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Not the right kind of 'digital capital'? An examination of the complex relationship between disabled students, their technologies and higher education institutions

ABSTRACT

The paper focuses on disabled students in higher education (HE) and their use of technologies to support their learning. Disabled students commonly report that they feel they have to work harder than other students because they have to manage both their disability and their study. Access to and accessibility of technologies affects how well disabled students manage this workload. Data were collected from disabled students in a teaching-intensive university in UK using an online questionnaire survey and a follow-up semi-structured interview. A 'digital capital' framework was used to explore the relationship between disabled students and their technologies and examine the potential complexities of this relationship in more detail. Our results show that while disabled students do have access to social and cultural resources; sometimes these resources are not appropriate or effective (e.g. school-based ICT qualifications) or they are not drawing on all the possible resources available to them (e.g. non-institutional based support or support from disabled students). This means that disabled students can lack the 'right' kind of digital capital to enable them to succeed within HE environments. These findings have implications for how HE institutions conceptualise and organise technology related support services for disabled students.

Keywords: disabled students; higher education, assistive technology, digital capital¹

¹ Abbreviations: AT (Assistive Technology) ; HE (Higher Education); DSA (Disabled Students Allowance)

1. INTRODUCTION

The focus of this paper is disabled students in higher education (HE) and the factors that influence whether and how they use technologies to support their learning. For the purposes of this article the term disabled student will be used to refer to any student who has a sensory, cognitive, physical or psychological impairment and who may benefit from using technological tools and related services to support and promote access to equitable educational experiences and outcomes (Seale, 2013a). The term technology will refer to any generic or specialist (e.g. assistive technologies) that might support and enhance learning. Typical generic 'technologies' include university websites; Virtual Learning Environments (e.g. Blackboard); library databases; email and social networking applications (e.g. Facebook). Many disabled students can only access learning resources and engage with learning experiences if they have access to assistive technologies (AT). Typical AT include alternative interfaces (e.g. screen-readers); reading tools (e.g. text-to-speech); recording tools (e.g. voice recording); writing tools (e.g. word prediction); planning tools (e.g. mind-mapping software) and communication tools (e.g. synthetic speech) (Seale, 2013a). In the UK, disabled students are currently entitled to a Disabled Students' Allowance (DSA) which enables them to purchase AT and related training and also entitles them to support packages provided by universities. The affordability of the DSA is currently under review by the current UK government; which depending on the outcome, could have a significant impact on the ability of disabled students to access AT and related support.

In this article, we argue that although access to and accessibility of technologies exerts a significant influence on disabled students' use of technologies, it is not the sole influencing factor. We argue therefore that 'digital capital' could be a useful framework for exploring the relationship between disabled students and their technologies and examining the potential complexities of this relationship in more detail.

1.1 Equity issues for disabled students in higher education

In several countries evidence shows that the numbers of disabled students in HE have steadily increased over the last twenty years (Korbel, Lucia, Wenzel & Anderson, 2011; Madriaga, Hanson, Heaton, Kay, Newitt & Walker, 2010). Despite these increasing enrolments there is evidence to suggest that disabled students continue to lag behind non-disabled students in terms of retention rates (Izzo, Marry & Novak, 2008; Mamiseishvili & Koch, 2011). One possible reason for low retention is the many challenges that disabled university students report they face. Disabled students commonly report that they feel they have to work harder than other students because they have to manage both their disability and their study (Hammer, Worth & Dunn, 2009). This often requires significant effort to compensate for lack of accommodations (Ryan, 2007). Disabled students report struggles in the provision of accessible or adapted learning materials (Claiborne, Cornforth, Gibson & Smith, 2011) and in particular in the provision of lecture notes (Brandt, 2011). These struggles are often linked to a lack of understanding and respect (Georgeson, 2009)

It is generally accepted that technology can remove barriers to equitable education for disabled students and therefore promote inclusion of disabled students in HE (Kajee, 2010). Studies have also shown that generic technologies can help ease some of the difficulties associated with having to manage both disability and study (Gerrard, 2007; Graves, Asunda, Plant & Good, 2011). A number of surveys also reveal that disabled students are commonly using AT to support their studies (Fichten, Asuncion, Barille, Ferraro & Wolforth, 2009a, Fichten, Asuncion, Nguyen, Budd & Amsell, 2010).

Although it is generally accepted that disabled students can benefit from access to online learning material and AT, there is evidence to suggest that this access can be denied or hindered. In particular disabled students can be disadvantaged due to a lack of access to appropriate AT (Davies, 2007; Draffan, 2009) or inaccessible design of university websites and online learning material (Fichten et al. 2009b; Kurt, 2011). The positive and negative issues of access highlighted here have led some to argue that technology is a 'double-edged sword' (Byerley & Chambers, 2002, p.169) and that disabled students in HE are on the 'wrong side of a second digital divide' (Burgstahler, 2002, p.420).

1.2 Disabled students and their relationship with technologies

One common response to the identified 'digital divide' for disabled students in HE is to use the 'lens of accessibility' to identify and advocate for changes in individual and institutional practices. Disabled students are presented as oppressed victims of their universities, who are deprived of equitable access to important learning resources as a result of institutional non-

compliance with legal requirements, professional codes of practice or technical standards and guidelines (Steyaert, 2005). Faculty and e-learning professionals are urged to improve their practices and senior managers and student support services are urged to improve their provision of and support for the use of AT (Asuncion, Draffan, Guinance & Thompson, 2009; Fichten et al. 2009b).

