7b and Q8b.	
Q5b. Have you ever used assistive technology?	Yes No
Q6b. What are your main reasons for not currently using assistive technology? (Select all that apply)	Device unsuitable/inappropriate Stigma/embarrassment Can’t access the assistive technology

	Don’t need it Other (please state) ________
Q7b. How would you describe your needs in relation to assistive technology?	I require AT but don’t have the AT I need I can manage without AT but I feel I could benefit from AT use I don’t require or need AT
Q8b. Please indicate if there are any of the following assistive technology types that you need but do not have (select all that may apply)	Educational assistive technology [ ] Aids to hearing [ ] Visual aids [ ] Mobility aids [ ] Communication aids [ ] Other [ ] For each that is selected, please specify the assistive technology that you need but do not have

Please note: All participants will answer Q13, Q13a OR Q13b, Q14-Q18.

Q13. Do you have a personal assistant while in college?	Yes No

Please note: those who indicate they have a personal assistant will be directed to Q13a while those who indicate they don’t have a personal assistant will be directed to Q13b.

Q13a. Does your personal assistant provide sufficient support to meet your needs?	Yes No
Q13b. Would having access to a personal assistant improve your educational experience?	Yes No
Q14. Are you registered with the disability office in your higher education institution?	Yes No
Q15. Please indicate the type of higher education institution you are currently enrolled in	University Institute of Technology Other
Q16. What province is your higher education institution located in?	Leinster Munster Connaught Ulster
Q17. What type of programme are you currently enrolled in?	Advanced certificate/higher certificate/ordinary bachelor degree Honours bachelor degree/higher diploma Postgraduate taught programmes Research degrees
Q18. What year are you currently in within your designated programme?	Drop down menu from 1-7 years

Q19. Are you a full time or part time student?	Full time student Part time student
Q20. What is your discipline of study?	Science, Maths, Computing, Engineering, Manufacturing and Construction Social Science, Business and Law Education and Training, Humanities and Arts Agriculture and Veterinary, Health and Welfare, Services Other (please specify) __________

Appendix E.2

College Learning Effectiveness Inventory (CLEI)

Please answer the following questions to the best of your ability.

1. **Never**
2. **Rarely**
3. **Sometimes**
4. **Usually**
5. **Always**

1. I wait to study until the night before the exam.	Never				Always
	1	2	3	4	5
2. I organize my time so that I have plenty of time to study.	Never				Always
	1	2	3	4	5
3. I do not seem to have time to get everything done that I need to do.	Never				Always
	1	2	3	4	5
4. I am aware of the assignments that are due in the next week.	Never				Always
	1	2	3	4	5
5. I do not turn in assignments.	Never				Always
	1	2	3	4	5
6. I organize class information in a way that helps me retain and apply it later.	Never				Always
	1	2	3	4	5
7. I plan in advance to prevent becoming overwhelmed with assignments at the last minute	Never				Always
	1	2	3	4	5
8. I avoid speaking in class.	Never				Always
	1	2	3	4	5
9. I participate in social activities on campus.	Never				Always
	1	2	3	4	5
10. I belong to a study group.	Never				Always
	1	2	3	4	5
11. I belong to an organized club on campus.	Never				Always
	1	2	3	4	5
12. I am discouraged with how I am treated by my instructors.	Never				Always
	1	2	3	4	5
13. I have symptoms of stress from all of the pressure I have been under since coming to college.	Never				Always
	1	2	3	4	5
14. I like my courses.	Never				Always
	1	2	3	4	5
15. I consider college to be a great time in my life.	Never				Always
	1	2	3	4	5
	Never				Always

16. I become overwhelmed when I think of my assigned class requirements.	1	2	3	4	5
17. I enjoy being a student here.	Never				Always
	1	2	3	4	5
18. I hate college, but I know I have to do it	Never				Always
	1	2	3	4	5
19. I can talk with people who provide encouragement to me about what I am learning.	Never				Always
	1	2	3	4	5
20. People in my community value a college education.	Never				Always
	1	2	3	4	5
21. My family cares how I do academically.	Never				Always
	1	2	3	4	5
22. I find it difficult to get the assistance I need for my academic success.	Never				Always
	1	2	3	4	5
23. I believe that I have the ability to complete college.	Never				Always
	1	2	3	4	5
24. I believe it is possible for me to make good grades.	Never				Always
	1	2	3	4	5
25. I find my attention wandering in class	Never				Always
	1	2	3	4	5
26. I have goals that I want to achieve by being in college.	Never				Always
	1	2	3	4	5
27. I see connections between my classes and my career goals	Never				Always
	1	2	3	4	5
28. I turn in assignments only partially completed.	Never				Always
	1	2	3	4	5
29. I know someone with whom I can study.	Never				Always
	1	2	3	4	5
30. I make study goals and keep up with them.	Never				Always
	1	2	3	4	5
31. I break big assignments into manageable pieces	Never				Always
	1	2	3	4	5
32. It seems as though I am playing catch-up.	Never				Always
	1	2	3	4	5
33. I ask questions in class.	Never				Always
	1	2	3	4	5
34. I attend events such as concerts, plays, speakers, or athletic contests as a part of the college experience.	Never				Always
	1	2	3	4	5
35. I avoid classes in which participation is required.	Never				Always
	1	2	3	4	5

36. I feel there are so many things to get done each week that I am stressed.	Never				Always
	1	2	3	4	5
37. My living situation distracts me from my studies.	Never				Always
	1	2	3	4	5
38. Family members criticize me because I am not a great student.	Never				Always
	1	2	3	4	5
39. My instructors show interest in me.	Never				Always
	1	2	3	4	5
40. I have friends here at college.	Never				Always
	1	2	3	4	5
41. My friends have good study habits.	Never				Always
	1	2	3	4	5
42. I doubt that I can make the effort to finish college.	Never				Always
	1	2	3	4	5
43. I have high academic expectations of myself.	Never				Always
	1	2	3	4	5
44. I dread the thought of getting test results in certain classes.	Never				Always
	1	2	3	4	5
45. I cannot seem to express my ideas on paper very well.	Never				Always
	1	2	3	4	5
46. Gaining knowledge is important to me.	Never				Always
	1	2	3	4	5
47. I find myself daydreaming when I study.	Never				Always
	1	2	3	4	5
48. I question why I need a qualification for the career I want to pursue.	Never				Always
	1	2	3	4	5
49. I am determined to do what it will take in order to succeed with my goals.	Never				Always
	1	2	3	4	5
50. I cannot get into studying even if there is nothing else to do.	Never				Always
	1	2	3	4	5

Appendix E.3

The Student Course Engagement Questionnaire (SCEQ)

To what extent do the following behaviours, thoughts and feelings describe you in your programme of study. Please rate each of the items on the following scale:

- **1- Not at all characteristic of me**
- **2- Not really characteristic of me**
- **3- Moderately characteristic of me**
- **4- Characteristic of me**
- **5- Very characteristic of me**

1. Making sure to study on a regular basis.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
2. Putting forth effort.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
3. Doing all the coursework requirements.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
4. Staying up on the readings.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
5. Looking over class notes between classes to make sure I understand the material.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
6. Being organised.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
7. Taking good notes in class.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
8. Listening carefully in class.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
9. Coming to class every day.	Not at all characteristic of me				Very characteristic of me

	1	2	3	4	5
10. Finding ways to make the course material relevant to my life.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
11. Applying the course material to my life.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
12. Finding ways to make the course material interesting to me.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
13. Thinking about the course between class meetings.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
14. Really desiring to learn the material.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
15. Raising my hand in class.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
16. Asking questions when I don’t understand the instructor.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
17. Having fun in class.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
18. Participating actively in small group discussions.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
19. Going to the professor’s office to review assignments or tests or ask questions.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
20. Helping fellow students.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5

21. Getting a good grade.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
22. Doing well on the tests.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5
23. Being confident that I can learn and do well in the class.	Not at all characteristic of me				Very characteristic of me
	1	2	3	4	5

Appendix E.4

The Self-Efficacy for Learning Form – Abridged (SELF-A)

Definitely Cannot Do it			Probably Cannot		Maybe Can		Probably Can		Definitely Can Do it	
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

Using the scale provided, please indicate how much each of the following statements reflects how you typically are. There is no right or wrong answer. Please indicate your percentage score for each item by typing a numerical value from 0-100 in the box provided.

1. When you miss a class, can you find another student who can explain the lecture notes as clearly as your teacher did? ☐

2. When your teacher’s lecture is very complex, can you write an effective summary of your original notes before the next class? ☐

3. When a lecture is especially boring, can you motivate yourself to keep good notes? ☐

4. When you had trouble understanding your instructor’s lecture, can you clarify the confusion before the next class meeting by comparing notes with a classmate? ☐

5. When you have trouble studying your class notes because they are incomplete or confusing, can you revise and rewrite them clearly after every lecture? ☐

6. When you are taking a course covering a huge amount of material, can you condense your notes down to just the essential facts? ☐

7. When you are trying to understand a new topic, can you associate new concepts With old ones sufficiently well to remember them? ☐

8. When another student asks you to study together for a course in which you are experiencing difficulty, can you be an effective study partner? ☐

9. When problems with friends and peers conflict with course work, can you keep up with your assignments? ☐

10. When you feel moody or restless during studying, can you focus your attention well enough to finish your assigned work? ☐

11. When you find yourself getting increasingly behind in a new course, can you Increase your study time sufficiently to catch up? ☐

12. When you discover that your assignments for the semester are much longer than expected, can you change your other priorities to have enough time for studying? ☐

13. When you have trouble recalling an abstract concept, can you think of a good example that will help you remember it on the test? ☐

14. When you have to take a test in a course subject you dislike, can you find a way to motivate yourself to earn a good grade? ☐

15. When you are feeling depressed about a forthcoming test, can you find a way to motivate yourself to do well? ☐

16. When your last test results were poor, can you figure out potential questions before the next test that will improve your score greatly? ☐

17. When you are struggling to remember technical details of a concept for a test, can you find a way to associate them together that will ensure recall? ☐

18. When you think you did poorly on a test you just finished, can you go back to your notes and locate all the information you had forgotten? ☐

19. When you find that you had to “cram” at the last minute for a test, can you begin your test preparation much earlier so you won’t need to cram the next time? ☐

Appendix E.5

The Psychosocial Impact of Assistive Devices Scale (PIADS)

Each word or phrase below describes how using assistive technology may affect a user. Some might seem unusual but it is important that you answer every one of the 26 items. So, for each word or phrase, consider the assistive technologies which impact on your **educational engagement**, and select the appropriate score to show how you are affected by them.

Please note: Instructions for non-current AT users who need or would benefit from assistive technology would differ slightly. Each word or phrase below describes how using assistive technology may affect a user. Some might seem unusual but it is important that you answer every one of the 26 items. So, for each word or phrase, consider the assistive technologies which you expect to impact on your **educational engagement**, and select the appropriate score to show how you anticipate them to affect you.

