Feeling valued: The interplay of assistive technology and identity

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Feeling valued: The interplay of assistive technology and identity

Abstract

Purpose: The aim of this study was to explore the impact of AT in identity for students with disabilities in higher education and if/how this changes over time.

Methods: Using a longitudinal qualitative research design, semi-structured interviews were conducted with students with disabilities (n=13) in higher education in Ireland on two occasions during an academic year. A trajectory approach to longitudinal analysis was employed. This involved the use of matrices and identification of a through line for the study, which connects participant change over time.

Results: The through line identified was feeling valued, which was central in the negotiation of identity over time across three themes: feelings of autonomy and competence; claiming disability; and feeling like you belong as a student. AT impacted experiences across the three themes which subsequently promoted or undermined students' sense of value. Reciprocally, feeling valued influenced use and perceptions of AT. Factors specific to a higher education context were also identified which influenced meanings attached to AT over time.

Conclusion: Creating an environment where students feel valued is key in promoting use of and positive perceptions of AT. This should form an integral part of AT and disability policy in higher education.

Keywords: students with disabilities; assistive technology; identity; self-worth; inclusion; higher education; longitudinal

Introduction

Participation rates of students with disabilities in higher education have been rising steadily year on year across Europe, the UK and the USA [1-4]. However, these students are more at risk of experiencing academic, social and psychological difficulties in comparison to non-disabled peers [5-10]. This demonstrates the importance of providing students with disabilities in higher education institutions (HEIs) with appropriate supports to try alleviate or prevent the experience of such challenges. AT is one such support that can promote academic engagement, participation and inclusion, self-confidence and autonomy within a higher education context [11].

Policies, legislation and funding relevant to the higher education context in Ireland have been instrumental in promoting participation of students with disabilities in higher education over recent years and access to AT. 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 [12]. The introduction of the Equal Status Act [13] and the Disability Act [14] promote equal participation and prohibit discrimination. The Equal Status Act protects against the discrimination of students with disabilities in any educational establishment in terms of admission or access to courses or facilities and ensures that reasonable accommodations (e.g. assistive technology) are provided to anyone that needs it to progress through education [13]. The Disability Act states that all public buildings must be accessible, that students with disabilities are entitled to a needs assessment and must be provided with the resources to meet their educational needs [14]. 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 11% of overall expenditure invested in AT [15]. AT in higher education in Ireland is funded through the Fund for Students with

Disabilities, providing access to devices for students with a variety of impairments who are registered with the disability office in their institution.

Once AT is accessed, it is important to consider potential implications for identity. Identity has been described by Vignoles et al. as “the subjective concept of oneself as a person” [16, p. 309]. Previous research outside of the higher education context has highlighted that AT can increase the risk of stigmatisation [17-20] and threaten self-perceptions of normality [21, 22]. These identity concerns can negatively impact on device use and result in abandonment or avoidance [20, 23]. However, AT has also been shown to have a positive impact on identity allowing those with disabilities to demonstrate their capabilities to others [23, 24], and regain a sense of normality through enabling participation in valued activities [20, 25]. Some studies within higher education environments have noted that AT can be viewed as an identity threat, increasing the visibility of impairment and resulting in stigmatising reactions from others [26-29]. As a result, some students deliberately hide their AT from others to avoid stigmatisation and/or maintain a ‘normal’ identity [26, 29] and will forgo using AT so they can keep their disability hidden from others [28]. However, no study to date has explicitly explored the impact of AT in identity for students with disabilities in higher education.

Previous research outside the higher education context has also highlighted how the meanings attached to AT are open to change over time [22, 30-32]. 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 [22]. For others, they can reconceptualise their AT as a part of them rather than an indicator of difference over time [32]. 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 [30, 31]. 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 [19, 22]. 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 [22, 32]. However, no research to date within a higher education context has explored how or why meanings attached to AT change over time among students with disabilities.

Exploring the interplay between AT and identity in the higher education environment is particularly important. Students with disabilities are more likely to drop out of university, struggle with coursework and fail modules in comparison to non-disabled peers [3, 33, 34]. Factors such as stigma, accessibility issues and low economic status have been highlighted as contributing to low rates of persistence [35]. Given the wide-reaching benefits associated with participation and completion of a third level education such as greater employment prospects, civic engagement, life satisfaction and longer life expectancy [36, 37], it is imperative to harness aids and supports which can promote participation for students with disabilities such as AT. In order for students to maximise use and benefits associated with AT, person factors such as identity and the extent to which an individual feels embarrassed when using the device should be considered [38]. Thus, it is important to explore the impacts of AT on identity and factors specific to the higher education environment which can contribute to changing perceptions towards AT over time. Identification of such factors can 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 [1, 39], with some noting identity issues as the reason [39]. This study will also build on previous research within an Irish higher education context which has highlighted the importance of AT for promoting academic self-efficacy and well-being [40], greater access to the curriculum, higher quality of life and self-esteem [41], and the need to increase the availability of, and streamline processes for acquiring AT for students with disabilities [42, 43].