Seale (2013a) argues that one problem with relying on an accessibility lens is that it oversimplifies the relationship between disabled students and their technologies by assuming that 'access' is the only factor that has a direct causal relationship with 'use'. There is growing evidence to suggest that this is not the case. For example, although there is evidence that disabled students receive support and encouragement to use technologies from peers and family (Ari & Anan, 2010; Sharpe, Johnson, Izzo & Murray, 2005) and are competent and confident users of technologies (Asuncion, Budd, Fichten, Nguyen, Barile & Thompson, 2012; Seale, Draffan & Wald 2010); there is also evidence that shows that disabled students can on occasions reject or abandon AT (Seale et al. 2010; Roberts & Stodden, 2005). Additionally, there is conflicting evidence that shows that disabled students rate technology provision and support positively (Roberts, Crittenden & Crittenden, 2011; Sharpe et al. 2005) and yet can also resist engaging with AT training (Draffan et al. 2007; Seale et al. 2010).

In this paper we will explore the extent to which the concept of 'digital capital' provides an alternative lens that can illuminate the complexities of the relationship between disabled students, their technologies and HE institutions. Digital capital focuses less on issues of access and more on the social and cultural resources that people draw on to enable them to be a valued

and functional member of society, and specifically in the case of disabled students, a successful learner within the HE environment.

1.3 Understanding the relationship between disabled student and technologies through the lens of digital capital

Cultural capital is generally understood as the possession of cultural competencies and knowledge that enable people to be cultural consumers in ways that are valued and expected in society. Social capital refers to the benefits that are derived from the social connections and networks of an individual or group (Bourdieu, 1997; Putnam, 2000). Bourdieu and Putnam were not writing specifically about disability or technologies; they were interested more generally in what unites and separates people within the communities that they live, work and learn. For this reason, their ideas have been used to challenge social injustice and inequities and to explore issues of widening participation in HE (Thomas, 2001; Riddell, Tinklin & Wilson, 2005) as well as the influence on a lack of social capital on the academic success of disabled students (Zell-Sacks, Wolffe & Tierney, 1998; Harrison, Hemingway, Sheldon, Pawson & Barnes, 2009). Digital divide researchers have also been interested in using the concept of capital to explore technology use and exclusion (Rojas, Roychowdhury, Okur, Starubhaar & Estrad-Ortiz, 2004; Selwyn, 2004). For example, Selwyn (2004) explores the relationship between capital, technology use and exclusion. Writing in the context of education, Selwyn offers a framework for identifying examples of ‘technological’ or digital capital that highlight the interactions between individuals and social structures of home, family and school. The acquisition of digital cultural capital is exemplified by individuals investing time in improving their technology

knowledge and competencies through informal or formal learning opportunities, as well as a socialization into technology use and ‘techno-culture’ through family, peers and media. Digital social capital is developed through, for example, the networks of ‘technological contacts’ and support that people have, which can be face to face (e.g. family, friends, tutors) or remote (e.g. online help facilities). Selwyn argues that using this framework is helpful if it can identify the effect of different forms of capital on the ability of individuals to make meaningful use of technologies.

Seale (2013b) used a digital capital framework to conduct a post-hoc analysis of data collected from 30 disabled students regarding their experiences of using technology to support their learning (See Table 1). Results indicated that disabled students possessed a significant amount of digital cultural capital and a fair amount of digital social capital. Seale observed however that for some disabled students, this cultural and social digital capital did not appear strong enough. For example, some disabled students appeared to be affected by the extent to which using specialist technologies marked them out as different.

<Table 1 about here>

The data used by Seale (2013b) were drawn from students studying in one UK university. There is a need therefore to explore the extent to which the results might generalise to students in other universities. The aims of the study reported in this paper are therefore twofold: firstly to examine in more detail the extent to which 'digital capital' can help illuminate the complex relationship which appears to exist between disabled students and their technologies and secondly to attempt

to replicate the findings of Seale (2013b) in a different context. The specific research questions are:

1. Do disabled students possess digital capital?
2. What effect do different forms of digital capital have on disabled students use of technologies?

2. METHOD

The study was conducted in one UK university during the academic year 2012-2013. The research conformed to the ethical standards of the British Educational Research Association and ethical approval for the project was obtained.

2.1 Data collection tools

Data were collected using an online questionnaire survey and a follow-up semi-structured interview. The questionnaire was loosely based on that used in the Seale (2013b) study, but designed to more specifically target information about digital capital. The questionnaire had 41 closed questions where respondents were required to choose from a selection of answers ranging from yes/no to rating scales. For many of the questions there was an option to write a 'free text' explanation for the answer given. There were 16 questions designed to find out what generic and specialist technologies the respondents use, frequency of technology use and nature of technology usage. Six questions explored the influence of family, school and friends on generic

and specialist technology use at the respondents prior educational institutions. Five questions explored the current influence of family, school and friends on current generic and specialist technology use.

