# Disabled children and young people's uses and experiences of digital technologies for learning

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# Contents

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## Summary of findings

- Disabled young people were broadly positive about digital technologies and used a range of technologies to support their formal and informal learning.
- Personal ownership and school policies influenced uses of digital technologies such as the potential for personalisation of devices.
- Disabled young people in the study carried out a wide range of activities typical of many young people.
- Disabled young people reported a range of advantages to using digital technologies and particularly tablets generally for learning.
- Disabled young people reported the usefulness of digital technologies for accessibility in order to access the curriculum.
- Disabled young people noted disadvantages of using digital technologies for learning showing that technology alone could not provide complete solutions in all situations.
- Digital technologies can help disabled young people to fit in within mainstream classrooms, but they can also make them feel self-conscious and stigmatised.
- Disabled young people were mainly positive and confident about their own digital skills and competences with occasional frustrations and glitches.
- Disabled young people had developed effective strategies to manage safety online though incidents of bullying or other distress had occurred when they were younger.

- There were differences between how far subject teachers were able to take on board the need to support disabled youngsters.

- Teachers often said that digital technologies were able to support the development of independence, self-management and confidence, essential for disabled young people; and that inclusion needed to be embedded within the culture and practices of the school. This can sometimes be at odds with subject teachers' practices in the classroom.

- Teachers in the project were mostly enthusiastic about digital technologies and used them in a wide range of ways to support disabled young people to learn.

- Qualified teachers of children and young people with vision impairments and teaching assistants were highly active in finding creative solutions to problems and initiating change processes through which learning opportunities were enhanced using digital technologies.

- Teachers noted many advantages for learning using digital technologies for all young people and capacity to enable disabled young people to access the curriculum more easily.

- Teachers noted that using digital technologies was not seamless and not all youngsters were keen to use them. Older (non-digital) technologies were still useful in some situations.

- In order to access the curriculum, disabled young people using digital technologies as accessibility tools carry an extra task or workload which needs to be acknowledged and allowed for. More inclusive pedagogical

design by subject teachers could potentially reduce these frequent ‘workarounds’.

- The skill and dedication of teaching assistants appears to obscure some lack of engagement and inclusive pedagogical design by subject teachers.
- Teachers were largely confident that they themselves had the skills and competences to fulfil their roles and were aware of the important part their skills played in supporting disabled young people.
- Further support in schools would be helpful to use digital technologies, particularly when newer technologies such as tablets are introduced that teachers need access to in order to support young people.
- Teachers noted that disabled young people were mostly able to avoid risk online and risks were low.
- Follow up interviews carried out two-three years after initial interviews suggested that changes in the interim were minimal despite the introduction of of Education, Health and Care (EHC) plans.

## Abstract

This report presents findings from a participatory, in-depth qualitative study to explore disabled children and young people's formal and informal learning practices. Interviews and observations in classrooms took place with seven disabled young people and nine teachers to gain their perspectives about disabled young people's uses of digital technologies at school. Visually impaired children and young people were chosen as an illustrative case for the project and to overcome claims that treating disabled children as a homogenous group was unhelpful for understanding the differences between disabled children. The findings showed that children and young people use and are positive about digital technologies to support formal and informal learning. Digital literacy skills were well developed and enabled the young people to use digital technologies effectively and safely. Mobile devices such as tablets were found to be particularly useful both for learning generally and for accessibility in order to access the curriculum. Nevertheless, digital technologies could sometimes make young people feel self-conscious and stigmatised. Some subject teachers were more on-board than others in supporting disabled young people and this meant that there was sometimes a lack of inclusive pedagogical design which resulted in an extra workload for disabled children. Follow-up interviews carried out two-three years after initial data collection showed that changes were minimal despite the introduction of policy change such as the introduction of Education, Health and Care (EHC) plans.

## Introduction

Whilst there is comprehensive research about young people's uses of digital technologies, there is very little that specifically examines how disabled young

people use, experience and develop appropriate uses of digital technologies such as computers, laptops, mobile devices and the internet (Passey, 2013; Söderström, 2009). This is an important gap in research given the possibility that digital inequalities – in terms of differences in access, online activities, digital competences and skills – may exacerbate current disparities for disabled young people and prevent them having the same online opportunities as their peers. In turn, this could have a detrimental effect on the opportunities they are able to access for learning, social networking, work and the development of digital competences and skills. Moreover, a lack of online skills could leave them at risk and vulnerable online (Ferrari, 2012). Given the very limited previous qualitative research in this area, this study was designed to investigate disabled young people's uses, experiences and practices using digital technologies for formal (related to school-work) and informal (not related to school-work) learning. It has been claimed that treating 'disabled children' as a homogenous group ignores the differences that exist between disabled children (Davis and Watson 2001 in Mallett and Runswick-Cole 2014). For this purpose, disabled children with a visual impairment (VI) were chosen as an illustrative case for the project[1].

This particular group of young people were chosen in light of previous studies which have shown that visually impaired adults meet the most barriers online compared with those with other impairments (Disability Rights Commission, 2004). Even so, systematic database searches of Academic Search Complete, AEI, BEI, ERIC,

[1] Identifying young people by impairment is at odds with the social model of disability embedded within Disabled Children's Childhood Studies approaches (See page 11). Children and young people who took part in the study are therefore identified as 'disabled' rather than visually impaired as they are illustrative of a group of disabled young people. This approach raises a number of issues which will be briefly discussed in the concluding section of this report alongside implications for future work.

Psych Articles, Science Direct and Web of Science have shown that there are very few studies which focus specifically on how children and young people with visual impairments engage with digital technologies in general and for learning and whether they encounter the same kinds of barriers as adults. This is important because what children and young people do in childhood may lay the foundations for the issues they face in adulthood. Of key importance in relation to this is the impact of online activity on engagement in education and work. A key study in this area, therefore, is the report by Kelly and Wolffe (2012) which investigated what percentage of young people between 17-25 years of age with visual impairments in the US were engaged in online activity with digital technologies; and how this varied according to participation in postsecondary activities such as education and training, employment and voluntary work. Survey results with a nationally representative sample showed that 43% of young people use the internet regularly to communicate and that those who use the Internet for regular online communication are significantly more likely to be engaged in postsecondary work, education and training. This shows that there is an important relationship between work or education and learning and online behaviour. Nevertheless, it's unclear from the study whether online activity impacts engagement in work or education or vice versa. A further study from Germany (Pfeiffer and Pinquart, 2013) considered computer access and internet use for school and leisure by young people with or without visual impairments. Questionnaires were completed by 686 young people aged 12-20 including 171 with visual impairments. It was found that young people with visual impairments used their computers more often than sighted peers particularly for schoolwork and searching for information. Also they found that adolescents with visual impairments

use a computer with internet more for social relations than their sighted peers. Again this shows an impact of disability on young people's online behaviour.

A recent UK study on social networking by young people with visual impairments (Hewett et al., 2012) carried out telephone interviews with 70 young people aged 14-17 years. The researchers found that almost all had internet access and accessed it every day mainly from home. Most of the young people had set up a page on a social networking site (91%) whilst many (60%) visited a social networking site on a daily basis to keep up with friends and to discuss homework. These findings are interesting and show the need for further research about disabled young people's engagement in social networking, development of friendships and how being online benefits or disadvantages disabled young people online.

There has been other research carried out where disabled children have been included as a homogenous group rather than identifiable by impairment. Earlier research by Livingstone, Bober and Helsper in the UK (2005) showed that young people's disabilities can be associated with lower levels of internet access at home (which is different to the later finding from Germany that visually impaired children access the Internet more often than their peers (Pfeiffer and Pinquart, 2013)). Livingstone, Görzig and Ólafsson (2011) found that children reported raised levels of risk across Europe, though (positively) digital skills were slightly higher than average. If disabled children experienced upsetting sexual images online, they were less likely to have a friend to talk to about it again prompting further examination of disabled children's friendships and related use of social networking sites.

Söderström's research (2013; 2009) demonstrated how disabled young people negotiate opportunities and barriers online in the development of friendships. Whilst,

online communication enhanced inclusion in local peer groups, exclusion was experienced when young people are not able to join in with their peers to enjoy videos on YouTube and other graphical websites. The internet thereby acted as both facilitator and barrier to young people's inclusion, important given it was also found that they are reluctant to stand out as different from their peers.

These perspectives are useful yet point towards very limited levels of research about disabled young people's online participation. This gap in research includes sustained focus on uses of, and experiences and practices with digital technologies for learning. Yet, the focus on learning, formal and informal, is of particular importance as digital technologies are becoming embedded in the curriculum and it is essential to ensure that disabled young people have the same access to the potential benefits for learning as their peers. The study therefore explores how disabled young people use digital technologies for learning whilst also considering the broader everyday uses in and outside of school to understand the wider context and implications.

**Accessibility**

Given that the key focus of the project is on how digital technologies support education and learning, it's important to define the concept of 'accessibility' through which disabled young people are able to access the curriculum with the support of digital technologies such as computers, laptops, mobile devices and the internet. Following from the work of researchers in Higher Education and e-learning (Seale & Cooper, 2010), this report will draw on the definition of accessibility provided by the IMS Global Learning Consortium because of its relevance to and focus on education and disability.

> [..] the term disability has been re-defined as a mismatch between the needs of the learner and the education offered. It is therefore not a personal trait but an artifact of the relationship between the learner and the learning environment or education delivery. Accessibility, given this re-definition, is the ability of the learning environment to adjust to the needs of all learners. Accessibility is determined by the flexibility of the education environment (with respect to presentation, control methods, access modality, and learner supports) and the availability of adequate alternative-but-equivalent content and activities. The needs and preferences of a user may arise from the context or environment the user is in, the tools available (e.g., mobile devices, assistive technologies such as Braille devices, voice recognition systems, or alternative keyboards, etc.), their background, or a disability in the traditional sense. Accessible systems adjust the user interface of the learning environment, locate needed resources and adjust the properties of the resources to match the needs and preferences of the user (IMS Global Learning Consortium, 2004 in Seale and Cooper, 2010).