1. Competence	Decreases						Increases
	-3	-2	-1	0	1	2	3
2. Happiness	Decreases						Increases
	-3	-2	-1	0	1	2	3
3. Independence	Decreases						Increases
	-3	-2	-1	0	1	2	3
4. Adequacy	Decreases						Increases
	-3	-2	-1	0	1	2	3
5. Confusion	Decreases						Increases
	-3	-2	-1	0	1	2	3
6. Efficiency	Decreases						Increases
	-3	-2	-1	0	1	2	3
7. Self-esteem	Decreases						Increases
	-3	-2	-1	0	1	2	3
8. Productivity	Decreases						Increases
	-3	-2	-1	0	1	2	3
9. Security	Decreases						Increases
	-3	-2	-1	0	1	2	3
10. Frustration	Decreases						Increases
	-3	-2	-1	0	1	2	3
11. Usefulness	Decreases						Increases
	-3	-2	-1	0	1	2	3
12. Self-confidence	Decreases						Increases
	-3	-2	-1	0	1	2	3

13. Expertise	Decreases						Increases
	-3	-2	-1	0	1	2	3
14. Skilfulness	Decreases						Increases
	-3	-2	-1	0	1	2	3
15. Well-being	Decreases						Increases
	-3	-2	-1	0	1	2	3
16. Capability	Decreases						Increases
	-3	-2	-1	0	1	2	3
17. Quality of life	Decreases						Increases
	-3	-2	-1	0	1	2	3
18. Performance	Decreases						Increases
	-3	-2	-1	0	1	2	3
19. Sense of power	Decreases						Increases
	-3	-2	-1	0	1	2	3
20. Sense of control	Decreases						Increases
	-3	-2	-1	0	1	2	3
21. Embarrassment	Decreases						Increases
	-3	-2	-1	0	1	2	3
22. Willingness to take chances	Decreases						Increases
	-3	-2	-1	0	1	2	3
23. Ability to participate	Decreases						Increases
	-3	-2	-1	0	1	2	3
24. Eagerness to try new things	Decreases						Increases
	-3	-2	-1	0	1	2	3
25. Ability to adapt to the activities of daily living	Decreases						Increases
	-3	-2	-1	0	1	2	3
26. Ability to take advantage of opportunities	Decreases						Increases
	-3	-2	-1	0	1	2	3

Appendix E.6

Warwick-Edinburgh Mental Well-Being Scale (WEMWBS)

Please select the answer which best describes your experience over the <u>last 2 weeks</u> **1- None of the time, 2- Rarely, 3- Some of the time,** **4- Often, 5- All of the time**					
1. I’ve been feeling optimistic about the future.	None of the time				All of the time
	1	2	3	4	5
2. I’ve been feeling useful.	None of the time				All of the time
	1	2	3	4	5
3. I’ve been feeling relaxed.	None of the time				All of the time
	1	2	3	4	5
4. I’ve been feeling interested in other people.	None of the time				All of the time
	1	2	3	4	5
5. I’ve had energy to spare.	None of the time				All of the time
	1	2	3	4	5
6. I’ve been dealing with problems well.	None of the time				All of the time
	1	2	3	4	5
7. I’ve been thinking clearly.	None of the time				All of the time
	1	2	3	4	5
8. I’ve been feeling good about myself.	None of the time				All of the time
	1	2	3	4	5
9. I’ve been feeling close to other people.	None of the time				All of the time
	1	2	3	4	5
10. I’ve been feeling confident.	None of the time				All of the time
	1	2	3	4	5
11. I’ve been able to make up my own mind about things.	None of the time				All of the time
	1	2	3	4	5
12. I’ve been feeling loved.	None of the time				All of the time
	1	2	3	4	5
13. I’ve been interested in new things.	None of the time				All of the time
	1	2	3	4	5
14. I’ve been feeling cheerful.	None of the time				All of the time
	1	2	3	4	5

Appendix F.1

Multiple disabilities of participants

	N	% of total sample
Multiple Disabilities Total	39	35.1
Specific learning difficulty & significant ongoing illness	1	0.9
Physical disability & visual impairment	1	0.9
Mental health condition & significant ongoing illness	1	0.9
Physical disability & significant ongoing illness	5	4.5
Hearing impairment & mental health condition	1	0.9
Physical disability, mental health condition & significant ongoing illness	1	0.9
Significant ongoing illness and ‘other’ disability	1	0.9
Aspergers/Autism & significant ongoing illness	1	0.9
DCD-Dyspraxia/Dysgraphia & mental health condition	1	0.9
Aspergers/Autism & mental health condition	1	0.9
Aspergers/Autism, DCD- Dyspraxia/Dysgraphia, specific learning difficulty, mental health condition & significant ongoing illness	1	0.9
Physical disability, mental health condition & other	1	0.9
Aspergers/Autism & specific learning difficulty	1	0.9
Specific learning difficulty, speech and language disability, mental health condition & significant ongoing illness	1	0.9
Aspergers/Autism, DCD- Dyspraxia/Dysgraphia & mental health condition	1	0.9
Physical disability, hearing impairment, visual impairment & DCD- Dyspraxia/Dysgraphia	1	0.9
Aspergers/Autism & ADD/ADHD	1	0.9
Visual impairment & specific learning difficulty	1	0.9
Physical disability & mental health condition	1	0.9
Speech and language disability & ‘other’ disability	1	0.9

	N	% of total sample
Mental health condition & ‘other’ disability	1	0.9
Physical disability, specific learning difficulty & mental health condition	1	0.9
Physical disability, visual impairment & significant ongoing illness	1	0.9
Aspergers/Autism & DCD- Dyspraxia/Dysgraphia	1	0.9
Aspergers/Autism & specific learning difficulty	1	0.9
ADD/ADHD, DCD- Dyspraxia/Dysgraphia & specific learning difficulty	1	0.9
ADD/ADHD & specific learning difficulty	1	0.9
Aspergers/Autism, ADD/ADHD, specific learning difficulty & mental health condition	1	0.9
Speech and language disability & mental health condition	2	1.8
Aspergers/Autism, ADD/ADHD & specific learning difficulty	1	0.9
Physical disability, Aspergers/Autism, mental health condition & significant ongoing illness	1	0.9
Specific learning difficulty & mental health condition	1	0.9
Specific learning difficulty & ‘other’ disability	1	0.9
ADD/ADHD, DCD- Dyspraxia/Dysgraphia & mental health condition	1	0.9

Appendix G.1

Ethical Approval Letter for Phase Two

Ollscoil Chathair Bhaile Átha Cliath
Dublin City University

Ms Aoife
McNicholl,
School of
Psychology

2nd August 2019

REC Reference:	**DCUREC/2019_151**
Proposal Title:	**The role of assistive technology in negotiating self-identity for students with disabilities in higher education.**
Applicant(s)	**Ms Aoife McNicholl, Prof. Pamela Gallagher and Dr Deirdre Desmond**

Dear Colleagues,

Further to expedited review, the DCU Research Ethics Committee approves thisresearch proposal.

Materials used to recruit participants should note that ethical approval for this projecthas been obtained from the Dublin City University Research Ethics Committee.

Should substantial modifications to the research protocol be required at a later stage,a further amendment submission should be made to the REC.

Yours sincerely,

Mark P

Dr Mark Philbin
Interim Chairperson
DCU Research Ethics Committee

DCU
Research & Innovation

Taighde & Nuálaíocht Tacaíocht
Ollscoil Chathair Bhaile Átha Cliath,
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Appendix H.1

Phase two email circulated to students by Disability/AT Officers

Dear student,

You are invited to participate in a research study entitled ‘The role of assistive technology in negotiating identity for students with disabilities in higher education’. The study is being conducted by Aoife McNicholl, a PhD in Dublin City University (DCU), Professor Pamela Gallagher (School of Psychology, DCU) and Dr. Deirdre Desmond (Department of Psychology, Maynooth University). The study has received ethical approval from the DCU Research Ethics Committee.

This research is being undertaken to improve understanding of the role of assistive technology (AT) in the identity of students with disabilities in higher education and if/how this might change over time. This will help to identify facilitators and barriers to AT use, and how these might be addressed to ensure students can comfortably and effectively use AT within the higher education environment. Participation will involve the completion of a short socio-demographic questionnaire and a face-to-face interview with the researcher at two-time points over the academic year. You are eligible to participate in this research if you are aged 18 years or older, have a disability, use **or** could potentially benefit from assistive technology and are a current student in a higher education institution in Ireland. Assistive technology can be described as any device which enables individuals to complete or engage with tasks more easily.

If you are interested in taking part in this research or would like more information, please contact aoife.mcnicholl22@mail.dcu.ie or Ph: 01 700 6867. Your participation in this study would be greatly appreciated. Thank you.

Kind regards,
Aoife McNicholl

Appendix H.2

Phase Two Recruitment Poster

Research Participants Needed!

Are you a student with a disability in higher education?

Do you use or could you benefit from assistive technology?

Are you willing to talk about your experiences?

Help us to understand the role of assistive technology in self-identity!

If you are interesting in participating in an interview or would like some more information please contact Aoife:

Email: aoife.mcnicholl22@mail.dcu.ie

Appendix I.1

Phase Two Sociodemographic Questionnaire

Q1. How old are you? (in years)

____

Q2. What gender do you identify with?

Male ☐
Female ☐
Other ☐

Q3. Please indicate if you have the following disability (check all that may apply):

Physical disability ☐
Hearing impairment ☐
Visual impairment ☐
Aspergers/Autism ☐
ADD/ADHD ☐
DCD- Dyspraxia/Dysgraphia ☐
Specific learning difficulty ☐
Speech & language disability ☐
Mental health condition ☐
Significant ongoing illness ☐
Other ☐ please state:

____

Q4. Do you currently use assistive technology?

Yes ☐
No ☐

Q5. Please indicate if you use the following type(s) of assistive technology
(check all that may apply):

Educational assistive technology ☐
Aids to hearing ☐
Visual aids ☐
Mobility aids ☐
Communication aids ☐
Other ☐ please state:

____

Not applicable (not a current user) ☐

Q6. Please indicate if there is any assistive technology that you require but do not currently have:	Yes ☐ No ☐ If yes is indicated please specify: ______________________
Q7. How would you describe your needs in relation to assistive technology?	I have all the AT I need ☐ I require AT but don’t have it ☐ I can manage without AT but feel I could benefit from AT use ☐ I don’t require or need AT ☐
Q7. Are you registered with the disability service within your higher education institution?	Yes ☐ No ☐
Q8. What type of programme are you currently enrolled in?	Advanced certificate/ higher certificate/ordinary bachelor degree ☐ Honours bachelor degree/ higher diploma ☐ Postgraduate taught programme ☐ Research degrees ☐
Q9. What year are you currently in within your designated programme?	______________
Q10. Are you a full time or part time student?	Full time ☐ Part time ☐
Q11. What is your discipline of study?	Science, Maths, Computing, Engineering, Manufacturing and Construction ☐ Social Science, Business and Law ☐

Education and Training,
Humanities and Arts ☐
Agriculture, Veterinary,
Health & Welfare, Services
☐
Other ☐ please specify:

____

Appendix I.2

Phase two interview topic guide time point 1

1. Please tell me about yourself (Prompt: What is important in your life; The kind of person you are; Likes and dislikes; People in your life; Interests and how you spend your time; What are you studying? What are your career plans?)
2. Please tell me about your disability and what it is like living with this disability.
3. Please tell me what is has been like being in college/university with this disability.
4. Are you currently using assistive technology (AT)?

