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The Role of ICTs in Students with Vision Impairments' Transition to University

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Abstract

A growing number of young people with disabilities is pursuing university education. Available research on the impact of Information and Communication Technologies on this matter has mainly focused on assistive technologies and their compensatory role for the adjustment of this group of students to the tertiary setting. However, limited research has looked at the role played by digital technologies such as social media and mobile devices in the transition to university, a critical period of change for all students but more challenging for those with impairments. This paper presents the findings of an empirical study that investigated the experiences of students with vision impairments aged 18 to 24 who were transitioning to a New Zealand university. The findings draw from observations, a researcher diary, focus groups, individual interviews, and data from social media. The study found that new technologies play several enabling roles that help students to manage diverse transition challenges. These roles not only include aspects such as impairment compensation, communication, information, and learning but also support arrangement, collaboration, and social connection and participation. By incorporating in the analysis the potential of digital tools, the article updates and expands the understanding of the role of ICTs in higher education from experiences and views of young people with vision impairments.

Keywords

ICTs, social media, disability, mobile devices, young adults, higher education.

1. Introduction

Young people with disabilities are increasingly pursuing personal growth through access to tertiary education. Evidence shows that the number of enrolments among students experiencing impairments has increased in the United States (Snyder & Dillow, 2010), the

United Kingdom (Ebersold, 2008) and New Zealand (Ministry of Education, 2010). However, undertaking tertiary education is a challenging and stressful experience for young people with disabilities as they are more likely to quit university compared with their non-disabled peers (Bardin & Lewis, 2008; Cobb, Sample, Alwell, & Johns, 2006). Even those who manage to persist have to spend more time studying at university before graduation (Caton & Kagan, 2007).

While there is extensive research about ICTs and disability in the education environment, the main focus has been on assistive technologies and how they compensate for the impairments of the students (Hersh & Johnson, 2010; Manduchi & Kurniawan, 2012), support their academic adjustment (Burgstahler, 2003), and help them to take control over their own learning (Sutcliffe, 1999). However, empirical research on the role of innovative new technologies such as social media and mobile devices from the perspective of people with disabilities is still absent (Jaeger, 2012).

This article deals with the current research gap and brings into discussion the role played by innovative technological tools. The findings show that ICTs not only compensate for the vision impairment of the students and facilitate access to information and communication, they also enable new ways of learning, support arrangement, collaboration, and participation, among other roles. These roles of ICTs allow students with disabilities to manage transition, develop new skills and see themselves as independent learners and self-determined young adults. In addition to its scholarly relevance, these findings also provide researchers, educators, service providers and policy makers with a new lens to understand the enabling roles of digital technologies and how young people with disabilities are using and adopting these ICTs in the context of their university transition.

2. Background

Specific research focusing on the role of technological tools in the transition to university experience of people with disabilities is still limited. However, by examining the literature, some relevant roles can still be identified. Available research has highlighted that ICTs play a compensatory role for people's impairments. This role of ICTs has particularly been outlined by advocates of the therapeutic or medical perspective of disability who see technological tools, especially assistive technologies, as not only attenuating people's impairments (Roulstone, 1998) but also increasing functional independence (Stumbo, Martin, & Hedrick, 2009). ICT tools such as assistive tools – which are defined as “any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities” (Scherer, 2002) – allow students with vision impairments to manage issues related to environmental orientation, mobility and reading (Wisniewski & Sedlak, 1992). These technologies range from personal digital assistants with speech and Braille output to screen magnification systems, speech synthesisers and more recently mobility-aid solutions for mobile phones which support trip planning. By compensating for their impairments, assistive technologies allow students to participate in education (Kelly & Smith, 2011; Krishna, Colbry, Black, Balasubramanian, & Panchanathan, 2008); however, we still lack empirical evidence of the role played by digital tools such as social media and mobile devices in this respect.

A second role of ICTs is providing access to information (Presley & D'Andrea, 2009). For example, closed-circuit television systems (CCTV), which use a video camera connected to a

monitor, can enlarge the size of text and images from books and other course-related material and adjust their colour and background. Personal computers, laptops and the Internet are also regarded as important in terms of providing access to information, especially in cases where the amount of information available online is vast (Ritchie & Blanck, 2003). Recent research shows that young people with vision impairments regard the Internet as the main means to access information and that they also consider themselves as competent users (Van der Geest, van der Meij, & Van Puffelen, 2014). The possibilities for information access via the Internet do not solely refer to the content of websites but also other sources such as digital text files, PDFs and eBooks which can also be manipulated with the support of assistive technologies.

