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Journal Item

How to cite:

Seale, Jane (2019). Wilderness and resistance: Illuminating the digital inequalities experienced by adults with learning disabilities between 1970 and 1999. *Disability & Society*, 34(9-10) pp. 1481–1503.

For guidance on citations see [FAQs](#).

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Version: Accepted Manuscript

Link(s) to article on publisher's website:

<http://dx.doi.org/doi:10.1080/09687599.2019.1576504>

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Wilderness and resistance: Illuminating the digital inequalities experienced by adults with learning disabilities between 1970 and 1999

Abstract

The focus of this paper is how special needs technology in the UK was developed and used for and by adults with learning disabilities between 1970 and 1999. 52 experienced practitioners were interviewed about their memories of the period. Analysis of their experiences reveal a number of digital inequalities; how the practitioners working to support the technology use of adults with learning disabilities experienced these inequalities as a vacuum of support and what attempt they made to redress the balance. These findings suggest that new technologies currently being developed are unlikely to reduce digital inequalities for adults with learning disabilities without significant shifts in our understanding about what contributes to such inequalities and the role that practitioners can play in resisting such inequalities.

Introduction

The focus of this paper is the practice of those who worked in the field of special needs technology in the UK between 1970 and 1999. In particular it will examine whether and how those who worked with adults with learning disabilities perceived an inequality with regards to how their use of special needs technology was supported compared to practitioners working with children.

With respect to 'adulthood', in the context of this paper, it is understood as beginning on departure from compulsory education, recognising that some people with learning disabilities leave school between the ages of 18 and 25. People with learning disabilities share with other disabled people barriers as to how they are perceived and treated, but they also experience difficulties which include and go beyond difficulties with communication, literacy, information processing and memory (Nind & Seale, 2009). The environment, which includes technology, can also play a role in enabling or disabling a person with learning disabilities (Seale, Nind & Simmons, 2013).

For the purposes of this paper special needs technology is defined as any general or specialist micro-computing related technology that is used for or by disabled people. 1970 has been chosen as a starting milestone as it was a period when aids for disabled people were being developed to enable control and communication and the community was excited about what they perceived as the great potential of technologies to revolutionise the lives of disabled people began to emerge (Seale, 1998a). Early examples of technologies include the Patient Operated Selector Mechanism (Copeland, 1974) and RM machines (e.g. Glen, 1981). The 1980's is marked by the domination of the BBC Microcomputers, which spawned the development of a generation of BBC compatible software and specialist technologies such as switches, concept keyboards and communication aids (Blenkhorn,

1986; Southgate, 1985; Glen, 1981). The 1990's marked a period when technologies were moving towards mobile devices, virtual reality, and Internet use (Cromby *et al.* 1996; Hegarty, 1998; Renblad, 1999).

Technology and practice developments meant that 1970- 1999 was a period of great hope. Many stakeholders believed that technology had great potential to positively transform the lives of disabled people. Despite this, there is evidence to indicate that there is long-standing digital divide in that people with learning disabilities are not able to access and use technologies to the same degree as non-disabled people. The heralded emancipation has not happened for them. The overarching aim of this paper is to try and understand why the predictions of the past have not come to fruition. In particular it will explore whether an examination of past practice might reveal whether and how such inequalities were resisted. The particular research questions this paper will address are:

1. Between 1970 and 1999 what digital inequalities existed for adults with learning disabilities? (RQ1)
2. How did practitioners experience these digital inequalities and what examples are there of practitioners attempting to address these digital inequalities? (RQ2)

Why is it important to examine special needs technology practice?

Seale (1998a) observed that there was a powerful narrative that special needs technology had great potential to emancipate disabled people. Despite this narrative, there is actually little evidence that the digital divide between disabled people, particularly those with learning disabilities, and non-disabled people is reducing (Seale, 2009; Alper & Goggin, 2017). Technology is not reducing difference or inequality in the way it was claimed it would. (Carey *et al.* 2005; Gutiérrez & Martorell, 2011; Moisey & van de Keere (2007 p.78) argued that as the use of technologies increases within the general population 'This digital disadvantage will continue to grow as the mainstream population increases its use of ICT and people with developmental disabilities do not'. In 2018, the same concerns were being expressed by Lussier-Desrober *et al.* who reported how people with learning disabilities lacked access to technologies in their daily lives which was affecting their social inclusion.

It is important to acknowledge that there are a number of challenges to interpreting claims of digital divide for people with learning disabilities. For example, the digital divide discourse tends to be dominated by a focus on access to the Internet and mobile technologies, rather than more varied technologies such as special needs technologies. Secondly, digital divide surveys either do not capture data on disabled peoples' technology experiences or do not distinguish between different kinds of disabilities such as physical disabilities and learning disabilities (Chadwick *et al.* 2013). Finally, conceptualisations of the digital divide are focused largely on access and accessibility, rather than whether technology can be used in personally meaningful ways once it is accessed (Seale, 2009). Despite these issues I would argue that it would be unwise to dismiss the existence of digital inequalities for people with learning disabilities since there is strong evidence to suggest that they experience many of

the factors that are linked to digital exclusion such as socio-economic deprivation and fewer employment and educational opportunities (Department of Health, 2001; Emerson *et al.* 2005, Emerson & Hatton, 2009).