Current AT Users

5. If yes, tell me about the type of AT you use.
6. Tell me about your experiences of using AT to date, both positive and negative (Prompt: to cover both aspects of everyday life and college/university specifically).
7. Please tell me about a difficult time or moment, to do with using your AT in college/university that comes immediately to mind: (Prompt: What happened? When? What was going on at the time? What role did others play? How did they respond? What makes this time important in your memories?)
8. Please tell me about a positive time or moment, to do with using your AT in college/university that comes immediately to mind: (Prompt: What happened? When? What was going on at the time? What role did others play? How did they respond? What makes this time important in your memories?)
9. Tell me about how others react to your AT use (Prompt: to cover both aspects of everyday life and college/university specifically and how they might experience this).
10. If applicable, tell me about your experiences of disclosing your AT use to others. (Prompt: to cover both aspects of everyday life and college/university specifically)
11. How do you feel about the AT that you use? (Prompt: What does your AT use mean to you? How does it influence the way you view yourself? How does it influence the way you view yourself as a student in college/university? The way you live your life? The way you view your future?)
12. Have you ever considered not using your AT? If so, what factors made you consider this?
13. Do you feel comfortable discussing your disability and support needs with others? Tell me a little bit more about this. (Prompt: Do you ever feel that you would benefit from different AT but don't ask for it? Tell me about this).
14. Is there something else you think I should know so that I can better understand the things we have just talked about?
15. Is there anything else you would like to ask me?

If participant answers no to Q4 ….

Non-current AT Users

5. If no, please tell me about your reasons for not using AT. (Prompt: What factors influence your reasons for not using AT? Do you require AT but don't ask for it? Tell me more about this)

6. If you have previously used AT, tell me about your experiences of using it, both positive and negative (Prompt: to cover both aspects of everyday life and college/university specifically).
7. If you have previously used AT in college/university, please tell me about a difficult time or moment, to do with using your AT in college/university that comes immediately to mind: (Prompt: What happened? When? What was going on at the time? What role did others play? How did they respond? What makes this time important in your memories?)
8. If you have previously used AT in college/university, please tell me about a positive time or moment, to do with using your AT in college/university that comes immediately to mind: (Prompt: What happened? When? What was going on at the time? What role did others play? How did they respond? What makes this time important in your memories?)
9. If you have previously used AT, tell me about how others reacted to your AT use (Prompt: to cover both aspects of everyday life and college/university specifically and how they experienced this).
10. If applicable, tell me about your experiences of disclosing your AT use or requirement to others. (Prompt: to cover both aspects of everyday life and college/university specifically)
11. How do you feel about AT? (Prompt: What does AT use mean to you? How would it influence the way you view yourself? How would it influence the way you view yourself as a student in college/university? The way you live your life? The way you view your future?)
12. Do you feel comfortable discussing your disability and support needs with others? Tell me a little bit more about this. (Prompt: Do you ever feel that you would benefit from different AT but don’t ask for it? Tell me about this).
13. Is there something else you think I should know so that I can better understand the things we have just talked about?
14. Is there anything else you would like to ask me?

Appendix I.3

Phase two interview topic guide time point 2

1. Tell me about your college/university experience since we last met. Tell me about any positive experiences or challenges or setbacks that you may have had.
2. How has your university responded to the changes brought about by the pandemic?
3. Has your AT status changed since we last spoke? If so, what factors contributed to this change? Has the way in which you use your AT changed since the pandemic?

Current AT Users

3. Tell me about your experiences of using AT, both positive and negative, *since we last met* (Prompt: to cover both aspects of everyday life and college/university specifically).
4. Please tell me about a difficult time or moment, to do with using your AT in college/university *since we last met* that comes immediately to mind: (Prompt: What happened? When? What was going on at the time? What role did others play? How did they respond? What makes this time important in your memories?)
5. Please tell me about a positive time or moment, to do with using your AT in college/university *since we last met* that comes immediately to mind: (Prompt: What happened? When? What was going on at the time? What role did others play? How did they respond? What makes this time important in your memories?)
6. Tell me about how others have reacted to your AT use *since we last met.* (Prompt: to cover both aspects of everyday life and college/university specifically and how they experience this).
7. If applicable, tell me about your experiences of disclosing your AT use to others *since we last met*. (Prompt: to cover both aspects of everyday life and college/university specifically)
8. How do you feel *now* about the AT that you use? (Prompt: What does your AT use mean to you? How does it influence the way you view yourself? How does it influence the way you view yourself as a student in college/university? The way you live your life? The way you view your future?)
9. What does being disabled mean to you? How do you view your disability?
10. How does AT influence your perceptions around identifying as disabled? How does it influence meanings around disability?
11. Tell me about how you think your perceptions towards AT may have changed *since we last met.* (Prompt: How has it changed the way you view yourself? How has it changed the way you view yourself as a student in college/university? Have the meanings you attached to your AT changed? If so, how?
12. Please tell me about the factors that might have contributed to this change?
13. What have been the consequences of this change? (Prompt: How has it affected the way you are in college? The way you live your life?

14. How have you successfully managed this change? What coping strategies did you use?
15. Have you ever considered not using your AT *since we last met*? If so, what factors made you consider this? (Prompt: to cover both aspects of everyday life and college/university specifically).
16. Do you feel comfortable discussing your disability and support needs with others? Tell me a little bit more about this and whether anything has changed *since we last met*. (Prompt: Do you ever feel that you would benefit from different AT but don't ask for it? Tell me about this).
17. Is there something else you think I should know so that I can better understand the things we have just talked about?
18. Is there anything else you would like to ask me?

Non-current AT users

3. If no, please tell me about your reasons for not using AT. (Prompt: What factors influence your reasons for not using AT? Do you require AT but don't ask for it? Tell me more about this. If you were using AT in college/university and are not now using it, tell me more about this)
4. If you were using AT in college/university *when we last met* and are not now using it, please tell me about a difficult time or moment, to do with using your AT in college/university that comes immediately to mind: (Prompt: What happened? When? What was going on at the time? What role did others play? How did they respond? What makes this time important in your memories?)
5. If you were using AT in college/university *when we last met* and are not now using it, please tell me about a positive time or moment, to do with using your AT in college/university that comes immediately to mind: (Prompt: What happened? When? What was going on at the time? What role did others play? How did they respond? What makes this time important in your memories?)
6. If you were using AT in college/university *when we last met* and are not now using it, tell me about how others reacted to your AT use (Prompt: to cover both aspects of everyday life and college/university specifically and how they experienced this).
7. If applicable, tell me about your experiences of disclosing your AT use or requirement to others *since we last met*. (Prompt: to cover both aspects of everyday life and college/university specifically)
8. How do you feel *now* about the AT that you use? (Prompt: What does AT use mean to you? How would it influence the way you view yourself? How would it influence the way you view yourself as a student in college/university? The way you live your life? The way you view your future?)
9. What does being disabled mean to you? How do you view your disability?
10. How would AT influence your perceptions around identifying as disabled? How would it influence meanings around disability?
11. Tell me about how you think your perceptions towards AT may have changed *since we last met.* (Prompt: How has it changed the way you view yourself? How has it changed the way you view yourself as a student in

college/university? Have the meanings you attached to your AT changed? If so, how?

12. Please tell me about the factors that might have contributed to this change?
13. What have been the consequences of this change? (Prompt: How has it affected the way you are in college? The way you live your life?
14. How have you successfully managed this change? What coping strategies did you use?
15. Do you feel comfortable discussing your disability and support needs with others? Tell me a little bit more about this and whether anything has changed *since we last met*. (Prompt: Do you ever feel that you would benefit from different AT but don't ask for it? Tell me about this).
16. Is there something else you think I should know so that I can better understand the things we have just talked about?
17. Is there anything else you would like to ask me?

Appendix J.1

Phase Two Plain Language Statement

Title of Research Study: The role of assistive technology in negotiating identity for students with disabilities in higher education.

Principal Investigator: Aoife McNicholl, aoife.mcnicholl22@mail.dcu.ie
Research Supervisors: Prof. Pamela Gallagher, pamela.gallagher@dcu.ie; Dr. Deirdre Desmond, deirdre.desmond@mu.ie

What is this research about and why is it being conducted?
This PhD research project aims to explore the role of assistive technology (AT) on the identity of students with disabilities in higher education and if/how this changes over time.

This research is being undertaken to improve our understanding of the role of assistive technology in the identity of students with disabilities in higher education. This understanding will help to identify facilitators and barriers to AT use, and how these might be addressed to ensure students can comfortably and effectively use AT within the higher education environment. Findings from this study will also be important in promoting a culture of inclusion and diversity within the higher education context.

The study is funded by the Irish Research Council Government of Ireland Postgraduate Scholarship Programme.

Am I eligible to participate?
To be eligible for participation in this research you must be 18 years or older, have a disability, use or could benefit from AT and are a current student in one of the 27 Higher Education Authority funded higher education institutions in Ireland.

How do I take part?
Participation in this study is completely voluntary. If, after reading this information, you would like to participate, please contact the PhD researcher by email (aoife.mcnicholl22@mail.dcu.ie) to arrange a suitable time and date for interview.

What does participation in the study involve?
Participation in the study involves completing a short socio-demographic questionnaire and taking part in two interviews (one early and the other later on in the academic year). During the interviews, you will be asked to talk about your experiences of using assistive technology, or your perceptions of assistive technology if you are not a current user, how these might influence your identity and if/how this might change over time. The interviews will last for approximately 90 minutes. With your consent, the interviews will be audio recorded.

Can I change my mind and withdraw from the study?
If at any stage during the study you decide you no longer want to participate, you can withdraw from the study without having to provide any reason. There will no consequences for withdrawing, and you are free to do so at any stage.

Are there any benefits associated with participating in this study?
While you might not experience any direct benefits, this study will provide important insights into the ways in which assistive technology can affect the identity of students with disabilities in higher education. We anticipate that the findings from this study will inform the support services offered by AT/Disability Officers to students when accessing AT in higher education.

Are there any risks associated with participating in this study?
We do not anticipate any risks. However, the study addresses topics which may be sensitive for some participants. You do not have to answer any questions or discuss topics that you would prefer not to discuss. If at any stage you would like a break or would like to end the interview you are free to do so and you do not have to give a reason. If at any stage you become upset during the study, you can contact the local counselling services in your higher education institution, your GP or Samaritans on 116123. If you would like information or support related to assistive technologies, please contact the Disability/AT officer in their higher education institution.

Why do you ask for my name and email address?
We ask you for your email address so that we can contact you again, later in the year, to invite you to take part in a second interview. At all times participation is voluntary.

How will my data be protected?
As personal data is being collected and analysed, the researchers will comply with General Data Protection Regulations (GDPR) and ensure it is solely used for research purposes. Identifying information will be stored separately to the information you give during interviews. No identifying information will be included in the results or analysis.

How will my data be kept secure?
Consent forms and socio-demographic questionnaires will be stored in separate locked drawers in a locked office on the Dublin City University campus. Only Aoife McNicholl and Prof Pamela Gallagher will have keys for these drawers. Electronic transcripts, soft copies of data, names and email addresses and audio recordings will be stored on the Principal Investigator's password protected Google Drive on an encrypted computer. These will be accessible to the Principal Investigator and supervising researchers only. PhD examiners will have access to the de-identified data upon request.

What will happen to my data?
Data from the research study will be stored securely for a period of five years following the completion of the study, after which it will be permanently destroyed. Only the Principal Investigator and the supervising researchers will have access to this data. PhD examiners may request access to the de-identified data. The data collected in this study will be analysed and reported on as part of a PhD thesis. The data collected may also be used in academic reports, journal articles and conference presentations. However, the data will remain anonymous and will not contain any identifying information. Although unlikely, it is possible that the data could be subject to a subpoena or the Freedom of Information Act, and under such circumstances the researcher would be obliged to provide the information requested. A summary of results can be made available to you following completion of the study if you contact the principal investigator through the details above.

Does this study have ethical approval?
This study has received ethical approval from the Research Ethics Committee (REC) in DCU.