A third role of ICTs is supporting and enhancing communication (Cook & Polgar, 2014; Seymour & Lupton, 2004). In the case of writing communication, using a pen and a piece of paper to write a letter or assignment can be arduous and time-consuming for students who cannot see properly, and impractical for those who are totally blind (Presley & D'Andrea, 2009). However, the barriers against writing communication can be reduced with the combined use of ICTs. For example, blind students can accomplish writing tasks by using laptops with Braille capability. Some students use dedicated electronic word processors for note taking in classes, producing files which can be saved electronically and transferred to a desktop or laptop (Presley & D'Andrea, 2009). Similarly, young people with vision impairments combine their use of assistive technologies with applications and the built-in accessibility features of portable devices (e.g. smartphones and tablets) for short and quick written messages (Scott, 2013). Internet-based tools are also complementing oral and face-to-face communication of people with vision impairments. In addition to phone calls, video chats (e.g. Skype) and social media (e.g. Facebook and Twitter) are tools that young people with vision impairments use regularly for communication (Kelly & Wolffe, 2012; Pfeiffer & Pinquart, 2013).

A fourth role of ICTs is the support of students with disabilities' education and learning, in both the school and the tertiary settings (Hutchinson, Atkinson, & Orpwood, 1998; Nochajski, Oddo, & Beaver, 1999; Sutcliffe, 1999). It is argued that ICTs help students to have control over their learning by promoting independence (Sutcliffe, 1999) and enhancing their academic performance (Smith & Kelly, 2014). For example, making course material accessible via electronic formats and providing alternative ways to support writing needs through assistive technologies allow students with vision impairments to manage study and learning demands (Hutchinson et al., 1998). In line with this claim, research by Zhou et al. (2012) has found improvements in the performance of high-school students with vision impairments who used the Internet to take comprehension, calculation, and science tests. In another study, a group of students with disabilities, including some with vision impairments, reported that ICTs supported their study experience and helped them to develop academic skills (Kim-Rupnow & Burgstahler, 2004). Although ICTs can support a positive educational experience, an important condition is that these tools have to be accessible (Nochajski et al., 1999; Sutcliffe, 1999). In addition, Mull and Sitlington (2003) point out that technology abandonment can occur if ICTs are unable to meet the specific needs of the student such as supporting independent functioning, working as intended or helping to address the demands of the curriculum. From a broad perspective, some scholars have questioned the potential of ICTs and have argued that digital tools are inherently disabling for people with disabilities (Goggin & Newell, 2003) and that they reflect society's structural inequalities (Adam & Kreps, 2006).

3. Method

The objective of this study was to investigate the role played by ICTs in the transition to university from the experiences and perceptions of students with vision impairments. It followed a qualitative approach as the purpose was to understand research participants' personal and collective construction of meaning regarding their transition and their use of ICTs. Along with contributing new knowledge, the study sought to implement some interventions to support research participants managing their transition journey. For this reason, action research (AR) was adopted as the research methodology. The AR study applied a blended approach of interventions from face-to-face group support meetings to the setting up of online tools such as a website repository and a Facebook group page for information access and group collaboration. Data gathering and analysis was conducted throughout two AR cycles. Qualitative data was collected throughout the different stages of the transition experience of the participants and included observations, a researcher diary, data from online tools, focus groups and semi-structured interviews. Research participants were selected purposefully. They were all students with vision impairments from Victoria University of Wellington in New Zealand. All the participants were undergraduate students first enrolled in trimesters 1 and 2, 2012, and trimester 1, 2013. They were in the age group of 18-24 years. In total, 19 participants took part in the study, of which 17 were first-year students. The remaining 2 participants were senior students with vision impairments who took part in a pilot study. Over a third of the participants came from Wellington, the capital city, and the rest from different cities and rural areas of the country. In terms of schooling background, the participants came from varied educational systems such as special education schools, boarding schools and public schools where they had received dedicated teaching support. At the time of contacting potential participants, there were no blind students enrolled at the University.