As Seale and Cooper note, central to this definition is the emphasis that 'the concepts of adaptation and flexibility and the idea that learning environments can and should be adjusted to meet the needs of learners.' (Seale and Cooper, 2010, p. 1107). The definition is useful for this study because it places 'the needs and preferences of a user', in this case disabled young people, at the core of the relationship between the 'user' and the 'education environment' and emphasises the 'ability of the learning environment to adjust to the needs of all learners'. This

relationship is important for the present study as it is examining how digital technologies support or hinder the ability of the learning environment to adapt to the needs of the learner.

### Disabled Children's Childhood Studies

The study approaches the research from the perspective of Disabled Children's Childhood Studies which emphasises the positive, equal worth of all childhoods (Mallett and Runswick-Cole, 2014). This approach extends a 'social model' of disability which makes a distinction between 'impairment' – based on the medical model and recognised as an individual condition; and 'disability' – created by the social, economic and political system in which disabled people live (Oliver, 1996). The social model has enabled disabilities to be understood as a form of social oppression linking it to questions of 'equity, social justice and human rights' (Cameron and Moore, 2014). Disabled Children's Childhood Studies seeks to challenge perspectives which frame children as somehow deficient, potentially vulnerable and underprivileged as it assumes that disability and disadvantage are direct outcomes of impairment (Cameron, 2014, p. 33).

## Research questions

In light of this background, a research project was carried out to explore the experiences and practices of disabled children and young people when using digital technologies to support their formal and informal learning.

In particular, the project set out to address the following research questions in relation to children and young people in secondary school:

- How do disabled children and young people use and experience digital technologies for formal (related to school-work) and informal (not related to school-work) learning– particularly computers, laptops, mobile devices and the internet – in school and out-of-school settings?
- How are digital competences and skills developed by disabled children and young people to support formal and informal learning? What are the issues they encounter?
- What factors influence how disabled children and young people use digital technologies for formal and informal learning?

## Methods

In order to address the stated research questions, the project was designed as a participatory, in-depth qualitative study to explore disabled children and young people's formal and informal digital learning practices. The participatory approach was considered to be essential for this research given the priority to carry out research 'with' not 'on' children in Disabled Children's Childhood Studies' approaches (Mallett and Runswick-Cole, 2014). Discussion took place with young people and qualified teachers of children and young people with vision impairments (QTVIs)/teaching assistants (TAs)/ subject teachers (STs) throughout to develop questions within appropriate data collection tools and methods, analyses and reporting to ensure that perspectives were well represented in the study. This is important to ensure that methods used were reflected on and developed for their suitability. Therefore, data collection tools were discussed with specialist teachers, teaching assistants and subject teachers before data was collected to ensure their fit

for purpose. Disabled young people were asked to reflect on the methods used – particularly the semi-structured interviews – to understand whether these were a useful tool for data collection and to ensure that the young people were comfortable in interviews and could readily express themselves. Initial data was collected between 2014 – 2015. Draft reports were shared with participants from each school in 2017 and a follow up interview was held with three key participants to discuss the findings and interim changes. Feedback on the report was also received from one of the young people. All comments were integrated into the report before finalising.

Participants were recruited in 3 secondary schools via the Vi-forum. This is a 'DfE hosted forum (supported by the RNIB) to support those involved in the teaching of pupils with visual impairments, share ideas and learn from each other' (http://lists.education.gov.uk/mailman/listinfo/vi-forum).

Table 1: Description of study schools

| | |
|---|---|
| A | This is an urban mixed gender, Church of England Academy. It has 1543 children on roll. The percentage of children with a statement of Special Educational Need (SEN) or Education, Health or Care (EHC) plan is 2.2% (3.9% Nationally). Pupils whose first language is not English is 6.5% (well below the national average of 15.7%). Pupils eligible for free school meals is 12.8% (well below the national average of 29.3%). At the last Ofsted inspection in 2011, the school received an Outstanding rating. |

| | |
|---|---|
| B | This is a semi-rural mixed gender, nondenominational Academy. It has 1524 children on roll. The percentage of children with a statement of Special Educational Need (SEN) or Education, Health or Care (EHC) plan is 2.2%. Pupils whose first language is not English is 2.2% (well below the national average of 15.7%). Pupils eligible for free school meals is 12.7% (well below the national average of 29.3%). At the last Ofsted inspection in 2013, the school received an Outstanding rating. |
| C | This is an urban, mixed gender, Roman Catholic high school. It has 779 children on roll. The percentage of children with a statement of Special Educational Need (SEN) or Education, Health or Care (EHC) plan is 1.4%. Pupils whose first language is not English is 2.2% (well below the national average of 15.7%). Pupils eligible for free school meals is 18.1% (below the national average of 29.3%). At the last Ofsted inspection in 2014, the school received a Good rating. |

Semi-structured interviews were carried out with seven disabled young people to gain their perspectives about their experiences and practices of using digital technologies for learning. Semi-structured interviews were also carried out with three subject teachers (STs), three qualified teachers of children and young people with vision impairments (QTVIs) and three teaching assistants (TAs) identified as closely

supporting the young people in order to gain their perspectives about how this group of young people are supported to use digital technologies for learning at school[2].

Table 2: Description of sample of young people (with pseudonyms)

| **Child** | **Age** | **Gender** | **School** |
|---|---|---|---|
| Fern | 14 | Girl | A |
| Rachel | 14 | Girl | A |
| Nigel | 13 | Boy | B |
| Laura | 16 | Girl | B |
| Jem | 17 | Boy | B |
| Simon | 17 | Boy | B |
| Siobhan | 14 | Girl | C |

All the young people are visually impaired except for Siobhan who is blind.

Table 3: Description of sample of subject teachers (STs)/qualified teachers of children and young people with vision impairments (QTVIs)/teaching assistants (TAs)

| Teacher | Role | Gender | School |
|---|---|---|---|
| QTVI(1) | Qualified teacher of children and young people with vision impairments (QTVI)* | Female | A |
| QTVI(2) | Qualified teacher of children and | Female | B |

[2] Interviews also took place in a primary school with a disabled pupil and two teaching assistants. These interviews were excluded from the current report given the specific focus on young people at secondary school.

| | | | |
|---|---|---|---|
| | young people with vision impairments | | |
| QTVI(3) | Qualified teacher of children and young people with vision impairments* | Female | C |
| TA1 | Teaching assistant | Male | A |
| TA2 | Teaching assistant* | Female | B |
| TA3 | Teaching assistant | Female | C |
| ST1 | Subject teacher | Female | B |
| ST2 | Subject teacher | Male | B |
| ST3 | Subject teacher | Female | B |

*These teachers also took part in a follow-up interview in 2017.

Where possible, observation also took place of each young person in the classroom to understand the uses of digital technologies for learning in situ, noted by hand on a standard proforma to capture classroom activities, technologies used by young people (mainstream/assistive), opportunities and barriers to using digital technologies and support available.

Recruitment to the project was a particular challenge given the 'additional layer' of gatekeeping for disabled children (http://ethicsguidebook.ac.uk/Research-with-children-105; https://www.nfer.ac.uk/nfer/schools/developing-young-researchers/NCBguidelines.pdf). Also, visual impairment is said to be 'low incidence, high distribution' which added an additional challenge to time and budgetary constraints. Nevertheless, these factors were weighed against the need to hear the voices of disabled children in research with the aim of investigating practice.

Sensitivity was needed to ensure that young people and teachers were not inconvenienced nor stigmatised by the process; also some schools and young people themselves could accommodate the interview but not the observation. In one

of the schools (School B), a teaching assistant sat in on the interviews at the request of the school. She placed herself unobtrusively at the back of the room. It was difficult to gauge the impact of presence though of course, it's possible that this had an impact on the openness of responses. In two of the schools (A and C), it was not possible to interview subject teachers whilst the qualified teachers of children and young people with vision impairments and the teaching assistants were deemed to be the most appropriate adults to respond to questions about how disabled young people were supported. Therefore subject teachers' perspectives are drawn from one school only. The data from the interviews have been included in the analysis given its relevance to answering the research questions but with the caveat that it provides direct accounts of subject teachers' perspectives from one school only.

To address the practical issues of recruitment, therefore, a pragmatic decision was taken at the analysis stage to combine interview data with young people and teachers (qualified teachers of children and young people with vision impairments, teaching assistants and subject teachers) together to provide a holistic overview. Nevertheless, it remained crucial that the young people's voices were heard given the dearth of research considering their views in this area. In response, data collected from the disabled young people has been reported initially to ensure the preservation and prioritisation of their views in relation to uses of digital technologies for learning; and digital competences and skills. Secondly, teacher perspectives have been written up to provide a complementary overview and support the identification of the factors that influence how disabled young people use digital technologies for learning within the schools. There are two main consequences of this approach. School characteristics and other differences have been given less emphasis than if the analysis had compared and contrasted the different approaches

taken in schools. Also, results are more prominent regarding the formal, school-related digital uses of disabled young people than the informal, not for school-work related activities. Nevertheless, the results have generated a holistic, rich snapshot of what was happening in the schools visited whilst maintaining the credibility and trustworthiness of findings.

To analyse the data, interviews with all participants were transcribed then common themes were identified across the sample in line with grounded approaches to qualitative data analysis (Charmaz, 2006). This was carried out in stages: texts were read several times to build an awareness of the data; and develop a preliminary coding frame. The codes were then revisited and refined to increase dependability. The data was systematically coded into themes using Atlas TI software; analysed and reported in order to answer the research questions. Observational data was written up and used to complement and deepen the analysis of the interview data thereby adding authentic detail and richness to the reporting.