In pointing to the digital divide as a reason for examining special needs technology practice I am not necessarily subscribing to the view that accessing technology is the most important objective in life for adults with learning disabilities or that technology by itself reduces inequalities. Rather, I contend that it is important to examine any inequalities that exist and that may serve to deny opportunities to adults with learning disabilities that others take for granted; of which digital inequality is just one.

What is the value of an historical examination of special needs technology practice?

Although not writing in the context of disability or special education, Light (2001, 726) argued that a historical examination of the different ways in which the problem of access to technology have been constructed was needed in order to understand the failure of technologies to reduce the digital divide. Light stated: 'A goal for educators should be to reduce the chance that future scholars will look at current efforts to close the digital divide and ask, with the benefit of their historical distance, how could they possibly have thought that?' Adapting Light's question to the field of learning disabilities, the overarching aim of this paper is to explore whether an examination of past practice might help explain why adults with learning disabilities are still experiencing digital inequalities.

To date there has been no in-depth, systematic examination of practice in the field technology and adults with learning disabilities that spans the time period between 1970 and 1999. The very small number of publications that do exist have just examined practice from a singular viewpoint (e.g. formal of evaluations of a single organisation's performance or informal reflections on personal practice) and for a small time-frame of two to five years (Hegarty & Aspinall, 2006; Seale, 1998b; Wain 1991; Beaumont, 1993a,b,c; Keeves, 1994). These limited organisational and personal accounts of practice between 1970 and 1999 reveal some interesting issues regarding a lack of funding and support, but they do not offer any evidential breadth or depth. The study reported here will make an original contribution to knowledge by undertaking an examination of technology use in the field of adults with learning disabilities that covers a period of thirty years (1970-1999) and draws on the memories and experience of a large group of practitioners who represent a range of different stakeholders.

A personal perspective on the special needs technology field

My personal interest in special needs technology and learning disability stems from my practice in the field as a researcher, consultant and a social services employee over the past thirty years. I began researching the use of microcomputers in 1986, when in my undergraduate psychology dissertation, I observed how adults with learning disabilities performed computer-based tasks and compared this to 'equivalent' non-computerised tasks

(Galuschka, 1987). Interestingly, my results revealed no significant difference between the two tasks in terms of the 'on-task' behaviour of the adults with learning disabilities. However, it was only later in my career that I began to question, like Winner (2009: 588), why, despite a plethora of studies that continued to find no significant difference did much of the community continue to insist that technology had great potential for people with learning disabilities; suggesting 'a willingness to forget the results of earlier experiments and to forge ahead as if today's innovations were totally unprecedented'.

In 1987 I joined the Computer Applications to Special Education (C.A.S.E) research unit at the University of Keele to undertake a PhD examining how microcomputers were introduced into adult training centres (Seale, 1993, 1998b). As part of my work within C.A.S.E I also ran training courses and visited hospitals and social services day centres to support staff in assessing whether and how adults with learning disabilities would benefit from using microcomputer technology. In 1991 I was employed as a Day Centre Officer by Telford Social Services to work with staff and 'service users' to support their use of microcomputers. As a practitioner, I experienced how factors such as social processes (e.g. training, support networks); cultural practices (e.g. differences between education, health and social services) and attitudes (e.g. regarding learning disability and/or technology) influenced whether or not adults with learning disabilities were afforded the opportunity to access and use micro-technologies.

As a practitioner I also saw how motivated many (though not all) adults with learning disabilities were to use computers. For some, this motivation derived from being able to use the same technology that was valued and used by their peers and family. Microcomputers served a symbolic function- offering an opportunity for adults with learning disabilities to make a statement about who they were and how they would like to be seen (Blume, 2012). I did not expect or witness any 'miracle-cures', however I did notice the subtle changes in behaviour or demeanour that I assumed to mean that the person with learning disabilities was deriving some benefit. Alongside this I experienced times when adults with learning disabilities positively rejected technologies and showed no interest at all.

Special Needs Technology Policy 1970-1999

The policy context in which I practised was one in which the services which could potentially support the use of technology by adults with learning disabilities were under-resourced compared to children's services. Unlike the primary and secondary sector, there was no national programme (e.g. the Microelectronics Programme, see Fowler 1991) co-ordinating the use of technologies across the post-compulsory sectors. In Further Education, some colleges did collaborate to form a national network that could share experiences and provide a more cohesive technology assessment and provision service. In 1986, initially supported with a government grant which provided a pool of equipment, this became the National Federation of Access Centres (See Vincent, 1989). This funding was short-lived, however, and the Centres eventually had to provide and fund their own equipment. It has to be noted however, that adults with learning disabilities are a minority group within both

specialist and mainstream colleges. In terms of financial support for people with learning disabilities who were not at school or college, the picture was of a 'vacuum' of support. When they left school or college, they became the responsibility of either Social Services or the Department of Health, neither of which invested in a national infrastructure of support in the way that education had. Some computer initiatives did exist, but they were rarely sustained over a long period of time (See for example, Horsefield, 1987 and Clay et al. 1988).

