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Accessing and delivering online education in the time of COVID-19: Challenges for visually impaired people in Malaysia

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ABSTRACT

Researchers have found that most people doubt the capabilities of people who are visually impaired or blind. This not only disregards the voices of the visually impaired, but it can also limit access to both education and employment, while fostering stereotyping that perpetuates marginalisation. This project harnessed the capabilities of blind people as co-researchers to assist the authors investigate the unique challenges that the Covid-19 pandemic presented for visually impaired students and teachers in Malaysia. Particularly in reference to their ability to access and deliver online education; and furthermore, to identify what visually impaired students and teachers need in order to improve their online experiences. This paper explores some of the needs of visually impaired people; some of technology and applications available for visually impaired and blind learners; and provides a critique of the various forms of assistive technology currently available for visually impaired people. The researchers discovered that software and hardware exist for visually impaired learners but there appears to be a lack of training on how to use them for both students and educators. Content creator accessibility training is also lacking. Schools for visually impaired learners are not given sufficient resources and their teachers sufficient training in how to deliver effective online education. The learning of Braille is becoming a lost art form in a world that increasingly emphasizes the 'visual' and the translating of the visual to the non or partially sighted. The implications of this is that visually impaired learners, who already face barriers and Marginalisation are being increasingly de-skilled, under resourced and further devalued in a world where the likelihood of further pandemics and moves towards increasing use of online education is being seen as the new normal.

Keywords: visually impaired, communication, technology, braille, Covid-19, blind.

INTRODUCTION

Online education has received much attention in recent years, especially during the Covid-19 pandemic. Educational institutions have been forced to transition into fully online education within a short period of time. This transition was more challenging for visually impaired students and teachers. Visually impaired learners need various assistance devices and applications to facilitate online education. Online education involves theoretical and practical activities which are conducted virtually over the Internet either in a synchronised or unsynchronised manner.

In this research, we have focused on two groups of visually impaired people in Malaysia, the first group were specialists with visual impairments working in online education. The second group were visually impaired learners from a school in Penang (St. Nicholas' Home). They, along with all schools in Malaysia, had to teach and learn from home using online during the Covid-19 pandemic. The main investigation of this research was exploring the challenges that visually impaired people in Malaysia faced during the Covid-19 pandemic in accessing and delivering online education.

This research presents a set of recommendations for developing materials for visually impaired learners which are focused on three domains, "needs", "online education", and "technology". Each domain has the potential to enhance the education quality for visually impaired learner.

LITERATURE REVIEW

The needs of the visually impaired

People who are visually impaired are not a homogenous group. There are degrees of blindness and needs vary according to where people are on the spectrum. It often takes a crisis for people to seize opportunities. Blind people recognise that they need new employment opportunities and as such, they need to open paths to higher education (Chikako, 2013). Numerous studies exist that assess obstacles and threats for students with disabilities in educational settings (Erten, 2011; Hong, 2015; Moriña, 2017), but the literature pertaining specifically to online education is sparse (Forbes, 2019). Whether face-to-face or online, people who have visual impairments need work, tasks and jobs that motivate them and offers them feelings of pride (Mealin & Murphy-Hill, 2012).

When working online, people with visual impairments want an equitable access to education and new employment opportunities. In this sense they need a variety of online interaction tools (Coughlan et al., 2020; Kri et al., 2020; Wongkia et al., 2012) which can be assisted by the creation and provision of accessible e-learning systems (Fitzpatrick et al., 2020; Freire et al., 2010; Maidenbaum et al., 2013; Power & Jürgensen, 2010; Shimomura et al., 2010; Sulong & Sulaiman, 2018; Wongkia et al., 2012).

Online tools that should be made available for visually impaired people include assistive technology (Freire et al., 2010; Hosokawa et al., 2020; Kimuro et al., 2020; Kri et al., 2020; Power & Jürgensen, 2010; Schloerb et al., 2010; Shimomura et al., 2010; Wongkia et al., 2012) including audio assistive technology (Coughlan et al., 2020; Hosokawa et al., 2020; Kri et al., 2020; Nees & Berry, 2013; Shimomura et al., 2010), haptic devices (Buonamici et al., 2015; Buzzi et al., 2015; Schloerb et al., 2010), screen readers (Freire et al., 2010), tactile graphics (Buonamici et al., 2015; Buzzi et al., 2015; Coughlan et al., 2020; Engel et al., 2020; Shimomura et al., 2010), braille screens, refreshable braille displays and multi-line braille

displays (Engel et al., 2020; Hosokawa et al., 2020; Jafri, 2014; Mealin & Murphy-Hill, 2012; Wongkia et al., 2012).