The host University's Ethics Committee granted ethical approval for the project following the rigorous approval process. In the reporting of the project, all names have been changed and it has been necessary to hide some of the young people's details and achievements to ensure their anonymity. For example, where young people have specific hobbies such as (guided) skiing or swimming, the report will mention participation in sport. The wish is not to undermine these young people's accomplishments but to ensure anonymity by removing potential identifiers.

## Results

### Disabled young people's experiences and practices

The results drawn from interviews and observations of disabled young people will be reported initially followed by interviews with teachers[3]. The main themes which emerged from analysis of the data collected with disabled young people are in relation to ownership and access to digital technologies; uses of digital technologies in and outside of school; opportunities enabled by digital technologies for learning and potential barriers; and digital skills and competences.

#### Ownership and access to digital technologies

Talking to the disabled youngsters showed that they use a range of technologies, such as computers, laptops, tablets, the iPod touch, mobile phones and assistive technologies (i.e. supernova; a Braille notetaker) and that these complement each other to support both formal and informal learning. The data show how school policies often influenced what the young people owned and had available for use both at home and in school. For example, School A, had provided two 14 year old girls with an HP Envy (a laptop with detachable tablet) to use whilst in school only. These were computers specifically set up (often on a daily basis) to support the girls' learning within lessons to access the curriculum. Both of the girls owned their own mobile phones and one also owned an iPad which she said she used for 'playing

[3] Within the report, 'teachers' refers to qualified teachers of children and young people with vision impairments, teaching assistants and subject teachers grouped together.

and like talking to my friends' as well as for schoolwork. The other used a computer at home.

In School B, iPads had recently been introduced for all year 8 children to use at school and away from school, paid for by parents. Nigel, 13, said he was allowed to use the iPad as he wanted including downloading apps to it. Nevertheless, school regulations prevented use of some apps in school, for example, messaging apps were blocked in school. Nigel also had an iPhone and said it was helpful that that his family use just Apple devices as they 'easily connect'. Disabled young people in the 6th form in School B were also allocated iPads with a detachable keyboard but for use in school only for school-related purposes. Simon, 17, said it was possible to add apps without the permission of a teaching assistant but he had not found the need to do this. He also used a laptop at home which he finds easier for writing longer essays. He said he would have liked to have had access to an iPad earlier because owning an iPhone had shown him how useful an iPad would be for school. Meanwhile, Jem (School B) also found the iPad provided by school useful and had used it to replace a laptop with supernova (magnification package). He used a mobile phone for calling and texting; and an iPod touch at home for social uses including Facebook and listening to music. Meanwhile, Laura, 16 was between the different schemes in School B and was not eligible for a school-provided iPad. Nevertheless, her parents had provided her with one that she was able to bring to school and use in classes with the teacher's permission. She also used a computer at home to type up homework with supernova assistive technology to help her enlarge her work. Laura said that it was important to her that the contents of her phone (an iPhone) and iPad were personal and private; also that owning her own iPad gave her independence from the school. Siobhan, 14, in School C said that she

used a Braille notetaker in school, and was learning to use a personal laptop with Jaws speech output software. At home, she used an iPhone or an iPod touch to contact with friends, she said: ‘I use my phone like any other teenager would so texting, Facebook, Twitter, YouTube’.

The data show therefore, the different technologies that the young people adopt and use. In addition, it was clear how school policies and parental provision of digital devices had influence on uses with some young people experiencing fluidity of devices across the home-school boundary whilst others had a more bounded experience. Furthermore, some of the same devices responded differently depending on the setting due to different regulatory practices. These conditions could potentially affect integration of formal and informal learning activities, and create separation between home and school related activities. In addition, there are possible implications for personalisation of devices, privacy and independence. Laura, for example, commented on the benefits of personal iPad ownership compared with school ownership that could constrain personalisation of devices.

## Uses of digital technologies in and outside of school

### Digital activities for learning

The disabled young people talked in interviews about a range of activities they carry out using digital technologies within and out of school. In school, common activities include Internet research (i.e. Wikipedia, Google) accessing textbooks, using pages or Microsoft word for writing, using keynote or PowerPoint to create or access presentations sent to them by teachers, revision web sites and apps, music composition, creating videos to improve performance at sport and, in one example, searching for French vocabulary. Nigel, 13, in School B gave an example of

searching on the internet and, as an aside, said he was getting confused between French and German food vocabulary as both are being studied at the same time.

> Int: I hear you use iPads a lot in French.
>
> Nigel: Yeh, and I think it was just searching vocabulary, cos we're doing food in French as well. It's getting confusing. (Nigel, 13, School B)

None of the participants said they had experience of coding at school which is interesting given the emphasis on coding in the new Computing curriculum introduced September 2014, around the time of the initial interviews. In relation to collaboration, only one young person, Simon, 17, in School B spoke of working together online with peers. He described using Dropbox and Prezi to collaborate on a project at school and at home.

> Int: Anything … . Do you have projects where you work together?
>
> Simon: Yeh it's either Dropbox, I mean basically for our business exam, our second one this year, it required us to get a load of research about individual businesses, so what we did was, we all took a business each, found the news articles and then put it onto Dropbox in our own group folder, so we could just go in and take out the relevant bits and pieces. You can do it at school, at home, whenever really, all you need is an internet connection. And they have, there's a website called Prezi. They use that for group presentations where again anyone can be working on it at the same time, you can make amendments as and when. (Simon, 17, School B)

**Digital technologies for assessment**

There was also some mention of using digital technologies in exams or for assessment more broadly. This sometimes reflected how independent the young person could be in these situations to carry out the assessment without the help of a teaching assistant. Jem, 17, in School B, for example, said that laptops were allowed in exams but not iPads in his school.

> Jem: It's it depends on your sort of like needs, um. I have the option of doing it on the laptop and, I used it for about half my GCSEs, depending on what sort of subject they were. Things like maths, it's just much easier to write them so. But this year I just used my laptop for all of them because, well not maths. There's like a specific exam ones which you know have nothing on them. (Jem, 17, School B)

Laura, 16, in School B said she had used an 'exam laptop with supernova' to take an exam; also that she had used a 'scribe' or teaching assistant to whom she dictated answers. Siobhan, 14, in School C similarly said that in a controlled assessment for science she had carried out research on the computer. She had needed to search for and find appropriate sites, then asked the teaching assistant to find the same site and copy it into the assessment for her. In relation to coursework, Siobhan also said that she was able to give her subject teachers work to mark on pen drives which they then returned to her as a word file and she then translates to Braille. These examples show how digital technologies can be useful for more independent assessment practices by the young people yet there are remain instances where a scribe or teaching assistant is needed.

### Digital technologies for homework

For homework, the young people said they carried out Internet searches, again using Wikipedia and Google. An example of this came from Rachel, 14, in School A as she said she had searched for art images for a poster. In some schools and lessons, homework was accessed via virtual learning environments. Revision sites were popular amongst the young people in preparation for exams and tests. Jem, 17, in School B said he had been on the Internet to identify which universities to apply for and complete a Universities and Colleges Admissions Service (UCAS) form. Laura, 16, in School B said she typed up homework on her home PC. Simon, 17, in School B said that amongst his peers, there could sometimes be discussion about homework on social media sites such as Facebook and Twitter.

### Digital technologies for hobbies, interests and keeping in touch

A variety of activities were carried out using digital technologies outside of school that were liked and found useful by the youngsters in and out-of-school. These activities often reflected and complemented other interests such as sports or music; and enhanced friendships and enabled keeping in touch with friends and family further away. Activities included keeping in contact with friends using Facebook or Twitter, online shopping, watching comic videos, playing games on mobile phones (for example, flappy birds) or on the Xbox (for example, FIFA), listening to music and keeping up with sports. For instance, Jem, 17, in School B provided a typical response.

> Int: … What do you like about Facebook?

> Jem: Um, well just that, I guess, well everyone likes Facebook really, you keep in touch with people and organising things and stuff like that really. (Jem, 17, School B)

Siobhan, 14, in School C is keen on music and explained that she liked to use the Sibelius app to compose music and lay down tracks played on her guitar. She also used a colour detector app to match her clothes as she cannot see them.

> Siobhan: On my phone I have colour detector. I turn the app on and what I do is I hold it up to something depending on what colour it is. It's really helpful if I'm going out and I need to get changed and there's no-one in the house.
>
> Int: How do you imagine colours?
>
> Siobhan: Um, I, yeh I basically just know what goes with what. For me a colour's just a tag, it doesn't really mean anything but I know that blue, a light colour wouldn't really go well with a dark colour. Um, yeh I don't know, I just know, I think just from people talking and, er that's an ugly colour, and that doesn't go with that. So my wardrobe's just filled with jeans. Jeans go with everything, that's what I think anyway. (Siobhan, 14, School C)

In addition to consuming sports online, Nigel, 13, in School B videoed his performances at sport in order to improve his technique; Laura, 16, in School B filled in a sports diary online that she shared with her coach.

### Reflections on uses of digital technologies in and outside of school

This account shows a range of activities carried out by the young people, typical of many young people's online activities to support education and outside interests. It is clear from the data that whilst digital technologies can complement the support given by teaching assistants, thereby adding to the young person's independence, there are also instances, for example in exams, where other assistance is still required. In addition, there are occasionally more diverse uses of technologies such as Siobhan using an app to help her choose her clothes. This another example show how young people individualise digital technologies to their own needs and preferences both in and out of school.