The current study aims to explore the impact of AT in identity for students with disabilities in higher education and if/how this changes over time. The specific objectives of the study were:

(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

Materials and Methods

Longitudinal qualitative research design

A longitudinal qualitative research (LQR) design was used to explore the impact of AT in identity for students with disabilities in higher education and if/how this changes over the course of an academic year. LQR is designed to capture and understand change and continuity through time using an in-depth qualitative lens [44, 45]. The foundational principles of LQR include duration, time and change [46]. Within LQR, time is built into the research process to focus on the experience of change, or stability over time; including causes and consequences [47]. Hence, LQR is driven by the desire to understand what change happens, why change occurs, and how participants experience and manage change over time [47, 48].

Participants

Students with disabilities who were 18 years or older, self-identified as having 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. 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" [49, 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" [50, p. 2229]. Data from 13 participants, across five HEIs in Ireland, who each took part in two interviews were analysed. Table 1 details participant and AT characteristics.

[insert table 1 here]

Procedure

Ethical approval was obtained from the Dublin City University Research Ethics Committee, Ref: DCUREC/2019_151. Participants were recruited through direct email facilitated through disability services and student organisations in HEIs, a Twitter and Facebook page dedicated to the study and social media shares by disability organisations.

Semi-structured interviews were conducted with students with disabilities at two time-points over the academic year, at the end of the first semester (November/December 2019), face to face or by telephone, and at the end of the second semester (May/June 2020) by telephone or zoom. In the intervening period, COVID-19 was declared a worldwide pandemic, meaning that at time 2, all students were engaged in online learning due to public health restrictions. Participants read a plain language statement and completed an informed consent form before each interview. Field notes were also taken before and after each interview, which detailed a summary of the interview and reflections, thoughts and feelings about the interview/participant. The first interview focused on thoughts and feelings about AT and how it impacted participants' views of I as a person with a disability and as a student. The second interview revisited these topics but was focused on change, how this was experienced and potential consequences of change. Interviews lasted approximately one hour, were recorded electronically using a Dictaphone and transcribed verbatim.

Data Analysis

Reflexive thematic analysis [51, 52], was used to capture an in-depth insight into experiences at each time point. The following six steps involved in thematic analysis 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 [53].

To forge a longitudinal account of change across cases over time, a trajectory approach to longitudinal analysis was employed [54]. This involved the use of matrices and Saldana's 16 questions to guide longitudinal analysis [46, 55]. The longitudinal analysis 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 [56]. A time ordered sequential matrix was created which captured change/continuity and the reasons why they were experienced for each of the emblematic themes (see Appendix 1) [55]. An overall summary matrix was then created which captured participant change/continuity from time 1 to time 2 across the three emblematic themes (Appendix 2). This allowed the identification of participants with similar trajectories of change/continuity within each theme [57], which was key for the subsequent write up. Saldana's framing, descriptive and interpretive questions [46] were used to identify change and continuity, the processes at play and a through line which connects and illuminates participant change through time.

Results

Feeling valued

The through line for this study is ‘feeling valued’; feeling valued was central to negotiating identity changes and continuities over time and 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, they experienced a need to re-establish a self-concept as 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 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. Personal, social and environmental factors influenced identity change and continuity within each of the aforementioned emblematic themes; AT was one such environmental factor. The conceptual model in figure 1 gives a visual representation of the through line, emblematic themes and key factors of influence in this LQR study.

[insert figure 1 here]

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. AT and PA supports were instrumental in supporting participants in these endeavours at time 1, bolstering personal feelings of competency, but also allowing students to demonstrate their abilities and proficiencies to others. This was central to participants feeling valued.

> *"…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*

In terms of trajectories from time 1 to time 2, some participants (n=4) experienced a loss of autonomy and feelings of competence, for others (n=4) feelings of autonomy and competence remained the same, while for others (n=5) this fluctuated, ebbing and flowing between increases and decreases in these domains.