What to do if you have any questions or concerns about the study:
If you have any questions about this study, please contact the principal investigator, Ms Aoife McNicholl, email: aoife.mcnicholl22@mail.dcu.ie

If you have any concerns about the manner in which this study was conducted, or should any concerns arise in the future in relation to this study, please do not hesitate to contact the supervising researcher Prof. Pamela Gallagher, School of Psychology, DCU (Tel: 01 700 8958; Email: pamela.gallagher@dcu.ie), or the DCU REC administrator (Email: rec@dcu.ie) as an independent contact. For queries relating to data protection, you can contact the DCU Data Protection Officer, Mr. Martin Ward (data.protection@dcu.ie Ph: 7005118 / 7008257).

Appendix J.2

Phase Two Informed Consent Form

Title of Research Study: The role of assistive technology in negotiating identity for students with disabilities in higher education**.**

Principal Investigator: Aoife McNicholl
Supervising Researchers: Prof. Pamela Gallagher, Dr. Deirdre Desmond

Please complete the following (Tick Yes or No for each question):

I am aged 18 years or older	☐ Yes No ☐
I have a disability	☐ Yes No ☐
I use or could benefit from using assistive technology	☐ Yes No ☐
I am a current student in a higher education institution in Ireland	☐ Yes No ☐
I confirm that I have read and understood the plain language statement and am aware of who I can ask questions about the study	☐ Yes No ☐
I understand that my participation is entirely voluntary, and I am free to withdraw at any time, without giving any reason and without being penalised for doing so	☐ Yes No ☐
I understand that my data will be stored securely on encrypted files for a period of up to five years	☐ Yes No ☐
I understand that my data will be kept confidential within the confines of the law	☐ Yes No ☐
I give permission to the research team to audio record the interview	☐ Yes No ☐
I give my consent to participate in this study	☐ Yes No ☐
I consent to be contacted again in the future, via the below email, in relation to a follow up interview	☐ Yes No ☐

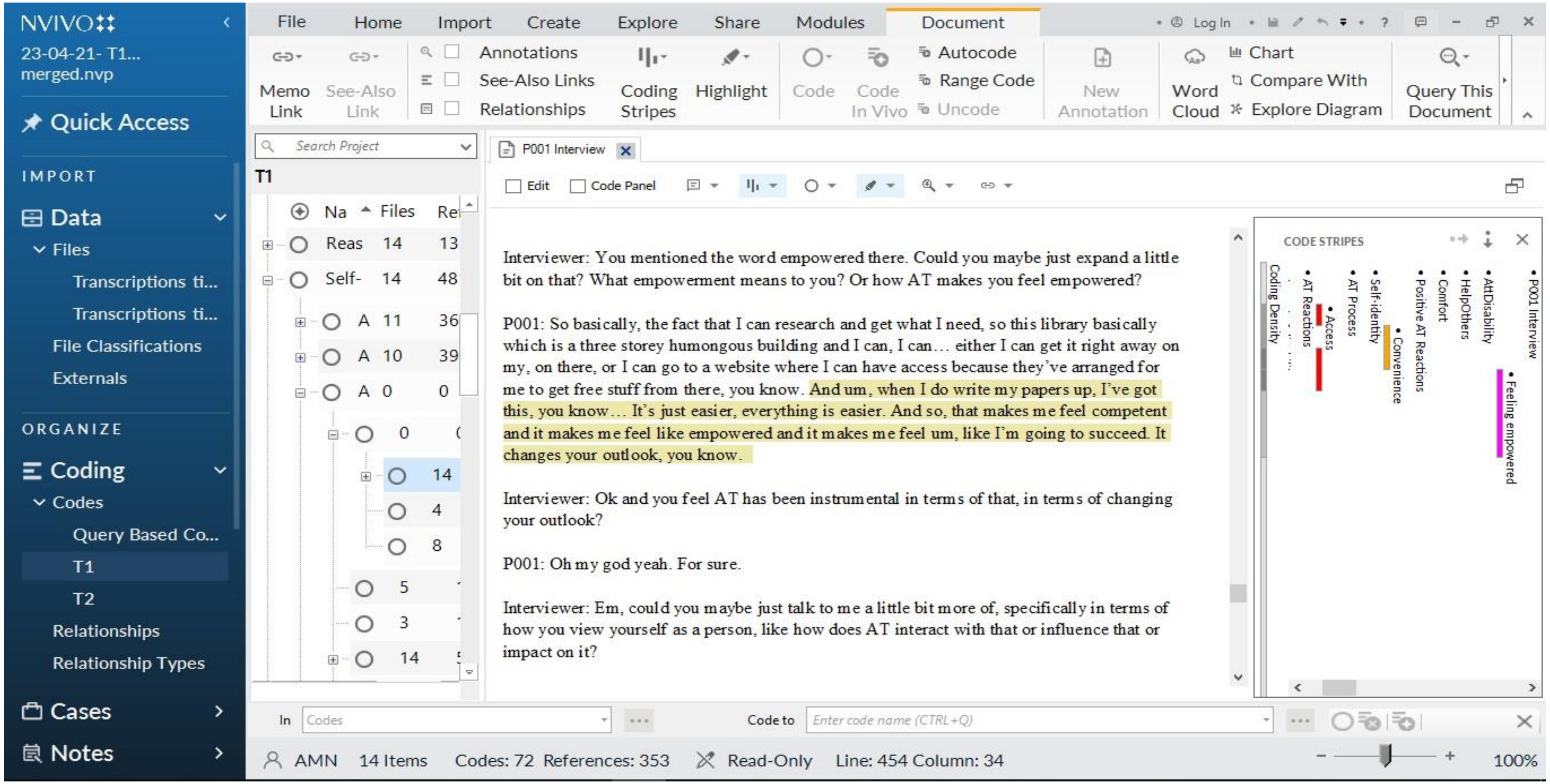
If YES: Please provide your email address: ____________________

Please provide your name: _______________

Name of participant (block caps)	*Signature*	*Date*
Name of researcher (block caps)	*Signature*	*Date*

Appendix K.1

Sample of a coded transcript



Interviewer: You mentioned the word empowered there. Could you maybe just expand a little bit on that? What empowerment means to you? Or how AT makes you feel empowered?

P001: So basically, the fact that I can research and get what I need, so this library basically which is a three storey humongous building and I can, I can… either I can get it right away on my, on there, or I can go to a website where I can have access because they've arranged for me to get free stuff from there, you know. And um, when I do write my papers up, I've got this, you know… It's just easier, everything is easier. And so, that makes me feel competent and it makes me feel like empowered and it makes me feel um, like I'm going to succeed. It changes your outlook, you know.

Interviewer: Ok and you feel AT has been instrumental in terms of that, in terms of changing your outlook?

P001: Oh my god yeah. For sure.

Interviewer: Em, could you maybe just talk to me a little bit more of, specifically in terms of how you view yourself as a person, like how does AT interact with that or influence that or impact on it?

Appendix K.2

Overview of themes and subthemes from cross-sectional analysis at time 1 and 2

Time 1	**Time 2**
Embracing a disability identity - My disability is a part of who I am - Struggling to identify as disabled - Feeling connected with the disabled community	The possibilities of online learning and digital technologies - Challenges of online learning - Greater flexibility in course design and structure - Blending in with the crowd - New ways of connecting - Optimism over future opportunities
Desire to be ‘normal’ - Being treated equally - Visibility of impairment influences feeling normal - AT and PA supports highlight me as different - AT as a facilitator of inclusion and participation	Left to fend for yourself? Consequences of a changed university landscape - Access to university support and services - Reliance on family members
Identifying as a student - AT helps me to succeed academically - AT transforms one’s outlook in higher education - Connecting with others	A rocky road: Finding your feet as a disabled student - Forming relationships with classmates and lecturers - Involvement with disabled communities - Timely access and use of AT - Deterioration in impairment
Building you up or breaking you down? Reactions from others - Positive AT and disability reactions - Stigmatising attitudes from others	
Dealing with stigma and negative reactions - Engaging in self-stigmatisation - Passing as non-disabled - Downplaying disability - Disclosing is contextual - Claiming disability	

Appendix L.1

Sample of conceptually clustered matrix

	Independence / empowerment (identifying as a student + normal)	**Disability identity**	**Sense of belonging**	**How others view me**	**Managing perceptions / identity**	**Summary**
P001	Requires specialised seating. AT makes things doable for her in HE- doesn't know how she would manage without. Cart allows her to independently carry books around. AT has empowered her to be a better student (grades have improved). Changed outlook- feels competent.	Accepting of disability. Visible and obvious, dealt with it her whole life. Would be open about disability regardless of whether it is visible or not.	Disability suite in library helped her fit in- working alongside others with impairments. Shared sense of understanding with son who also has a disability.	Classmates willing to assist with finding suitable seating. Supportive husband- assists in whatever way he can.	No strategies used- spoke about how her impairment was very visible to others (couldn't conceal)	Comfortable with disability and happy to use AT (sees benefits).
P002	Recording device makes her feel confident and capable. Promotes understanding and helps her feel like she's 'getting it'. Helps her succeed academically- doesn't know if she would manage without AT. But at the same time puts in work and effort- AT just makes things easier and helps her achieve.	Feels different due to visibility of disability / AT. Desire to be 'normal'. Feels less self-conscious now though in comparison to first year. Views herself as an expert in her own condition.	Feels university is quite open and accepting of people with disabilities. Very supportive class which helps her fit in.	Worried about others treating her differently / being judgemental. Others viewing AT as an unfair advantage (mostly younger students). She feels it just puts her on a level playing field. OT very supportive and encouraging	Discloses on a need to know basis to avoid stigmatisation. Frustrated that she can't conceal her disability- lack of privacy.	Struggles with feeling different. Continues to use AT because of associated benefits. Defensive at times? Has her guard up.

Appendix L.2

Sample of a time ordered sequential matrix for one of the emblematic themes

Feeling autonomous and competent

	Time 1	**Time 2**	**Reasons for change / continuity**	**Summary**
P001	AT makes things doable for her. Feels empowered as a student (better grades). Has changed her outlook- feels competent, capable and successful as a result of AT.	Increased sense of independence while on campus due to acquiring new specially adapted chairs. Feels disempowered since pandemic and return home- more reliant on family members to assist. Doesn't want to be a burden. Has devised strategies so she is less dependent on others. Feels productive and capable when she has access to appropriate AT- makes her feel able. Really hopes she can return to college next year as she now has the appropriate supports in place.	• Access to / availability of AT • COVID-19 restrictions • Stigma conscious, internalisation of societal perceptions of disability= dependent & devalued.	Changes in feelings around autonomy, competence and capabilities. Briefly experienced increased independence when has access to chairs on campus. Feeling disempowered and dependent since returning home due to lack of access to chairs and increased reliance on family. Doesn't want to be a burden- sees asking for help as a sign of weakness. Is aware of the stigma associated with disabled people as being dependent? Identity management- trying to compensate for this by devising own strategies to help increase independence.
P002	Recording device makes her feel competent and capable. Feels more confident about	Increased dependence on AT since more to online learning- realises how much she needs it.	• COVID-19 restrictions • Stigma conscious and resistance to stereotypes of	Feeling competent and capable remains important to her- no change. More

	Time 1	**Time 2**	**Reasons for change / continuity**	**Summary**
	her understanding of the material. Can succeed academically with the support of AT- doesn’t know how she would manage without. Makes things doable for her. Works hard and is determined to succeed- AT supports.	Doesn’t know how she would manage online learning without AT. Helps her to succeed academically.	disabled individuals as dependent and devalued (continuity). • Access to AT.	dependent on AT at time 2- doesn’t conflict with identity as AT increases feelings of competence. Would this be different if she were dependent on others instead? Contrast with P001, P012 etc. Determined, works hard, AT assists.