## Opportunities and barriers of digital technologies for learning

### Opportunities for learning

The uses of digital technologies reported above have much in common with previous studies of young peoples' technologies' uses. Similarly, when asked about the opportunities enabled by digital technologies to support the young people to learn, examples were also typical. Nevertheless, these uses were intermingled with examples of how digital technologies, particularly tablets, enhanced accessibility for the young people. In relation to general uses, responses often included preferences for tablets over laptops or textbooks unrelated to disability. For instance, young people reported several advantages of digital technologies. These included the physical attributes of tablets that helped to avoid the need to carry heavy textbooks, detachable keyboards useful for writing longer essays, tablets being good for reading books on, iPads being much easier to carry around given that laptops are heavier, tablets being simple and easy to use, and tablets more transportable when used in cars.

Siobhan said that she enjoyed using tablets for learning as they can be used for lots of different things and she could not survive without the Internet. Laura said she found it much easier to connect to the Internet using her iPad in classes whereas it was more difficult and took much longer with her laptop. Nigel, 13, School B, said that he found tablets more fun than reading on a textbook due to their interactivity and the fun of swiping rather than turning pages.

> Nigel: Um, the things like that you can get on the internet and it's just in front of you and that it makes it a bit more fun than just reading a textbook.
>
> Int: How would you describe that as fun?
>
> Nigel: Because it's more interactive and you're like involved with, it's not just turning pages, like things that you can do with your fingers and like swipe, it's just more fun to turn pages. (Nigel, 13, School B)

**Opportunities for accessibility**

In relation to accessibility, the young people described many ways in which digital technologies, particularly tablets, supported their learning through providing access to the curriculum. For example, young people liked that accessibility settings such as magnification was built into tablets because this makes it much easier and quicker to set up than a laptop with magnification. Some of the young people said that they found it useful to zoom in and see enlarged text. Subject teachers made PowerPoint presentations available before or at the start of classes ready for the young people to open so that they could see them at the same time as others in their class. Some of the young people said it was useful to take a picture of an image in a textbook, screen or Whiteboard and then enlarge it, hold the tablet closer (made easier

because of the light weight) or change the contrasts in order to see it. For example, Laura said that she liked to enlarge the keyboard when using a touchscreen because then she can see the letters as she cannot see her handwriting: 'Because if I write I can hardly see my own writing'. Also, she finds it very useful to type her work up because then she can enlarge it. Laura clearly values the independence that digital technology uses can afford and noted this several times in the interview, for instance: '…but now I've got my iPad, I feel very, more independent, which is what I want to do and what other people want me to do as well.' Laura's favourite subject is Creative Media which as she describes, is made possible for her through technology.

> Laura: Creative media. Um, it's done in ours yeh, it's really good. It's a BTEC so there aren't any exams, which is quite good for me, one less to worry about it. I love creative media, it's my favourite subject ever, yeh. And then the other side of it is photography, um so together it makes creative media. But in the TV side we have to actually go out filming, like scenes and then actually edit them in Premierpro and because the school have got like an optical mouse, which is basically like a little window that comes up and that enlarges it, um that's really helped with the editing, cos you have to edit like really detailed things. So that has really really helped in that aspect and the same with Photoshop. Um, yeh so that's pretty much helped me in that. The school have been really good at doing that sort of thing. (Laura, 16, School B)

Likewise, Fern described how she likes to use touchscreens because she sometimes cannot see the mouse, and with a touchscreen she can move easily to find it.

> Fern: Cos like sometimes, you know it sometimes goes to a white background, like the mouse blends into the background. With a touchscreen you can just like touch it. (Fern, 14, School A)

Siobhan, 14, is blind and said that while she enjoys using tablets, she also needs a laptop and Braille equipment given she has no sight. For example, when a subject teacher uses PowerPoint, a teaching assistant needs to copy this into a basic word file to make it linear for it to be translated into Braille. In School A, Fern, 14, and Rachel, 14, have a dedicated laptop with detachable tablet set up for them in advance. Rachel said that she found it useful that everything was ready for her to use. Jem, 17 and Simon, 17, both like to record notes and play them back to themselves for revision.

> Jem: […] And then for revision I, there's this setting whereby you can listen to your notes back, so a lot of my revision consists of the iPad reading notes to me that I've written on. […] It is easy to sort of you know switch, so often I'd read it as well as it being read to me so that it's sort of double on me if you like. (Jem, 17, School B)

**Barriers to learning**

The accounts above show how the young people independently or with the support of teachers and teaching assistants have developed practices using digital technologies to support their learning generally and in relation to accessing the curriculum. Nevertheless, alongside the positive benefits of using digital technologies the young people also talked of the barriers they faced. Again, these could be split into those related or unrelated to disability. For example, Rachel said that when she removed the tablet screen from the HP envy, she sometimes found it accidentally

shut down. This could be a feature of the HP Envy rather than disability. Jem, 17, said that he gets impatient with the time it takes to load documents on the PC. Whilst much preferring to use the iPad, he admitted that he found putting textbooks on the iPad a challenge due to shortage of space and not understanding how to save to the cloud. Simon said that he definitely needed a detachable keyboard for the iPad, it would be difficult to write an essay on a touchscreen. He also noted it took him a long while to get access to an iPad through school and this had frustrated him because he could see how useful it would be from using his iPhone. He noted another frustration was when the PC crashes and he gets error messages for no reason.

**Barriers to accessibility**

In relation to disability, Siobhan said that she found the need to reformat PowerPoint documents into linear order for translation into Braille frustrating. Laura, 16, said that she did not use technology that much in lessons because staff were so used to enlarging worksheets and many had not yet adopted new practices using tablets and laptops. In addition, some teachers liked her to use her laptop rather than iPad. For instance, one teacher delivers power points to her on memory stick rather than through email. Laura said that she can understand her reasons for this as email may not be 100% reliable, but it means then she has to carry both laptop and iPad around school. Also her laptop is less reliable than the iPad as it is older. Nigel, 13, said that often the technology does not work seamlessly but that this didn't bother him because as he said: 'I'm used to it' and was able to keep up with the work with the help of a teaching assistant as backup. For instance, in an observed lesson, the teacher used an animation of food stuffs for the children to call out and practice

vocabulary but this did not work on Nigel's iPad so the teaching assistant whispered the English words to Nigel instead so that he could participate.

In consideration of more affective dimensions of using digital technologies in classrooms when other children do not, Fern mentioned that she sometimes felt somewhat stigmatised by being the only young person in class using an HP Envy (tablet/laptop) when other young people in the same class were not using technology.

> Int: Does that bother you at all?
>
> Fern: Sometimes, cos like I feel like everyone's looking at me, cos I have it and like. (Fern, 14, School A)

Fitting in is also important to Laura as this response shows though in Laura's case, friends' ownership of iPads clearly helps.

> Int: … What do you like most about the iPad?
>
> Laura: I like it because it's more independent for me. I feel like just an ordinary person when I'm using it, because I like to be a tiny bit different, but I don't like to be so much different that everyone treats me differently. Um, I like to be just like a normal girl sort of thing in the mix, which I quite like. Um and having an iPad and my friends have iPads as well, it just makes me feel like I'm one of them basically. (Laura, 16, School B)

The interviews with young people show how they perceive digital technologies to be important for learning both generally and through the accessibility they provide which enables them to access the curriculum more easily. Barriers are mainly related to

technical frustrations and subject teachers not always taking on board young people's needs and preferences.  This is important for the conclusion sections because it highlights lack of accessibility, the ability of the environment to adjust to the young person.

**Reflections on the opportunities and barriers of digital technologies for learning**

The opportunities facilitated by digital technologies such as mobile devices are due to their general affordances being used in creative ways, for example, the ability to take and enlarge photographs. These are then combined with the inbuilt accessibility settings by the young people, which enable them to benefit further through their own agency combined with the support of teachers, teaching assistants and qualified teachers of children and young people with vision impairments.

The implication in relation to technical difficulties is that schools and technology providers need to ensure that digital technologies can be used as seamlessly as possible. A further implication is that (some) subject teachers still need to develop more awareness and skill to support disabled young people in mainstream schools.

A further reflection is that, for these young people, uses of digital technologies sometimes represent a balance of tensions and choices between increasing their own independence through using digital technologies versus self-consciousness and a need to fit in. Many teachers understand this tension as will be seen in the interviews with teachers later in this report.

## Digital skills and competences

### Digital skills

A key element of how young people use technologies is whether or not they possess adequate skills and competences. Much has been written about this under the guise of terms such as ‘digital literacy’, ‘digital capabilities, ‘media literacy’ and ‘Internet literacy’. Alongside this, a number of frameworks have been developed for the development of digital skills and competences. As an example, a framework was developed by the Institute of Prospective Technological Studies (IPTS) (Ferrari, 2012) as shown in Figure 1.

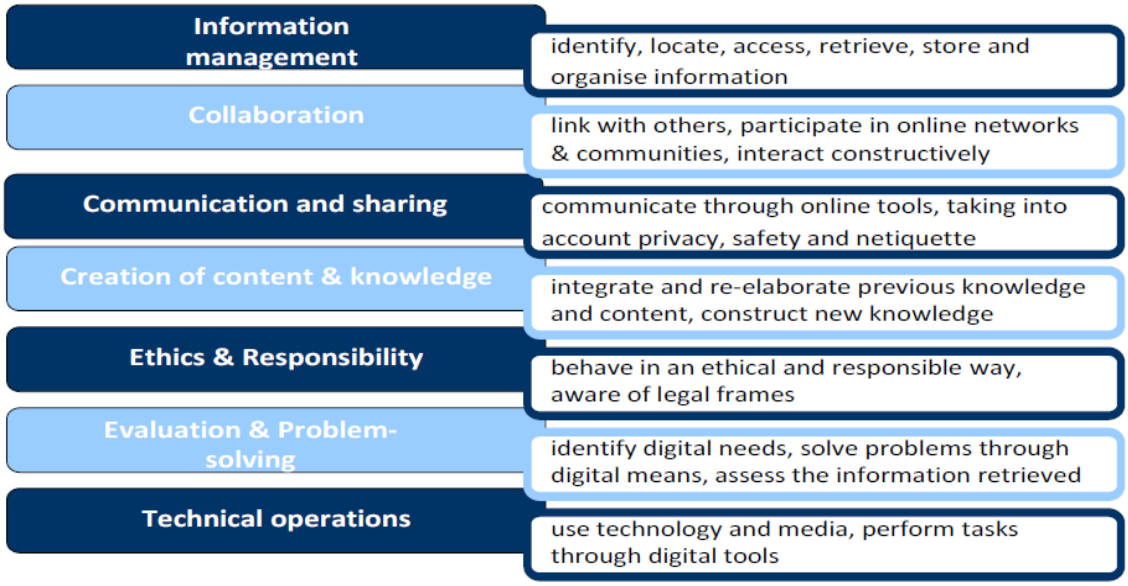


Fig.1 Institute for Prospective Technological Studies (Ferrari, 2012)

Frameworks such as the IPTS example (Ferrari, 2012) are useful for providing a detailed overview of the kinds of skills and competences which are needed and implicitly demonstrated by activities carried out by disabled young people using

digital technologies. This section will describe the skills and competences as mentioned by participants in the interviews.

