Vision Australia
Blindness. Low Vision. Opportunity.

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Online, but Offtrack

2018 Vision Australia Report: Barriers to Online Learning Experienced by University Students who are blind or Have Low vision.

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Executive Summary

Online learning has emerged as an increasingly important method for universities to provide course content. Today, it is virtually impossible for a university student to avoid interacting with an online learning environment, even for those courses that are delivered on-campus.

The value of a tertiary education is increasing, and there is a clear connection between tertiary education and employment. People who are blind or have low vision and who have obtained a tertiary qualification have a much greater chance of finding employment than those who have not.

Over the past three years Vision Australia staff have spoken with a number of university students who are blind or have low vision. Without exception they have reported that they have experienced numerous accessibility barriers when using online learning environments. In some cases, these barriers have prevented them from continuing their studies.

In the absence of research in this area, Vision Australia conducted a small-scale research project in 2017 to assess the prevalence and nature of barriers to online learning experienced by current and recent university students who are blind or have low vision. 35 participants, using a range of assistive technologies and studying at 24 of Australia's 37 public universities, completed an online survey and/or participated in telephone conversations about their experiences.

With few exceptions, participants reported that they had encountered significant accessibility barriers when using online learning environments. In some cases these barriers had resulted in participants abandoning their studies altogether, while many others found studying extremely stressful, difficult and unrewarding.

The accessibility barriers reported by participants include:

- Inaccessibility of key components of online learning environments, such as discussion boards and collaborative tools, to the most common assistive technology used by people who are blind or have low vision;
- Lack of understanding and timely support from disability services staff;
- Unwillingness of lecturers to make changes to course delivery formats to make them more accessible;
- Inconsistency in the provision of reasonable adjustments.

Taken together, the prevalence and extent of these barriers represent a systemic failure by the university sector to develop and deploy online learning environments in ways that adequately address the needs of students who are blind or have low vision. A comprehensive and urgent response is called for from Universities Australia, the Tertiary Education Quality and Standards Agency, and the Australian Government, in order to remove current accessibility barriers and to ensure that future online learning environments do not replicate the mistakes and deficiencies of the past.

About Vision Australia

For more than 150 years, Vision Australia - and its predecessors - has delivered services for our clients so they can live the life they choose. Through our 29 centres, we support individuals at every stage of life, by providing a broad range of support including: employment services, the largest library supporting our community and people with a print disability, clinical advice, children services and orientation and mobility training. We are also a leading provider of NDIS and My Aged Care for people who are blind or have low vision.

Introduction

In May 2002 the Human Rights and Equal Opportunity Commission (now the Australian Human Rights Commission) collaborated with the Australian Vice-Chancellors' Committee (VAC) to convene a National Forum on accessible curricular materials (referred to throughout this report as the National Forum). The purpose of this National Forum was to explore more effective ways of providing curricular materials in accessible formats for tertiary students with a print disability. There had been several recent media stories detailing the difficulties that some students were experiencing in obtaining their university study materials in braille and other accessible formats, and several disability discrimination complaints had been lodged. Within the blindness and low vision sector, there was a general feeling that a "tipping point" had been reached, and that unless urgent action was taken, the ability of students with a print disability – especially those who were blind or had low vision - to pursue tertiary studies would be fatally curtailed.[1]

Thirty eight of Australia's (then) thirty nine universities were represented at the one-day National Forum, together with representatives from government, the blindness and low vision sector (including university students), and the Vocational Education and Training (VET) sector. The various presentations and detailed discussions resulted in a consensus that coordinated efforts were needed to address the shortcomings in provision of accessible-format curricular materials. A key outcome of the National Forum was a commitment from the AVCC to establish a Steering Committee that would provide a national, coordinated approach to the development and implementation of strategies for improving access.[2] This Steering Committee met on several occasions, and it was an effective mechanism for achieving real and sustained change.[3]

The Emergence of Online Learning Environments

In the 15 years since the National Forum, many aspects of the landscape in which Australian universities operate have undergone far-reaching change: economic turbulence and the unpredictability of funding sources; greater alignment between university education and career outcomes; growing community awareness about the long-term benefits of a university education; and changing student demographics with an increase in the number of overseas students, have combined to compel universities to develop new course content and innovative approaches to how that content is delivered. At the same time, the proliferation of digital information and communication (ICT) technologies such as high-speed broadband, cloud

computing, smartphones, multimedia publishing, and online collaboration environments, have provided universities with unprecedented flexibility in the design and delivery of courses.

What has emerged from all these rapid changes and innovations is a university sector that is firmly situated in the digital age. It is now virtually impossible to find a university that does not incorporate online components into its course content delivery and assessment. Some courses are delivered exclusively online, and of those “blended” courses that offer both online and the traditional offline (face-to-face) study options, many can be studied online in "distance mode". Even courses that are offered on-campus almost always require that students engage with online learning environments in one way or another.

For students with a print disability, the development of online learning environments has presented the usual mix of benefits and barriers that always accompanies technological changes in a society like ours, which is habituated to the consideration of accessibility only long after new technologies have been introduced. Unless the needs of people with a disability are considered and addressed from the outset, the design of virtual spaces such as online learning environments, will inevitably produce accessibility barriers that are every bit as disabling as those that are produced by the careless design of inaccessible physical spaces. Accessibility is no more guaranteed in the virtual world than it is in the world of bricks and mortar – indeed, it is tempting to paraphrase Murphy's Law and assert that in the virtual world, if something can be designed so as to be inaccessible then it will be. The corollary is that accessibility of the virtual world will be achieved if, and only to the extent that, there is a rigorous focus on inclusive design[4], an insistence on compliance with standards and best practices, a coordinated approach to the procurement of software and systems, and a refusal to compromise the dignity, equality and independence of people with a disability.