The interview was semi-structured and included 14 questions. Five questions asked respondents to identify three technologies that they used most often to support their learning and to explain how useful they were, why they supported learning and what training they had received to use these technologies. Three questions asked respondents about the helpfulness of past and current sources of technology related support. Four questions asking respondents about their decisions to use or abandon certain technologies and factors that influenced these decisions. The final question related to respondents feelings about using technology to help them learn.

2.2 Recruitment

The project team made an agreement with the university disability support service whereby the service emailed all the students on their list on our behalf with a message about the project and asking for volunteers to take part. A link to the online survey was contained within this email. At the end of the questionnaire respondents were asked if they were willing to take part in a follow up interview.

2.3 Sample

In contrast to the research intensive university sampled in the Seale (2013b) study the sample in this study was drawn from a teaching intensive UK university. Teaching intensive universities tend to have strong widening participation agendas and therefore a higher proportion of disabled students. The total percentage of students registered as disabled in the sample university in 2012 was 12.96%

A total of 175 students responded to the survey. Not all 175 respondents completed every single question in the survey, therefore we will make it clear what the total response sample was for each question reported. The majority of the respondents were under thirty years old (116 out of 175; 66.3%), with those aged 21-29 comprising the largest group (61 out of 175;34.9%). The majority of respondents were female (118 out of 175; 67.4%). The programmes studied by participants ranged from Foundation degree (12 out of 175; 6.8%) to Undergraduate degrees (135 out of 175;77.2%) and postgraduate degrees (22 out of 175;12.6%). The majority of respondents indicated that their learning needs related to a specific learning difficulty such as dyslexia (86 out of 153; 56.25%) (See Table 2). Whilst the second largest group were those with medical conditions or mental health difficulties (53 out of 153; 34.6%) erroneous conflation of these two groups limits interpretation of these figures.

< Table 2 about here >

22 of the 175 questionnaire respondents agreed to be interviewed. 45% of the interviewees were under 30 years old. There were equal number of those aged 18-20 (n=5) and 21-29 (n=5). As with the questionnaire respondents, the majority of interviewees were female (n=15). The majority of interviewees also indicated that their learning needs related to a specific learning difficulty such as dyslexia (n=12). (See Table 3)

< Table 3 about here >

2.4 Data analysis

The survey was delivered online, using Survey Monkey. Simple frequencies and cross-tabulations were calculated. Interview audio files were transcribed and transported into NVivo for coding. The first iteration of the coding of these interviews used the categories of digital social and digital cultural capital outlined in Table 1. This initial analysis revealed gaps and the team identified two additional categories: 'Responses to Technology', and 'Evaluation of Support' which were subsequently applied in a second round of coding (See Table 4).

< Table 4 about here >

In order not to privilege one student's voice or a group of student voices over others, we have deliberately sought to use quotes from all 22 interviewees to illustrate findings and when presenting quotes, we will identify participants with a code (1-22).

3. RESULTS: DO DISABLED STUDENTS POSSESS DIGITAL CAPITAL?

Data from both the survey and interviews reveal that access to technology was not an issue for the participants. The top three personal technologies owned by survey respondents were mobile phone (162 out of 166; 97.6%); laptop (159 out of 166; 95.8%) and iPod or MP3 player (112 out of 166; 67.5%). Just over half of respondents (87 out of 166; 52.4%) owned ATs for their personal use. The most common AT that respondents owned or had access to in order to support their learning were recording tools (107 out of 136; 78.7%); planning tools (92 out of 136; 67.6%) and reading tools (85 out of 136; 62.5%). The findings from this study replicate those of other studies that have revealed that disabled students generally rate their technology provision positively (Sharpe et al. 2005; Draffan et al. 2007; Robert et al. 2011) This is significant because if a 'digital divide' does exist for disabled students, it is not a division caused by poor access, reinforcing our argument for the need to seek new conceptual frameworks, such as that of 'digital capital', for understanding disabled students relationship with technologies.

3.1 Digital Cultural Capital

Overall the data show that although the disabled students in this study possessed a significant amount of digital cultural capital, some components of this capital were stronger than others.

3.1.1 Technological 'know-how'

The majority of survey respondents had experience of search engines (162 out of 164; 98.8%); had used an electronic library or portal (160 out of 164; 97.6%) and had used online learning materials they had found for themselves (152 out of 164; 92.7%). The majority of respondents had used presentation software such as PowerPoint (155 out of 155; 100%) but under half had used a webpage, wiki or blog to present information (55 out of 155; 35.5%). The majority of respondents had contacted tutors or peers using email (162 out of 163; 99.4%) and had accessed course materials via an online learning environment (134 out of 163; 82.25%). The majority of respondents were experienced in using technologies for self-management (143 out of 143; 100%) with 83.2% (119 out of 143) using a computing device to plan assignments and 69.9% (100 out of 143) using a computing device to record lectures.

Interview respondents identified 15 strategies for employing AT to support their learning, with the most common being recording and transcribing, audible proof-reading and assistance with reading text in screen.