All the young people were mainly positive about their skills. Simon (17, School B) considers his skills to be better than most people with technology and will prepare him well for University (he had applied and was waiting for results). Similarly, Siobhan (14, School C) assumes that she is able to use technology well because of her age but does add the caveat that she is not an 'expert':

> Siobhan: Oh, I always say to my mum, you're really wise, mum but it's a fact that the younger generation know everything about technology. […] I'm not the best. I'm all right with it, but, I'm not an expert. (Siobhan, 14, School C)

Likewise, responses from the other youngsters suggest they think using technology is 'straightforward'. In the process of transition to college, Laura (16, School B) said that she was able to use technology to be 'more independent' which would prepare her well for University. In addition, several of the young people mentioned that they can touch type and that this was learnt in primary school and useful for typing up notes and other text. There are also occasional frustrations such as having difficulty moving large documents between devices (Jim, 17 and Simon, 17, both school B). Simon also mentioned he gets exasperated when the computer crashes or there are errors seemingly without reason. Fern (14, School A) said that she got irritated sometimes when she forgets how to do something.

> Int: It sounds like you've got very good computer skills. Do you get frustrated at all, are there things you don't know how to do?

> Fern: Yeh. Like sometimes when I don't know how to do it, I just get frustrated cos I'm like, I know how to do it but I don't. (Fern, 14, School A)

When asked about how the disabled young people had learnt to use technology, in a typical response, Simon (17, School B) said that he had picked it up as he went along through trial and error.

> Simon: Yeh it's more I'm just used to it really, because I've been doing it for so long, you just kind of pick things up as you go along and little bits and pieces, oh that's useful.

He also believed starting out young with computers had contributed to his having skills which he considered advanced for his age. Siobhan (14, School C) said that she also used trial and error to learn things. In relation to using supernova speech output on the laptop, she said:

> Siobhan: At first I was like, there's no way I'm going to be able to do this. Three hours later, I'm doing it. (Siobhan, 14, School C)

Exceptionally amongst the participants, Jem (17, School B) said that when he was younger he had been nervous about using technology and that this plus lack of interest had put him 'behind'.

> Jem: Yeh I guess lack of interest, I guess I never really, like I said before like as a young person I was never, too much interest so I guess maybe I was a couple of years behind.
>
> Int: Any reason why you were apprehensive?

> Jem: Um, maybe because they were difficult to enlarge. Cos talking like ten years ago where it, so knowledge, iPad didn't really exist and it was a lot less advanced than it is now. So maybe it was that, um but yeh sort of more recently I've sort of got more used to it and it's not really a problem. (Jem, 17, School B)

Like others in the interviews, Jem alludes to how tablets and advances in digital technologies in general have become easier to use, possibly needing less skill to operate than laptops with magnification etc. which have enabled him to catch up with his peers. Nevertheless, noting the different uses of the accessibility settings on tablets operated by this group of disabled young people, suggests that they need and use a wide repertoire of skills in order to zoom, playback, edit pictures, use the focus to take a picture and other workarounds. Participants such as Nigel (13, School B) describe using the inbuilt accessibility settings on the iPad such as triple tapping which shows an added dimension of skill and control.

> Int: On the iPad when you zoom, do you tend to do that [MAKES GESTURE] or do you have it set to larger text?
>
> Nigel: Well on the internet I do the pinch thing, um but when it's like emails and texts, I've got it set to large text and then, cos some apps you can't do the pinch. So I've got another accessibility which is you tap with three fingers twice and then it just zooms in and you can change how far it zooms in. (Nigel, 13, School B)

Most of the youngsters describe searching for, identifying and evaluating sites for schoolwork as straightforward. A couple noted that they used Wikipedia whilst being told by teachers that they should not. Jem (17, School B) said that sometimes

teachers recommend useful websites to use. Fern (14, School A) noted that sometimes it can be difficult to search well unless she can see the letters she is typing using magnification. For evaluation, she looks for websites she hopes are reliable. With searches and other activities, all the young people mentioned support (including extending their knowledge of apps and software) they receive either from teachers and teaching assistants at school, from parents and in one case for Siobhan (14, School C) from the company, Humanware, for the use of both assistive technology and with the iPod touch.

**E-Safety and managing risk online**

In relation to e-safety, across the board the young people reported that they had not been upset online and cases of bullying were rare. Laura (16, School B) said that bullying had been worse at primary school and that she assumed that this happened because of her disability.

> Int: On line safety. … Has anything ever happened to you that's upset you or you wish hadn't happened … ?
>
> Laura: If you've got slight difference um and not one of the, I was going to say ordinary people [LAUGHS], but yeh if you have got visual impairment, I did used to get, I did used to get bullied quite a lot but I just, I very much think positively about most things. I say things happen for a reason and if I get bullied, I don't mind, cos it's who I am, I'm not going to change who I am just because someone doesn't like it.
>
> Int: That sounds like it was in the past?

> Laura: It was, cos I didn't used, I used to be the only person in my primary school with a disability and I love being one of the other people.
>
> Int: And that was hard for you?
>
> Laura: Yes. But sometimes I did get called horrible names and stuff like that but it just makes you tougher. Um, it makes you in some ways ready for the workplace, cos it's not going to be all happy, all sweet and everybody's going to be ok with everything in the world. (Laura, 16, School B)

Whilst Laura has reconciled herself to bullying as seemingly a fact of life that she takes for granted, it is sobering that she considers this good preparation for the workplace. In contrast to Laura, Siobhan (14, School C) said that if she received an unpleasant comment online, she would assume it was because everyone does, not as a result of her disability. She mentioned that she sometimes saw comments online aimed at disabled people but not specifically at her.

A range of strategies were deployed by the young people to stay safe online. Fern (14, school A) for example said that she only accepts friends on Facebook who go to her school or who are a friend of a friend. Whilst she has her profile set to public, she never says where she is so that anyone could find her. Similarly, Laura (16, School B) said she would not meet anyone face-to-face that she met online and only accepts people she knows as friends. Most young people mentioned they had taken part in safety advice sessions at school and their schools also block some software in addition to having no tolerance policies on bullying. In spite of these positive reports of being online, there were signs that the young people are cautious and

remain aware of the risks. Fern (14, School A) said that she did worry about being online, and Siobhan said that she tried to keep away from anything upsetting and was also concerned about the consequences of her own actions in the future.

> Int: … Which websites do you use most often? You mentioned YouTube and Facebook, tell me about Facebook.
>
> Siobhan: I don't really use it that much anymore. I only use it for the messaging, just to keep in contact with friends, or family that I've got abroad. I'm not bothered about status and pictures and stuff like that. And I don't really want to do something I'll regret, cos what goes on line stays on line.
>
> Int: You're touching on safety. How do you make sure you're safe?
>
> Siobhan: I only have people I know. I don't, I don't engage myself in conversations that could be used for something that I don't want. I don't reply to any comments that are from anonymous people.
> (Siobhan, 14, School C)

The comments from Siobhan and the other youngsters suggest an awareness and healthy regard for e-safety which includes taking responsibility for actions brought about by parental support and school e-safety initiatives and policies.

#### Reflections on digital skills and competences

The interviews suggest that most of the youngsters interviewed are competent in terms of digital literacy and fairly confident that they have the skills they need for school and, in some cases, for the transition to 6th form or University which will happen soon. Indeed, the accounts given demonstrate that the young people have a

wide repertoire of skills and competences given the need to be both creative with technologies to access the curriculum and to learn to use the sometimes complex accessibility settings or assistive technologies on which they rely. The young people interviewed also seemed able to avoid risk and stay safe online which the data suggest have been influenced by e-safety strategy training given by the schools. Nevertheless, there are a couple of instances of anxiety about being online reported and also earlier bullying incidents which suggest that more could have been done in primary schools to develop the skills and competences online that the children needed earlier.

## Teachers' perspectives on experiences and practices

This section reports on semi-structured interviews carried out with three subject teachers (STs), three qualified teachers of children and young people with vision impairments (QTVIs) and three teaching assistants (TAs) who support disabled young people to learn using digital technologies for learning at school. The main themes which emerged from analysis of the data collected with teachers are in relation to school support provided for the disabled young people; uses of digital technologies in school to support disabled young people; opportunities and barriers of using digital technologies for learning; and digital skills and competences.