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. For P008 and P006, they were rendered dependent on family members due to unavailability of appropriate supports such as a PA or a breakdown in AT. P003 was unable to use her AT effectively due to the inaccessibility of the online learning environment while P005's deterioration in her mental health undermined feelings of competency in relation to her academic engagement. 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 when you're like doing the college work." – P008, 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. P005 engaged in denial and avoidance, not wanting to admit to herself or others that her mental health had deteriorated.

Trajectory 2: Continuity in feelings of autonomy and competence

Continuing to feel autonomous and competent in relation to academic work was evident for four participants (P002, P009, P010, and P014) across time. Unlike some of the students above, they experienced little or 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. P009 and P010 highlighted the importance of ongoing access to AT in promoting confidence to participate in class.

> *“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*

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. P001, P011 and P012 experienced increases in feelings of competency and autonomy because of access to AT and digital technology, which promoted greater independence in the classroom or confidence in pursuing further study and employment. Digital technologies removed environmental barriers such as having to physically travel to the university campus or workplace for classes or meetings, which increased accessibility and made future educational and employment goals more achievable. For P004 and P013, AT was not the driving force in positive changes in feelings of autonomy and confidence. Instead, contact with others with disabilities in the classroom or greater familiarity with the academic environment were key factors. 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.

> *"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*

However, there were also times since the first interview, when these participants (P001, P004, P011, P012 and P013) experienced losses of autonomy and competence. Four participants (P001, P011, P012 and P013) felt disempowered and their value or self-worth was threatened due to being rendered incompetent. This was due to malfunctioning AT or lack of access to AT previously used on campus in their university, and the unavailability of PA supports, which in some instances resulted in participants relying on family members for support. These participants struggled with the lack of interdependency in these situations and were acutely aware of being a burden on loved ones.

> *"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 [58]. 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.

> *“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*

P004 differs from the some of the above participants 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 found support from his mother more efficient and effective when proofreading assignments. This highlights the importance of a person-centred approach to device assessment and selection to ensure it meets the individual’s needs, thereby reducing the risk of AT abandonment [38].

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 [59-61]. 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, AT was a central part of claiming disability and was strongly incorporated into their identity. It was used as a means of challenging stigmatising perceptions through demonstrating their capabilities or validating the legitimacy of their impairment. Others were happy to embrace their disability identity through being able to live the lives they wished, which AT facilitated.

> *"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*

Some participants were not entirely comfortable with their disability and claiming was dependent on the context or situation. Participants were happy to claim a disability identity in order to access supports in their institution, such as AT, as they recognised this was essential in being successful as a student. However, in 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, they were reluctant to claim a disability identity and instead engaged in 'passing' as non-disabled or downplayed their disability.

> *“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*

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.

Trajectory 1: More comfortable in claiming a disability identity

Two participants (P003 and P012) 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, they noted being less self-conscious and incorporating their disability more strongly into their identity at time 2. For P012, this was a result of positive experiences using digital technologies such as zoom, which increased her willingness to self-advocate and challenge those not offering remote learning/working opportunities. P003 used stickers to “add [her] own kind of stamp” to her hearing aids, taught children on placement about hearing difficulties and set up an Instagram page to outline her journey with her hearing impairment and AT since the first interview. The driving forces behind these changes for P003 were joining an AT community of hearing aid users and being in regular contact with individuals who had a shared sense of understanding of her experiences. In addition, her continued involvement as a disability ambassador in her university, where she spoke about her experiences with disability and AT, facilitated claiming a disability identity. These factors were key in viewing AT as a valued part of her identity.

Trajectory 2: Continuity in willingness to claim a disability identity

For other participants (P001, P004, P006, P008, P009, P010, P013 and P014), 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. 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*

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 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.

> *"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… 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*

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. 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.

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.

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, a mental health condition and visual impairment, respectively. 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. 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 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.

However, each of these participants also noted times when they were reluctant to claim their disability. Despite P002, P005 and P011 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. For P011, failure of others to recognise her impairment and need for accommodations illegitimised her disability experience. These participants' sense of value as a disabled person was constantly under threat which resulted in internalisation of these negative societal perceptions.

> *"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 [disability access scheme to higher education]. 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*

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 [62]. A social identity is described by Tajfel 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" [63, p. 255]. Participants felt valued when they fit in and felt they shared common bonds with others in the higher education environment.

While some participants felt like they fit in from the outset of their higher education journey, others noted that during their first year in higher education, AT disrupted their ability to fit in and highlighted them as different. 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 higher education institution which highlighted them as different. 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. However, these participants noted in the first interview that they gradually experienced increased feelings of belonging over time as they progressed through their higher education journey.