Dominant practices within the Special Needs Technology field 1970-1999

When I entered the field in the 1980's there were two main trends that dominated practice. The first trend, inherited from the 60's and 70's was that of using technology to deliver 'drill and practice' type programs designed to teach 'basic skills' such as matching; memory; counting and numbers; logic and mazes; money; spelling and time (Horsefield, 1987; Jotham & Leicester, 1988). The second trend, particularly in the UK, saw health and social services begin working towards closing down large, segregated institutions and supporting the residents to integrate into local communities and live in smaller, supported living or 'group homes'. Microcomputers were introduced into the institutions as part of a drive to use social and living skills 'programs' to teach the residents the social and life skills they would need when they began living more independently (Wain, 1991). Microcomputers were also introduced into social service day centres and similar third sector organisations in order to continue to develop the social, life and literacy skills of people with learning disabilities who were now living in the community (Clay *et al.* 1988).

Competing discourses within the Special Needs Technology field 1970-1999

As a practitioner in the field in the 80's and 90's I quickly became aware of a dominating discourse reflecting a form of technological determinism (Roulstone, 2016) that heralded technology as an innovatory prostheses (Foulds, 1982; Chapman, 1982; Cain, 1984) which provided an emancipatory breakthrough for disabled people (Southgate, 1985; Sebba, 1988; Day, 1995).

For pupils with significant physical and sensory impairments, IT can provide physical access to the curriculum. This is technology at its most dramatic, liberating the pupil from the physical barriers to learning...For these pupils, the technology provides independent access to a world of communication and learning that has been closed until now. (Day, 1995, 4)

The power of this optimistic narrative produced a range of responses from the special needs and technology community. Firstly, there was a tendency to over-focus on the technological wizardry of the new products being developed to the detriment of disabled people and the practitioners who supported them in using the technology. Secondly, there was a tendency to expect too much from the technology. Hopes of a prosthesis turned into hopes for a panacea (Seale, 1998a; Roulstone 2016). Therefore, whilst the community appeared to

agree that technology had great potential, there were disagreements and tensions regarding the perceived extent of that potential. One outcome of such disagreements was the emergence of a 'counter narrative' that attempted to caution against viewing technology as a panacea. This narrative came from teachers, advisors and researchers alike (Heddell, 1985; Hawkrige & Vincent, 1985; Hope, 1987). However, this narrative derived largely from those working with children rather than adults. These practitioners made similar arguments that disability, science and technology scholars would later make regarding extreme techno-centric views which can both 'misread the benefits of technology and also offer misplaced hope as to the potential of technology' (Roulstone, 2016: p1). For example:

We have to decide if new technology is a miracle cure-all or if it is just the flavour of the month and can be safely ignored...reality lies at neither of these extremes, but... computers can in the right circumstances, be very powerful tools in helping children with learning difficulties.(Hope, 1987,13)

An emergent theoretical position

In the late 90's my growing awareness of concerns regarding technological determinism led me to challenge what I considered to be an 'uncritical hype' regarding technology. My concern led me to publish a paper in this journal, which argued that there is a need to consider the voices of disabled people in order to judge the potential of technology in more meaningful ways (Seale, 1998a). In more recent times I have continued to examine the factors that mediate technology use and which might serve to undermine the 'hype' and suggest that the potential of special needs technology is not as great as it was earlier considered to be (Seale, 2009, 2014; Seale & Chadwick, 2017). Therefore over time, I have adopted a position somewhere in the middle between 'techno-optimist' and 'techno-sceptic'. I believe that technology has some value for some adults with learning disabilities; that technology should not be uncritically promoted by professionals working in the field and that adults with learning disabilities should be supported to make informed decisions about whether or not using technology would be meaningful for them. This position however, does not deny the positive ways in which practitioners can support adults with learning disabilities who wish to access and use technologies.