### Support for disabled young people in school

#### Overview of support structures

General support for each of the disabled young people was structured similarly in all three schools. It was overseen by a regional qualified teacher of children and young people with vision impairments who worked closely with each school to support the needs of the individual child; and in turn to work alongside and support teaching

assistants and teachers. In School B, for example, QTVI2's role is to support any child with a visual impairment which she defines as 'any visual condition which can't be corrected by glasses'. She visits the school regularly (at least once a week) to meet with the teaching assistants and students, and describes the main components of her role as follows:

> QTVI: I have meetings with the students that will be to assess their needs, to chat to them about how things are going, to look at any equipment issues. If they're given a new piece of equipment, I will do some training with them to make sure they can use it. I would also then observe each of the students in class from time to time just to see how they're doing. And the other big thing that I do, is I do a training session at the beginning of each year. I do one for any new teachers or any new staff about all the students and I do another one specifically for the teaching assistants about how to support. (QTVI(2), School B)

Teaching assistants also took on a similar range of responsibilities in each school to support the young people generally including with digital technologies. For example in School A, there are 69 statemented children and a team of 9 teaching assistants supporting them on a rotational system. Teaching assistants often specialise, for instance, in School A, TA1 specialises in both visual impairment and digital technologies. He said that his responsibilities can change year by year underpinned by the need to appropriately support the young person, 'So they're getting the correct support where they need it' (TA1, School A).

Additional support was also provided for the disabled young people from external providers. For instance, in School C, QTVI(3) explained how the Rehabilitation Officer at the local County Council supported Siobhan with mobility training, technical support came from Action for Blind People and Humanware (a not-for-profit support organisation and a technical company), there was also contact with Guidedogs for the Blind and Partially Sighted People (also a not-for-profit support organisation) in case a guide dog was needed at a later stage.

In addition to the discrete support teams, subject teachers also teach disabled young people as part of their teaching role. Even so, there appeared to be differences as to the extent to which subject teachers integrated this into their role and were proactive in anticipating and adjusting to students' needs. For example, ST1 said that she supported the disabled student in her class through sending PowerPoint presentations in advance and in preparation of last-minute resources, enlarging worksheets to A3 to provide enlarged text. She acknowledged that this latter method was not ideal compared with increasing the font size electronically and printing out the worksheet in A4 which drew less attention to the student. Nevertheless she needed to be pragmatic and found that enlarging worksheets meant that the student did not need to use a magnifying glass which would mark her out further. The teacher said:

> ST1: 'I think it will do but she is happier for it to be A3 rather than her having to use a magnifying glass and then scan it over the piece of paper, yeh' (ST1, School B).

In contrast, ST3 said that the disabled young person in her class was supported by the teaching assistant and implied that she did not see her own support as an implicit

part of her teaching role. In contrast to this, ST2 said that he works closely with the teaching assistant, believing that the teaching assistant knows the student better, and can support him to adapt his own teaching to be more inclusive. He was very proactive in adapting his own teaching to be inclusive for the disabled student in his class. For example, in the classes he teaches, which include a visually impaired student, he does not use video or animation but instead uses more activities involving listening and reading from a textbook which he knows the student can fully participate in. He also sends the student PowerPoint presentations in advance of lessons converted to Keynote so that the student can manipulate the presentation to his own preferences. If the teacher needs to use a Whiteboard, he ensures the teaching assistant is there to convert text onto a mini Whiteboard which can be placed near the student. Like ST1, he is aware that the student does not want to stand out as different and is careful to avoid this. Ironically, he related how his teaching was recently observed and evaluated. In the feedback, he was criticised for not making good use of the teaching assistant. In response, he explained to the observer that a careful system had been worked out with the teaching assistant and the student which meant that support was as unobtrusive as possible. He therefore saw the critical assessment as a success:

> ST2: ‘But they didn’t see that. But that’s good for me, that means I’m doing it surreptitiously and he’s not feeling that he is standing out in front of everybody’ (ST2, School B).

These examples are useful for understanding the differences in how subject teachers view and approach their support for disabled students. The data is limited to one school, nevertheless, differences such as these between subject teachers can be inferred indirectly through the accounts by teaching assistants and qualified

teachers of children and young people with vision impairments in the other two schools; also the activities described by the young people above. For example, TA1 (School A) describes the challenge to get subject teachers to take on board the difficulties disabled students face and seek to overcome.

> TA: It's getting across to the teachers what the students, visually impaired, what they can and can't see. Until they could experience not being able to see, I don't think people understand what it is like. This is one of the stumbling blocks I've had with some of the staff at school. (TA1, School A)

Similarly, QTVI(2) in School B noted the challenge for teachers of preparing materials much further in advance than they are used to particularly in schools (unlike School B which she oversees) where there is less experience of accommodating disabled children.

> QTVI: So a lot of my students are in a school where they've never had a visually impaired pupil before and of course that, teachers getting their heads around giving their work in perhaps four weeks in advance, six weeks in advance for somebody to try and source it, is quite difficult. (QTVI(2), School B)

It's clear from the statements above that some subject teachers are more conscious than others of the need to sensitively anticipate the needs of disabled children and have taken this on board to different extents.

**Independence**

The qualified teachers of children and young people with vision impairments and teaching assistants put great emphasis on the importance of fostering independence

in disabled children in their own approaches. This is said to be important for children's own independence and self-management at school and so that they can manage the transition into employment. The QTVI(1) in School A described why independence was important:

> QTVI: She's got to be independent and she's got to be proactive and I think that's what you've got to build as well. So just technology on its own isn't ever going to be a solution unless the children have the training, the staff have the training, it's built into the pedagogy, it's built into the school. (QTVI(1), School A)

This is a crucial point because not only is the qualified teacher of children and young people with vision impairments stating that technology alone is not the complete 'solution', which will be discussed in the next section, but also that fostering independence and being inclusive need to be embedded within the culture of the school, its teaching and other activities. If subject teachers vary in relation to how far they engage with inclusive pedagogical approaches there will continue to be limitations and compromises to how inclusive the curriculum is and how far disabled young people can then access it independently (with or without digital technologies). This has been shown in the examples above and will be elaborated upon in the sections below in relation to activities and uses of digital technologies to support access to the curriculum.

## Uses of digital technologies in school to support disabled young people

### Digital activities to support disabled young people

The qualified teachers of children and young people with vision impairments (QTVI)/teaching assistants (TAs)/ subject teachers (STs) gave a range of examples

of how they use digital technologies to support the young people to learn. Examples included digital support by teaching assistants in classrooms, such as advising on resources or digital equipment to use, taking photos of the Whiteboard to enlarge it for the young person and teaching them how to use hardware or software. Some subject teachers email PowerPoint presentations in advance of the lesson or provide on USB. There is also a lot of preparatory work carried out beyond the classroom by teaching assistants including downloading books where available from the RNIB UK Education Collection https://www.rnibbookshare.org/cms/ (previously Load2Learn), translating documents into Braille from word, modifying assessment materials in-house, modifying resources electronically locally or sending off textbooks/large amounts to regional resource bases, moving PowerPoint presentations to word, teaching how to use hard and software, using an embosser to print out materials, and using a VI forum (http://lists.education.gov.uk/mailman/listinfo/vi-forum) to identify modified textbooks. More broadly, QTVIs, subject teachers and teaching assistants can be involved in creatively seeking solutions to barriers that young people encounter. For example, TA1 explained how he worked to update the support available for visually impaired young people through using digital technologies.

> TA: Well when I first started at the school there was another teaching assistant who was dealing with it and she was just enlarging work. So she'd receive a booklet from a member of staff who'd say, this needs enlarging for this lesson, so she was enlarging it on her computer and then printing the work out and taking it along as a booklet as paper based form. There you go and that's what you're doing today and power point it, everything like that. So all the students had was paper and the students would sit at the front of the

> class so that they could see the Whiteboard, everything like this. And this year, I mean I was doing that last year but it was like, well we need something better. What is there available? So I tried looking at iPads, because I knew that the technology was there for an iPad, but some of the schools systems aren't compatible for iPads, so then we looked at other ideas. So we've managed to get in, we ordered at the start of last year, eight tablets/laptops that I thought, well can we have a go at these for visually impaired students. (TA1, School A).

Alongside this need and commitment to be innovative and seek to improve the situation for the disabled young people comes responsibility. QTVI(3) talked about this in relation to procurement and the consequences of good and bad decision-making.

> QTVI: And also when you have a pupil that needs a piece of equipment, there's so many companies out there that make different pieces of equipment, that picking, and they're so expensive that if you make a mistake and order something wrong, then you're stuck with it and you then have to find other ways around it. (QTVI(3), School C)

**Reflections on digital activities to support disabled young people**

What is clear from analysis of the teacher accounts, particularly from interviews with teaching assistants and qualified teachers of children and young people with vision impairments, is the wide range of activities they carry out to support disabled young people and how much responsibility they carry for this. In addition, they are

frequently involved in creative problem solving to address the needs and preferences of young people and there are also examples of how they are instrumental in driving through change to improve the situation for the young people using digital technologies. The commitment shown by teaching assistants, qualified teachers of children and young people with vision impairments and sometimes subject teachers to the young people as demonstrated in the interviews is impressive and clearly enhances young people's experiences and opportunities for learning.

## Opportunities and barriers of using digital technologies for learning

### Opportunities for learning

Participants were enthusiastic about the advantages and opportunities provided by digital technologies for learning by disabled young people. Some of the comments were general, for example, respondents noted that tablets are at a stage now where everyone is familiar with them and work well in classrooms, they are easy-to-use, they reduce the amount of hardware that children have to carry (lighter than laptops), they allow teachers and teaching assistants to try out new things and find new solutions, they are lighter and easier to manipulate than laptops and also have more 'street cred'. In a typical example, a teaching assistant said:

> TA: Definitely made a huge difference, yeh. Just listening to the learners themselves, you can tell that. I think with some of the technology, it's just so much more inclusive. Doesn't look different, does it. It's not a huge massive machine. If you've got an iPad, everybody's got them and it's great. (TA2, School B)

Others noted that inbuilt accessibility settings were very useful for disabled young people, and that some of the teachers were keen to integrate tablets and this helped

all the children. It was also reported that digital technologies reduce stigma as they are small and less obtrusive than previous hard and software such as CCTV units used to magnify resources or anything else provided which could potentially make the young person stand out. In relation to costs, one of the qualified teachers of children and young people with vision impairments said that tablets could be cost-effective given that they reduced the need for laptops with expensive speech output software and large screen calculators.