> *"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*

For others, their ability to fit in was an ongoing concern and they were self-conscious about feeling different or struggling to feel like they belonged as a student with a disability, during the first interview. For these participants, having a disability made it difficult to navigate an environment within which they were the minority.

> *"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*

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.

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, in the cases of P004 and P011, and increased familiarity with peers and lecturers over time in the cases of P009 and P013. For P011, getting to know other students with disabilities through an AT group increased feelings of belonging through the knowledge that she was not alone in her disability/AT related struggles and others could empathise with and understand her experiences. Involvement in this group was instrumental in her 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.

> *"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*

Trajectory 2: Continuity in feelings of belonging

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 students with disabilities, 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. For P008, continued access to a sports wheelchair was essential to her playing with the university-based soccer team. P010 noted the importance of non-disabled friends in his class in helping him fit in. For P006 and P003, feelings of belonging were promoted through involvement in ambassador roles within the university which remained constant. P003 also highlighted the importance of ongoing access to AT in promoting involvement in college clubs and societies.

> *"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*

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. For P005, social anxiety and a long commute prevented her from getting involved in extra-curricular college life, making friends and meeting new people. 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. These participants internalised negative societal perceptions of disabled people as deviant and longed for a space where they could feel accepted. For P012, she wished for a disabled community in her institution where her disability could be embraced and viewed as the norm, rather than feeling different from others.

> *"a sense of community and being a part of the community. I would say it's a shame… Um, there should be more opportunity to, to congregate and socialise and just have the craic [fun] 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*

Discussion

This study was the first to explicitly explore the impact of AT in identity over time for students with disabilities in higher education. Key findings include the identification of feeling valued as the driver in the negotiation of identity over time, the indirect impact of AT on feeling valued through its influence on feelings of autonomy and competence, claiming disability and feeling like you belong and the identification of factors specific to the higher education environment which facilitated the renegotiation of meanings attached to AT over time. This study highlights the importance of considering students with disabilities' sense of value to optimise AT use and promote a positive sense of identity.

Feeling valued: The driving force in the negotiation of identity

This study contributes to understanding the relationship between AT and identity change/continuity and highlights the central role of feeling valued in negotiating this. Feeling valued was 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 [64]. Previous research has found self-esteem to be an important motive in the construction of identity [16, 65-69]; however this is the first study to implicate this as an identity motive for students with disabilities in the higher education context. An identity motive has been described as something which influences the extent to which a person gravitates towards or away from certain identities [16]. It is crucial to understand the motive behind the experience of identity change/continuity over time for students with disabilities 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 [16].

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 [70]. 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 [70-72], with academic competency and approval from others, among other domains, recognised as important for the self-worth of college students [72]. Within the current study, students valued being viewed as competent and capable students but also regarded approval from others as important for their self-worth. AT had a significant influence on feelings of self-worth in each of these domains.

The impact of AT in student and disability identities

AT impacted 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 students with disabilities [41, 73], 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 enabling participants 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.

AT also played a critical role in the performance of identities. Social identity performance refers to the deliberate expression or suppression of actions, behaviours, signs or symbols that are typically associated with a social identity [74]. Students actively manipulated AT as a means of dealing with stigma and protecting their sense of value. This may have been for the purpose of identity consolidation, which secures their status as members of a particular social group [74], or highlight the influence of contingencies of self-worth on device use/non-use. Students may have refrained from using AT or actively tried to reduce its visibility in order to consolidate the identity of a ‘normal student’; similar strategies such as concealment, non-use and refraining from accessing AT in the first instance have been highlighted in the literature [26, 28]. Viewing the deliberate manipulation of AT employed by participants through the lens of contingencies of self-worth offers a novel way of considering device use/acceptance. From the perspective of contingencies self-worth, a person can experience fluctuations in self-worth depending on successes or failures in domains deemed as important to the self and people are motivated to harness situations and circumstances which satisfy these domains [70]. AT has the potential to satisfy contingencies of self-worth, such as academic competence, through enabling students to complete academic tasks more easily and improving academic performance. Equally, AT can result in setbacks of failures in important domains, such as approval from others, through highlighting students as different and increasing the risk of stigmatisation. Thus, participants may have chosen not to use AT or tried to reduce its visibility to mitigate against device use adversely affecting their self-worth. Future research should explicitly explore the role of contingencies of self-worth in device use/acceptance.

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. Factors specific to the higher education context such as involvement in disability ambassador roles and membership to an AT community in their university, 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. These context specific factors add to other research outside of higher education which highlight the importance of a deterioration in impairment, embracement of a disability identity and early intervention as pivotal in changing perceptions towards device use [22, 32]. These findings highlight specific actions which HEIs can take to promote positive perceptions towards AT, such as creating opportunities and spaces for students with disabilities to advocate and openly speak with others with and without disabilities about their impairment and device use.