The 22 interviewees identified 17 affordances of technologies. The most commonly mentioned affordances were mobility (n=13), followed by versatility (n=9), providing access to resources (n=6) and saving time or money (n=5). The identified affordances were mostly in reference to a laptop/desktop PC:

I have back problems, frozen shoulder and carpal tunnel syndrome, so my laptop is

important to me because it is lightweight and portable. I can connect at home and at work. I can set up things as I like them, so I don't have to re-establish settings every time I use it. Also all the different software packages I use are all in one place. [10]

Twelve interviewees referred to 13 constraints of technologies. Many examples that students gave were related to AT. The most commonly identified constraints were: wastes time (3); not portable (3); too much hassle (2) and not user-friendly (2):

I did this for a while and I tried it but just scanning it all in and getting it on to the laptop, it just took sooo long[...]Although, you can teach it how to pronounce things correctly[...]it just was taking too long, too much effort and I didn't get along with it that I just stopped using it altogether.[1]

Nine interviewees (2,4,8,9,16,18,20,21,22) talked about being computer literate before they started their studies. For some this literacy started at a young age, for others it was developed in their prior employment or studies:

Thanks to my OCR national certificate I actually know enough to get round most problems.[18]

I came from a technology background and worked with technology[...]I know people at home who couldn't write a letter on the computer, or send an email, but I could do those sorts of things so I wasn't quite as intimidated as some people maybe.[8]

When survey respondents were asked to rate their confidence (on a scale of 1 to 10) in their ability to use technology to support their learning, the average rating was 7.42. In explaining their levels of confidence, students considered that the nature and value of technologies; having access to or quality of training and personal technological proficiencies influenced their confidence levels. Just four (8, 9, 11 and 20) interviewees talked about skills they felt they did not possess.

Two participants (2, 10) suggested that their technological 'know-how' gave them an ability or sense of confidence to teach themselves how to use new technologies:

but I'm now actually using a different mind-mapping software from the one they gave me, so I kind of taught myself that one.[2]

The levels of technological know-how reported in this study are very similar to those reported by Seale et al. (2010) who reported that the disabled students in their study were extremely familiar with technology, used a wide range of strategies and had high levels of confidence in their own ability to use technology.

3.1.2 Participation in formal ICT related education and training

One hundred and fifty three survey respondents said that they had undertaken formal ICT related qualifications at school or college. The most frequently mentioned qualifications were: GCSE in

IT (n=15); Touchtyping such as Pitman (n=9); and Keyskills courses such as EdExcel (n=9).

Twenty students commented on the positive impact of their formal ICT education and training, with the most common explanations focusing on whether the course studied helped the student gain basic (n=10) or advanced (n=4) skills. Despite these positive comments, for those who undertook a formal qualification, 63.4% said the knowledge gained had not helped in their current technology use at college or university. The most frequent criticism of the courses were that they were irrelevant (n=3) or out-of-date (n=3).

Three interview participants (9,16,18) referred to prior qualifications:

Computer skills course which was a separate course – Sandwell college – which gave me confidence to use within my studies.[16]

Ten interviewees (1,6,7,9,10,13,15,19,20,21) talked positively about the training they received as part of their DSA, once they were at university:

Brilliant - she was amazing. She did it to my level of understanding[..]and then[..]after she talked about it, it kind of all clicked into place, how to use it properly.[9]

Three students (8,10,14) however, had a less positive experience of DSA related training:

Learnt one or two things, but felt I was not gaining that much. [14]

Despite the largely positive responses to formal training provided when students entered HE, both survey and interview respondents commented on how the delivery of training could be improved. In particular, respondents commented on a lack of flexibility and timeliness in when an overall training package was delivered as well as problems with the length and duration of specific training sessions:

At home. It was difficult because he had quite a lot that he had to do. And with being a part-time student they don't necessarily understand that you're working [...] he would want mornings and I couldn't possibly take time off work, he can't come in the evenings. It was just untidy and by the time I'd see him again in a months' time, well I'd completely forgotten what he taught me, so it didn't work, it just didn't work.[22]

The lengthiness of the DSA process made me feel a little behind so this should be addressed.

Maybe identified prior to starting so the process can be underway before lectures start. Also then I could have learnt the technology before sessions start so I am ready to go.[17]

Whereas the guys who installed it a. they were very technology minded as well but they also did it in four-hour blocks and it's like, by the end of two hours, I've taken in enough and everything else went out of my head.[7]

3.1.3 Informally investing time in self- improvement of technology skills

Sharpe et al. (2005) interviewed 139 disabled US graduates about instructional accommodations and AT provided to them in secondary and HE settings. A majority of participants, (84%) indicated they either had taught themselves or had help from a family member in learning how

use their AT. Unlike the Sharpe et al (2005) study the questionnaire and interview respondents in this study commented very little on informal investments of time in improving technology skills. Just four interview participants (4, 14, 17, and 19) made reference to being self-taught.

3.1.4 Socialisation: influence of family, peers, education and work environments on technology use

Just over half the survey respondents (n=153, 57.5%) said they were not encouraged by their school/college to undertake any formal ICT or technology related qualifications prior to entering university. Nine interviewees (1,2,6,7,8,10,11, 15,21) offered explanations for why their prior educational institutions (school, college) had not influenced their technology use.

Not a lot of previous support – encouragement through staff at the college – to use for study and help develop study.[15]

Eight interviewees talked about the positive influence of their previous study experience/environment on their technology use (2,4,9,10, 13,16,18,21).