Other examples given of the advantages of using digital technologies were more specific including that tablets allow for books to be downloaded directly to devices, the quality of the output in relation to enlarged resources is much better than previously, and that it saves the teaching assistants a lot of time. It was also said to be good for students, as they can have presentations emailed to them in advance rather than having to spend time at the start of the lesson loading and modifying documents.

In addition to the advantages above, teachers (subject, qualified teachers of children and young people with vision impairments, teaching assistants) often emphasised that digital technologies supported children's independent learning and self-management allowing them to be more proactive in their learning than had previously been possible. For example, the young people took more responsibility for themselves in asking teachers to forward PowerPoint presentations in advance of lessons; and are then able to modify documents to their own preferences. One teaching assistant said that this independence could have a knock-on effect in relation to building confidence:

> TA: […] by creating that little bit of independence with a student with visually impairment, they've *then got* confidence. Because with Fern, when you look at Fern after, when she first came to school, she was very quiet, very withdrawn. Now when she uses technology and she's getting a bit more independence, all the teaching staff have said, she's a different kid, since she's been using it. She's very cocky, she's very bubbly and it's like she's had this whole year of being suppressed of her personality. She's just, it's all coming out now, she's very, she's bright and funny. (TA1, School A)

One of the qualified teachers of children and young people with vision impairments said that tablets were very useful however she did not think they were ideal for all tasks, and the skill was for the young people to recognise what to use when and in complementary ways. She also believed that some low-tech solutions were still appropriate and should not be disregarded, such as Minoculars (small telescopes):

> QTVI: The Minoculars are like a little mini telescope and the students can just literally hold them in their hand like that and they can see. It's a very small field of vision but they can see enough, because what I think all the time, you don't ever want a student to be in a position where they're just stuck. (QTVI(2), School B)

**Barriers to learning**

Whilst there was broad consensus about the benefits of using digital technologies to support learning for disabled young people, some participants also mentioned disadvantages or barriers to using these technologies effectively. In relation to downloading accessible resources, it was noted that not everything is available

electronically and that sometimes the quality of what is available is not satisfactory. Also that it was a challenge to find time to develop new resources for tablets with the rollout of iPads to year 8s in School B, given that the resources developed over previous years were not Apple compatible.

Subject teacher 1 (School B) said that there could be compatibility issues with sending and opening PowerPoint presentations to tablets but these were gradually getting smoothed out. Similarly, a number of respondents commented that it could be difficult transferring files to the iPad given the lack of USB. Also in School B, Wi-Fi could sometimes be weak and occasionally the firewall has blocked the use of particular software.

For accessing resources via the Virtual Learning Environment (VLE), QTVI(3) said that Siobhan could not use the VLE independently: 'It's just not accessible' (QTVI(3), School C). Also Siobhan is still reliant on traditional assistive technologies to a greater extent than the other (visually impaired) participants given the need for Braille. Even so, the teaching assistant acknowledged that as a teaching assistant she could save time by automatically converting a word document to Braille using an Apex Braille Notetaker once she had reformatted the document to a linear format which would previously have taken much longer than is now possible. Another issue is that Siobhan's software can crash and another method of accessing the Internet is needed. QTVI(3) goes on to make the point that there is an extra work or task load that Siobhan needs to carry out at school to access the curriculum and that this involves a high level of skill for the young person.

> Int: What's frustrating about technology? When does it frustrate you?

> QTVI: Ah, it frustrates me that say the Apex crashes on the internet. So that you then have to find another way of accessing the internet. So then she's learnt how to use the Apex, then she has to learn how to use the iPad or iPod, then she has to learn how to use the JAWS and the keyboard strokes and then there's all the shortcut keys. What is very simple for a sighted person makes it very difficult for somebody with a severe visual impairment. That's what's most frustrating. QTVI(3), School C)

Some of the participants said that the potential for improvement using digital technologies could be undermined by subject teachers not being on board or failing to appreciate the needs of the young person with visual impairment. In addition, TA1 said he was frustrated by the dynamics in the school that meant that solutions could not always be implemented quickly due to school processes. QTVI(2) (School B) said that it could also be difficult to get what was needed through the Local Authority (LA); reiterated by QTVI(3) who had encountered similar problems with the LA when they lost track of what equipment the young person already had and 'initially refused' a request for a laptop based on a belief that the young person had already been provided with one.

Subject teachers themselves acknowledge the difficulty and challenge of supporting disabled young people. One teacher, ST1 (School B) said that sometimes she was unable to plan adequately in advance which would enable best practice when supporting visually impaired young people thereby having to resort to using the photocopier.

> ST: No, um, in terms of sheets, it means that if I do want to use a sheet last minute and I've only just decided, it means that I will enlarge an A4 sheet rather than having properly modified in a Word document to the right, which I know, constantly get told isn't the way to do it. That's not what we should be doing. … So for example, so if I was wanting to provide that sheet to Laura, the right way to go about that would be to go into the electronic file, increase the font size to the right font size and print out that sheet again. The wrong way to do it which is the very quick way of doing it, is actually take that to the photocopier, press enlarge to A3 sheet, which means it's not actually technically to the right font size but it's generally just a bit bigger than it being a normal one. (ST1, School B).

TA1 (School A) said that whilst digital technologies could provide solutions, this could not have been in isolation but was part of a wider pedagogical approach adopted by the school and should be 'built into the pedagogy'.

Finally, it is important to mention that one of the teaching assistants (TA1, School B) drew attention to the fact that technology did not provide a solution for all young people. A couple of students in the school were reticent about using technology despite the teaching assistant's best efforts to promote it based on her perception that it could really help them. She gave the following explanation of this.

> TA: Oh yeh, yeh we have. Yeh there's a couple of the year nines and the year tens, who have been a bit reticent in terms of taking responsibility for themselves. They haven't got as severe visual problems as the others, so I think sometimes the more necessary

> the technology is to access materials, the more likely they are to use it. If they're a little bit on the edge where they can just about manage, but what they don't realise is, by just about managing, they're tiring their eyes and it's making it worse as it goes along. (TA1, School B)

This example shows both the teaching assistant's enthusiasm for digital technologies and the belief that technology can help students to learn. Nevertheless, it reminds that not all children and young people embrace digital technologies – particularly if they think they make them stand out as different in some way – and that this should not be assumed. The qualified teacher of children and young people with vision impairments in the same school emphasised this, she said that there are 'those who would rather die than be seen even if it's an iPad' (QTVI(2), School B).

#### Reflections on the opportunities and barriers of digital technologies for learning

It is clear from the interviews that there are potentially many advantages to using digital technologies within schools to support disabled young people. Nevertheless, these benefits cannot be assumed for all young people and some may need to have further encouragement about the advantages to get on board in the same way that some subject teachers appear to. Even then, it is suggested that digital technologies cannot provide a complete solution, nor should they. Sometimes other more traditional technologies still have a role to play particularly when technical problems are encountered and a timely solution is needed. In addition, it is worth emphasising that whilst digital technologies support both disabled young people and their teachers to save time and access the curriculum, there is a substantial workload associated with this for both. It needs to be acknowledged that disabled young people in particular are carrying an extra task load, in this study highlighted by their

uses of digital technologies, in order to access the curriculum. This may not always be explicit or fully understood by subject teachers. This task load is much increased by technical issues, therefore schools need to work with technology providers to ensure digital technologies function as effectively as possible.

## Digital skills and competences

### Digital skills

Interviews with teachers suggested that they were largely satisfied that they had the skills and competences needed to fulfil their roles and support disabled young people. This capability was considered to be an important part of each of the jobs. Indeed, one of the teaching assistants, TA2, noted how important computer skills were for her role and suggested that this had been part of why she was recruited.

> TA: […]They employed me hoping that I would take on this role, because I've got reasonable computer skills having worked in science before, and there was a lot of modification that was required, so you needed good computer skills to be able to adapt documents for children who have got VI needs. (TA2, School B)

Many talked of the importance of keeping up with new developments. TA1 (School A) said that he updates his skills through taking a heuristic approach:

> TA: Er that's what I'm doing. As I say it's suck it and see, we'll see what happens. I'm not afraid of making a mistake. If I make a mistake, right I've tried that way, it doesn't work, let's look at a new pathway and go down that one. (TA1, School A)

He also alluded to the usefulness of having good support with technology within the school and also from the QTVI. In School C, the QTVI(3) said that she supports young people through her own skills and having built relationships with company contacts through conferences that she can contact when needed: so if I get to the point where I think, I don't know how to do this, I can ring them and they'll talk me through it on the phone' (QTVI(3), School C).

Like the other QTVIs and TAs, she said that she spent some time training disabled young people how to use technology. She said she is 'usually one step ahead' and can show Siobhan how to do things and then Siobhan practises on her own at home. In the case of email, Siobhan had had to teach herself how to use it because the school server had blocked her from using her own email address. As noted earlier, visually impaired children need complex supplementary skills to be able to access and effectively use digital technologies including accessibility settings or discrete assistive technologies which can represent an extra work or task load. One of the subject teachers, ST2 in School B said that in general he depended on the students he taught to use apps on the iPad.