Over the past several years, staff at Vision Australia have received a growing number of reports from university students who are blind or have low vision about the difficulties that they have had when trying to use the online learning environments associated with their courses. We have heard from a number of students who said that they had no choice but to abandon their university studies altogether because they were unable to participate in online activities as a result of the platform not being accessible to the assistive technology they used. We have heard from other students who have continued their studies, but found the experience exhausting, traumatic, and unrewarding. We have received comments such as, "I felt humiliated and belittled because I could not check my own assignment grades like everyone else because that particular function of the online software is inaccessible to people who use screen-reading software", and, "I was told that the online discussion board was accessible, but I

found that there were 200 links on the page and I couldn't actually find anything I needed because of all the clutter", and "some of my lecturers were really good and helped me with those online activities that were inaccessible, but others made no effort at all and told me it was my problem", and, "I asked the disability services people for assistance with the online stuff, but it took them six weeks to get back to me and by then I was too far behind in my course to continue with it".

These and similar comments are persuasive and disturbing in their own right, and suggest that the burgeoning use of online learning environments by universities has led to numerous accessibility barriers. However, the exact nature and extent of these barriers has not been previously studied. Vision Australia therefore decided to conduct some small-scale research in order to gain a more detailed understanding of the online learning experiences of current and recent university students who are blind or have low vision. Before outlining the methodology used, and discussing the findings, it will be useful to provide some general information about the university sector in Australia, and to offer some comments on the connection between receiving a university education and obtaining employment.

Universities in Australia[5]

The Australian higher education sector comprises universities and other institutions that provide higher education.[6] There are currently 43 universities operating in Australia. 40 of these are domestic universities, while two (Carnegie Mellon University and University College London[7]) are branches of overseas universities operating in Australia. There is also a small, "Australian university of specialisation" (the University of Divinity). Of the 40 domestic universities, three are private (Bond University, Torrens University, and the University Of Notre Dame Australia), and the remaining 37 are classified as public universities. Universities Australia is the peak body representing the interests of the university sector. The 37 public universities, as well as Bond University and the University of Notre Dame Australia, are members of Universities Australia.

Although it is not a university itself, Open Universities Australia (OUA) is an increasingly important contributor to online higher education options. OUA was founded in 1993 as Opening Learning Australia, changing its name to Open Universities Australia in 2004. OUA describes itself as Australia's learning online education marketplace.[8]

While only one participant in our research survey reported that they were studying directly with OUA, the fact that OUA-developed course materials are being incorporated into other university courses means that students studying at other universities are increasingly likely to encounter OUA. It is therefore important that any initiatives for removing barriers to online learning include OUA in their scope.

Australian universities have a total enrolment of more than one million students, and a workforce of 100,000 staff. University expenditure accounts for 1.6% of GDP, and 80% of start-up business founders are university graduates. Australia has produced 12 Nobel prize winners, and is one of the world's leading research nations on a per capita basis.

The Australian Government regards higher education as a vital part of Australian society: “Higher education is integral to the long term success of Australia’s intellectual and economic development"[9]. It provides a range of funding supports for higher education (including the university sector) through a range of initiatives that assist with infrastructure, student support, increasing equity and improving quality in higher education.[10] Over the past four years, actual and proposed reforms to the Government's support of higher education have caused considerable and ongoing controversy and tension with the higher education sector and students. During the course of this research it was suggested to us that recent changes to the formula used to calculate supplementary funding provided by the Australian Government to assist universities to meet the needs of students with a disability have resulted in a lack of resources for universities to provide adequate support. In the past, funding was provided on a needs basis, whereas recent changes have resulted in a numbers-based formula which, it is suggested, can disadvantage students who require specialised equipment and support. Such as those who are blind or have low vision

In 2008 the Australian Government conducted a review of higher education in Australia[11], which recommended that a national, independent body be established to have regulatory oversight of the Australian higher education sector. As part of its response to the Review, the Australian Government announced in the 2009-10 Budget that it would establish the Tertiary Education Quality and Standards Agency (TEQSA).[12] TEQSA's focus is on "… ensuring That higher education providers meet minimum standards, promote best practice and improve the quality of the Australian higher education sector."[13] The legislation that established the TEQSA also established the Higher Education Standards Framework (HESF), and the Higher Education Standards Panel (HESP).[14]

The HESF is a set of standards that was most recently revised in 2015 and comprises two parts. Standards in Part A are divided into seven "Domains" that reflect the various stages of the "student life cycle", that is, the journey that students typically take through the higher education landscape, from being a prospective student, through the enrolment process and course selection, learning and participation, and concluding with the award of a qualification.[15] The standards in Part B of the HESF focus on matters of relevance to education providers, such as registration, categorisation, and course accreditation.

A number of the standards that comprise the Part A domains are particularly relevant for students with a disability, and may be implicated by the findings of our research into the barriers to online learning faced by students who are blind or have low vision. These include standards relating to Student Participation and attainment (Domain 1), Learning Environment (Domain 2), and Teaching (Domain 3).

Universities and Disability

According to Curtin University's National Centre for Student Equity in Higher Education (NCSEHE), the percentage of students with a disability enrolled in Australian university under-graduate programs was 5.0% in 2016. In the period 2011-2016 there was a 57.4% increase in the number of under-graduate enrolments from students with a disability.[16] We are not aware of reliable statistics on the number of university students who are blind or have low vision. However, it is worth bearing in mind that the use of online learning was very well-established by 2016, so if the number of students who are blind or have low vision also increased during this time, then they are likely to have encountered online learning to an increasing extent.

University Education and Employment

Universities Australia notes that:

> "Australia's universities prepare people for the highly skilled jobs of tomorrow, and to be leaders in developing and adapting new knowledge to revitalise our economy, strengthen our society and tackle the many problems we will face."