Findings also contribute to our understanding of why students may have experienced changing perceptions towards AT. It was clear that over time 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. 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 [75]. 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 all 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 authors’ knowledge, which implicates contingencies of self-worth in influencing changing perceptions towards AT over time and device use/non-use.

Strengths and limitations

One of the key strengths of the study is in the LQR design employed. Through implementing a LQR design, this study has highlighted 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 students with disabilities in higher education. This is also the first study to explore the impact of AT in the identity of students with disabilities over time. It has identified feeling valued as the driver in the negotiation of identity, the impact of AT in feeling valued and vice versa, 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. Identifying feeling valued as a driver in the negotiation of identity and the ways in which AT impacts on this has significant implications for disability and AT policy within higher education. It points to the importance of HEIs creating an environment where students feel valued to promote a positive sense of identity and reduce the risk of identity conflicts. This could include: 1) promoting feelings of autonomy and competence through providing flexible PA and AT services to support students; 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 4) the creation of AT and disabled communities to increase feelings of belonging among students with disabilities through sharing mutual experiences related to disability with others. With regards to AT policy, this study has highlighted ways in which stigma associated with AT use can undermine students’ sense of value. There are a number of initiatives that HEIs could implement to address stigma and AT use: 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) ‘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 normalized; and 4) 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.

There are also some limitations to this study which must be considered. Firstly, this study collected data from an Irish higher education context only. AT policies and procedures and academic structures may differ across higher education contexts in other countries which could impact on students’ identity experiences. Secondly, information regarding the history of AT use was not collected. Future research should examine if students were using AT prior to entering higher education, and for long, to explore the role of history of AT use on identity. Thirdly, all of the participants were using some form of AT and were registered with the disability office in their HEI. 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. Future research could also explore the impact of AT on identity throughout an academic programme, from first year to final year. This could highlight specific events or turning points important in the relationship between AT and identity which may not have been captured in the current study.

Conclusion

In conclusion, this study highlights the importance of creating an environment where students with disabilities feel valued to promote a positive sense of identity among this population and reduce the risk of identity issues. This should form an integral part of AT and disability policy in higher education to ensure that students feel comfortable using their AT and can harness any associated benefits.

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No potential conflict of interest was reported by the authors.

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References

[1] Association for Higher Education Access and Disability (AHEAD). Students with disabilities engaged in support services in higher education in Ireland 2020/21. Dublin: AHEAD Educational Press; 2022.

[2] Hauschildt K, Gwosć C, Netz N, et al. Social and economic conditions of student life in Europe: Synopsis of indicators eurostudent 2012-2015. Bielefeld: W. Bertelsmann Verlag GmbH & Co. KG; 2015.

[3] Hubble S, Bolton P. Support for disabled students in higher education in England. London: House of Commons Library; 2021. (Briefing paper; no. 8716).

[4] National Center for Education Statistics. Digest of education statistics 2020. Washington, DC: U.S. Department of Education; 2022.

[5] Barnard-Brak L, Lechtenberger D, Lan WY. Accommodation strategies of college students with disabilities. Qual Rep. 2010;15(2):411–429.

[6] Herts KL, Wallis E, Maslow G. College freshmen with chronic illness: a comparison with healthy first-year students. J Coll Stud Dev. 2014;55(5):475-480.

[7] Mamiseishvili K, Koch LC. First-to-Second-Year Persistence of Students With Disabilities in Postsecondary Institutions in the United States. Rehabil Couns Bull. 2011;54(2):93–105.

[8] Mullins L, Preyde M. The lived experience of students with an invisible disability at a Canadian university. Disabil Soc. 2013;28(2):147-160.

[9] Mullins AJ, Gamwell KL, Sharkey CM, et al. Illness uncertainty and illness intrusiveness as predictors of depressive and anxious symptomology in college students with chronic illnesses. J Am Coll Health. 2017;65(5):352-360.

[10] Sachs D, Schreuer N. Inclusion of Students with Disabilities in Higher Education: performance and Participation in Student’s Experiences. Disabil Stud Q. 2011;31(2).

[11] McNicholl A, Casey H, Desmond D, et al. The impact of assistive technology use for students with disabilities in higher education: a systematic review. Disabil Rehabil: Assist Technol. 2021;16(2):130-143.

[12] Higher Education Authority. Higher education authority 2018-2022 strategic plan. Dublin: Higher Education Authority; 2018.