4. Findings

Overall and independently of their individual transition experiences, the participants shared a positive view of ICTs. As one student stated: "*Technology, I think, is one of the biggest helps out there for anyone with a disability*" (VIS-JO). Another participant added that she "*will never go back*" (VIS-CA) to paper-based readings such as those provided in high school after getting used to new ICT tools that allowed her to access university course material electronically. Based on the participants' perceptions, seven roles of ICTs have been identified (see Figure 1) to play an enabling part throughout the different stages of their transition experience: enabling vision compensation, accessing information, facilitating communication, assisting learning, establishing and sustaining support, increasing collaboration, and achieving social connection and participation.

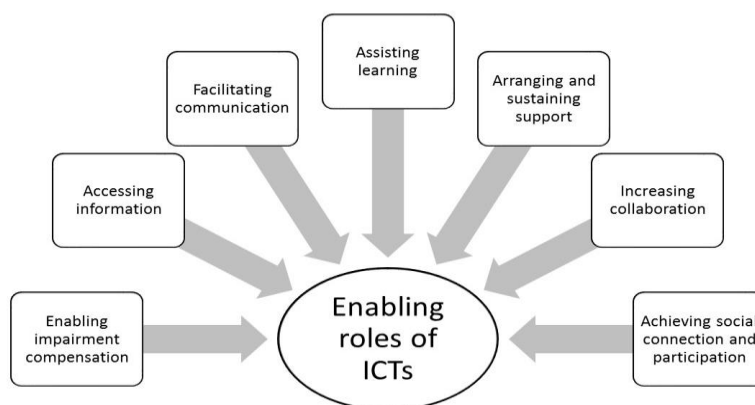


Fig 1: The enabling roles of ICTs for transition to university

4.1. Enabling impairment compensation

The findings support the argument that ICTs help students with disabilities to compensate for their impairment. The participants unanimously outlined the role of assistive technologies in this respect and its impact on the way they made sense of their transition experience. This was also observed when they had to manage some academic tasks such as reading course material. The students highlighted that their vision impairments are a barrier to their transition experience. Having to read a large amount of printed course material throughout the academic trimester and being unable to see it properly quite often brought other effects such as feeling easily tired and losing concentration. They perceived that their reading pace was slower than that of their non-disabled peers.

However, access to and use of different digital technologies offered the participants the opportunity to counteract these side effects and manage the impact of their impairment. From closed circuit television systems (CCTVs) to text enlargement software, the students were able to manipulate text according to their particular needs. A minor adjustment in the brightness and contrast of their monitors or laptop screens also made a difference and improved the readability of text. Other ICT applications such as eBooks and PDF files offered similar opportunities to compensate for their vision impairment. One participant, for example, commented that usually it takes her half an hour to read a page. However, by using the assistive technology provided by the University she reduces the time to ten minutes. Usually, the participants use more than one ICT tool to manage the impact of their impairments. Talking about this point one participants said: *“I have OpenBook [a scanning and reading program], ZoomText [a magnification program] and I’ve also got a recorder to take to lectures as well...OpenBook and the recorder do help. I like OpenBook because I can look at the stuff that is there anyway and even if I am not reading it following it is enough”* (VIS-CA). The findings also show that social media and portable devices enable impairment compensation. These tools, used alone or in conjunction with assistive technologies, expanded the abilities of these students to manage their impairments in the context of their transition. For example, before enrolling, many participants preferred to use YouTube for accessing university-related information. For them, being able to listen to videos, instead of reading printed brochures and handbooks, was not only appealing but also useful in terms of avoiding tiredness and blurred vision caused by their impairment. Portable devices with Internet access, such as tablets and smartphones, have a similar impact. The observation data

from the participants' meetings with their Disability Advisers show that participants took advantage of the built-in text enlargement and touchscreen features in their personal devices to compensate for their vision impairment.

4.2 Accessing information

From the participants' perspective, access to information is one of the most significant roles of ICTs in relation to their university transition. On the one hand, ICTs enable them to obtain information in a broader range of formats than just print. Information not only can be accessed digitally, for example, via eBooks and PowerPoint presentations; if printed, it can be also adjusted through assistive technologies, such as CCTVs. Moreover, the participants greatly appreciated the fact that via ICTs they can search, retrieve and access a larger amount of information and from different sources.