One important reason that full and independent access to online learning is so important for students who are blind or have low vision is that there is a strong link between university education and employment.

Australia's national unemployment rate is currently 5.5%, the lowest in four years.[17] According to the most recent research[18], the unemployment rate for people who are blind or have low vision is 58% - more than ten times higher than the current national average. When Vision Australia conducted its research into employment among people who are blind or have low vision in 2012, the national average for unemployment in Australia was 14%[19]. In the five years since this research was conducted, there has thus been a substantial drop in unemployment generally. However, we have no evidence that there has been a corresponding drop in the unemployment rate for people who are blind or have low vision, and unemployment continues to be a major barrier to equal participation in the economic and social life of the community.

A key finding from the 2012 Vision Australia research is that 75% of people who are blind or have low vision and who also have tertiary education are employed, up from around 5)% in 2007[20]. This connection emphasises the strong positive impact of higher education in improving job opportunities for people who are blind or have low vision. It is instructive and encouraging to observe that this figure of 75% compares favourably with the 70.9% of university graduates who were in full-time employment four months after completing their degree[21].

In 2016 Vision Australia conducted some supplementary research with a specific focus on employer attitudes to the employment of people who are blind or have low vision. An Employer Attitudes survey was distributed to a cross-section of Australian businesses. The findings indicate that although there may be a willingness to consider someone who is blind or has low vision for employment, employer attitudes are often negatively impacted by factors such as the actual or perceived cost and effort of making reasonable workplace adjustments, incompatibility between IT systems and adaptive technology, and lack of awareness of and difficulty using government funding options that are available.[22]
People who are blind or have low vision face many barriers when seeking employment, but those who have obtained tertiary qualifications have a much greater chance of being employed than those who have not. It is therefore essential that barriers to achieving a tertiary education be minimised. Such barriers can include the lack of accessible curricular materials (which was the focus of the 2002 National Forum), but they can also include barriers to full and independent participation in online activities. Engagement with online learning environments is no longer merely optional for university students, and barriers in this area can, and in some cases do, have a fatal impact on the ability of students who are blind or have low vision to achieve a level of education that will help maximise their opportunities for employment.

Researching Online Learning Experiences of Students who are Blind or Have Low Vision

Previous Research

Although the prevalence of online learning has been rapidly increasing over the past 15 years, there appears to have been little if any research into the barriers that online learning environments present in practice for students who are blind or have low vision. In 2005, a Special Interest Group (SIG) was established as a vehicle for Australian universities to discuss the accessibility of E-Learning systems:

> "The WANAU [Web Accessibility Network for Australian universities] eLearning SIG provides a forum for university staff and students who have an interest or stake in ensuring that learning and teaching content, together with the delivery platform, is accessible."[23]

However, the activities and current status of this Special Interest Group remain unclear, although the WANAU itself is still operating. In any case, though, this Special Interest Group is unlikely to have been in a position to conduct research across the university sector.

In 2002 Dey Alexander, who was then a Usability Analyst from Monash University, conducted "An Accessibility Audit of WebCT".[24] Until it was acquired by Blackboard in 2005, WebCT was one of the main platforms used by universities (and other higher education providers) for delivering online learning. The accessibility audit did not specifically seek the experiences of students, but it concluded that WebCT had "a range of accessibility problems". The paper also noted that "Decisions on purchasing learning management systems are generally based on a range of criteria including pedagogical issues, flexibility and ease of use, and licensing and running costs, but often without explicitly considering the need for the system to be accessible to disabled students". On the basis of the results of our online survey, we suspect that this is still an accurate comment on the way online learning platforms are chosen, despite the 15 years of advocacy, standards development, and public policy in the area of disability.

In 2005, Scott Feldman researched the experiences of "blind and visually-impaired students in graduate training", as part of a doctoral dissertation undertaken at the University of Illinois at Chicago.[25] The research was based on qualitative interviews that he had conducted in 2002, and used insights from grounded theory to arrive at a view of disability that was "congruent with an

ecological perspective … An ecological approach holds promise for integrating individual and social models of disability into a unified paradigm."[26]

Feldman's research was conducted at a time when online learning was in its infancy, and so it focussed exclusively on the experiences of students in the US as they attempted to gain access to printed reading materials. Nevertheless, Some of Feldman's findings have important implications for the current Australian context, which is dominated by the use of online learning. Key among these is that many students who are blind or have low vision find it difficult to advocate on their own behalf, or even to bring accessibility issues to the attention of those who can advocate for them. As Feldman explains: "Disability legislation was designed to decrease the power differential between individual persons with disabilities and institutions or systems. Nevertheless, participants generally perceived the law to be ineffective in doing so."[27], and " Participants perceived themselves to have little power to force the university to change."[28] In talking with university students who are blind or have low vision, we hear, again and again, that they feel completely powerless and totally isolated in the face of large, unwieldy university bureaucracies and systems that are skewed in favour of the institution. As one student told us:

> "As a student I'm just one of thousands, and the admin people see me as just another small brick in the wall. If I can't access a lecture, they still sleep comfortably at night – it's just a job for them, but it's my life that is affected."

However, Feldman also found that there were some exceptions to the feeling of powerlessness: "An important exception to these trends were students who strongly identified with a rights approach and asserted high expectations for institutional support."[29] This finding, which we believe to also be true in the current Australian context, suggests that universities and advocacy organisations should develop resources for students to become acculturated to a rights-based model of disability service provision, at the same time recognising that the assertion of rights cannot occur if large institutional bureaucracies fail to embed a rights-based, student-centric, culture among all staff.