= claiming disability
= feeling like you belong
= unusual case

Please note: the above is just a sample and the colour coding of ## and ## is evident further down in the table

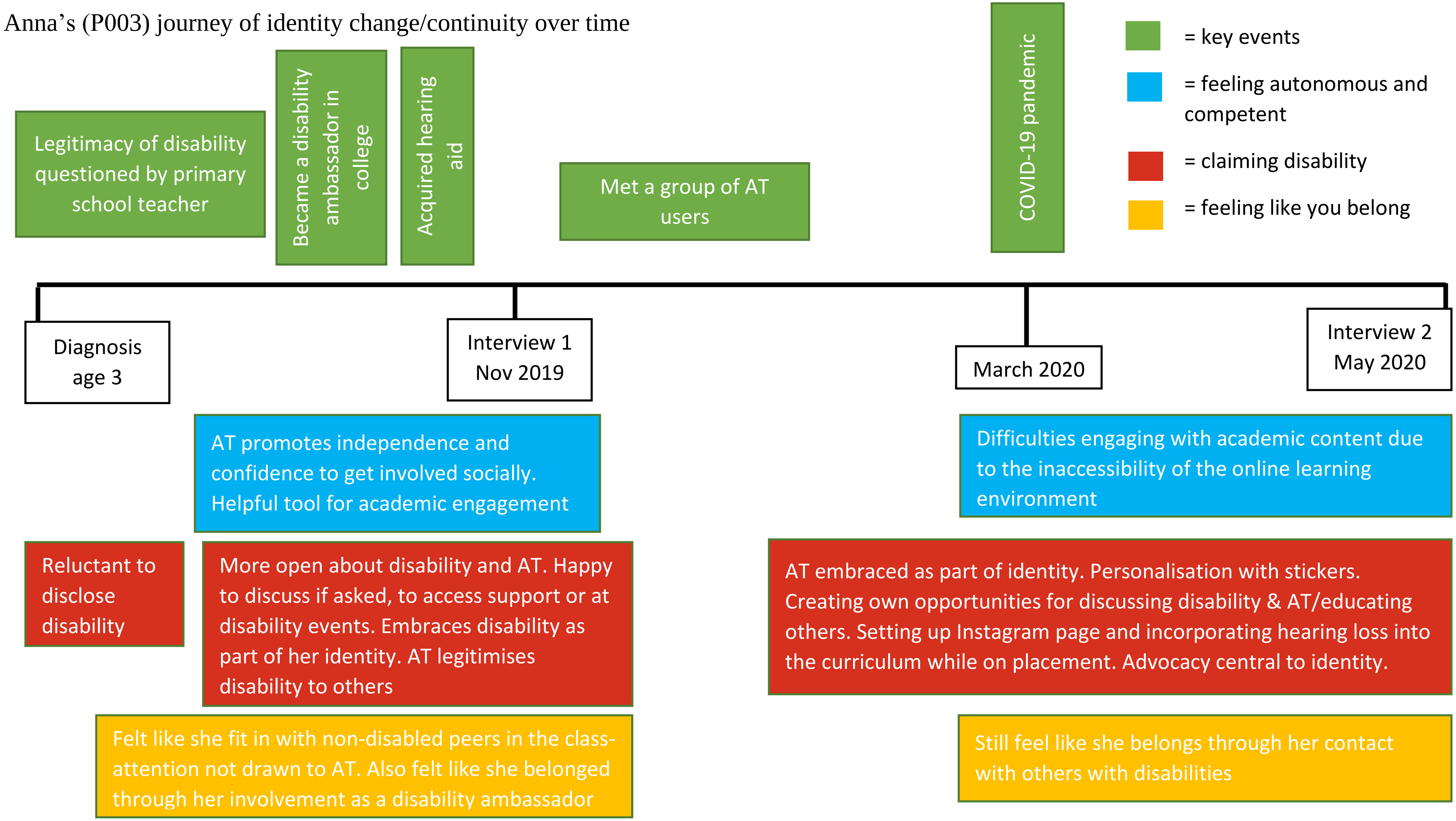
Appendix L.3

Sample of overall summary matrix

	Feeling autonomous and competent	**Claiming disability**	**Feeling like you belong**
P001	Increases and decreases in autonomy and competence.	Continuity in willingness to claim disability. Embraced as part of who they are.	Continuity in feelings of belonging. Felt like they fit in within higher education.
P002	Continuity in feelings of autonomy and competence.	At times felt more comfortable with claiming disability but also experienced times when reluctant to claim disability.	Continuity in feelings of belonging. Struggled to feel like they belonged in higher education.
P003	Loss of feelings of autonomy and/or competence	More comfortable claiming disability. Incorporated more strongly in identity.	Continuity in feelings of belonging. Felt like they fit in within higher education.
P004	Increases and decreases in autonomy and competence.	Continuity in willingness to claim disability. Embraced as part of who they are.	Greater feelings of belonging within higher education.
P005	Loss of feelings of autonomy and/or competence	At times felt more comfortable with claiming disability but also experienced times when reluctant to claim disability.	Continuity in feelings of belonging. Struggled to feel like they belonged in higher education.
P006	Loss of feelings of autonomy and/or competence	Continuity in willingness to claim disability. Embraced as part of who they are.	Continuity in feelings of belonging. Felt like they fit in within higher education.
P007	Did not complete follow up interview	Did not complete follow up interview	Did not complete follow up interview
P008	Loss of feelings of autonomy and/or competence	Continuity in willingness to claim disability. Embraced as part of who they are.	Continuity in feelings of belonging. Felt like they fit in within higher education.

Appendix M.1

Anna's (P003) journey of identity change/continuity over time



🟩 = key events

🟦 = feeling autonomous and competent

🟥 = claiming disability

🟨 = feeling like you belong

Legitimacy of disability questioned by primary school teacher

Became a disability ambassador in college

Acquired hearing aid

Met a group of AT users

COVID-19 pandemic

Diagnosis age 3

Interview 1 Nov 2019

March 2020

Interview 2 May 2020

AT promotes independence and confidence to get involved socially. Helpful tool for academic engagement

Reluctant to disclose disability

More open about disability and AT. Happy to discuss if asked, to access support or at disability events. Embraces disability as part of her identity. AT legitimises disability to others

Felt like she fit in with non-disabled peers in the class-attention not drawn to AT. Also felt like she belonged through her involvement as a disability ambassador

Difficulties engaging with academic content due to the inaccessibility of the online learning environment

AT embraced as part of identity. Personalisation with stickers. Creating own opportunities for discussing disability & AT/educating others. Setting up Instagram page and incorporating hearing loss into the curriculum while on placement. Advocacy central to identity.

Still feel like she belongs through her contact with others with disabilities

Anna's Journey (P003)

In this case history, I will explore Anna's journey over time, a 21 year old undergraduate student with a hearing impairment. She was interviewed at two time points over the academic year. Anna regularly contends with ear infections and attends hospital appointments which she finds "quite draining". Her hearing impairment makes it difficult to engage and interact in a lecture or socially outside of the classroom, without support from AT. At the time of the first interview, Anna was using various types of AT such as a recording device, which she used to record lectures, her hearing aids for daily use and an assistive listening device while in class. Anna's journey through higher education so far has been largely positive; classmates and lecturers have been understanding of her disability and AT needs and she feels like she belongs in higher education. Some key events which have contributed to her positive experiences include her advocacy work through her disability ambassador role in the university and joining an AT group. However, Anna did encounter some difficulties with engaging with online lectures due to a lack of accessibility considerations which rendered her hearing aids redundant. In the sections that follow, I will outline Anna's experience of identity changes and continuities across three emblematic themes; 1) Feeling autonomous and competent, 2) Claiming disability and 3) Feeling like you belong. The central role of the through line 'feeling valued' in Anna's negotiation of identity changes and continuities over time will be highlighted throughout. The role of AT in supporting Anna's academic and social engagement, as well as the vital role it plays in helping Anna embrace her disability is also evident in her case history. Anna's journey is one of becoming, as she embraces her disability and increasingly views it as an important part of her identity over time.

Feeling autonomous and competent

For Anna, viewing herself as autonomous and competent as a student in her academic work and ability to engage in extra-curricular activities was important for her sense of value. At time 1, access to AT ensured she could participate in all aspects of college life. However, at time 2 Anna experienced a loss in competence surrounding her ability to engage academically which threatened her sense of value.

It was clear during my first interview with Anna that she was a driven young woman whose outlook on life was positive and uplifting. Anna placed a lot of importance on being actively involved in college life and didn’t feel limited by her impairment.

> *“I find that I’m very determined like [laughs], you know, to get things done regardless. Em and that I just like to get involved in as much as I can.” – time 1*

AT supported Anna in her academic and social engagement in university. From an academic perspective, her digital voice recorder and hearing aids ensured she didn’t miss out on anything in class, while from a social perspective, her hearing aids ensured she could actively participate in extra-curricular activities and have quality social interactions with others. In this sense, AT increased her sense of value or self-worth through promoting her independence and competence.

> *“Just helps me to get involved and helps me to be like, to make the most out of my college. Em and helps me work like do well in my lectures and things like that.” – time 1*

At time 2, Anna noted difficulties in engaging with academic content when her lectures moved online as a result of the COVID-19 pandemic. Poor audio quality in recorded lectures and lack of provision of captioning services posed considerable challenges for Anna and rendered her hearing aids redundant. This threatened Anna’s sense of value as a competent, capable student.

> *“I couldn't really use them [AT] through online learning, um, including my hearing aid as well because I did find it quite difficult, um, with like, the laptop and things like that. It doesn't really pick up the sound well.” – time 2*

In order to protect or maintain her sense of value and ensure she could continue to engage academically despite the environmental barriers she was faced with, Anna adapted to this situation and creatively sourced her own solution. Instead of using her hearing aids, she started using earphones instead for online lectures which could focus and enhance the transmission of sound to her right ear, which she noted was less affected by her impairment. She also noted that she was happy to ask for extra support from her lecturers if needed to ensure she didn't fall behind.

> *"if I did have any problems with missing out on things, like I would just send them an email and they'd catch me up or help me where I've missed out. Like my team of lecturers were very good." – time 2*

Claiming disability

Anna's willingness to claim a disability identity was something that changed over time, with her gradually coming to embrace her disability as part of her identity when she started in university. At time 1, she viewed her disability as a part of who she is and was happy to claim to educate others and make positive contributions to the disabled community. In this way, claiming her disability promoted a sense of value for Anna. However, at this point she did not embrace her AT as part of her identity. At time 2, there were evident changes in how Anna claimed her disability. It was clear that her disability was incorporated more strongly into her identity; she actively created her own opportunities to share her disability experience with others. She also now embraced her AT as part of who she is.

Anna noted that as a young child, others often questioned the legitimacy of her impairment as it wasn't visible. She had a particular negative experience with a teacher in primary school who didn't believe she had a hearing impairment, as she did not use a hearing aid at the time, and refused to use an assistive listening device in class. This negative experience resulted in reluctance to claim her disability and openly disclose it and her support needs to others for some time afterwards. This was evident when she recounted early experiences of disclosing her AT use to lecturers at the start of first year in university, noting it was "an email first [laughs] to see kind of the reaction" (time 1). It was only after building a relationship with lecturers over time, that she felt comfortable discussing her disability and needs in person. These strategies were an attempt by Anna to buffer against encountering stigmatising reactions from others, and situations where her disability experience could be illegitimised, leaving her feeling devalued. Feeling validated by others as a person with a disability was important for Anna in feeling valued at this point.