Previous study introduced me to this positive experience. [13]

Compared to the Sharpe et al. (2005) study fewer students in this study reported a positive influence of family on technology use. Under half of the respondents indicated that their family had a very positive attitude to technology and encouraged them to use it (67 out of 153; 43.8%).

A third of respondents indicated that their family had a neutral attitude (48 out of 153; 31.4%), while a tiny percentage reported that their family had a negative influence (4 out of 153; 2.6%). Further, under half of respondents indicated that their family response to technology influenced their own technology use or experience (67 out of 152; 44.1%) . In the survey, explanations for a lack of family influence fell into two categories: their family (particularly parents) were not very interested in technology (n=10) or ‘I would use technology regardless of my family’ response (n=3).

3.2 Digital Social Capital

Overall the data reveals that disabled students in this study found friends a more helpful source of support in relation to generic technologies whilst university and other formal support services were considered more helpful when it came to needing help to use specialist technologies. In addition, the participants prefer face-to-face support compared to online support.

3.2.1 Networks of face to face technological contacts that students access when they need technology related help

When asked which sources of support they accessed at school or college if they needed help using AT, respondents (n=153) indicated that their most helpful source of support was learning support staff, followed by privately funded support workers and friends from school or college (See Table 5). When asked which sources of support they accessed at school or college if they needed help using general technologies, survey respondents (n=153) indicated that their most

helpful source of support was friends, followed by learning support staff and teachers/lecturers.
(see Table 5)

<Table 5 about here>

Asked which sources of support they currently accessed in HE if they needed help using general technologies, survey respondents (n=144) indicated that their most helpful source of support was friends from the same course, privately funded support workers and lecturers (See Table 6).

< Table 6 about here>

Asked which sources of support they accessed in HE if they needed help using specialist technologies, a similar pattern emerged; respondents (n=144) indicated that their most helpful source of support was privately funded support workers followed by friends from the same course and lecturers (See Table 6).

The trend observed in the survey for accessing formal support to use specialist technologies in preference to informal support was replicated in the interviews. Seven interviewees (1,6 4,7,9,20,21) talked about university based support provided by Disability Support Services, lecturers or library support staff as sources of support:

I think the university is very good [...] I've been emailed and been in correspondence with my subject-specific librarian when I had problems [...].[6]

Two interviewees (10, 20) refer to getting help from equipment suppliers:

When it works, it is very good as they also access the computer externally and can talk you through the problem and how they are fixing it, while you watch [...] I have found that really helpful. [20]

Four interviewees (3, 9, 19, and 21) describe the support received from learning support assistants:

I also have learning support as well which helps me to focus on subjects I find difficult and helps me to make sure that I'm getting everything I can in the university and also helps me to structure my essays and reports.[..]I am very grateful for the support I've had with the technology training and everything. [19]

For many survey respondents, being in HE was the first time they had experienced in-depth support, and this was often linked to the fact that it was it upon entering HE that they were first diagnosed with their particular learning need:

I have my own personal support workers and tutors who assist me with technology at university and I also have support with DSA that I wasn't entitled to at college.

3.2.2 Networks of virtual/online technological contacts that students access when they need technology related help

Survey respondents indicated that they whilst they were accessing virtual or online sources of support, they were not the most helpful sources of support available to them. Generally speaking, online networks and forums were less helpful than company technical support websites or help lines (See Tables 5 & 6).

In the interviews, just three participants (2, 8, and 10) described how they used online sources of support:

And of course I have email so I can email people and ask them questions which is a form of support. [8]

When talking about how support systems could be improved, there were very few suggestions for increasing the availability of remote support. Instead there seemed to be a preference for face-to-face support (2, 8, 14, and 20):

I quite like kind of actually having someone there, like I don't particularly like online tutorials and stuff like that. I prefer if there's somebody there to .. kind of.. if things go wrong and I don't know what's happened[...]I think it's better to actually have a proper human teacher.[2]

These findings contrast those found in other studies. For example, Eden and Teiman (2011) used two questionnaires to investigate the impact of the use of mobile and online communication tools on the social and emotional relationships of students with learning disabilities. Students with learning disabilities reported using personal computers more frequently, especially for receiving practical advice. Seale (2013b) reported evidence that many disabled students had networks of online contacts which they used as sources of technical and study support. These online social networks incorporated message boards on company websites and professional networks such as LinkedIn.

4. RESULTS: WHAT EFFECT DO DIFFERENT FORMS OF DIGITAL CAPITAL HAVE ON DISABLED STUDENTS' USE OF TECHNOLOGIES?

The claim for the possession of digital capital by disabled students is only really helpful if it can expand our understanding of the relationship between disabled students and their technologies. Within this study two particular phenomena have been observed: a rejection of technologies, particularly AT, and a reliance on formal institutionally based support mechanisms for help with using AT.

4.1 Digital cultural capital and acceptance or rejection of technology

Although the disabled students in this study have high levels of digital cultural capital, their response to technology was varied. While many viewed technology positively, some were more

negative. Two interviewees (21, 22) rejected technologies due to a scepticism or a rejection of technology fads:

A lot of them are on Facebook [...] maybe I'm struggling to get into the 21st century I don't really want to discuss where I went this afternoon, or what I did and if I had a glass of Pimms – why? It's a waste of my time [...] I'm not one of those people that have to have new technology. [22]

Two interviewees (5, 16) at some point in their study made an outright decision not to use technology before even trying it. For both, this decision appeared to be because they were either not confident or not emotionally ready to use it.