[13] Equal Status Act. Dublin: Government of Ireland; 2000. Pub. L. No. 8.

[14] Disability Act. Dublin: Government of Ireland; 2005. Pub. L. No. 14.

[15] Higher Education Authority. Review of the fund for students with disabilities. Dublin: Higher Education Authority; 2017.

[16] Vignoles VL, Regalia C, Manzi C, et al. Beyond self-esteem: Influence of multiple motives on identity construction. J Personal Soc Psychol. 2006;90(2):308-333.

[17] Carneiro L, Rebelo F, Filgueiras E, et al. Usability and user experience of technical aids for people with disabilities? A preliminary study with a wheelchair. Proced Manuf. 2015;3:6068–6074.

[18] Ellington T, Lim S. Adolescents’ aesthetic and functional view of hearing aids or cochlear implants and their relationship to self-esteem levels. Fash Pract. 2013;5(1):59–80.

[19] Hersh MA. Deafblind people, stigma and the use of communication and mobility assistive devices. Technol Disabil. 2013;25(4):245–261.

[20] Lund ML, Nygård L. Incorporating or resisting assistive devices: Different approaches to achieving a desired occupational self-image. OTJR: Occup, Particip Health. 2003;23(2):67–75.

[21] Kent B, Smith S. They only see it when the sun shines in my ears: Exploring perceptions of adolescent hearing aid users. J Deaf Stud Deaf Educat. 2006;11(4):461–476.

[22] Pape TL, Kim J, Weiner B. The shaping of individual meanings assigned to assistive technology: A review of personal factors. Disabil Rehabil. 2002;24(1–3):5–20.

[23] Shinohara K, Wobbrock JO. Self-conscious or self-confident? A diary study conceptualizing the social accessibility of assistive technology. ACM Trans Access Comput. 2016;8(2):1–31.

[24] Shinohara K, Wobbrock JO. In the shadow of misperception: Assistive technology use and social interactions. Proceedings of the SIGCHI Conference on Human Factors in Computing Systems; 2011 May 7-12; Vancouver BC. Canada: Association for Computing Machinery; 2011. P. 705–714.

[25] Folan A, Barclay L, Cooper C, et al. Exploring the experience of clients with tetraplegia utilizing assistive technology for computer access. Disabil Rehabil: Assist Technol. 2015;10(1):46–52.

[26] Bell D, Carl A, Swart E. Students with hearing impairment at a South African university: Self-identity and disclosure. Afr J Disabil. 2016;5(1):1–9.

[27] Goode J. ‘Managing’ disability: Early experiences of university students with disabilities. Disabil Soc. 2007;22(1):35–48.

[28] Kendall L. Higher education and disability: Exploring student experiences. Cogent Educat. 2016;3(1):1-12.

[29] Thompson-Ebanks V, Jarman M. Undergraduate students with nonapparent disabilities identify factors that contribute to disclosure decisions. Int J Disabil, Dev Educat. 2018;65(3):286–303.

[30] Gibson BE, Carnevale FA, King G. “This is my way”: Reimagining disability, in/dependence and interconnectedness of persons and assistive technologies. Disabil Rehabil. 2012;34(22):1894–1899.

[31] Kirk S. How children and young people construct and negotiate living with medical technology. Soc Sci Med. 2010;71(10):1796–1803.

[32] McDonald CL, Bennett CL, Rosner DK, et al. Perceptions of ability among adults with upper limb absence: Impacts of learning, identity, and community. Disabil Rehabil. 2020;42(23):3306–3315.

[33] OECD. Inclusion of students with disabilities in tertiary education and employment. Paris: OECD Publishing; 2011.

[34] Foreman P, Dempsey I, Robinson G, et al. Characteristics, academic and post-university outcomes of students with a disability at the University of Newcastle. High Educat Res Dev. 2001;20(3), 313–325.

[35] Quinn, J. Drop-out and completion in higher education in Europe among students from under-represented groups. Brussels: European Commission; 2013.

[36] Department for Business, Innovation and Skills. (2013). The benefits of higher education participation for individuals and society: Key findings and reports “The Quadrants”. London: Department for Business, Innovation and Skills; 2013. (BIS publication; no. 146).

[37] Central Statistics Office, Higher Education Authority. Higher education outcomes graduation years 2010-2014: Analysing graduate destinations and earnings using administrative data. Dublin: Central Statistics Office; 2018.

[38] Scherer MJ. Living in the state of stuck: How assistive technology impacts the lives of people with disabilities. 4th ed. Cambridge (MA): Brookline Books; 2005.