Similarly, social media and mobile devices appear to offer additional opportunities for accessing information in a dynamic and timely fashion. One participant highlighted the "*convenience factor*" (*VIS-GE*) of these tools. Overall, during the focus groups and individual interviews, the participants stressed how useful it was to receive notifications straight to their mobile phones when information was posted on Facebook – the social media site of their choice – which they used, among other purposes, for receiving a variety of updates. Similarly, the Facebook group page set up for this research was quickly adopted as an additional source of information as updates went promptly to their smartphones and were accessed anywhere at their convenience. In the same way, the University's official Facebook page and the course pages set up by some lecturers during the academic trimester were also regarded by the participants as useful sources of information for their transition. The findings reveal that social media and portable devices are becoming primary ways to access information regarding transition challenges other than the demands of the academic system. For instance, some participants who lived in university halls of residence used these tools to access information about accommodation matters. They subscribed to the Facebook page of their accommodation in order to receive the latest updates directly to their personal profiles.

The findings show that the use of portable devices with Internet access improved the way the participants searched for information. For example, instead of using a printed bus timetable which was hard to read, many participants preferred to use their laptops or smartphones to plan their trips to university and other places. Through their devices, they could find information about bus and train services in real time. As one participant described: "*I learned to look for it [bus timetable] at home. I got my computer set to really large fonts so I can read it. So, I learned to do it at home before I take the bus. I can make my internet screen bigger so it makes it easier to read*" (*VIS-MO*).

In the same way, getting to know how to move around the university campus was made easier when they accessed via PDF files or Google Maps the Accessible Routes Maps, a web mapping service application set up by the University's Disability Services unit. For other participants, online tools also made searching for information regarding products and services easier and eventually enabled them to do some online shopping and/or contact advocacy organisations such as the Blind Foundation. In summary, the use of a range of new technologies to access information helped the participants in coping with different transition challenges and becoming familiar with and more in control of their university life.

4.3 Facilitating communication

ICTs were an important communication medium for students with vision impairments. The participants indicated that ICTs make it *“a lot easier to communicate with people”* (VIS-JO) because these tools offered them an array of channels that complement and/or supplement traditional forms of oral and written communication. In practice, ICTs supported participants’ face-to-face communication with their close friends and relatives when there were barriers of time and distance. This finding also echoes previous research on ICTs improving communication (see section 2).

For the participants, portable devices and social media applications were the preferred means of communication. All the participants had mobile phones with Wi-Fi connections and they used their devices for texting and instant messaging with friends from high school and family members on a regular basis. Several participants commented that they used Facebook as a communication channel because it made communication quicker and better, and can be used on their smartphones. Interestingly, the participants did not report any accessibility issues when using these tools in their laptops/desktop or smartphones. One participant commented that: *“The layout and ‘user-friendly’ nature of Facebook makes it a more agreeable medium by which [to] communicate”* (SVI-GE).

Another reason the participants used this platform was that all their friends were Facebook users. One participant, for example, mentioned that she hardly ever uses the landline telephone at home to call her close contacts. She preferred Skype because she can see them on her laptop or smartphone. Evidence from this study suggests that portable devices are diminishing the preference of students with vision impairments for *“old”* (VIS-CO) technology. Emailing was also used by the participants but to a lesser extent and for more formal communication such as contacting disability service providers or university staff. In summary, communication via portable devices and social media tools allowed the participants to overcome issues of distance and time and was interconnected with other ICT roles such as support and collaboration.