It was a massive pain to try and get them because I wasn't in a fit state when I was first assessed so I said no to everything, and then had to be reassessed to get them which took months. [5]

Ten students made references to using technology and then abandoning it. The most common technology specifically referred to was an AT called Dragon Dictate. The three most common reasons for abandoning technologies were: time factors (1,2,20,21) ; technology being too difficult to use (8,7,20) and not knowing or remembering how to use technology (12,22).

I think being mature student and being quite nervous of technology...But time pressures are huge, definitely. I haven't got the time to get it wrong. [20]

The level of technology rejection and abandonment (10/22= 45%) is less than the 85% (10/12) reported by Roberts and Stodden (2005) but higher than the 12% (4/31) reported by Seale et al. (2010). The reasons for rejection and abandonment however are similar to the reasons given by students in these studies. But the evidence regarding rejection and abandonment is perplexing given the levels of digital cultural capital that students reported possessing. Generally speaking, these students were confident and competent users of technologies; so why would they reject or abandon a technology that could enable them to study more efficiently? One potential answer to this question links to the influence of perceived time pressures on students' decision-making. In previous sections we have presented data that reveals the importance of the time and timeliness of training.

From the literature we know that disabled students find it difficult to manage both their disability and their study. The need to learn new and sometimes complex technologies could therefore exacerbate this pressure. If you add to this the fact that many disabled students in HE are introduced to AT and related training right at the beginning of their studies; a time when they also have to get to grips with starting a new course and being away from home, it is no surprise that several students in this study reported being overwhelmed. Faced with such pressures disabled students may therefore decide that in order to survive in HE, they will not invest time in AT or training. If this is the case, the question remains, why was the digital cultural capital that disabled students possessed not enough to provide them with some resilience to cope with such time pressures? We would argue they had the wrong kind of capital.

One example of having the wrong kind of digital cultural capital is the formal ICT qualifications gained prior to entering HE. A significant number of disabled students in this study reported that these qualifications did not help them in their technology use at university. This is probably because such qualifications are very generic and tend to focus on typing and using generic 'Office' applications. Perhaps therefore, disabled students gain very few skills that would transfer to the use of more specialist AT and thus ease the perceived time pressures. Although disabled students get a chance to obtain these skills when they enter HE, through for example DSA funded AT training, our results show that some students find this training overwhelming due to its 'front-loaded' nature which can lead to inflexible timing and delivery.

Disabled students have little control over the timing, speed or content of AT training and tend to be treated as empty vessels that need filling with information about how to use AT. Selwyn (2004, p.355) argued that possession of digital capital 'enables individuals to become producers and distributors of their own cultural products, rather than active or passive consumers of the products of others'. If we apply this argument to the students in this study; then it is possible that AT training places disabled students in an overly passive role. Training is about learning skills and remembering information rather than developing decision-making skills that would enable disabled students to become active and informed consumers of AT. As active consumers, they might be more able to balance in a more informed way, the risks of abandoning technologies and related training with the potential benefits of engaging with them. Therefore perhaps what is missing for disabled students both before and after they enter HE are opportunities to develop the skills required to identify and evaluate information about what accessing AT and related support entails.

4.2 Digital social capital and preference for formal support in using assistive technologies

Evidence from this study has identified a reliance by disabled students on formal institutionally based support mechanisms for help with using AT. This is in contrast to the research that suggests that, for disabled students, peer support can be important in terms of beliefs about what can be achieved by using technologies (Ari & Anan, 2010). The data from the survey reveals a rather complex picture however in relation to how the disabled students interacted with their peers. From Tables 5 and 6 three interesting findings emerge. Firstly, survey respondents rated support received with generic technologies from friends as more helpful than more formal support services. Conversely the help from friends with specialist technologies was rated less helpful than more formal support services. Thirdly, respondents did not rate the support from other disabled students as highly as other sources. The concepts of bonding and bridging capital, may help to illuminate our understanding of these observations.

Putnam (2000) made a distinction between bonding and bridging relationships in which bonding relationships form between people who share a common bond, while bridging relationships bring diverse people together. The common bond that disabled students share with non-disabled peers is the course they are studying. Non-disabled students might therefore be comfortable asking non-disabled peers about help with generic technologies because these tend to be associated with courses or subjects rather than disabilities. Certainly when interviewees commented on the kind of support they needed or how support could be improved, support for using general applications such as Microsoft products or subject specific applications such as modelling programs were

commonly mentioned. Furthermore asking other people for help with generic technologies like mobile phones is commonplace.