However, Anna did note becoming more open and accepting of her disability as she settled into university, embracing it as a part of her identity. Two key factors played a role in this: her use of AT and her involvement as a disability ambassador in her university. Anna noted that having to talk about her disability and AT use with others, in events organised by her university, helped her come to terms with her disability but equally could promote acceptance among others if she shared her story. Through talking to prospective students about her experiences, she became a role model for others, and took comfort in reassuring them about any concerns they had. Giving back to others and assisting them in their journeys was something which helped her feel valued and fulfilled.

> *"I love helping others especially those that are vulnerable and like, bringing them on through their journey as best that I can." – time 1*

> *"I think just when I'm talking to other students at the open day or the likes when I go out on the school visits I like talking to them or telling them what I use. The fact that nobody really cares when you get to college in a way that you're using this [AT] like and the supports that are available in [University Name] are great. That I found and just being able to tell them my own experience and them kind of seeing their kind of sigh of relief like oh thank God I didn't know that was there, that was available because there's things they don't get in school um, that they might need but when they come to college they have that opportunity to get them." – time 1*

Anna also noted that her AT use played an important role in claiming her disability and embracing it as a part of who she is. The experiences she has had while using AT, both positive and negative, the ways in which she overcame challenges, and her thoughts and feelings on using it now, gave her the confidence to share her story with others, through her disability ambassador events. These experiences made her feel worthy of having something valuable to offer prospective students in her talks.

> *"Well I think like it [AT] helps me like share my experiences and like see what I can do to help others through that like. You know from what I've used and what I've done and how and using, like my attitude towards using it in college itself. You know that I'm not scared to anybody to see my [recording device]." – time 1*

During the course of the first interview, Anna noted that now she was happy to discuss her disability or AT use with classmates, colleagues or children while on placement, but would only do so if asked or felt she needed to. In contrast to how she felt in school and initially when starting in university, she now doesn't really care what others think about her disability or AT use. She now viewed her disability as a part of her.

> *"I used to be very like, not very open about it [disability] because of past experiences but then I kinda started to learn more like, it's who I am and I've just got to deal with it. Em, other people just have to deal with it and if they don't like it, they don't like it but I can't change [laughs] who I am so." – time 1*

However, Anna did not view her AT as part of her identity at this point. She viewed it as an "extra helping hand" and a means of highlighting and legitimising her disability to others. It served the purpose of assisting with her academic and social engagement and validating her disability to others but was not viewed as an extension of herself or part of her. Since acquiring her hearing aids Anna was acutely aware that "people are kind of a bit more aware that I'm not making it up" (time 1).

In contrast to the first interview, where Anna viewed AT as a helpful tool to her day to day life, there was an evident change in how she embraced AT during the second interview. This was something that Anna herself was not even consciously aware of saying, "I don't think much has changed with my perspective on it [AT]", when asked. Yet, Anna now was happy to claim AT as something that was a part of her and her daily routine. It was strongly incorporated into her identity and just viewed as an extension of herself.

> *"I would say like, it's just like getting up in the morning and putting on a pair of glasses. You know, you need your glasses to see. So, what is the difference with*

> *getting up in the morning and putting on your hearing aids? … that's who I am and I can't change that."* – time 2

This was also evident when she spoke about how now, she personalised her hearing aids by adding stickers to make them colourful. Anna viewed her hearing aids as an outward representation of her personality and thus, liked adding her own personal touch to them. She was aware that this made them more visible to others, but this was something she was ok with.

> *"it is kind of just um, make it look a bit nicer and just add my own kind of stamp to it. 'Cause it's brown and I quite like colour, so the stickers are colourful and I just- I just like doing it, really."* – time 2

Anna also seemed to be more open and willing to claim her disability at the second interview in comparison to when I spoke to her previously. She recently decided to set up an Instagram page to outline her journey with her hearing impairment and AT use and incorporated a teaching segment on hearing impairments, and her experiences, for children while on placement. These actions demonstrate how she actively created opportunities herself to discuss her disability with others and embrace it as part of who she is, rather than disclose in response to support needs, questions asked by others or in events organised by the disability office. It is clear that Anna sees educating others and raising awareness about her disability and AT as an important endeavour in her feeling valued and making a worthwhile contribution to the disabled community. Claiming her disability through advocacy work seems to have become increasingly important to her over time, seeking out and creating her own opportunities to share her story and help others.

> *"I like it [Instagram page] because I think I've just become, you know, more accepting of like my disability, and that like, you know, as I said, it's a part of me that I can't change, so why not use it to educate others, and maybe like inspire others to share their journey, or like become more comfortable with it too."* – time 2

The changes outlined above in relation to Anna’s openness surrounding her disability and AT and the way in which she now embraces her AT as part of her identity came about as a result of a culmination of various factors. One key factor which impacted on her openness and willingness to claim her disability was her recent involvement with a group of hearing aid users. Belonging to this group made her feel accepted and valued as she was surrounded by others who truly understood and could empathise with her experiences. This promoted the sharing of information, advice and her experiences with others.

> *“We've been able to kinda ask each other for advice, or you know, just share our journeys with each other as well.” – time 2*

In addition, Anna’s continued involvement in her role of disability ambassador in her university positively contributed to her openness and acceptance around her disability and AT and claiming it as part of who she is. Anna also noted that her desire to set up the Instagram page was informed by the lack of knowledge and understanding among the general public with regards to hearing impairments and hearing aids. Once again, Anna’s passion for educating and helping others, and thus, making important contributions to the disabled community, was central to her feeling valued.

> *“I just kinda, when I'm thinking about it, like I'm talking to people. Like they don't really know a lot about hearing and like hearing loss, and things like that. So I kinda wanted to make a bit more of an awareness. Like you know, different, um, things that can be used to help it like, you know, yeah [referring to setting up Instagram page].” – time 2*

Feeling like you belong

Anna experienced continuity in feelings of belonging over time. At time 1, she noted feeling like she fit in within her class and through her involvement in her disability ambassador role and this remained the same at time 2. Feeling like she belonged in higher education was important for Anna feeling valued.

During the first interview, Anna noted that she felt like she fit in and belonged among non-disabled peers in her class. These students did not draw attention to her AT use and helped Anna feel comfortable and accepted. Feeling accepted by her classmates as a SWD promoted feelings of value and self-worth for Anna.

> *"Like I find even in my class like if people know that I'm recording lectures or have a digital voice recorder, like they've seen it but they don't really care that you have it, you know…I think you know, when you're coming through education as well and you're kind of in this, when your peers react positively I think that's a big thing." – time 1*

Equally, Anna noted feeling like she fit in and belonged through her disability ambassador role in university. Talking to other students with disabilities who had a shared sense of understanding of her experiences facilitated her feeling comfortable speaking about her disability and accepting it. It offered a safe space where Anna could speak openly without worrying about feeling judged or different to others.

> *"I think it was just when like I registered for the disability service here like and then kinda became an ambassador for them like doing the talks and going out to schools and working at the DARE orientation that I was talking to those students about it and I just became more comfortable talking about it and then realised again there's nothing I can do about it so. I mean just have to get on with it." – time 1*

At time 2, Anna still felt like she fit in and belonged in higher education. Continued contact with other students with disabilities facilitated continuity in these feelings. Anna reiterated the importance of having a space where she could speak to others who could truly understand and empathise with her experiences. This promoted a sense of value for Anna as she felt understood and accepted by others.

> *"So it's nice to be able to talk to people that have some sort of understanding of what you're going through and what you have gone through as well." – time 2*

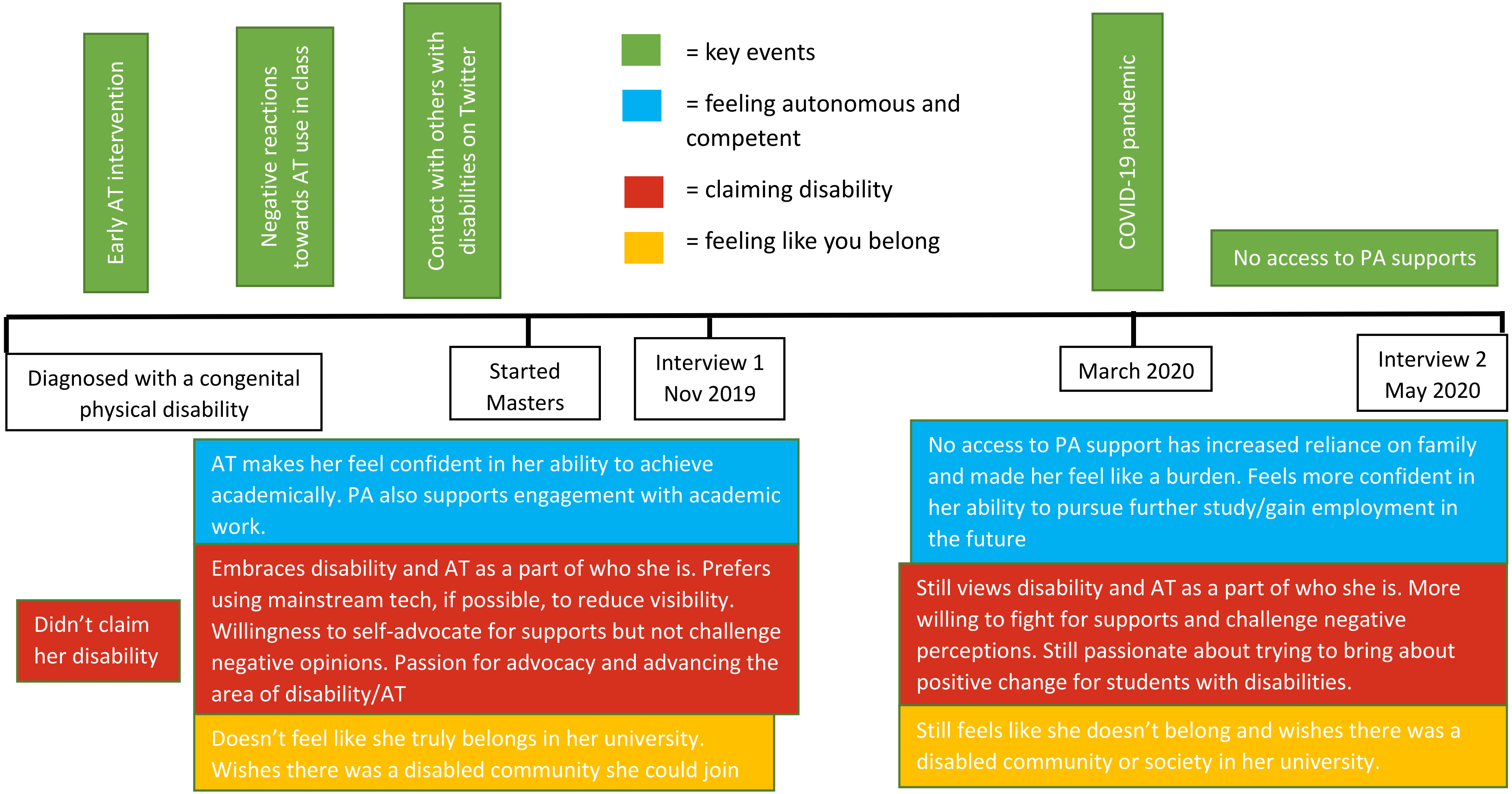
Conclusion

This case history captures Anna's experience of identity changes and continuities over time across three emblematic themes; 1) Feeling autonomous and competent, 2) Claiming disability and 3) Feeling like you belong. Feeling valued was central to the way in which Anna negotiated her identity over time. For Anna, her sense of value was staked on feeling competent and capable as a student in her academic work, feeling legitimate and validated by others as a disabled person, making positive contributions to the disabled community through engagement in advocacy work and feeling like she fit in with others in higher education. Anna encountered situations and circumstances which undermined or threatened her sense of value; negative reactions from a primary school teacher and the inaccessibility of online content. Her response and adaptation to these challenges centred around restoring her self-concept as a valued worthy person; reluctance to claim her disability for some time to avoid stigmatising reactions that could undermine the legitimacy of her impairment and engaging in problem solving and actively finding a solution which would ensure she could continue to engage academically despite the accessibility issues she encountered.