[39] Lightner KL, Kipps-Vaughan D, Schulte T, et al. Reasons university students with a learning disability wait to seek disability services. J Postsecond Educat Disabil. 2012;25(2):145–159.

[40] McNicholl A, Desmond D, Gallagher P. Assistive technologies, educational engagement and psychosocial outcomes among students with disabilities in higher education. Disabil Rehabil: Assist Technol. 2023;18(1):50-58.

[41] Craddock G. The AT continuum in education: Novice to power user. Disabil Rehabil: Assist Technol. 2006;1(1–2):17–27.

[42] Shevlin M, Kenny M, McNeela E. Participation in higher education for students with disabilities: An Irish perspective. Disabil Soc. 2004;19(1):15-30.

[43] Zorec K, Desmond D, Boland T, et al. A whole-campus approach to technology and inclusion of students with disabilities in higher education in Ireland. Disabil Soc. 2022 [cited 2023 Sept 12]; [27 p.]. DOI: 10.1080/09687599.

[44] Neale B. Qualitative Longitudinal Research: Research Methods. New York (NY): Bloomsbury Publishing; 2020.

[45] Tuthill EL, Maltby AE, DiClemente K, et al. Longitudinal qualitative methods in health behavior and nursing research: Assumptions, design, analysis and lessons learned. Int J Qual Methods. 2020;19:1-21.

[46] Saldaña J. Longitudinal qualitative research: Analyzing change through time. Walnut Creek (CA): Altamira Press; 2003.

[47] Calman L, Brunton L, Molassiotis A. Developing longitudinal qualitative designs: Lessons learned and recommendations for health services research. BMC Med Res Methodol. 2013;13(1):1–10.

[48] Carduff, E., Murray, S. A., & Kendall, M. Methodological developments in qualitative longitudinal research: The advantages and challenges of regular telephone contact with participants in a qualitative longitudinal interview study. BMC Res Notes. 2015;8(1):1–10.

[49] Leonardi M, Bickenbach J, Ustun TB, et al. The definition of disability: What is in a name? Lancet. 2006;368(9543):1219–1221.

[50] Khasnabis C, Mirza Z, MacLachlan M. Opening the GATE to inclusion for people with disabilities. Lancet. 2015;386(10010):2229–2230.

[51] Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3(2):77–101.

[52] Braun V, Clarke V. One size fits all? What counts as quality practice in (reflexive) thematic analysis? Qual Res Psychol. 2021;18(3):328-352.

[53] Terry G, Hayfield N, Clarke V, et al. Thematic analysis. In: Willig C, Stainton Rogers W, editors. The SAGE handbook of qualitative research in psychology. London, UK: SAGE Publications Ltd; 2017. P. 17-37.

[54] Grossoehme D, Lipstein E. Analyzing longitudinal qualitative data: The application of trajectory and recurrent cross-sectional approaches. BMC Res Notes. 2016;9(1):1–5.

[55] Miles MB, Huberman AM, Saldaña J. Qualitative data analysis: A methods sourcebook. 3rd ed. Thousand Oaks (CA): SAGE; 2014.

[56] Neale, B. The Craft of Qualitative Longitudinal Research: The Craft of Researching Lives Through Time. London, UK: SAGE; 2021.

[57] Kneck Å, Audulv Å. Analyzing variations in changes over time: Development of the Pattern-Oriented Longitudinal Analysis approach. Nurs Inq. 2019;26(3):1-8.

[58] Branscombe NR, Ellemers N. Coping with group-based discrimination: Individualistic versus group-level strategies. In: Swim JK, Stangor C, editors. Prejudice: The target’s perspective. San Diego (CA): Elsevier; 1998. p. 243-266.

[59] Dunn DS, Andrews EE. Person-first and identity-first language: Developing psychologists’ cultural competence using disability language. Am Psychol. 2015;70(3):255-264.

[60] Lyons BJ, Martinez LR, Ruggs EN, et al. To say or not to say: Different strategies of acknowledging a visible disability. J Manag. 2018;44(5):1980–2007.

[61] Putnam M. Conceptualizing disability: Developing a framework for political disability identity. J Disabil Policy Stud. 2005;16(3):188–198.

[62] Cameron JE. A three-factor model of social identity. Self Identity. 2004;3(3):239–262.

[63] Tajfel H. Human groups and social categories: Studies in social psychology. New York (NY): Cambridge University Press; 1981.

[64] Stets JE, Burke PJ. Self-esteem and identities. Sociol Perspect. 2014;57(4):409–433.

[65] Abrams D, Hogg MA. Comments on the motivational status of self-esteem in social identity and intergroup discrimination. Eur J Soc Psychol. 1988;18(4):317–334.