Interviewee responses reveal that disabled students can be reluctant to rely on non-disabled peers for help with specialist technologies because: they may be reluctant to burden non-disabled friends with disability related issues; they think that non-disabled friends would not know the answers to disability specific questions or they feel too embarrassed to draw attention to their disability related technology issue:

I try not to involve my best friends too much because I don't think it's fair on them and I try not to involve my dad too much either. I don't want him to worry about me. [21]

Most students I come across [...] are not really aware of what's there. [20]

No – don't use in session [...] feel too embarrassed amongst peers. [16]

In other words what disabled students share with non-disabled peers is bonding capital rather than bridging capital. The difference between them (disabled/non-disabled) separates them when it comes to specialist technologies. For Putnam (2000, p.178) 'real world interactions often force us to deal with diversity' and are therefore a positive occurrence because they promote bridging capital. Anecdotal evidence from this study suggests that one way in which the bridging capital of disabled students might be developed is by disabled students showing non-disabled peers how they too might benefit from using AT:

I think the use of my Dictaphone has influenced my friends to now get Dictaphones and to use them. They've seen actually that it's a really useful tool to have. [1]

The advantage of developing such bridging capital might be a reduced dependence on formal support networks. Whilst interviewees in this study valued formal sources of support, they also commented on how it was not always available at times that were convenient to them. Support from non-disabled peers may be able to 'plug' this gap. Such support is however likely to depend on a de-stigmatisation of AT as only for disabled students (Seale, 2013a).

The common bond that disabled students potentially share with other disabled peers is knowledge about AT and related training. There was however very little evidence that such bonding capital existed in the current study. Just one interviewee identified that support from a disabled person could be potentially useful:

Come to think of it that's not a bad idea. You know what I have thought, that somebody with dyslexia should actually support somebody else with dyslexia. [22]

While just one student talked about how they evangelised about the value of AT related support to others:

I say to people, you know, if you are struggling or if you do have dyslexia or have a problem, go and see the disability or assistance unit. Because actually they are there, they do just want to help you. [21]

Disabled students in this study were not connecting with other disabled students to gather support for their technology use. In the learning disability field, too much bonding capital with other disabled people is considered a hindrance in that it signifies a difficulty in transcending segregation (Bates & Davis, 2004). However, in the context of disabled students in HE perhaps greater bonding capital with other disabled peers would be beneficial; for example, in helping students make more informed decisions about whether to use or abandon AT and related support. This hypothesis requires further research however in order to understand in more depth the extent to which disability, as a dimension of difference, influences bonding and bridging capital compared to other dimensions of difference such as social and economic status or subject discipline.

It is likely however, that disabled students in HE will have less face-to-face contact with other disabled students because there are more non-disabled students than disabled students attending HE. One potential solution to this problem is for disabled students to make online connections with other disabled students studying in other institutions. For example, Lewthwaite (2011) studied how disabled students used Facebook. She argued that the disabled students were accruing valuable social capital by using Facebook, enabling students to survive beyond their close knit social groups.

In seeking to use the concept of digital social capital to understand why disabled students rely on formal institutionally based support for help with AT, our examination shows that disabled students in this study may have ample supplies of certain kinds of social capital: face-to-face support and bonding capital with non-disabled students; and not enough of other kinds of capital such as bridging capital with non-disabled students; bonding capital with disabled students as well as online support.

5. CONCLUSION

In this paper we have argued that the relationship between disabled students, their technologies and HE institutions is complex and cannot be understood solely in terms of access and accessibility. We have used the concept of 'digital capital' as a lens to understand the social and cultural resources that disabled students draw on to support their technology use in HE. Our results show that while disabled students do have access to social and cultural resources; sometimes these resources are not appropriate or effective (e.g. school-based ICT qualifications) or they are not drawing on all the possible resources available to them (e.g. non-institutional based support or support from disabled students). This means that disabled students can lack the 'right' kind of digital capital to enable them to succeed within HE environments. These results have implications for the way support services within HE are conceptualised and organised so that support for using technology is understood and experienced by disabled students as:

- *Diverse*: coming from a variety of sources (formal/informal; within/outside university; disabled/non-disabled students; face-to-face/online)

- *Constructive*: in that it consciously builds on the capital that disabled students already have, seeks to bridge any gaps in capital and encourages disabled students to make links between the different sources of support available to them
- *Empowering*: Enabling students to be more active consumers of technology and to make informed decisions about the relative merits of engaging with technology and technology related training.

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Table 1: A framework for examining the digital capital of disabled students in higher education²

Digital cultural capital	Categories	Examples
	Technological know-how	Using a range of technologies to support learning
		Developing strategies for using generic and specialist technologies to enhance learning efficiency
		Being aware of the pros and cons of using technologies
		Being confident to use technology to support learning
	Informally investing time in self-improvement of technology skills and competencies	Learning through trial and error
		Self-taught by consulting manuals, help pages.
	Formally investing time in improvement of technology skills and competencies	Accredited ICT qualifications gained prior to entering higher education: e.g. GCSE or A levels, National Vocational Qualifications
		Training received whilst at higher education or in employment: e.g. DSA funded assistive technology training sessions
	Influence of family and institution attended prior to higher education in offering early and sustained access and encouragement to use technology	Family positively encourages technology possession and use
		Family members are confident and knowledgeable about technologies
		School or college positively encourages technology and use and acquisition of technological skills and competencies
		School or college ensure access to and provision of technologies to support learning
Digital social capital	Networks of face-to-face technological contacts	Friends on the same course
		Friends who live nearby (e.g. same hall of residence)
		Disabled friends
		Course tutors
		University support staff (e.g. librarians)
	Networks of online technological contacts	Use of social media (e.g. FaceBook)
		Use of specialised online forums
		Use of company websites and help pages
		Use of email