Anna's journey is one of becoming, as she embraced her disability and increasingly viewed it as an important part of her identity over time. Her journey highlights the importance of taking on ambassador roles and having contact with others with disabilities in promoting a positive sense of disability identity, incorporating AT into her identity and helping her feel like she fits in and can relate to others in higher education. It was evident that the meanings Anna attached to her AT changed over time, from viewing it as a helpful tool to support her academic and social engagement to being viewed as a part of her. The central role that AT plays in helping Anna claim a disability identity and legitimise her disability to others is also highlighted, helping Anna feel validated and valued as a disabled person. Anna's journey demonstrates the actions that higher education institutions can take to create an environment where students are happy to embrace their disability and AT use as part of who they are, namely provision of opportunities to engage in advocacy roles and the creation of spaces where students with disabilities can mix and form friendships with one another and share experiences.

Appendix M.2

Timeline representing Aoidean’s (P012) journey of identity change/continuity over time



🟩 = key events

🟦 = feeling autonomous and competent

🟥 = claiming disability

🟨 = feeling like you belong

Didn’t claim her disability

AT makes her feel confident in her ability to achieve academically. PA also supports engagement with academic work.

Embraces disability and AT as a part of who she is. Prefers using mainstream tech, if possible, to reduce visibility. Willingness to self-advocate for supports but not challenge negative opinions. Passion for advocacy and advancing the area of disability/AT

Doesn’t feel like she truly belongs in her university. Wishes there was a disabled community she could join

No access to PA support has increased reliance on family and made her feel like a burden. Feels more confident in her ability to pursue further study/gain employment in the future

Still views disability and AT as a part of who she is. More willing to fight for supports and challenge negative perceptions. Still passionate about trying to bring about positive change for students with disabilities.

Still feels like she doesn’t belong and wishes there was a disabled community or society in her university.

Aoidean's Journey (P012)

In this case history, I will explore Aoidean's journey over time, a 22 year old postgraduate student with a physical disability. She was interviewed at two points over the academic year. Her physical disability affects her mobility, but she is ambulant and doesn't require a wheelchair. The ways in which her disability impacted on her day to day life included experiencing fatigue and low energy, especially at pressure points in the semester, and having to deal with pain, muscle spasms and discomfort. AT that Aoidean was currently using included her iPhone to record lectures, adaptive furniture, text to speech software, Grammarly and assistive aids for cooking/preparing meals. In Aoidean's journey through higher education so far, she has contended with negative reactions from classmates and lecturers and had to manage without access to much needed PA supports. However, she also had access to systems of support such as connections with a disabled group on twitter and her support from her sister, who has assisted her throughout her educational journey. In the sections that follow, I will outline Aoidean's experience of identity changes and continuities across three emblematic themes; 1) Feeling autonomous and competent, 2) Claiming disability and 3) Feeling like you belong. The importance of the through line 'feeling valued' in Aoidean's negotiation of identity change and continuity will be highlighted throughout. AT and digital technologies played an important role for Aoidean in promoting a view of herself as autonomous and competent, but at times, drew unwanted attention to her. Aoidean's journey is one of empowerment, demonstrating a determination and willingness to fight for inclusion and equality over time.

Feeling autonomous and competent

For Aoidean, viewing herself as autonomous and competent in her abilities to engage academically in higher education were important to her feeling valued. However, at time 2, Aoidean experienced a loss in competence in her ability to carry out academic work, due to a lack of PA supports, which undermined her sense of value and rendered her dependent on family members. She did note however feeling more competent in her ability to gain employment in the future or pursue further study due to the possibility of remote working and availability of digital technologies such as Zoom.

At time 1, Aoidean noted the importance of AT for her academic success, productivity and organisation of her academic work. Increasing her academic competence, through the use of AT, promoted a sense of value in the knowledge that her disability was not limiting or restricting her academic potential. Equally, support from a personal assistant (PA) was key to enabling her to engage academically.

> *"It's [AT] the means that I'm able to do my work and to be most efficient and to do well, and without that, it would be another barrier that I would otherwise rather not have to have to jump over or cross." – time 1*

> *"I might book study room in the library and read and ask my PA to write for me, or type, even better if they're comfortable with typing." – time 1*

However, at time 2, Aoidean experienced a loss of competency in her ability to complete academic work. Since the pandemic and move to online learning, Aoidean did not have access to supports she previously received in college, such as personal assistant (PA) services. This undermined Aoidean's feelings of competency and thus her sense of value, as she was now reliant on family members to support her in completing academic work. This was something Aoidean really struggled with and found hard to accept. Aoidean did not want to feel a burden on others because of her disability and as a result, refrained from asking for assistance from family members at times, as she knew they had other responsibilities. Requesting support in this instance, where the relationship was not interdependent, would result in Aoidean feeling devalued and inferior to others, and thus, she tried to avoid these situations where possible. However, Aoidean did accept support from a notetaker for this period and was happy to do so. This did not compromise Aoidean's feelings of value or self-worth as this individual was employed by the disability office and received payment in exchange for providing Aoidean with support.

> *"I will miss having a PA. I miss it already uh, but I miss, I miss having one for a, even just for academic. Um, I was planning to do, to get a lot more help from my PA over the summer… I was planning to like get my PA to help me print them out, file them away because that's a lot of like going from the printer, getting the folder, putting it in it's, it's a lot to, to do. And I was gonna, I was gonna get my PA to help me code. So I was planning to like sit beside her and I call out, "Okay*

> *it was on this date, it was this newspaper." And I will be right beside her so I can see what she's doing [laughs].” – time 2*

> *“a PA it's, it's different because you know, you know that's their job. And they're happy to do it and that's what they're, that's their job, they're there to you know, to help you with what you need. And you're my sister, and you care about me but you also have your own fulltime job. You're, you're building a house and you're you know, you have your own stuff going on.” – time 2*

Despite Aoidean finding things challenging without PA support, as described above, the wide availability and use of digital technologies such as zoom since the COVID-19 pandemic and move to online learning did offer some opportunities. The positive experiences Aoidean had with using digital technologies such as zoom resulted in her feeling more competent and capable about pursuing further education and employment in the future. The option of remote working/learning removed environmental barriers which may have previously existed, such as lack of accessible transport or PA supports, while also making further education or employment possible even if faced with a deterioration in her impairment. This increased Aoidean’s sense of value or self-worth as she felt she was now in a better position to achieve her goals and aspirations for the future.

> *“but even in terms of let's say, if I was invited to speak somewhere else down the country, or to collaborate or to travel abroad. Um, if I was invited to go somewhere and I was planning to go but something happened, or I just didn't feel comfortable travelling, um, or things fell through with my PA arrangements. That hey, I could, I could actually tune in virtually, and I can give just as good of a contribution, um, you know, through, through, through something like this [zoom].” – time 2*

> *“I'm hoping to go back, um, so it has given me some hope over what, what could be available…I suppose a PhD is four years and a lot can happen in four years. Um, I'm hoping things won't change too much but in, you know, just in terms of, four years is a very long time to hope that you will be the way you were and to be in, in good fittle like in good, in good shape and feeling okay. So just, just like my*

> *undergrad and just like my masters you know where I've been sick or gone through- Um, when I say sick I mean like just picking up, uh, like an infection or a cold or flu, but it physically affects me more and for a lot longer. Um, and just, just being, just being tired, just being fatigued and exhausted to know that if I want to stay with my family in, in Lucan, and my family in Lucan where it's more comfortable. And you know I have a little bit more help there. Um, when I'm not feeling the best that I can tune in [virtually].” – time 2*

Claiming disability

For Aoidean, claiming her disability as a part of who she is was not something she was comfortable with as a child but gradually embraced as she got older. At time 1, she noted that she claimed a disability identity but in some instances, was still apprehensive about challenging the negative opinions of others. However, at time 2, it was evident that Aoidean incorporated disability more strongly into her identity, demonstrating a determination to challenge and transform stigmatising, ableist attitudes to create better opportunities for herself and others with disabilities. This change in perspective was brought about by the possibility of remote working/learning during the COVID-19 pandemic, demonstrating to Aoidean that these practices can work in the employment and higher education sectors and should be made available for those with disabilities. Increasing accessibility and inclusion for the disabled community was important for her feeling valued as a disabled person.

When I first met Aoidean, she was a confident, self-assured young woman who embraced her disability as a part of who she is. However, this was not always the case and it took time for her to claim her disability and view it in this way. Aoidean noted when she was a child or young teenager she preferred not to use the term disabled. While she accepted that she had “additional needs” or a “mobility problem” she did not embrace a disability identity or view herself as disabled. At this point in her life, she was scared that her disability may be viewed as the defining feature of her identity by others which could undermine her sense of value, and as a result, she preferred to use different terminology to try distance herself from being categorised as disabled.

> *"You'd get people who, who know of you and maybe, know your family, but- and they know you've been in hospital and they, they know, they know everything about you, apparently. But not everything. And you kinda get these awkward questions like they mightn't have even said hello and they say, "How is your back?" And you're like, I don't know your name [laughs], you know. So I think, I think when I was younger, I wouldn't have said, I'm disabled or even have a disability. I think when I was younger, like a child or a young teenager, I'd say I have additional needs. Or I have a mobility problem. Or I have an issue with my mobility. Probably, would have used that language kind of for a long time." – time 1*

Aoidean noted that since starting in higher education, she was happy to claim her disability to access AT and avail of supports from the disability/AT officer or her lecturers. Her confidence in self-advocating was promoted through having to discuss her disability related needs from a young age with medical professionals. Her sister, who had experience dealing with students with disabilities, also played a key role in advising and encouraging Aoidean to seek out supports.

> *"Um, you know, you're, you're dealing with doctors and you're dealing with different teams and stuff so- And as well my, my sister was a, she was the principal of my secondary school and she would have been advising me kind of what, what to be doing as well." – time 1*

However, while Aoidean was happy to claim her disability in this respect, she didn't feel comfortable challenging negative opinions and fighting to reframe assumptions towards those with disabilities during her undergraduate degree. Claiming was done more out of personal gain than to transform the perceptions of others, as she found the latter to be too draining and exhausting. This was the case when her lecturer provided her with a physical copy of lecture notes, which drew attention to her in the class, rather than sending the slides over by email as requested.