The literature suggests that special education or learning services should be put in place for the visually impaired (Lahav, 2014; Power & Jürgensen, 2010; Ramiati et al., 2020) and that provision is made to help them access visual information (Buonamici et al., 2015; Buzzi et al., 2011, 2015; Ferati & Sulejmani, 2016; Fitzpatrick et al., 2020; Iwamura et al., 2020; Kimuro et al., 2020; Maidenbaum et al., 2013; Miao et al., 2011; Naves, 2011; Ramiati et al., 2020; Schloerb et al., 2010; Sulong & Sulaiman, 2018).

In their everyday lives, visually impaired people need full access to information in all its forms (Ferati & Sulejmani, 2016; Galesi et al., 2020; Iwamura et al., 2020; Murillo-Morales & Miesenberger, 2020; Power & Jürgensen, 2010; Shimomura et al., 2010; Trinh & Manduchi, 2020), freedom of movement (Maidenbaum et al., 2013) (Lahav, 2014), better interaction with humans and the environment (Awad et al., 2018; Trinh & Manduchi, 2020), and information about people and things nearby (Rafael et al., 2013).

Just as visually impaired software developers need navigation tools to assist them in their work, visually impaired people need tools, tactile charts, maps, recipes, geometry and left/right signifiers to assist them in their everyday life (Buzzi et al., 2011, 2015; Coughlan et al., 2020; Engel et al., 2020; Fitzpatrick et al., 2020; Hosokawa et al., 2020; Kimuro et al., 2020; Mealin & Murphy-Hill, 2012; Miao et al., 2011; Schloerb et al., 2010; Sulong & Sulaiman, 2018; Trinh & Manduchi, 2020; Wongkia et al., 2012).

Online education and technology for People with Low Vision

The use of visual media has always been an important part of education and it has been even more so emphasised with the increasing use of technology. Imagery give children opportunities to explore, identify, analyse, classify, and verbalise about things or scenes (Dominique et al., 1994). For the visually impaired, however, these images are often meaningless as they cannot see them. The addition of rich descriptions can assist the visually impaired and sighted people. Many see this as a win-win.

Dominique et al., 1994 state that despite the rapid innovation that can be observed towards technologies and applications, there are very few educational materials available for visually impaired learners, and those that exist are often expensive, poorly adapted and scarce. Screen readers are regarded as the most useful technology for visually impaired learners as they utilise the user's auditory senses and 'read aloud' the text that is on the screen (Blas et al., 2004, ISĂILĂ, 2012). One downside is that it reads everything on the screen, including elements of HTML that may be irrelevant to the user. This makes the process difficult, boring and more time consuming for the visually impaired learner (Blas et al., 2004).

Subjects can also be taught online in Braille, using online Braille simulation software, yet it does not compare to the experience of using a braillewriter. The Braille system cannot be replaced by technology and vice versa (Amato, 2009) yet technology can often help many visually impaired students.

If information and services provided by the state, institutions and public services are not fully accessible, there is a serious risk that they erect new barriers increasing the information gap and a 'digital divide' between those who can benefit from opportunities provided by ICT and those who cannot. According to (Pavithran, 2017) when colleges and universities lack a clear, mandatory, and functioning accessibility policy, faculties may create

and maintain their own online education course websites with limited instruction, guidance, and support from their institution. The literature also suggests that it is important for the institutions to seek input from visually impaired students on the accessibility of online courses offered as well as to train school faculty members on online accessibility as a way to overcome this barrier (Pavithran, 2017).

Critiques of assistive technology

Despite the promise of online learning for visually-impaired learners, there have been critical views about the ways in which assistive technology has been used to facilitate such learning. Such criticism has been levelled both at the design of the technology as well as the social and cultural aspects of the ways in which such technology has been deployed.