4.4 Assisting learning

Students with vision impairments used a combination of ICTs to enhance their learning experience. Most participants carried their laptops and smartphones, and in some cases tablets, to the lecture theatres. They downloaded and/or accessed via Blackboard the PowerPoint file of the lecture slides. Occasionally, they used the computer labs provided by the university when they needed to do some printing. Then, depending on their personal vision needs, they enlarged the content of the PowerPoint on their devices while following the presentation of the lecturer. Some participants, in addition, brought in their digital voice recorders and stored the recordings of lectures as MP3 files or other similar sound formats on their laptops so they could listen to them later. Alternatively, during lectures, a few participants used their smartphones to take pictures of the content on the whiteboard. Even for VIS-BL, a participant who commented that he was *“still finding my feet”* at university, digital technologies *“fill all the gaps”* as he could read books and watch videos online *“when something was missing in lectures”*. These strategies of the participants to support their learning experience are in line with a tendency among university students in general who are using their personally owned portable devices to engage inside lectures (Gurung & Rutledge, 2014). Despite some concerns that this trend may have a negative impact on academic performance and cause student distraction (Kobus, Rietveld, & van Ommeren, 2013; Traxler, 2013), all the participants in this research commented that bringing in their own portable

devices with which they are familiar was clearly benefiting their learning and transition experience at university.

Moreover, while formal learning takes place mainly in the physical settings of the university (lecture theatres, library, study rooms, labs), students with vision impairment are also using social media and portable devices as a complementary environment for more informal and individualised learning. For instance, some participants used YouTube to support “*big study*” (VIS-JO). That is, independently of the quality of the information retrieved, these students used the video-streaming platform to search for further information and complement what was taught by the lecturer in class and/or obtain a better understanding of the essay topic they had to write about. In both cases, students with vision impairments adapted social media to respond to their personal learning needs.

The findings also support scholarly discussion about the potential of social media for *learning on demand* (McLoughlin & Lee, 2007), in particular the growing interest in personal learning environments (Dabbagh & Kitsantas, 2012). Personal learning environments are student-designed learning approaches that encompass different types of content – such as videos, apps, games and social media tools – chosen by a student to match his or her personal learning style and pace (Johnson, Adams, & Haywood, 2011, p. 8). In this respect, the participants did not limit themselves to textbooks and lectures in order to learn but also took advantage of alternative ways of learning via social media and Internet-enabled portable devices. This complementarity between formal and informal learning offers valuable insights for understanding how this group of students manage transition challenges related to the academic issues.

4.5 Arranging and sustaining support

ICTs also play a role in arranging and sustaining support. Arranging support was one of the primary concerns of the participants during the few weeks before and after the start of the academic trimester. All the participants were aware that they had moved away from the dedicated and specialised help received in high school. Therefore, they were concerned about having special course arrangements, assistive technology and other kinds of support in place at university. In general, ICTs were an easier way to search for disability support information but also a convenient medium for contacting the University’s support services and other providers such as the Blind Foundation. As one participant put it: “*Technology... makes it easier for you to access things. It makes it a lot easier for you to communicate with people, who you need to communicate with, Disability Adviser, Course Coordinator or something like that. It is just easier than going on foot to meet everyone*” (VIS-JO).

For some participants, a phone call or an email was a preferable way to find out about and ask for transition assistance without disclosing too much about themselves and their disability. Once support was arranged, ICTs enabled the participants to follow up with their Disability Advisers and promptly let them know if any other issue had arisen. They also received weekly emails from the Unit’s note takers because, as one student pointed out, it is difficult to write notes and “*having someone else in the class doing it for me really helps*” (VIS-GE) to understand what was taught in the lectures.

4.6 Increasing collaboration

ICTs also facilitate task collaboration. The majority of participants used social media tools and other interactive online applications set up on their portable devices to support online

knowledge sharing. These applications provided the participants with an additional way to work together with their peers, especially in regard to academic tasks. This use of ICTs did not replace but complemented conventional face-to-face forms of group work and study. Via these tools, the participants produced and/or shared diverse forms of content from comments to information. For example, some participants reported that they used Facebook to privately ask their peers for help and share ideas and information about academic matters. These tools allowed the participants to collaborate with each other outside of the university campus. In addition to one-on-one collaboration, ICT tools also supported online team work. The course pages set up by lecturers and other teaching staff on Facebook also enhanced cooperation and knowledge sharing with their lecture peers. Online collaborative work via the social networking site was especially useful for those participants who reported having faced challenges and turning points related to the academic system. As these participants reported, interactive online tools allowed them to post questions, start group discussions and get feedback from other students who were also concerned and/or had some knowledge about particular academic tasks. Other Web-based tools set up by the University also supported cooperation and knowledge sharing. During the focus groups, the participants mentioned that Blackboard, the University's course management system, became not only a relevant source of information but also a tool for facilitating collaboration during different stages of their transition to university. Being able to collaborate and share knowledge regarding academic matters via ICTs helped the participants in gaining confidence about their transition.