> *"Maybe if, if things were a bit more smoothly, going a bit more smoothly at the time I might have contested it a bit more. But I thought, I've just sorted one big*

> *thing. And dealing with people and explaining yourself and if something like that doesn't go quite the way- So I would have thought he would have sent me the slides. It takes energy dealing with people and dealing with lecturers and explaining constantly."* – *time 1*

Claiming her disability and being open with others about her needs was also contextual within the classroom environment. Aoidean preferred to be more discreet about her use of certain AT in class, such as her iPhone to record lectures. In fact, she actively tried to conceal the fact she was recording lectures from fellow classmates due to earlier reactions during her undergraduate degree, such as classmates asking for recordings. Aoidean noted that this put her in an awkward situation, as she did not have permission to share recordings with others. She also felt that there was an expectation for her to share the recordings, as often disabled people depend on others for support or assistance. There was an underlying assumption that disabled people require society to be helpful and accommodating and thus they should be happy to offer assistance to others without question. This highlights the power differential at play between disabled and non-disabled students, with Aoidean feeling devalued as a disabled person in this situation. In response to these reactions, Aoidean started using her iPhone to record lectures, instead of the digital voice recorder, as it was more discreet and others were unaware that she was recording. This was an attempt by Aoidean to avoid future situations where her sense of value as a disabled person could be drawn into question. In this situation, Aoidean downplayed her disability rather than embracing it and challenging these negative opinions from others.

> *"I'm not sure is it a kind of an attitude maybe when people approach someone with a disability, sometimes that they might think that, 'Oh, they don't mind... sure it's there already. And you know, they'll understand because you know, they need people to be understanding.'"* – *time 1*

> *"If I could just put my phone on airplane mode and turn it over, um, that was, no one was going to ask me about that really."* – *time 1*

However, in other instances, Aoidean had no choice but to embrace her disability and AT. She used other visible AT in class, during her undergraduate degree, but noted that she was ok with this as it was essential at the time for comfort. Being comfortable was more important to her than fitting in and meeting able bodied norms.

> *"I didn't get my furniture until pretty much the second semester. And by then, my condition at the time had deteriorated quite a bit. I was in a lot of pain. So by the time that my furniture came, everyone was delighted. And, um, so I didn't- I suppose the, the furniture thing didn't bother me because it was, Well, if I don't have it, I mean, I am going to be in a bad way." – time 1*

Now as a Master's student, it was evident that Aoidean viewed her disability and AT as a valued part of her identity. She viewed her disability as a valuable asset, equipping her with the skills and confidence to navigate life. This helped Aoidean feel valued, having skills and abilities that her other non-disabled peers may not. Feeling fully comfortable with her disability and claiming it as a part of who she is was facilitated by contact with others with disabilities through a disability organisation on twitter and becoming more mature over time.

> *"I suppose but that's the thing about sometimes having a disability and having an alternative maybe way of growing up or lifestyle. Um, that you are equipped with… I've kind of had to get comfortable with talking and letting people know sometimes and sometimes that can be a bit- Sometimes you're feeling- more so let's say, with arranging events or something not that that's a bit more mature. But, um, you do grow with maybe better communication skills." – time 1*

> *"I think social media, and Twitter in particular has helped to, to speak, to speak more about it and getting to know the likes of, um, seeing what the likes of [disability organisation] are doing. They're like a disabled and feminist movement in Ireland and, uh, yeah, no. I do but I think that's something that comes with age and time and speaking to people." – time 1*

It was also clear that Aoidean now incorporated AT into her identity, embracing it as a part of who she is as a person. This contrasts with previously in her undergraduate degree where she opted for discretion where possible. Aoidean noted that early intervention was key to her embracing her AT as part of her identity at this point in her life.

> *"It's [AT] the extension of my arm… it's just my thing. It's just what I do. And it's my routine." – time 1*

> *"Um, but the assistive technology assessments, um, they got me on the touch-typing when I was about seven or eight and that was in conjunction with my school. And, uh, if I didn't, if I didn't have that when I was that age, I probably wouldn't be as comfortable and familiar with, with it all now." – time 1*

Claiming disability at this point, as she completed her masters, also went beyond her own personal acknowledgment and embracement of her disability. Claiming additionally served the purpose of advocating for those with disabilities more generally and educating others about disability related issues. Aoidean's enthusiasm for trying to improve things for those with disabilities and bring about positive change was key to her feeling valued.

> *"I'm very, um, concerned, uh, and passionate about access for all. I'm a big believer in it, obviously, and trying to help, sort of- I don't like to use- maybe "educate," but saying to even just my peers around me, about the people that I meet, you know, like did you notice that bar now had stairs up to that, or did you notice that the lighting was very low." – time 1*

At time 2, Aoidean was still happy to discuss her disability and AT needs to others. She openly told friends and family about her ergonomic keyboard, which she recently acquired, as it could also be beneficial to them. The only time Aoidean did have reservations about disclosing was if she could be asked to share something with others, such as notes or recordings, mirroring her perspective at time one.

> *"So I suppose I have been talking about it but in a more casual sense, um, that, talking about things. So talking about the Kindle, talking about the keyboard.*

> *Those are two things people can't come to me and look for. Do you know what I mean? No one can really ask me to borrow my keyboard [laughs] or whether, uh, whether you say specifically about typing notes or files. That when people hear like, "Oh, she's, she's notes and that, aw she's." Um, that's when people are more inclined to, to come to me or to, to bother me in the past." – time 2*

Aoidean also noted that she still embraced her disability and AT as a part of who she was as a person. She also still viewed AT as essential in enabling her to participate and engage on a day-to-day basis. One aspect that did change however was her willingness to fight for supports, if not received, and challenge negative perceptions of others. Unlike at time 1, claiming her disability now also served the purpose of transforming negative perceptions of others. Now she noted that she had become more "bold" and felt that the "ball is a bit more in [her] court." In particular, this related to having the option of remote learning and working moving forward. The ability of employers and higher education institutions to move all services online during the COVID-19 pandemic was what changed Aoidean's perspective around this. The pandemic showed that it was possible and Aoidean felt she could make a legitimate case for it moving forward. For Aoidean, feeling valued as a disabled person involved willingness to fight for her rights and need for accommodations to ensure greater accessibility for the disabled community in work and education in the future.

> *"And like I said, I think you will be very hard pressed to say, no, to a student who says, 'I am not able, or I can't go to class all the time.' And uh, kind of what are, what are you going to do about it, you know? I'm gonna pay my fees the same as everyone else. Um, what do you, what do you suggest? What do you, what are you gonna do for me?" – time 2*

> *"There's no excuses anymore. So, and I think for the people like myself, and as well other people like, maybe single parents, or people with young kids, or but in this case, people with disabilities. I think that can only be a good thing going forward, hopefully, if it's done right. And this is where communication, uh, is so important, and not to jump, not to just jump into something. To have a very um, collective, intersectional, uh, chat discussion on how do we do this right for*

> *people who come to us, and say they want to work from home, or they want to work." – time 2*

Aoidean also reflected back on the previous encounter with the lecturer that she described during the first interview. She noted that now, that she was older and more mature, she would not accept being treated in that way. Handing out physical slides to her in class just wasn't good enough when the accommodation she had asked for was to receive the lecture slides by email. She noted that the lecturer's behaviour did not take into account that she may be in pain on any given day and may not have been able to make it to the class. Aoidean was adamant that she would no longer accept being devalued or treated with any less respect than she deserved.

> *"I've learnt a lot about what, what's okay, what's not okay, and things about language and approaches and, um, the importance of, um, not being undermined, and not being, um, treated with any less, um, any less assistance or decency than you are entitled to. Uh, so if, if it was me going back to that nearly three years ago, I would've handled that very differently." – time 2*

Feeling like you belong

For Aoidean, feeling like she fit in and belonged in higher education was important for her sense of value. At both time 1 and 2, Aoidean felt isolated and struggled to feel like she belonged due to not having the opportunity to mix with other students with disabilities, which threatened her sense of value.

At the time of the first interview, Aoidean struggled to fit in and truly feel a part of the university environment as a SWD. She longed for more opportunities to meet and engage with other disabled students in her university. Aoidean felt that the formation of a disabled society or organisation, where students could come together and chat, would be hugely beneficial in relation to the sharing of advice but equally ensuring students didn't feel alone in their struggles. Being surrounded by others with disabilities who could truly empathise and understand with what she was going through would help Aoidean feel valued and more included in the university environment.

> *"it's so important in colleges by just getting people together and getting them talking and making you feel that you're not on your own. And you're not the only one struggling to sort out your PA hours or, you know, stuff like that because sometimes you feel like, oh, this is, this is me and but often you'll find that these challenges are very common, unfortunately." – time 1*

At time 2, Aoidean still didn't feel like she truly belonged as a disabled student in her university. She longed for that sense of community, and opportunity to meet and interact with other disabled students, noting that she would look into setting up a society or organisation herself. At the same time, Aoidean was mindful that this needed to be done in a sensitive manner so as not to create segregation. For Aoidean, there was a fine balance between feeling valued due to belonging to a disabled community in her university, where she was surrounded by others with similar challenges, but equally still feeling valued and accepted by the rest of the non-disabled student population.

> *"There should be far more, more informal, casual, open and friendly arrangements. That's carefully done in the sense that- you've to be very, you've to be very careful in that you're not creating segregation in that, that you're not- This, ok this is where the disabled students meet up. And this is what the, you know, you have to be very careful. Um, because I can see, I can see potentially that being cropping up. That students feel well this is where I'm invited to at a certain time and a certain place. But the hope would be if you set something up and it's done carefully and sensitively and it's done right. Um, that these students make connections and they go off and they make their own plans." – time 2*

Conclusion

This case history captures Aoidean's experience of identity changes and continuities over time across three emblematic themes; 1) Feeling autonomous and competent, 2) Claiming disability and 3) Feeling like you belong. Feeling valued was central to the way in which Aoidean negotiated her identity over time. For Aoidean, her sense of value was staked on feeling competent and capable as a student in her academic work, working towards positive change and equality for the disabled community and feeling like she fit in with others in higher education. Aoidean faced challenges through her higher education journey which threatened her sense of value, such as AT drawing unwanted attention to her in class, a lack of PA services to support her academic engagement and a lack of opportunities to mix with disabled students and feel like she belonged. Aoidean found no resolution to these challenges and adopted strategies such as downplaying her disability and support needs so she would be less of a burden on family members, reducing the visibility of her AT use in class when possible and considering setting up a disabled community herself in university in the future to maintain a sense of value and a positive sense of identity.

Aoidean's journey is one of empowerment. We see the transformation from a young woman who accepted ableist treatment from others, to a young woman who is determined to fight for equality and inclusion for herself and others with disabilities. Aoidean's journey highlights the importance of AT and digital technologies in viewing herself as a competent and capable student in her current and future academic endeavours, but also in facilitating greater inclusion of people with disabilities in the higher education and employment sectors. The impact of AT in Aoidean's disability identity is also evident when she carefully balanced the visibility of her devices with necessity, opting for discretion where possible in class to avoid negative, awkward encounters with others. Aoidean's case history highlights the pivotal impact of AT in student and disability identities but equally showcases how her experiences with remote learning, during the COVID-19 pandemic, has instilled a belief in Aoidean that these practices can and should be provided for those with disabilities moving forward. Aoidean is a change maker and is determined to improve prospects for those with disabilities in higher education and employment in the future.

Research Dissemination

Publications

McNicholl, A., Desmond, D., & Gallagher, P. (2020). Assistive technologies, educational engagement and psychosocial outcomes among students with disabilities in higher education. *Disability and Rehabilitation: Assistive Technology*, 1-9.

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