The research discussed above was all conducted before online learning had become the default, or dominant, method of delivering university courses. In 2017 a research project was undertaken in Australia titled "Negotiating Higher Education with A Disability. Led by Charles Sturt University, this research invited students with a disability to share their experiences of higher education by completing a survey, and offered the opportunity for respondents to participate in a subsequent in-depth interview. It had a broader scope than online learning, and sought to include a range of disabilities.

There appears to have been very little if any research that has focussed specifically on the experiences of students with disabilities negotiating online learning environments, and as far as we know, our research is the first to collect and analyse the experiences of students who are blind or have low vision. We have recently become aware of growing interest in online learning accessibility from various bodies in the US, but as yet this interest has not been translated into systematic research projects.

Unfortunately, it is often the case that new technologies or processes are introduced without any kind of disability impact analysis, and the imperative for such an analysis usually comes when it is too late to make fundamental design changes, and only after the groundswell of distress, exclusion and inequality has reached a "tipping point" that can no longer be ignored. There is, perhaps, an implicit assumption that standards will ensure that people with disabilities are not excluded by innovation, but standards rarely keep pace with change, and even when they do, they are often imprecise and compromised in order to secure a consensus. In addition, the legal framework for enforcing them is complex, time-consuming, and beyond the energy and resources of most people with a disability to invoke.

Vision Australia's Research

Methodology

At the outset, it must be strongly emphasised that actual and potential accessibility barriers that university students who are blind or have low vision experience are not confined to online learning environments. We know from anecdotal evidence, as well as from incidental conversations we had with some of the participants in the current research, that many students are still unable to get their curricular materials in an accessible format in a timely way. A recurring theme in the conversations we have had with students who are blind is the difficulty in obtaining braille materials – often this is due to a belief among university staff that braille is obsolete and optional, instead of the primary literacy medium that it is. One participant mentioned another barrier:

> "I had an exam in one of my courses. The uni gave me a Word version of the exam, but it had lots of tables in it, and my screen-reading software could not read it at all. So I was not able to complete the exam, and I eventually felt I had no option but to transfer to another university."

It would be easy (and tempting) to design research that sought to document all the barriers that students who are blind or have low vision experience, and to produce a report of several hundred pages as a result. Apart from the time and resources involved, such research runs the risk of producing "analysis paralysis" that would see the report relegated to an end-product rather than being used as a tool for the achievement of positive systemic outcomes. To keep the task manageable, and to maximise the opportunities for bringing about real change, we therefore decided to focus our research project exclusively on experiences with online learning environments. In doing so, we of course do not diminish the significance of other barriers, such as access to curricular materials and the consistent location of lectures and seminars in venues that are easy to find on the university campus. In fact, it is deeply disturbing that so many students who are blind or have low vision are still experiencing significant barriers in obtaining curricular materials in accessible formats. The progress that was made after the National Forum in 2002 does not appear to have been sustained, and the systemic failures that compelled the Human Rights Commission to convene the 2002 National Forum have returned.

> We also decided to restrict the scope of our research to Australian universities. We are aware that many of the online learning platforms used by universities are also used by other higher education providers, and are deployed in the Vocational education and training (VET) sector, especially the government-run system of Technical and Further Education (TAFE) colleges throughout Australia.[30] It is therefore very likely that any barriers identified in the university sector are also present at least to the same degree in the VET sector in general, and the TAFE system in particular. Serendipitously, two participants in the research had studied at institutions in the VET sector and their negative experiences did mirror those of participants studying in the university sector. However, the TAFE system is considerably dispersed both in terms of location and administrative responsibility, and we felt that it would be very difficult to conduct effective initial research with that system. We believe that the current research has laid a foundation that could inform future research into the experiences of TAFE students who are blind or have low vision, and that any progress achieved in the university sector in addressing barriers to online learning could be usefully leveraged in achieving similar progress in the TAFE system.

While we had received considerable anecdotal evidence that university students who are blind or have low vision experience barriers when accessing online learning, we recognised that documenting these experiences in a form from which conclusions could be drawn and recommendations made presented several challenges. University students in general are under pressure to meet multiple course deadlines and have little time to participate in research that is

designed by those who are not. Students who have a disability often have even less time, because tasks such as accessing course materials can take longer, and negotiating with complex university systems and bureaucracies requires more mental and emotional energy. It is not uncommon for students with a disability to require extensions of time to complete assignments and other tasks, usually because of accessibility barriers, and often these extensions accumulate and intrude into vacations, meaning that students must continue their course-related work at a time when other students relax and are more likely to participate in activities such as completing research surveys. Most students with a disability also encounter many discriminatory barriers of one kind or another in other areas of their lives, which accumulate to take a high toll on time and energy. There is, moreover, no straightforward way of publicising information among all university students who are blind or have low vision. Finally, we were conscious that if students are already experiencing barriers accessing online learning environments, they may be understandably reluctant to participate in research that utilises online methods for gathering data, even if they are confident that those methods will be accessible and user-friendly.

In designing our research project we therefore decided to offer two ways for students to participate: firstly, by completing a short and relatively simple online survey and, secondly, by participating in a telephone interview with one of Vision Australia's staff who were conducting the research. The brevity and simplicity of the online survey would, inevitably, lead to a certain granularity in the resulting data, but we felt that it was more important to collect an initial data set that would sketch an overall picture and form the foundation for any future research, and to do so in a way that would not exacerbate the stresses and pressures that students already experience.

The online survey was designed by Vision Australia's Client Engagement team in collaboration with the four staff from the Advocacy and Engagement Department who comprised the group conducting the research. It was available for completion from early May 2017 until June 30 2017. The project was limited to current and recent (1-2 years) university students who are blind or have low vision. In view of the rapidly-changing technological landscape that characterises online learning platforms, we recognised the importance of working with data that was current: failure to do so would make it impossible to assess the extent of accessibility barriers that were present now, rather than, say, five years ago. It must be acknowledged, however, that this approach does obscure the stresses and other negative impacts that accessibility barriers may have had on former students, though it is certainly not meant to devalue them or excuse the systemic failures that caused (and still cause) accessibility barriers.