I have not approached the examination of special needs technology practice between 1970 and 1999 with the lens of a historian, rather I have come to it with the lens of a socio-culturalist; drawing on both disability studies and science and technology studies literature. Before I elucidate on this lens it is important to note that both these fields have tended to ignore adults with learning disabilities and their relationship with microcomputers. Instead, scholars who work at the intersections of these fields have highlighted disabilities such as Deafness, spinal cord injury and brain injury and technologies such as cochlear implants, communication aids; media technologies and powered wheelchairs (e.g. Moser & Law, 1998; Blume, 2012; Goggin & Newell, 2003; Roulstone, 2016). Despite the invisibility of adults with learning disabilities in this literature I consider that it offers two useful concepts

with which to examine the implementation of technology for and by adults with learning disabilities in the period 1970-1999. The politics of power and authority and the politics of intervention. Underpinning both of these concepts is the argument that the development and implementation of technology is a non-neutral political process (Goggin & Newell, 2003; Goggin, 2018; Roulstone, 1998; 2016)

The politics of power and authority

Blume (2012: 352) argues that we need to: 'look at the decisions, the trade-offs, the political strategies involved in constructing and using a device.' With this in mind, what interests me is the political strategies involved in constructing special needs technologies and how these have resulted in digital inequalities for adults with learning disabilities. Winner (1980, 27) argued that the 'things we call technologies are ways of building order in our world' and therefore are inherently political. When we create a technical system, we create and maintain a particular set of social conditions, special patterns of power and authority. Examples of technical things that Winner discussed included industrial mechanization and the space program. The special needs technologies that are the focus of this paper were themselves part of an industrial revolution that saw a move towards manufacturing microelectronics. Indeed it is important to note that the UK government policy of getting technology into education was not entirely driven by the department responsible for education. For example, it was the Department of Trade and Industry who in 1984, made funds available to place a BBC Microcomputer in every school (including special and hospital schools) in the UK; reflecting a desire to promote the UK micro-technology industry. Considering this political act alongside the political decision not to fund or resource a support network for post-compulsory settings raises for me a question regarding why such acts of power and authority were being exerted. Did UK micro-technology industries, and therefore UK government, only cast their gaze over schools because they saw no profit in the adult market? Roulstone (2016, 46) argued that:

The limitation of economic resources, whether via state funding cuts or marketised principles has been seen to shape professional practice for some decades and is unlikely to diminish [...]

It is in this context, therefore that I argue that it is important to understand how the politics of technology shaped the practice of practitioners working in the field of special needs technology and particularly whether they sought to intervene in or resist a politics that served to further segregate or exclude a particular group of disabled people- adults with learning disabilities.

The politics of intervention

Much has been written in both the disability studies and the science and technology studies literature about how disabled people have resisted ableist constructions of disability. For example, Galis (2011) positions disabled people as 'lay-people' who adopt an 'anti-science'

perspective and as ‘carriers of disability expertise and experience’ who seek to intervene in the policy-making actions of scientific experts. He conceptualises this intervention as ‘research in the wild’. Within the two fields there is also some (although not unanimous) recognition that disability professionals may be similarly (if not equally) oppressed by the politics of power and authority that are at play in relation to technology. For example, Roulstone (2016, 65) suggests that ‘technological determinism can afford little professional or patient subversion of medical meta-narratives’ surrounding technology. Blume (2012: 350) argued:

We have been led to see technological progress as inevitable and as a legitimate source of hope. It is as a result of this dynamic or momentum that the preferences of users lacking either professional authority or market power have had relatively little influence.

Influenced by these arguments, I would suggest that those who work in under-resourced ‘non-medical’ professional contexts such as social services run adult training centres could be conceived of as lacking the ‘professional authority’ to challenge dominant political discourses relating to technology. In this context then, it would seem useful to explore the extent to which practitioners working in the field of special needs technology and adults with learning disabilities engaged in a re-appraisal of the potential of technology and sought to intervene in the politics that positioned technology as a panacea but, compared to other disabled groups, sought to limit access to this panacea for adults with learning disabilities.

I will now present the results of a study which captured the reflections of experienced practitioners who were working in the special needs technology field between 1970 and 1999. Analysis of these reflections will be used to examine whether digital inequalities existed for adults with learning disabilities and whether and how practitioners attempted to resist these inequalities. Finally, I will discuss the implications of the answers to these questions for future research and practice, particularly in the context of the digital divide.

METHOD

In this study 52 experienced practitioners in the field of special education and technology were interviewed between November 2015 and February 2017. The primary inclusion criteria was that participants had begun to work in the field between 1970 and 1999 and had occupied one or more of the following roles during their career:

- Teacher: taught learners labelled as ‘special educational needs’ using technology.
- Researcher: conducted and published research in the field of special needs and technology.
- Developer: commercially designed, developed and distributed technology for disabled people.
- Advisor: Supported the practice of others in the field, by providing advice, information, training or user assessments.

Ethics

The research conformed to the ethical standards of the British Educational Research Association and ethical approval for the project was obtained. All participants were offered the option of having their contributions anonymised, or consenting to their identities being made public. Only seven participants asked for their contributions to be anonymised.