The use of technology without sufficient attention to laying the necessary groundwork for its effective use often leads to poor utilisation. For example, in a case study of a blind association in North Cyprus, (Silman et al., 2017) discovered that assistive technology was often left unused even when available as it was often regarded more as a distraction rather than an aid in the classroom, largely due to a lack of training of instructors.

Likewise, Alper and Raharinirina (2006) found evidence of widespread abandonment of assistive technology devices, even in cases where it was made available to persons with disabilities and their families. They attributed this to a lack of consideration of the needs of the person with disability and/or their family, assistive technology selected for the person by family members of a therapist, complicated design of the device, insufficient funding, unreliable technology, lack of technical support, and equipment drawing negative attention to the individual (Alper & Raharinirina, 2006).

The uncritical use and/or advocacy for the use of assistive technology can lead to the privileging of certain ways of being that may exacerbate rather than mitigate the challenges that visually-impaired learners face — what some authors have called ‘ableism’. Commenting on special education in the United States, Hehir (2002) bemoans the increasing reluctance of schools to teach Braille to students with low vision, preferring instead that they learn to read print, or make use of technologies like audiobooks and voice synthesisers. This is largely because of an uncritical normative pressure to ‘teach’ poorly sighted students to become more like sighted ones. As one student cited in Hehir (2002) revealed, “I was taught to read print, not Braille, because everyone felt it would make me more like sighted people.”

RESEARCH METHODOLOGY

We collected and analysed our data using a qualitative approach rooted in an interpretivist epistemology as such an approach was best suited to understanding the challenges of online education through the lived experiences of visually impaired learners (see Maxwell, 2013; Seidman, 2005). To this end we conducted semi-structured interviews with a group of visually impaired students and a visually impaired teacher at a school for the blind, and then used thematic analysis to code and categorise concepts in the interview transcripts.

Selection of participants

A series of preliminary consultations were held with experts familiar with issues facing visually impaired people in Malaysia to learn about these issues and to identify potential groups with

which to engage. These experts included leaders of civil society organisations for the visually impaired, government officials, and educators.

Through these consultations we were able to identify a school for the blind that had considerable experience with online education. We then proceeded to approach the school and obtain permission to meet and interview some of their students. Five students agreed to be interviewed, all of whom experienced varying degrees and types of visual impairment. Additionally, we also interviewed one teacher at the school who was totally blind. Our participants constituted a purposive sample of representatives of the population we sought to understand, that is, visually impaired learners in Malaysia who experience online education (Saunders, 2012; Weiss, 1994).

Data collection

We prepared in advance of our interviews an interview guide containing a list of questions covering the range of issues we were interested to explore with our participants. We used the guide to structure our interviews, but otherwise sought to keep the conversation free flowing, allowing for a degree of spontaneity.

The interviews were conducted virtually, over the video and audio-conferencing application Zoom. At the time of our interviews, a nationwide Movement Control Order, imposed as a result of the Covid-19 pandemic, prevented us from travelling to interview the students in person.

Two of the interviews were conducted in English while the remaining four were conducted in Bahasa Melayu (Malay language) as the participants were more conversant in that language. All interviews were recorded with the participants' permission and were transcribed and/or translated into English as necessary.

Data analysis

Transcripts were analysed collaboratively by all four members of the research team. To do so, we uploaded the transcripts onto the free, open-source qualitative research tool Taguette (Rampin et al., 2021), and then coded for concepts. Coding was performed inductively following (Saldana, 2009). While each researcher coded for concepts relevant to the particular theme they were assigned to focus on, we also coded as a group through several calibration exercises designed to optimise inter-coder consistency. Codes were then analysed inductively to construct a narrative in response to the research questions we asked, which we report in the results section below.