> ST: But the digital aspect of it is good in that way, so you get the alternative for the kids who are a bit more IT literate and enjoy um getting involved in the IT side of things. For me, personally I don't teach them how to use the apps. They teach me, so they go away and find out. If you want the best way to learn about technology is to ask an eleven or twelve year old, specially if you've got a group like I have, that are a top set group. (ST2, School B)

### E-safety and managing risk online

In relation to e-safety and particularly online bullying, very few concerns were raised by teachers in line with the disabled young people's accounts which tended to play down this as an area of concern. TA1 (School A) said that the risks he was concerned about are more mundane than cyberbullying or other safety concerns. For example, other children turn off the lights on 'stairwells' which means that visually impaired children cannot find their way around. Nevertheless, he did acknowledge that the year 7 head of year had spoken to year 7s recently because of 'silly arguments they have and they fall out over it and that's what can spark a bit of the bullying. But she [had] said, it is just silly'.

### Reflections on digital skills and competences

The teachers interviewed in the study are mostly positive about their own skills and competences to support the young people. They clearly recognise the importance of digital technologies in their jobs and the need to keep up with new innovations and to update their skills accordingly. Whilst this appeared to be working quite well, there were indications that further internal support from schools would be useful. For example, when schools introduce new technologies and devices, it would be helpful to also provide these to teaching assistants who are closely supporting young people to use them (where this is not already the case). Also, in some schools, training needs were apparently supplemented by a number of external companies on an informal, goodwill basis. This appeared to be working well but did appear to be reliant on individual teacher networks rather than part of an embedded, sustainable school strategy.

## Follow up interviews in 2017

In 2017, draft reports were shared with the young people and their teachers in each school and a follow up interview was carried out with key participants. This included speaking with QTVIs in Schools A and C and the teaching assistant in School B in order to discuss findings and interim changes. The report was also shared with some of the young people who had taken part in the initial interviews. Feedback was received from one of them. All comments were integrated into the report before finalising and an overview is provided within this section.

All 3 interviewees and one young person agreed with the findings set out in the report and were enthusiastic about the findings. The QTVI in School C commented:

> QTVI: I thought it was brilliant. I thought it just brought together everything that I knew that was going on, but didn't have the evidence for it (QTVI(3), School C).

The young person from School A said that the report captured how she remembered things working at school. In relation to change, the following issues emerged in the interviews: children's progress and transition, staffing, software/hardware and connectivity, and the introduction of Education, Health and Care plans (https://www.gov.uk/children-with-special-educational-needs/extra-SEN-help). This is a new support scheme for children with special educational needs up to the ages of 25.

Participants noted that many of the young people in the earliest stage of the project had moved on from school and were studying either in 6th form colleges or at university. Interviewees were positive about what the young people had achieved before their transition out of the school. One of the schools, School A, had increased

the number of children with a visual impairment who now attended the school. The respondent thought this was because this is a good school with good support and word gets around to other parents of disabled children. In School B, the hours worked by the teaching assistant had been reduced slightly which had been demotivating. In all 3 schools, it was noted that teachers were more on board with supporting disabled youngsters with digital technologies than they had been at the time of the initial interviews and this was linked to a generational shifts caused by younger teachers' familiarity with technology. In addition, technologies were considered to be more embedded generally and used more seamlessly in schools.

In relation to software/hardware and connectivity, School A had moved over to using iPads rather than the HP Envys (laptop/tablet combination devices) used at the time of the initial interviews. This was due to lobbying by the QTVI because she believes they are easier to use and more practical for children who need very large font sizes. In School B, the iPad scheme has now ceased and iPads are bought personally by many young people. Visually impaired young people are eligible for a grant to buy an iPad from a charitable organisation. She reported that the network is also much improved with fewer problems than at the time of the earlier interviews. If a teacher decides to carry out a whole class activity on iPads for a lesson, they are able to borrow them for the class. In School C, the QTVI said she was hopeful that developments in the area of Braille notetakers would improve the situation for children she supports.

All 3 interviewees commented that the Education, Health and Care plans had not resulted in much change. In most cases, support provided has remained the same. In School C, the QTVI said that when some young people had been moved from a statement to the EHC plan, provision had been reduced and parents had had to

question the assessment. Nevertheless, usually this was corrected in the final documentation. She also commented that the plan does take more account of parent's views than the previous policy which is useful.

## Discussion

Given the limited research in the area, this research project was carried out to explore disabled children and young people's experiences and practices of using digital technologies - particularly computers, mobile devices and the internet - to support their formal and informal learning. The focus was investigated from the perspective of young people and their teachers. The results showed that young people were broadly positive about digital technologies and that a range of technologies are being used to support formal and informal learning. Personal ownership and school policies were found to influence uses. These factors affect whether devices can effectively cross the home-school boundary enabling integration of formal and informal learning activities and the potential for personalisation of devices. The young people in the study carried out a wide range of activities typical of many young people using digital technologies both in school, for assessment, for homework; and to support their hobbies, interests and activities outside of school. They reported a range of advantages to using digital technologies and particularly tablets in line with previous research that has studied young people's technology uses. In addition, this group of young people reported how they use digital technologies for accessibility, to adjust the learning environment to their own needs and preferences in order to access the curriculum. They reported being able to benefit from tablets in this regard, when using the general affordances of tablets creatively and the inbuilt accessibility settings. These examples showed the

usefulness of tablets as ‘assistive technologies’. The young people also noted several disadvantages of using digital technologies for learning. Whilst teachers, particularly teaching assistants, were supportive in enabling young people to make good use of digital technologies in addition to young people’s own agency, technology alone could not provide a complete solution in all situations. In addition, whilst using digital technologies can help young people to fit in in mainstream classrooms, they can also make them feel self-conscious and stigmatised. On the whole, the young people were positive and confident about their own digital skills and competences with occasional frustrations and glitches. They appeared to have developed effective strategies to manage their safety online although occasional incidents of bullying or other distress were reported particularly when they were younger.

The interviews with teachers (qualified teachers of children and young people with vision impairments (QTVIs)/teaching assistants (TAs)/ subject teachers (STs)) added a useful extra perspective to the young people’s accounts. General support within each of the three schools was similarly structured with each member of the team carrying out a wide range of responsibilities to support disabled young people with commitment and skill. It appears that there are differences between how far subject teachers take on board the need to support disabled youngsters. This was clear within the one school where subject teachers were interviewed and could be inferred from the other interviews across the sample. Some subject teachers did see the importance of their role in supporting disabled young people – in addition to the support given by qualified teachers of children and young people with vision impairments and teaching assistants – nevertheless, this could be challenging for them given time constraints. Within the schools, independence and self-

management were emphasised by teachers, particularly qualified teachers of children and young people with vision impairments and teaching assistants, and there was recognition that inclusion needs to be embedded within the culture and practices of the school. Even so this can sometimes be at odds with subject teachers' practices.

The teachers in the project were enthusiastic about digital technologies and used them in a wide range of ways to support the young people to learn. Qualified teachers of children and young people with vision impairments and teaching assistants reported active engagement in finding creative solutions to problems and initiating change processes through which learning opportunities were enhanced using digital technologies. Teachers noted many advantages for learning using digital technologies by disabled young people. Some of these were general to all children whilst others were due to their potential to enable the disabled young people to access the curriculum more easily. In addition, teachers saw benefits from using digital technologies, especially tablets, to support young people's development of independence and self-management and, in turn, confidence. Even so, it was emphasised that using technologies was not seamless and that not all youngsters were keen to use them. Older technologies still had their place in schools and often teaching assistants and qualified teachers of children and young people with vision impairments enabled students to use these in complementary ways. An important aspect of this, however, is that disabled young people using digital technologies as accessibility tools to access the curriculum experience an extra task or workload to do so which needs to be acknowledged and allowed for.

Teachers were largely confident that they themselves had the skills and competences to fulfil their roles and were aware of the important part their skills

played in supporting disabled young people. Further internal support from the school would be helpful, particularly when new technologies such as tablets are introduced that teachers need access to in order to support young people. From their perspective, the young people reported that the online risks they encountered were low and manageable.

Finally, the follow-up interviews and feedback integrated into this report suggested that changes were minimal. Some improvements in technological provision were noted whilst the introduction of Education, Health and Care (EHC) plans had not resulted in much change.

## Conclusions and recommendations

This research project was carried out to explore the experiences and practices of disabled children and young people when using digital technologies to support their formal and informal learning. It has shown the many positive dimensions to how disabled children, here illustrated by research with visually impaired youngsters, use digital technologies. Even so, there are a number of areas that schools and researchers could helpfully give further attention to that include the following:

- While some subject teachers have the awareness and skill to support disabled young people very well, it appears that not all subject teachers take this need on board either through lack of awareness or time constraints. If this could be remedied, it could potentially reduce the frequent ‘workarounds’ carried out by disabled young people and particularly teaching assistants in order to gain access to the curriculum. It may also reduce the stigma and self-consciousness which disabled young people experience when circumstances

mark them out as different using technology and which may contribute to some young people rejecting use that could be beneficial to them. It appears from this project that the skill and dedication of teaching assistants obscures some lack of engagement and inclusive pedagogical design by subject teachers. As noted by Cameron (2014), there should be a move away from disability as a 'problem to be accommodated, instead [of] identifying and addressing the barriers' (Cameron, 2014, p.79).

- It has been shown in this project that school policies including regulation of uses of digital technologies can affect the level of formal and informal integration of uses of digital technologies for learning; also the potential for personalisation of devices, privacy and independence which may support learning for disabled young people. Schools could helpfully keep this in mind when planning technological provision.

- A positive outcome of the research was that young people were managing their safety online and the accounts did not suggest that disability made them specifically vulnerable at secondary level. Nevertheless, a couple of accounts did suggest that e-safety advice earlier at primary level would be beneficial alongside more support to develop skills and competences.

Finally, future research is needed on a larger scale, possibly longitudinal, to build a fuller picture of the issues. Also, the tension needs to be resolved in future research between treating 'disabled children' as a homogenous group that ignores the differences that exist between disabled children (Davis and Watson 2001 in Mallett and Runswick-Cole 2014) compared with identifying children by

specific impairment which reinforces the medical rather than social model of disability.

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