In keeping with the straightforward, user-friendly design, all fields on the Survey were optional. Participants could choose whether to share their contact details, the name of the institution at which they were studying (or had recently studied), the specific assistive technology they used, and non-directed comments about their experiences using online learning environments (lectures, tutorials, online forums, etc.) and when they occurred.

Although almost all participants shared the name of the institution(s) at which they studied (more participants withheld their phone number than the name of the institution), we have meticulously avoided naming any particular university in this report. The fundamental purpose of our research was to identify the extent of accessibility barriers to online learning across the university sector, rather than to draw attention to the shortcomings or failings at a particular institution. The fact that 24 universities are represented allows us to draw conclusions about the sector-wide nature of the barriers that participants reported.
by the university sector itself as part of a coordinated response to the findings in this report.

The Survey was promoted through Vision Australia's networks, including contacts with university students. We also promoted the project (both the Survey and the telephone interview option) through our social media channels, and it was distributed more widely via Twitter and Facebook.

Findings and Discussion

When we launched the research project, we expected to receive about a dozen responses. Our expectations reflected the significance we ascribed to the various challenges mentioned above. In fact, however, 35 university students participated in the research project by completing the online Survey and/or participating in telephone interviews. We believe that this extremely high number is a reflection, not of the insignificance of the various challenges facing university students, but, rather, of the extreme importance that students who are blind or have low vision place on sharing their experiences of the accessibility barriers they are encountering, in the hope that, by so doing, they will be contributing to systemic change that will make university study more accessible and enjoyable, if not for them, then at least for future students.

In total, the participants in the research were studying or had recently studied at 24 (65%) of Australia's 37 public universities. There were no participants studying at private universities, overseas universities or Australian universities of Specialisation. One participant had studied at a higher education provider other than a university, and two had studied at institutions in the VET sector.

80% of participants completed the online survey initially, while the remainder chose to participate in a telephone interview. While all participants had the ability to access the online survey, some found it easier and more convenient to discuss their experiences than to write about them. One participant commented:

> "I find so many barriers at university that I don't know where to start when I try to write about them. One barrier kind of leads to another, and you can't write about one without linking all of them in. When I can't access one particular component online, it means that I don't have the time or energy to persevere with trying to access others. It's a cascade of barriers that never stops and never gives me any respite. It often feels like that every time I press the power button on my laptop I'm going to find barriers that will steal my time and sap my strength. There aren't any barriers for me when talking on the phone."

It is important that any further research in this area adopt a design that allows multiple ways for participants to engage with the research, otherwise valuable perspectives are likely to remain undocumented and participants with the most intense experiences may be excluded.

41% of participants used adaptive technology related to screen enlargement, such as Zoomtext and Windows Magnifier. The remaining participants used synthetic speech or braille-based technology such as Jaws for Windows, NVDA (both screen-reading software) and the Braillenote Touch (a refreshable braille notetaker based on the Android operating system). A small number of participants relied solely on the Mac and its built-in accessibility features (Voiceover and Zoom). An important implication of this finding is that universities must consider the range of technologies that current and potential students use, and avoid the assumption that all students who have low vision will use, say, Zoomtext, or that all people who are blind will use Jaws.

Some participants mentioned that the universities had offered to provide a different brand of screen-reading software than the ones they were familiar with, because that software was more compatible with the university's online learning platform. As one participant noted:

> "I've been using this particular software for over 20 years now and am very comfortable with all its commands and features. The software the uni wanted me to use was completely unfamiliar to me and I just didn't have the time to learn all the commands while I was trying to get my assignments done – it takes a long time to become really proficient and productive with screen-reading software. But the university then said it was therefore not their problem if I couldn't use the online learning platform.'

While it sometimes happens that all students are required, as part of their course, to become familiar with a particular piece of technology (such as specialised statistics or database software) it is not reasonable to require that a student who is blind or has low vision learn how to use a completely unfamiliar technology in order to access a fundamental feature of the university's course delivery, such as its online learning environment. The design of such environments has to accommodate the diverse needs of students, not require that the diverse needs of students be collapsed into a particular set of design parameters.

The two most commonly-used online learning platforms identified by participants were Moodle and Blackboard. Other systems (or elements of systems) mentioned include Adobe Connect, Google Drive, Wattle, Turnitin, and a number of systems that appear to have been custom-built by the universities themselves. As will be discussed further below, questions such as "which system is more (or less) accessible?" do not have a straightforward, binary answer. One reason for this is that online learning platforms provide significant customisation options that allow universities to tailor the platform to meet their own needs. So, for example, one Blackboard implementation can be very different, both in terms of structure and content, from another, and these differences can be (and often are) reflected in differing levels of accessibility. Universities can also "re-brand" basic systems, so that it can be difficult for an end-user to determine what platform is actually being used as the basis for the university's online learning environment.

Accessibility is not only affected by the basic system that is purchased, but also by the way it is subsequently customised and implemented.

Participant Experiences of Online Learning Environments

Two participants described their experience using online learning environments in completely positive terms:

> "When accessing my online learning materials I found it a pleasant experience overall. Very easy to utilise the Blackboard platform they set up while I was undergoing studies …"

And,

> "Excellent. … The online platform itself was fully accessible with a screen reader."