Sampling method and sample details

Twenty-seven participants were recruited through a mixture of purposive and snowball sampling methods. Twenty-five were recruited through snowball methods in that the researcher was given their contact details by the participants in the study. There were 38 men and 14 women. Sixteen participants began their career in the field of special needs technology in the 1970's; 27 in the 1980's and nine in the 1990's. 29 participants worked solely with children, 10 solely with adults and 13 with both. Of the ten participants who worked solely with adults, six of these worked specifically with adults with learning disabilities. The primary role for 16 of the participants, within the period in question was that of advisor; 11 were developers, 18 were teachers and seven were researchers. 34 of the participants had occupied two or more roles during their career. 21 of the participants were still working in the field, 27 had retired and four were now working in different fields.

Data collection

Participants were interviewed (mostly individually, but some in pairs) either face-to-face (n=18); via Skype (n=20), via telephone (n=13) or via email (n=1). The interviews totalled 3959 minutes (65.98hours). The average interview length was 84 minutes, the shortest was 35 minutes and the longest was 150 minutes. The semi-structured interview schedule focused on establishing a potted history of the participants' career in the field, participants' views on the expectations of the community regarding the potential value of technologies for disabled learners and whether that potential had been met and opinions regarding the factors that influenced the use of technology within the community.

Data analysis

Using NVivo, a narrative analysis focused on capturing stories of how technologies were used with adults with learning disabilities and examining narratives around whether expectations of technology that the community had in the past. A thematic analysis was then conducted in order to distil from these narratives, factors that influenced practice. Using the coding process outlined by Braun and Clarke (2006) four main themes were identified:

1. The resources the community draws upon to underpin its practices (RQ2)
2. What is considered core to the practice of the community (RQ2)

3. The factors that sustain or hinder the community (RQ1)
4. How practice is required to respond to social, cultural and historical contexts (RQ1).

After I had analysed the first ten interviews I shared my emergent coding framework with an experienced learning disability researcher. She acted as a critical friend and read transcripts from participants who had consented to not being anonymised, discussed with me the things that struck her as interesting and how these related to my emergent coding framework. Member-checking (sending participants their individual transcripts and a draft of the article) was used to enhance trustworthiness and credibility. None of the participants disagreed with the suggested findings and many fed-back that they felt it was important to share their experiences.

The analysis presented in the following sections is drawn from data from all 52 participants as even those practitioners who worked with children experienced issues relating to their students transitioning to adult education or social services. This will be further illuminated by a more detailed examination of the personal stories of two practitioners who worked solely with adults with learning disabilities. In the interests of space, just selected quotes will be presented that best reflect the issues being discussed and represent a spread across the different generations and roles. When presenting quotes from participants I will identify them with a code that indicates their surname (if consent was given), role and generation (e.g. LARCHER-TEACHER-70).

DIGITAL INEQUALITIES: AN EXERTION OF POWER AND AUTHORITY

Analysis of the interviews illuminates the digital inequalities that adults with learning disabilities were subjected to as well as practitioners' views and experiences regarding the political decisions that contributed to these inequalities.

Identifying the existence of inequalities for adults with learning disabilities

The majority of interviewees identified the existence of a 'significant gap' (HEDDEL-ADVISOR-70) that resulted in a 'falling off the edge of the world' (LARCHER-TEACHER-70) in relation to disabled adults as a whole:

I have always thought that provision for adults was much more difficult than provision in schools. I felt that most acutely when I was in a school. Because I could see young people leaving my school and suddenly after having had a whole range of support, they suddenly had much less support than they did before. (STEVENS-ADVISOR-80)

Participants observed that this 'vacuum of support' impacted disabled adults in a number of ways. One participant for example speaks of the frustrations of disabled students forgetting all they had learnt at school and the horror for him therefore of 'building up potential [at school] which was never really met [once left school]' (EVANS-TEACHER-90).

One significant inequality observed by participants is when disabled adults had their technologies taken away from them when they made the transition from services funded by education, to services funded by health or social services:

We did have situations where the speech synthesizers were taken away from children and it was very difficult to work with social care to get equipment, because there was no funding and possibly no understanding of the need. So the expectations for the young adults ability in the world, that we had at school, was just totally at odds with what was considered by the adult care situation. [DAY-TEACHER-80]

That is if they were lucky enough to keep the devices, because a lot of them were pulled back weren't they? It was always a difficult wasn't it, funding the follow-on equipment? [BROUGH-TEACHER-70]

Participants also identified that the commercial sector who developed technologies for disabled people tended to ignore learning disabilities:

For the group that I'm interested in, which has always been those with cognitive difficulties then that's the...in a sense we are the Cinderella's of the industry in many ways. There's a lot of money in visual impairment...there's some money in physical impairment, but there's very little for learning difficulties. [DETHRIDGE-DEVELOPER-80]

Furthermore, for adults with learning disabilities there was also a lack of age-appropriate technologies:

There wasn't anything around for adults, so what it tended to be was lots of drill and practice spelling programs with the rewards that I particularly loathed- the clapping and the cheering and the 'well done!', but it was all geared for five years olds. I was very much against that, I wanted real stuff for real people, not designed for young children, with young children rewards. [MCKEOWN-ADVISOR-90]