4.7 Achieving social connection and participation

The participants used social media to maintain existing relationships and to build new ones. Meeting new people at university was a difficult task for most participants, who felt isolated, especially at the beginning of the academic trimester. For them, making new friends was perceived as the way to fulfil their need for socialisation and to receive support and information regarding academic matters. One way to deal with the issue, while working on making new friends, was to turn to their *strong ties* (Putnam, 2000), in other words family and close friends. Meeting them face-to-face remained the participants' preferred type of social interaction, but the busy university life made meetings occasional if not difficult, especially for those who moved to Wellington to study. To counteract the barriers of distance and time, these students used social media to supplement online their limited physical social interactions with their strong ties. Applications such as Skype and Facebook, along with texting and emailing, were reported to be used regularly to cope with the lack of social connections, an issue that was more difficult to deal with for some participants.

Social media sites can also be used to support relationship building (Ellison, Steinfield, & Lampe, 2007) with *weak ties* (Putnam, 2000). The research findings confirm that online interaction and participation via Facebook course pages set up by university teaching staff offered the participants the opportunity to share and receive valuable information from their peers who were considered distant acquaintances rather than friends. The forum feature used in Blackboard also supported participants' social interaction with weak ties from their lectures. While the findings did not show that social media and other interactive tools favoured the creation of online-only social connections, they support the idea that these tools complemented and/or invigorated existing offline weak ties. When a repository website, called *Goingtouni*, was set up for this research, the participants were invited to participate in diverse online discussions. However, the students, who had not met each other previously,

scarcely contributed to the discussion. In contrast, a second group of participants who took part in a number of face-to-face group support meetings used their personal Facebook accounts to “catch up” (VIS-MO) online with other members of the group. These meetings were the glue for the creation of new social connections among the participants and the use of social media complemented their need for social interaction and networking. In a few cases, these loose social connections showed signs of becoming friendships.

In summary, the findings of this study suggest that social media and digital devices helped students with vision impairments in managing the social connection challenges. While face-to-face encounters were the preferred form of social interaction, the participants also used these tools to keep in touch with their existing connections and to build new relationships. In doing so, the participants coped with the feelings of isolation that concerned them from the beginning of their transition to university. Talking about this issue one participant commented: “*When I am in my room I open my Facebook and sometimes I find my friends saying: ‘oh, come to the study lounge tonight. We miss you. Come to hang out’. So I pick up my stuff. I go down there and study with them all night as well as socialising. More socialising goes on when studying but I still get a heap of work done*” (VIS-MO).

5. Discussion and conclusions

This article has shown that, from the experiences and perceptions of young students with vision impairments, ICTs play several enabling roles for their transition to university. Despite widespread diffusion, use, and the evolving nature of ICTs, the interest of academics and disability support services in higher education have centred on how assistive technologies help young people with impairments to adjust to the academic demands of university life. To the best of our knowledge, no prior research extended the study of assistive technologies by investigating how social media and mobile devices are also used by students with vision impairments to make sense of their transition experience. As mentioned in this paper, transition to university is a more challenging experience for young people with disabilities. From the views of students with vision impairments, ICTs not only compensate for their impairments and facilitate information gathering, communication and learning, but also create opportunities for collaboration, support arrangement, and social connection and participation. The literature has already described how non-disabled students use digital technologies in higher education. Like, their peers without disabilities, young people with vision impairments are active users of digital technologies and are adapting these tools to manage transition needs. In this sense, the findings of this study have implications for research and practice as scholars and service providers may want to pay more attention to the way these groups of students are using and adapting social media and mobile devices in higher education. Considering that students with disabilities are more likely to drop out of tertiary education than their non-disabled peers, a potential line of enquiry and practice can look at how digital technologies may be used towards students with disabilities’ retention and engagement in higher education. Researchers may also be interested in further studying and/or comparing the roles ICTs play for non-disabled students and in the context of other educational settings (e.g. polytechnics, community colleges). This study is also timely for disability service providers who may use its insights to inform the development and implementation of blended support programmes and to engage actively with young people with disabilities to understand their transition views and needs. While this research included students with a number of permanent

eye conditions under the umbrella of vision impairment, a limitation is that none of the participants was legally blind.