² The categories in column one were first applied by Seale (2013b). The examples of these categories have been drawn from the work by Seale (2013b) and the data from this current study

Table 2: Range of disabilities³ represented across the survey participants

If 'Yes' in question above and you are willing to indicate the nature of your needs, please tick all that apply:		
Answer Options	Response Percent N=153	Response Count
Social communication/Autistic Spectrum Disorder	7.8%	12
Blind or visual impairment	3.3%	5
Deaf or hearing impairment	6.5%	10
A Specific learning difficulty (e.g. dyslexia)	56.2%	86
A physical impairment or mobility issues	9.2%	14
Illness or health condition/mental health condition	34.6%	53
Other difficulties (please specify)	12.4%	19

Table 3: Demographic details of interview participants

Participant	Gender	Age	Length of Study	Place of Study	Level of study	Disability
	Female (F) Male (M)		Part-time (PT) Full-time (FT)	University (U) College (C)	Foundation Degree (Fd) Undergraduate (UG) Postgraduate (PG)	
1	F	21-29	FT	U	UG	Specific Learning Disability
2	F	21-29	FT	U	UG	Specific Learning Disability
3	F	50-59	PT	U	PG	Blind or visual impairment
4	M	21-29	FT	U	UG	Specific Learning Disability
5	F	18-20	FT	U	UG	Illness or health condition/mental health condition
6	M	21-29	FT	U	UG	Illness or health condition/mental health condition
7	F	60+	FT	U	UG	Illness or health condition/mental health condition
8	M	40-49	FT	U	UG	Specific Learning Disability

³ Note: These categories are based on those specified by the UK Higher Education Statistics Agency

9	F	40-49	FT	U	UG	Illness or health condition/mental health condition
10	F	50-59	PT	U	PG	A physical impairment or mobility issues
11	F	30-39	FT	C	Fd	Specific Learning Disability
12	F	18-20	FT	C	Fd	Specific Learning Disability
13	M	30-39	FT	C	Fd	Specific Learning Disability
14	M	18-20	FT	C	Fd	Specific Learning Disability
15	M	18-20	FT	C	Fd	Specific Learning Disability
16	F	40-49	PT	C	PG	Specific Learning Disability
17	F	30-39	PT	C	Fd	A physical impairment or mobility issues
18	M	18-20	PT	U	UG	Illness or health condition/mental health condition
19	F	40-49	FT	U	UG	Illness or health condition/mental health condition
20	F	50-59	PT	U	PG	Specific Learning Disability
21	F	21-29	FT	U	UG	Specific Learning Disability And Illness or health condition/mental health condition
22	F	50-59	PT	C	Fd	Specific Learning Disability

Table 4: Additional coding categories applied to interview data

Responses to Technology	Accept technologies as useful to support learning
	Actively work to improve personal use of technology
	Evangelise: Have such positive feelings about the value of technologies that actively seek to persuade peers to use them
	Static: Accept technologies, but slow or don't do anything to improve personal technology use
	Abandon: Was using technologies but made a deliberate decision to abandon
	Reject: Made an outright decision not to use technology before even trying it
Evaluation of support	Positive or negative judgements made regarding the value or helpfulness of the technological support students have received from either formal or informal sources

Table 5: Ratings of support for technology use prior to attending higher education

If you needed help using general technologies or assistive to support your learning whilst at SCHOOL/COLLEGE what sources of support did you access? Please tick all that apply and rate on a scale of 1 to 6 how helpful the support was (1 not very helpful, 6 extremely helpful).		
Answer Options	General technologies Response Count=153 Rating Average (Rank)	Specialist Technologies Response Count =153 Rating Average (Rank)
Friends from school/college	4.73 (1)	3.47 (3)
Learning support staff	4.16 (2)	4.10 (1)
Teachers/lecturers at school/college	4.08 (3)	3.24 (4)
Privately funded support workers	3.82 (4)	3.84 (2)
People who have a similar disability or learning support need as you	3.49 (5)	3.08 (6)
Online Networks and forums	3.41 (6)	2.98 (7)
Company technical support websites or help lines	3.31 (7)	3.10 (5)
Other	2.74 (8)	1.74 (8)

Table 6: Ratings of support for technology use whilst in higher education

If you need help using general technologies or assistive technologies to support your learning on your CURRENT COURSE OR PROGRAMME, what sources of support do you access? Please tick all that apply and rate on a scale of 1 to 6 how helpful the support was (1 not very helpful, 6 extremely helpful)		
Answer Options	General technologies Response Count=144 Rating Average (Rank)	Specialist Technologies Response Count =144 Rating Average (Rank)
Friends from the same course/programme	4.70 (1)	4.01 (2)
Privately funded support workers	4.02 (2)	4.18 (1)
Lecturers at college/university	4.01 (3)	3.65 (3)
Friends from the same halls of residence or student accommodation	3.68 (4)	2.91 (8)
Other	3.50 (5)	2.89 (9)
Company technical support websites or help lines	3.42 (6)	3.44 (4)
Friends or family from home	3.42 (7)	3.18 (7)
People at the college/university who have a similar disability or learning need as you	3.32 (8)	3.42 (5)
Online Networks and forums	3.16 (9)	3.17 (6)
Workplace colleagues	2.76 (10)	2.65 (10)