Some participants also observed the third component of a triple-whammy of 'access' to technologies for adults with learning disabilities in that if adults were able to i) access technologies; ii) and access technologies that were age-appropriate then iii) they frequently bumped into the barrier of having to use them in ways that powerful others, considered appropriate. For many practitioners, appropriate technology use meant being: 'hung up on the idea- well that they have got to learn something' [HEGARTY-RESEARCHER-70]. This preoccupation with educational outcomes was considered by the participants to not always be helpful- either because it was setting adults up for continued failure or because it was ignoring other important reasons for using technology such as social and vocational goals:

I have a problem in that a lot of kids have been through school. People have taught them in terms of their language, literacy and numeracy, yet as soon as you get them into FE college or day centres, the very first thing they seem to try and do is to re-teach them language literacy and numeracy! Basically, the poor people have failed at it several times already, why are they doing that? What you should be doing, is looking at- what do they want to do and what do they want to achieve? What have they seen that they would like to have a go at? How can we open up those possibilities? [LARCHER-TEACHER-70]

Illuminating how these inequalities were experienced by practitioners

In order to illuminate how, if at all, the inequalities that the study sample have identified influenced practice I will present the work histories of two teachers in the sample who worked solely with adults with learning disabilities- Ann Aspinall and Barrie Ellis. Both had technical interests and skills prior to taking up their roles within the adult special needs field, but Ann was the only one with formal qualifications in that she had (amongst others) a BTEC in computer studies. Ann worked in the field between 1989 and 2008. She entered when she took up an administrative post at Home Farm Trust, a national charity supporting adults with a learning disability. During this period she became ICT Service Development Manager and then Project Manager for an EU funded project focusing on Assistive Technology and Employment. Barrie worked in the field between 1994 and 2003. He entered when he took up a job as an ambulance driver at a social services special care unit and then changed to become a Day Centre Officer. He left to run his own company (One Switch) focusing on accessible games for all disabled people.

Both Ann and Barrie entered the field at a time when the support structures in the compulsory sector was losing funding. While NCET/Becta continued to include adults with special educational needs within their remit; it was largely the colleges that they engaged with, rather than third sector organisations or social services. I will illustrate how each experienced 'vacuums' of support and the differences and similarities between these experiences.

The technologies that Ann and Barrie accessed to support adults with learning disabilities varied enormously. This is partly due to the different services they worked in (and therefore the level of funding was accessed); partly due to their differing lengths of period working in the field and the differing needs of the disabled people they worked with. When Barrie started at the Special Care Unit, working with people with profound and multiple learning disabilities, there were already some technologies such as BBC microcomputers, touch screens, 'Brilliant Computing' software, wooden push buttons, and switch adapted cassette players. Partly due to a lack of funding and partly due to lack of age appropriate software, Barrie added to the resources available by adapting second-hand equipment and writing his own programmes. For example, he adapted a Commodore 64; wrote games in BASIC following an adventure game style and wrote a 'light show' programme on an Atari 800.

In contrast, Ann began her career in the field with absolutely no specialist equipment available to her. However, as her career progressed, so did the amount and sophistication of the technologies made available to her and the adults with learning disabilities she worked with. Ann started with administrative IT equipment (PCs and Microsoft Word) because that was all the service had to begin with. This changed to RM machines with touch screens and bundled software including *Widgit Symbols*. In terms of software Ann started off buying mainstream games such as Living Books from high street shops. She then created a more adult version of Living Books using PowerPoint. This led to more detailed 'life-story' work involving digital cameras and scanners as well as developing the use of the Internet (e.g. Google Images and email). Finally, before Ann left she was introducing assistive technologies such as personal digital assistants, mobile phones, finger-print locks, bath over-flow reminders and door cameras. The transformation of technology use at Home Farm Trust was due in part to the ability of the organisation to fund raise. Initial equipment such as touch screens was acquired through parent fund-raising. The Trust then obtained funding from the Ian Karten Charitable Trust to set up an ICT training Centre. There was also a successful Lottery Fund bid for more computers across the service, followed by an EU funded project called TATE (Through Assistive Technology to Employment 2004-2007 [1]).

Both Ann and Barrie struggled with accessing relevant guidance and information, they were simply not connected to the kinds of networks that people in schools were. Ann talks about going around mainstream computer shops such as 'PC World' looking for appropriate software, and of inviting a salesman from a touch screen company to come and talk to HFT. Barrie talks of being aware of 'Brilliant Computing' software through their catalogue and of also going to an 'AbleNet' exhibition but being concerned that the technologies on sale there were too expensive. Whilst this was the extent of support available to Barrie, for Ann, the most influential source of information and inspiration was C.A.S.E. at Keele University where she attended a three day course, and later went on to complete a diploma in IT and Special Education.