[66] Beach SR, Tesser A. Self-esteem and the extended self-evaluation maintenance model. In: Kernis MH, editor. Efficacy, agency, and self-esteem. New York (NY): Springer; 1995. p. 145-170.

[67] Greenberg J, Solomon S, Pyszczynski T. Terror management theory of self-esteem and cultural worldviews: Empirical assessments and conceptual refinements.

In: Zanna MP, editor. Advances in experimental social psychology. San Diego (CA): Academic Press; 1997. p. 61-139.

[68] Leary MR, Baumeister RF. The nature and function of self-esteem: Sociometer theory. In: Zanna MP, editor. Advances in experimental social psychology. San Diego (CA): Academic Press; 2000. p. 1-62.

[69] Steele CM. The psychology of self-affirmation: Sustaining the integrity of the self. In: Berkowitz L, editor. Advances in experimental social psychology. San Diego (CA); Academic Press; 1988. p. 261-302.

[70] Crocker J, Wolfe CT. Contingencies of self-worth. Psychol Rev. 2001;108(3):593-623.

[71] Blankenship BT, Stewart AJ. Intersectional identities, identity dimensions, and academic contingencies of self-worth. Identity. 2017;17(3):109–124.

[72] Crocker J, Luhtanen RK, Cooper ML, et al. Contingencies of self-worth in college students: Theory and measurement. J Personal Soc Psychol. 2003;85(5):894-908.

[73] Schock RE, Lee EA. Children’s voices: Perspectives on using assistive technology. Except Educat Int. 2016;26(1):76–94.

[74] Klein O, Spears R, Reicher S. Social Identity Performance: Extending the Strategic Side of SIDE. Personal Soc Psychol Rev. 2007;11(1):28–45.

[75] Crocker J, Park LE. Seeking self-esteem: Construction, maintenance, and protection of self-worth. In: Leary MR, Tangney JP, editors. Handbook of self and identity. New York (NY): The Guilford Press; 2003. p. 291-313.

Appendix 1

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.

Appendix 2

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.

Tables

Table 1. Sociodemographic and AT characteristics for participants

Participant number	Age	Gender	Disability Type	AT used / AT needs (met vs unmet)	Programme of study and Year
P001	58	Female	Physical disability, significant ongoing illness	Educational AT / unmet needs	UG Year 1
P002	41	Female	Visual impairment	Educational AT / unmet needs	UG Year 2
P003	21	Female	Hearing impairment	Aids to hearing, educational AT / met needs	UG Year 4
P004	22	Male	Specific learning difficulty, speech & language disability, significant ongoing illness	Educational AT / unmet needs	UG Year 3
P005	20	Female	Mental health condition	Educational AT / met needs	UG Year 2
P006	21	Female	Dyspraxia, specific learning difficulty	Educational AT / met needs	UG Year 3
P007[a]	19	Male	Dyspraxia, specific learning difficulty	Educational AT / met needs	UG Year 1
P008	22	Female	Physical disability	Educational AT, mobility aids / met needs	UG Year 4
P009	37	Female	Specific learning difficulty, mental health condition, significant ongoing illness	Educational AT / met needs	UG Year 1
P010	21	Male	Visual impairment	Educational AT, visual aids / met needs	UG Year 2
P011	38	Female	Visual impairment	Educational AT, visual aids, mobility aids / unmet needs	PG Year 1

Participant number	Age	Gender	Disability Type	AT used / AT needs (met vs unmet)	Programme of study and Year
P012	22	Female	Physical disability	Educational AT, other / unmet needs	PG Year 1
P013	21	Female	Physical disability, visual impairment	Educational AT, visual aids / met needs	UG Year 1
P014	42	Male	Autism Spectrum Disorder	Educational AT / met needs	UG Year 1

Note. UG= undergraduate; PG= postgraduate

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

Figures

Figure 1 Caption: Conceptual model of the negotiation of identity change/continuity over time across the three emblematic themes

Figure 1 alt text: depicts the interrelationships between the through line, emblematic themes and factors of influence in the negotiation of identity

Figure 1 long description: Depicts a blue box at the top with the text feeling valued, the through line for the study. A bidirectional arrow is underneath this which connects to three orange boxes across the middle. One box contains the text feeling autonomous and competent, another claiming disability and the other feeling like you belong. These are the three emblematic themes. Underneath the orange boxes are three green boxes depicting factors of influence. One contains the text personal factors, another social factors and the other environmental factors. Arrows from these boxes are directed upwards onto the three emblematic themes.