For one of these participants, the experience could have been better, even though they had a positive experience overall:

> "Some helpful strategies would have been to use bold instead of italics -made it easier to read for me. Ensure adaptive technology such as Zoomtext was compliant with the system: I use both magnification and speech function to enable me better access once I get tired of reading my material. Also Times New Roman is great as a basic reading font on presentations. The use of highlighter in Yellow would be best as Green and Blue and or Red colours hurt eyes for those who are vision impaired with no colour blindness issues."

All of the strategies mentioned by this participant are unsurprising, and could be considered examples of best practice in meeting the needs of students who have low vision, and could be incorporated into the design of systems and delivery of content, and there would be benefits for all students. There appears to be little information available to universities about what constitutes best practice when meeting the needs of students who are blind or have low vision, and more guidance in this area would reduce, and in some cases eliminate, some of the accessibility barriers that currently exist, and make for a more enjoyable and productive study experience overall.

Accessibility barriers, both small and large, can have a profound impact on students' experiences of study, and their perceptions of future possibilities, especially when the cumulative effect of those barriers is taken into account. One participant explained:

> "I spent years at university constantly trying to overcome barriers – online, offline, you name it - and constantly battling discriminatory prejudicial and hurtful attitudes and behaviour from support staff who were employed in roles where they should have known better. I'm finished now, and I never want to set foot inside a university again as long as I live. I'm totally repulsed by the idea of further study – it was a deeply traumatic experience for me and I have emotional scars that may never fully heal."

This is far removed from the liberating experience of exploration, adventurous self-discovery, and unquenchable thirst for knowledge that university education is supposed to produce. Of course, not all accessibility barriers relate directly to online learning, but many of them do, as online learning has become woven into the structure of university courses.

Participants identified various barriers they encountered when using online learning environments. One participant described the experience of using online learning as follows:

> "AWFUL. the uni website is very difficult to see. Also I spend so much TIME LOOKING FOR THINGS - that makes for frustration and exhaustion. Things improved once i got an assitant to help, so she can find things and then I can do what I need with the

> information. Many online modules and forms are not able to be made accessible because of the great number of choices and pathways depending on your answers … Also there is a mismatch between assistive devices and software and being able to use them to do the uni work. …"

Another participant commented:

> "It has been a difficult experience especially providing feedback to peers online."

The difficulty interacting with peers was raised by many participants, including this student: "the blackboard discussion boards didn't always allow me to post a comment … Blackboard Collaborate is inaccessible."
Another participant noted:
"I can't use the discussion boards at all: I email comments to my lecturers and they post them for me. I can't complete online tasks like other students."

Another participant commented:

> "I am not able to participate in the discussion forums and sometimes I miss the materials."

A further comment came from this participant:

> "Discussion boards were inaccessible. Blackboard Collaborate navigability was limited as the chat functionality was inaccessible."

The same participant noted, however, that other Blackboard functionality was usable to them:

> "I could however, easily use the microphone, raise and lower my hand by pressing Control-R. I was able to download material successfully."

Although the previous comment reflects a positive experience using some Blackboard functionality, it also highlights an issue that was raised by a number of participants: it often happens that some parts of a platform are accessible while others are not, and it can be impossible to know in advance whether the functionality one needs to use for a particular task is accessible. One participant explained:

> "When I launched Adobe Connect I could never be sure whether I would be able to participate along with everyone else. Sometimes I could join an online seminar, but I couldn't read the Powerpoints that the presenter was using; sometimes I could join an online chat group, but I couldn’t access the list of participants or tell who was speaking at any particular time. It was very much hit and miss, and it was never the same from one day to the next or one subject to the next. I wasted a lot of time trying to figure out how to make it work."

In some cases, having no access at all is, ironically, less stressful and more consistent than having sporadic or unpredictable access, because when faced with the latter, users often feel that they themselves must be the cause of the accessibility issue rather than the system itself. It is important that accessibility is incorporated into systems in a consistent and comprehensive way, and that accessibility testing, using various combinations of assistive technology, is undertaken during the deployment of such systems. We know from our experience using smartphone apps that developers frequently use the term "accessibility" loosely, and claim that their app is accessible when in reality only a small subset of its features is accessible. It is virtually impossible for an end-user to assess the accuracy of such claims in advance, and even university support staff may be unaware of accessibility barriers if they have been led to believe that a particular system is accessible.

The situation is made more complex by the fact that the software that underpins online learning environments is frequently upgraded, and the level of accessibility can change significantly from version to version without notice and anyone being aware of it: even the developers themselves may be unaware that a software "enhancement" has had a negative impact on accessibility unless they have done appropriate accessibility and user testing. Universities should be able to rely on the accuracy of accessibility information provided by software developers, and it is the responsibility of developers to ensure that they have undertaken accessibility and user testing sufficient to substantiate that information. At the same time, however, universities have a responsibility to clearly specify accessibility requirements when calling for tenders to provide software platforms, and to properly evaluate accessibility claims made by developers to ensure that those requirements have been met.

Reasonable Adjustment

The Disability Standards for Education 2005 ("the Standards") were developed under S.31 of the Disability Discrimination Act 1992 (Cth) ("the DDA") to provide certainty and clarity about the application of the Act in particular areas. If a person is found to be complying with a particular Standard, then they are deemed to be complying with the DDA itself. Conversely, it is just as unlawful to contravene a Disability Standard as it is to contravene the DDA.

The Disability Standards for Education cover all levels of education, and all phases of the education process. They thus apply to universities, and to areas such as enrolment, course participation, and curriculum development and delivery, and the provision of training to specialised support staff as well as to students who require specialised equipment such as

adaptive technology. The Standards require that education providers make reasonable adjustments in these areas, to the extent that such adjustments do not impose "unjustifiable hardship" (which should not be viewed as the equivalent of "no hardship at all").