CREATIVE PRACTICES: ATTEMPTS TO INTERVENE IN DIGITAL INEQUALITIES

Analysis also revealed how practitioners attempted to resist or intervene in the digital inequalities they were observing or experiencing by either challenging the deterministic narratives surrounding technology that positioned it as a miracle cure or creative problem-solving.

Challenging deterministic narratives

From the interviews I conducted with practitioners reflecting back on the period, it would seem that many challenged the positioning of technology as a panacea:

So it was a fear that we have to use this technology, because we know it benefits, but we also had to be aware of its immense dangers. It can produce a panacea which is actually nonsensical. [FOWLER-ADVISOR-80]

People think that it is going to be a magic cure; that is going to relieve them of lots of work. Nightmare! [DAVIDSON-ADVISOR-80]

Interviewees talked of the need to understand that the success of technologies depended as much on humans (the disabled person themselves as well as their teachers) as it did on technologies. This challenging of a deterministic narrative' however did not lead to a full-out rejection of technologies. Many believed that technology did have an important role to play and that practitioners should not settle for 'good enough':

I think the technology is here to stay isn't it. But I don't think we should ever say that it has reached its potential for people [...]. We are a long, long way from that. I don't think we ever should think that technology has reached its potential I think you always have to be looking at how things could be better. [FULLER-ADVISOR-70]

Creative problem-solving

The memories that Ann Aspinall and Barrie Ellis shared with me suggested that they had both in different ways attempted to intervene in the 'vacuum of support' they experienced. This intervention expressed itself in terms of creative problem-solving. Ann tried to solve the problem of lack of resources by proactively campaigning and applying for external funding. Barrie tried to solve the same problem differently, by making his own alternative technologies.

Ann was a 'shaker' in the sense that she made things happen. It was because Ann went to the senior management team with a vision for a training centre that HFT were convinced to seek external funding:

I went to my boss and the board (with his full support because he could see what I was doing and he could see that it was good) and said that computers were really good for the people that we working with and that we should have more. They said- OK you can have more- if you can find the funding. So I worked with the Fund Raiser and we went to the Lottery Board and we got Lottery Funding to put computers in each of our day services [ASPINALL-TEACHER-80]

It could be possible to dismiss Ann's attempts at intervention- since she relied largely on charitable funding, which for purist critical disability scholars, could be perceived as doing little to challenge the 'charity discourse' which positions disabled people as 'pathetic' and 'pitiable' and therefore deserving of the generosity of others (Goggin and Newell, 2003,

133). Ann was a pragmatist however, and just did whatever she could to reduce the access to technology divide for the adults with learning disabilities that she worked with.

Barrie was a 'maker' in the sense that he used his programming and engineering knowledge to adapt old pieces of technologies and write programmes to meet the needs of the adults in the Special Care Unit:

I adapted an old Commodore 64 I had. I had a 'Music Maker Pop Hits' bit of software, where I knew that if you pressed the space bar you could make the music progress. So I knew that some of the people I was working with wouldn't be able to press the space bar but I had an old 'Quickshot' wobbly joystick and I knew that if I put in a certain place, they may be able to push it with their elbow. I thought that might be quite interesting at the cause and effect level- just to give them some ability to play Abba themselves. [ELLIS-TEACHER-90].

Barrie's intervention through creative development of his own technologies, meant that he was also able to be creative in how he used them with service users:

Amazing things- just very powerful things that you could do with a single switch that sounded nice rather than just banging tambourines or drums in other music groups. ...I was trying to develop these non-conventional art systems. We were using ink-water pistols which was extremely messy, bowling machines where people could just hit a switch and knock a ball down the alley...I programmed a lottery program on the BBC [Micro].(ELLIS-TEACHER-90)

Both Ann and Barrie experienced vacuums and resisted vacuums in different ways, both influenced by the contexts and conditions in which they worked.

DIGITAL INEQUALITIES: THE EMERGENCE OF A PRACTICE 'IN THE WILD'

My analysis of interviews with 52 experienced practitioners who worked in the field of special needs technology between 1970 and 1999 would suggest that governmental and societal investment in microcomputers within education created a particular set of socioeconomic conditions that have oppressed and discriminated against adults with learning disabilities. A lack of funding for adult services and the blinkered gaze of the technology market resulted in a *wilderness* experienced through a lack of available technology for learning disabilities and/or adults with learning disabilities having their technology taken away; a lack of age-appropriate technologies for adults with learning disabilities and a lack of agency for adults with learning disabilities to decide how they would use technology *if* they got access to it.