References

- Adam, A., & Kreps, D. (2006). Enabling or disabling technologies? A critical approach to web accessibility. *Information Technology & People*, 19(3), 203-218. doi: doi:10.1108/09593840610689822
- Bardin, J. A., & Lewis, S. (2008). A survey of the academic engagement of students with visual impairments in general education classes. *Journal of Visual Impairment & Blindness*, 102(8), 472-483.
- Burgstahler, S. (2003). The role of technology in preparing youth with disabilities for postsecondary education and employment. *Journal of Special Education Technology*, 18(4), 7-19.
- Caton, S., & Kagan, C. (2007). Comparing transition expectations of young people with moderate learning disabilities with other vulnerable youth and with their non-disabled counterparts. *Disability & Society*, 22(5), 473-488.
- Cobb, B., Sample, P. L., Alwell, M., & Johns, N. R. (2006). Cognitive-behavioral interventions, dropout, and youth with disabilities: A systematic review. *Remedial and Special Education*, 27(5), 259-275.
- Cook, A. M., & Polgar, J. M. (2014). *Assistive technologies: Principles and practice*: Elsevier Health Sciences.
- Dabbagh, N., & Kitsantas, A. (2012). Personal Learning Environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning. *The Internet and Higher Education*, 15(1), 3-8. doi: 10.1016/j.iheduc.2011.06.002
- Ebersold, S. (2008). Adapting higher education to the needs of disabled students: Developments, challenges and prospects. In OECD (Ed.), *Higher education to 2030* (pp. 221-240): OECD Publishing.
- Ellison, N. B., Steinfield, C., & Lampe, C. (2007). The benefits of facebook "friends:" Social capital and college students' use of online social network sites. *Journal of Computer-Mediated Communication*, 12(4), 1143-1168.
- Goggin, G., & Newell, C. (2003). *Digital disability: The social construction of disability in new media*. Oxford: Rowman & Littlefield Publishers.
- Gurung, B., & Rutledge, D. (2014). Digital learners and the overlapping of their personal and educational digital engagement. *Computers & Education*, 77, 91-100. doi: 10.1016/j.compedu.2014.04.012
- Hersh, M., & Johnson, M. A. (2010). *Assistive technology for visually impaired and blind people*. London: Springer Science & Business Media.
- Hutchinson, J. O., Atkinson, K., & Orpwood, J. (1998). *Breaking down barriers: Access to further and higher education for visually impaired students*. Cheltenham: Stanley Thornes Publishers Ltd.
- Jaeger, P. T. (2012). *Disability and the Internet: Confronting a digital divide*. Boulder, CO: Lynne Rienner Publishers.
- Johnson, L., Adams, S., & Haywood, K. (2011). *The NMC Horizon Report: 2011 K-12 Edition*. Austin, Texas: The New Media Consortium.
- Kelly, S. M., & Smith, D. W. (2011). The impact of assistive technology on the educational performance of students with visual impairments: A synthesis of the research. *Journal of Visual Impairment & Blindness*, 105(2), 73-83.