The Standards have led to some improvements in access to education for people with a disability, but individuals and providers alike have expressed repeated concerns that they lack specificity and have therefore been applied in inconsistent ways across the various education sectors. So, for example, a student may find that one university considers a particular adjustment as "reasonable" whereas another university may refuse to provide exactly the same adjustment, even though both universities believe they are following the Standards. It can be very difficult for a student to challenge a university's refusal to provide a particular adjustment unless they have some way of knowing whether the adjustment they are seeking is reasonable within the context of the Standards. On the other hand, universities may not be aware of the adjustments that are considered to be best practice or reasonable by the sector as a whole and by the Standards themselves. A rapidly-evolving area such as online learning is especially prone to both these uncertainties.

If online learning systems are designed from the outset to meet accessibility benchmarks, then there is less likelihood that a university will need to provide an adjustment later on. If, for example, a user of screen-reading software is able to use the system's collaboration functionality "out of the box", then they are much less likely to need the university to provide them with an adjustment such as asking the lecturer to submit comments and tasks on their behalf. The view that it is easier and less costly to make adjustments later rather than to insist on built-in accessibility at the outset is rarely likely to lead to more equitable outcomes for students and cost savings for universities, and in many cases will restrict the ability of students to engage with their courses with the same degree of autonomy and independence as other students. There are, of course, situations where a reasonable adjustment is the best option, but it is important that such adjustments are not viewed as a universal, inclusive, solution to all accessibility barriers that students experience.

As far as we know, all public universities in Australia now provide dedicated support services for students with a disability, and one function of these services is to develop any reasonable adjustments that a particular student may require. A number of the participants who completed our survey commented on these disability services:

> "Any problems using the online environment have been minimised due to the support from the Disability Unit as they continue to advocate on behalf of their clientele."

Another participant also reported a positive experience of a university's disability services:
"I was considering enrolling at a particular university and I contacted their disability services using the email address on the website to ask about the accessibility of the various online systems they used. They responded very quickly and emailed me a document that listed every system the university used and an assessment of how accessible it was based on the screen-reading software that I used. If they had found accessibility issues, the document also listed what adjustments they could make for me. This was extremely helpful and for me it gave me confidence that I would get a high level of commitment to meeting my needs if I studied there."

But not all comments were as positive:

> "Although the university has a disability office, they are of little use other than special exam provisions."

And,

> "When I email them [the Disability Services staff] about some assistance I need, I generally just get an automated out-of-office reply and it sometimes takes weeks before I actually get to speak with someone. In that time things have generally become more difficult for me because I haven't received the assistance."

Another participant provided this comment:

> "I have had quite a bit of difficulty accessing online books as I cannot copy and paste them to view them in a larger font. I have found the disability support department are not very understanding of low vision and I am often required to provide medical certificates for assignment extensions. I am feeling like I am not helped much and it is only my determination that will help me complete my degree."

In conversations, a number of participants expressed their surprise and frustration that the support services they needed to use during their university studies were all predicated and administered according to a medical model of disability, when the social model is widely accepted in other areas of social policy. One participant explained:

> "I go to my doctor when I'm sick, or need a 'flu shot. She knows what my blood pressure and cholesterol are, but, honestly, she wouldn't have a clue about what assistance I need at uni. And yet she's the one they listen to, rather than me. How can that be person-centred?"

Potential university students make choices about the particular university they wish to attend based on factors such as proximity to where they live, particular courses offered, and institutional reputation in the field they wish to study. Students with a disability should be able

to make those same choices without also having to consider the quality of support services – there must be a consistent approach across the university sector so that students can have confidence that they will receive high-quality, needs-appropriate support services regardless of which university they attend.

Inconsistencies between universities in the types of reasonable adjustments they provide, and the quality and nature of the support services available to students with a disability, have a particularly detrimental impact on those students who engage in cross-institutional study. A number of participants in our research indicated that they had recently studied at more than one university, and some commented on the disparities they encountered in receiving reasonable adjustments and specialised support to assist them in their studies. Students choose to complete individual subjects of part of the study program at another institution for various academic and non-academic reasons (for example, the availability of a particularly relevant subject only at one university, or a change in their residential location), and universities now have various mechanisms in place to allow for this.[31] Students who are blind or have low vision should be able to explore their cross-institutional study options without having to also consider variations in assistance and support services available to them at different universities.

Universities have developed specialist disability services to assist students to negotiate complex bureaucracies to obtain the assistance they need to study with equity and independence. When these services fail for whatever reason to provide the high-quality support that is intended, students who may already feel disempowered and unable to overcome the barriers they are experiencing can very easily fall so far behind in their studies that it becomes impossible to ever catch up. A good case can be made for the use of technologies such as predictive analytics, which allow universities to identify students who are possibly "at risk" in their studies (for example, if a student consistently does not participate in online discussions and collaborations it may be a sign that they are experiencing barriers),, and who therefore may benefit from targeted assistance. In designing and implementing strategies of this kind, universities must obviously be sensitive to a student's individual needs and circumstances, otherwise they will be seen as tools of sinister surveillance rather than beneficial intervention. It is important, too, that there be a consistent approach across the sector, so that a student who is blind or has low vision can be sure that they will not be allowed to "fall through the cracks" no matter which university they attend.

Inconsistent Platform Accessibility

One theme that emerged from the survey is that the accessibility of basic online platforms such as Moodle and Blackboard[32] can vary significantly from implementation to implementation,

even using the same configuration of assistive technology. This is a topic that requires further investigation from both a technical and a user-centric standpoint. However, two related factors that do seem to be a key determinant of the accessibility of an online platform (at least from a user perspective) is the way(s) in which it has been customised by the university, and the manner in which content is made available through the platform. One participant commented:

> "It was really hard to use PDF documents. Also, the webpage refreshed quite a bit."