Much of the literature on specialist 'assistive' technology has focused on how and why users abandon their technologies, within rehabilitation contexts (e.g. Wessels *et al.* 2003). However little attention has been paid to the phenomenon identified here, within an

education context, of technology *reclamation*- of disabled people having their technologies taken away. This is of concern for lots of reasons, but given that the reclamation of the technologies here happened at a time when disabled people were transitioning from childhood to adulthood- a time typically characterised as involving an examination of who we are and who we want to be- I would argue that one major concern is the attack on self. Disability and science and technology studies scholars talk of the impact of technology on constructions of self. Shildrick (2002, 126) for example, talks of the tensions of viewing communication technologies as offering an escape from the body or as locations of wholly positive transgressions of self. In the context of the study reported here, I would suggest that the reclamation of technology represents a denial of an autonomous-self who has the right to choose what their relationship with technology is and will be.

In the interviews, participants identified that adults with learning disabilities were ignored by certain stakeholders such as commercial developers. This invisibility meant that they were reduced to using age inappropriate technologies. Disability and technology scholars such as Goggin and Newell (2003,139) would argue that the invisibility of adults with learning disabilities is due in part or whole to how learning disabilities is viewed as ‘too: difficult or irrelevant to be considered in the design and implementation of new media technology’. The invisibility of learning disabilities still permeates current research and development. For example, an inspection of the literature that heralds the potential of new technologies such as eye-gaze technologies, robots and brain computer interface technology for disabled people reveals that disability is largely constructed as motor impairments. In other words, learning disabilities continues to escape the gaze of the market (e.g. Rytterstrom, Borgestig & Hemmingsson, 2016; Encarnacao *et al.* 2017; Sreeja *et al.* 2016). This phenomenon could be viewed as a denial of the right to shape technology. Winner (2007, p.209) proposes that the right to influence technologies (e.g. to influence companies to design for adults with learning disabilities) is limited by the extent to which people have property rights. If you do not possess technology or those who have funded it for you, take it away from you- you lose your right to influence the market. Future research therefore could make a useful contribution by identifying the extent to which adults with learning disabilities are able to make agentic decisions to purchase and maintain ownership their own technologies.

Roulstone (2016, 93) discusses Finkelstein’s view that ‘technology decision-making had to be more fully-shaped by...disabled people aware of the reappraised role of technology’. In the context in which Roulstone was writing this reappraised role of technology was with regards to being aware that technology did not guarantee liberation or independence. In the context of the study here, the role of technology in the lives of adults with learning disabilities may need to be reappraised so that the spectrum of what technology is considered ‘good for’ stretches beyond educational outcomes, to include those outcomes that adults with learning disabilities themselves consider appropriate or meaningful. For example, Jotham and Leicester (1988,21) observed that adults with learning disabilities ‘come to computer sessions not to learn to read, but rather to use computers and make things happen’. For adults with learning disabilities, who have not experienced a lot of

power and control over their lives, 'making things happen' was an appropriate, meaningful use of technology back in the 1980's. In more recent times, growing evidence suggests that what adults with learning disabilities perceive to be particularly meaningful is being able to use technologies such as the Internet to engage in friendly and loving relationships (e.g. Lofgren-Martenson, 2008).

In addition to illuminating the digital inequalities that existed for adults with learning disabilities between 1970 and 1999 my analysis has also suggested that some practitioners working in the field attempted to resist these inequalities. Writing in the context of disabled people, Galis (2011) called such interventions 'research in the wild'. I contend that this concept can be adapted and applied to practitioners, so that their resistive actions can be identified as 'practice in the wild'. Just like 'research in the wild', practice in the wild appears to be informed by experience of being at the receiving end of policy. Furthermore, at the core of this practice is 'deliberative problem-solving' (Galis, 2011, 826) expressed through actions such as lobbying for funds or writing software programmes. Writing in the context of nuclear power technology, Winner (1998) talks about the twists and turns of history that lent support to those who resisted what once seemed inevitable. In the context of special needs technology and adults with learning disabilities I would argue that the study reported here has captured some early 'twists' where some attempts at resistance started. But what about the 'turns' later on in history, after 1999? Has the spark of resistance been extinguished? If so, can this explain, in part at least, the digital inequalities that still exist for adults with learning disabilities? This would seem worthy of further investigation.

CONCLUSION

The study reported in this paper is the first to conduct an in-depth historical examination of the use of technologies with adults with learning disabilities in the UK between 1970 and 1999. Drawing on a large data-set of 52 interviews, this study has illuminated the digital inequalities that adults with learning disabilities were subjected to; practitioners' views and experiences regarding the political decisions that contributed to these inequalities and their attempts to resist these inequalities through an emergent 'practice in the wild'. This knowledge can inform digital divide research by suggesting that, contrary to some arguments, the digital divide will not be solved by improving digital literacy skills alone.

Whilst the study has filled in an important gap in knowledge, it does have limitations which suggest a need for follow-up work. These include a need to capture the memories of adults with learning disabilities themselves, so that disabled peoples voices are not ignored in preference for the experts' voice as well as a need to include more practitioners who work solely in the field of adults with learning disabilities.

NOTES

[1] <https://joinup.ec.europa.eu/node/134143>

[2] <http://www.specialeffect.org.uk/>

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