- Kelly, S. M., & Wolffe, K. E. (2012). Internet use by transition-aged youths with visual impairments in the United States: Assessing the impact of postsecondary predictors. *Journal of Visual Impairment & Blindness*, 106(10), 597-608.
- Kim-Rupnow, W. S., & Burgstahler, S. (2004). Perceptions of students with disabilities regarding the value of technology-based support activities on postsecondary education and employment. *Journal of Special Education Technology*, 19(2), 43-56.
- Kobus, M. B. W., Rietveld, P., & van Ommeren, J. N. (2013). Ownership versus on-campus use of mobile IT devices by university students. *Computers & Education*, 68(0), 29-41. doi: <http://dx.doi.org/10.1016/j.compedu.2013.04.003>
- Krishna, S., Colbry, D., Black, J., Balasubramanian, V., & Panchanathan, S. (2008). A systematic requirements analysis and development of an assistive device to enhance the social interaction of people who are blind or visually impaired. <https://hal.inria.fr/file/index/docid/325432/filename/Systematic.pdf>
- Manduchi, R., & Kurniawan, S. (2012). *Assistive technology for blindness and low vision*. Boca Ratón: CRC Press.
- McLoughlin, C., & Lee, M. J. W. (2007). *Social software and participatory learning: Pedagogical choices with technology affordances in the Web 2.0 era*. Paper presented at the ICT: Providing choices for learners and learning, Singapur.
- Ministry of Education. (2010). Profile & Trends: The tertiary education system 2009. *Tertiary Sector Performance Analysis and Reporting*. Retrieved September 18, 2010, from http://www.educationcounts.govt.nz/_data/assets/pdf_file/0003/80076/2009-p-and-t-full.pdf
- Mull, C. A., & Sitlington, P. L. (2003). The Role of Technology in the Transition to Postsecondary Education of Students with Learning Disabilities A Review of the Literature. *The Journal of Special Education*, 37(1), 26-32.
- Nochajski, S. M., Oddo, C., & Beaver, K. (1999). Technology and transition: Tools for success. *Technology and Disability*, 11(1, 2), 93-101.
- Pfeiffer, J. P., & Pinquart, M. (2013). Computer use of adolescents with and without visual impairment. *Technology and Disability*, 25(2), 99-106.
- Presley, I., & D'Andrea, F. M. (2009). *Assistive technology for students who are blind or visually impaired: A guide to assessment*. New York: AFB Press.
- Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. New York: Simon & Schuster.
- Ritchie, H., & Blanck, P. (2003). The promise of the Internet for disability: a study of on-line services and web site accessibility at Centers for Independent Living. *Behavioral sciences & the law*, 21(1), 5-26.
- Roulstone, A. (1998). *Enabling technology: Disabled people, work, and new technology*. Buckingham: Open University Press.
- Scherer, M. J. (2002). The change in emphasis from people to person: Introduction to the special issue on Assistive Technology. *Disability & Rehabilitation*, 24(1-3), 1-4. doi: 10.1080/09638280110066262
- Scott, S. (2013). *iOS - Worthy of the hype as assistive technology for visual impairments? A phenomenological study of iOS device use by individuals with visual impairments*. (Doctoral Dissertation), Tennessee State University, Nashville, Tennessee.
- Seymour, W., & Lupton, D. (2004). Holding the line online: Exploring wired relationships for people with disabilities. *Disability & Society*, 19(4), 291-305. doi: 10.1080/09687590410001689421

- Smith, D. W., & Kelly, S. M. (2014). Assistive technology for students with visual impairments: A research agenda. *Current issues in the education of students with visual impairments*, 46, 23-53.
- Snyder, T. D., & Dillow, S. A. (2010). Digest of education statistics 2009 (NCES 2010-013). *National Center for Education Statistics, Institute of Education Sciences*. Washington, DC: U.S. Department of Education.
- Stumbo, N. J., Martin, J. K., & Hedrick, B. N. (2009). Assistive technology: Impact on education, employment, and independence of individuals with physical disabilities. *Journal of Vocational Rehabilitation*, 30(2), 99-110.
- Sutcliffe, J. (1999). Information technology. In H. M. S. McCall (Ed.), *Visual impairment: Access to education for children and young people* (pp. 264-278). London: David Fulton Publishers.
- Traxler, J. (2013). Mobile learning: Shaping the frontiers of learning technologies in global context. In R. Huang (Ed.), *Reshaping Learning: New Frontiers of Educational Research* (pp. 237-251): Springer.
- Van der Geest, T., van der Meij, H., & Van Puffelen, C. (2014). Self-assessed and actual Internet skills of people with visual impairments. *Universal access in the information society*, 13(2), 161-174.
- Wisniewski, L., & Sedlak, R. (1992). Assistive devices for students with disabilities. *The Elementary School Journal*, 92(3), 297-314. doi: 10.2307/1001982
- Zhou, L., Griffin-Shirley, N., Kelley, P., Banda, D. R., Lan, W. Y., Parker, A. T., & Smith, D. W. (2012). The relationship between computer and internet use and performance on standardized tests by secondary school students with visual impairments. *Journal of Visual Impairment & Blindness*, 106(10), 609-621.