RESULTS, DISCUSSION AND RECOMMENDATIONS

The findings of this study suggest that most online resources are created for sighted people and they have to be adapted for visually impaired people, which provides challenges in transitioning to online education. All the students we interviewed for this research were partially sighted to varying degrees, one of the key challenges they faced was reading text on screens. More than a few participants complained about the colour and contrast levels between text and background, font sizes and font styles. 14 point size and simple styles such as Arial and Tahoma were deemed to be the most readable, where every letter looks different from the other letters and the bold type looks good too. Coloured text or text against a coloured background was generally deemed to be difficult to read, and there was a general preference for monochrome

text/background combinations. This was particularly the case for one participant who in addition to having extreme hyperopia (far-sightedness) found it difficult to distinguish certain colours. However, there were even differences in preferences in the type of monochrome text/background combinations. While most participants preferred black text on a white background, one student with severe astigmatism mentioned that he found this particularly hard to read as the white background was too bright. He also tended to turn up the contrast when reading text on screens. Another student whose vision was severely myopic (near-sighted) mentioned that boldface type helped improve legibility.

One insight we may derive from the above, apart from the need to include accessibility considerations for the blind and partially sighted when designing online interfaces, is that even the partially sighted suffer from a range of different types of visual impairments that result in different needs. Accessible design in learning interfaces, therefore, while having made commendable strides in recent years, should also take into account the nuances inherent in the different types of impairment that students experience, and facilitate rather than impede the ability of users to select configurations that meet their needs.

All our research participants found the use of images to be very problematic, particularly when they were not labelled with clear descriptions. Although this may cause content creators additional work in designing image descriptions, the enhanced depictions would make documents with imagery more accessible.

Most of the participants involved in this research needed assistance from family members when learning online from home. This included help with turning on computers, opening applications like Zoom or Teams, pressing certain keys on their computer keyboards and ensuring microphones and cameras were set up correctly.

This suggests that learners have not been provided with sufficient training and been given enough resources to assist them with their online learning. They all needed some kind of assistance, that under normal 'non-pandemic' circumstances, they would have been given while at the educational establishment. At home this assistance was not always available due to other commitments that family members may have had.

Technology in terms of software and hardware play an important role to assist the visually impaired people in their online education. In this research, participants identified various types of technology that can be used in their education. However, some technologies are not feasible for them either because of the cost, or the technology itself is not useful for all cases.

For example, one of the basic devices mentioned by several participants is the 'video magnifier', or closed-circuit television (CCTV). The basic function of this device is to magnify the image using a camera and television screen. Similar functions are also available in mobile devices, which are convenient to use for many visually impaired students. One limitation here is the phone screen size which makes online Zoom or Teams calls is restrictive.

Other useful applications are voiceover, Google voice, and Talkback which are widely available as mobile app, and they are easy to use. Although designs and accessibility barriers, as mentioned above (font size, screen resolution etc) often make them unusable. There is also an issue with the variety of these platforms used. Some lecturers use Facebook, some use Google classroom, others use Google meet, Zoom, Whatsapp and so on. So navigating between each of the platform is often problematic.

In terms of hardware, participants emphasised the needs for portable and lighter braille reader machine for education. Braille readers could be developed as a mobile application as well. It is worth noting here that the researchers found that braille is being taught less and less in favour of visually impaired learners to utilise 'text-to-speech' technological options. This 'de-skilling' of visually impaired and blind learners, takes them away from the ability to create their own worlds into living in a 'translated' world of sighted people.

Our visually impaired research participants experience many difficulties adapting to online education. Practical classes are affected negatively more than others, but even basics like a lack of basic computers for them to work on impact them severely. As such, and as mentioned above, they had to resort to using their mobile phones to access their online classes.

One problem mentioned consistently by all participants is in regard to poor internet connectivity. This not only affects their learning but also their ability to interact with their fellow classmates. Not only this, our data reveals several instances where technology intended to facilitate online learning has either failed to meet its intended purposes or, worse, has inhibited learning.

Our research participants wanted the option to be able to learn and use Braille and added that the development of Braille printers at an affordable price would greatly benefit their education. Other existing software and hardware available was deemed generally sufficient. The problem lies in the lack of training in how to use or get the best out of the technology and the software both with students and teachers.

Educators tend to lack consistency in their teaching methods, styles and utilisation of technology for learners with low vision – particularly when they might have problems transitioning from one platform or one application to another when working online from home. Simple discussions and standard operating procedures set in place would vastly improve the online learning experience of visually impaired people.

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ETHICS APPROVAL
Ethical approval for this study was obtained from Research Management Centre (RMC) at HELP University, Malaysia.

INFORMED CONSENT STATEMENT
Informed consent was obtained from all respondents involved in the study.

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