Another participant noted:

> "I found some online articles hard to access, as many were like an image format that had been badly photocopied - making it hard to read, and screen reader didn't work."

The following comment by another participant is a good summary of the variations that occur between the accessibility of the basic platform and the way it is adapted and used by the university:

> "Accessing the … [online learning platform] was very easy. It has an easy layout to navigate when zoomed in and everything is readable with a screen reader. The content of each subject page can vary based on who has created it; there is no consistent format. For example, for a pdf copy of lecture notes, one subject may have a section called 'Documents' in which the lecture notes can be found. A different subject may have no such sections as 'Documents', instead there might be a section called 'Lectures' in which the notes can be found. This makes it difficult to quickly find specific documents as sometimes many sections of the subject page must be searched to find what I'm looking for. Sometimes papers and readings are uploaded as a pdf that my screen-reader cannot interact with. All lectures were recorded and uploaded. They were easy to access but there were no descriptions of what the lecture covered; the only thing distinguishing each file was the date. By the end of a semester, trying to find a specific lecture in a sea of files with almost identical names was challenging."

What these and similar comments demonstrate is that the accessibility of online learning environments is not solely determined by the "out of the box" accessibility of the underlying software. A platform that is relatively inaccessible to begin with is made even worse by the use of inaccessible content and poor design, while good examples of relatively accessible platforms are quickly compromised when accessibility benchmarks and good design principles are not followed when the platform is actually implemented. In choosing an online learning platform, a university may give careful consideration to its accessibility as determined by its compliance with accessibility standards and guidelines, but the platform must be implemented and used in ways that also conform to accessibility standards and guidelines, otherwise accessibility barriers will be inevitably created.

Ancillary Systems

While the primary focus of our research was on online learning platforms in the context of core curricula, it is important to note that the use of online learning and other interactions has also increased in other areas of university life. Acceptance of offers of university places, enrolment procedures, updating personal details, requesting subject changes or absences, library orientation and resources training, stress management, study skills and other "life skills" offerings, are all now conducted in an online environment, and are often developed and delivered using the same platforms that provide curricular content. The impact of accessibility barriers in these and other ancillary systems can be just as detrimental to students as those occurring in core online learning systems. One participant in our research provided the following comment:

> "I had decided I wanted to enrol at … [in a particular university] and I contacted the Disability Services team to ask if the online enrolment process was accessible to blind people using screen-reading software. They said that they didn't know but how about I try it and let them know what I found. I didn't feel like being a guinea pig and putting myself through extra stress and wasting time only to find that I couldn't enrol. Surely the university should be testing this stuff for accessibility and not leaving it up to students. I figured that if they didn't know if their enrolment was accessible they wouldn't know much about anything else to do with accessibility, so I didn't enrol there."

Just as accessibility must be front-of-mind at all stages of the design and deployment of online learning platforms, so also it must be integrated into every online system used throughout the university. This also includes "back end" systems that may be used by university staff. People who are blind or have low vision should be able to seek employment in universities on an equal basis with the rest of the community. The inaccessibility of administrative and related systems can present an insurmountable barrier to equal employment. The release of the Australian Standard AS EN 301.549:2016 for the procurement of accessible ICT in 2016 provides an ideal framework for universities to use when designing or purchasing its ICT infrastructure.

Access to Training Resources

A number of participants commented on the lack of opportunities for them to learn about how to use their adaptive technology with the specialised software that they were required to become familiar with as part of the university course. One student remarked:

> "The university has all sorts of training programs for you to learn how to use SPSS, but no-one can tell me how to use it with my screen-reading software – the only thing they know about is the mouse. I'm expected to just figure it out myself. Other students aren't expected to figure it out by themselves, so why should I?"

Another participant noted:

> "I'm strongly encouraged to use Endnote to keep track of my bibliographies and references. The university has several training modules where you can learn how to use it, but none of them even mention that there is such a thing as a screen reader. Everything's written for sighted people and the people who run the courses no absolutely nothing about how someone using adaptive technology can use Endnote, or even if we can use it at all."

The accessibility barriers that are presented by online learning platforms themselves are exacerbated by the inconsistent provision of disability support services; in some cases these services are provided by staff who lack a detailed understanding of the needs of, and the technologies available for, students who are blind or have low vision. The rapid evolution of both mainstream and adaptive technologies, combined with factors such as the increasing casualisation of both the academic and support workforces, mean that there is a critical need for adequate and ongoing training for all staff involved in providing services to students with a disability, and especially to those who rely heavily on adaptive technology, such as students who are blind or have low vision. It is also important to note that students themselves are often not provided with any support in learning how to use adaptive technology, whereas other university students have a wealth of resources available so that they can learn how to use library and other software, databases, and the other technology that they will need to use as part of their university education.

A further consequence of the lack of specific training resources is that universities do not have a good understanding of the accessibility of the software that they require their students to use, and so they are unable to engage in any systematic approaches with software developers to have accessibility barriers fixed. It is almost impossible for an end-user such as a student to engage with large software development companies, even if they have the time and energy to do so. The university sector, acting as a whole, has a much greater ability to bring about positive change.

Conclusion and Recommendations

The research conducted by Vision Australia in 2017 collected and analysed the experiences of online learning environments by current and recent Australian university students who are blind or have low vision.

The rapid growth in the use of online learning as a core component of curriculum delivery means that almost all university students will be required to study using an online environment, regardless of their course of study, and irrespective of whether they are studying on- or off-campus.

The results of our research show very clearly that while there are examples of good accessibility to online learning, they are very much the exception rather than the rule. Words such as "awful", "difficult", "stressful", and "hard" are typically used by students who are blind or have low vision when describing their experiences of online learning. The accessibility barriers that students are experiencing occur across the Australian university sector and exist in most online learning platforms. They are equally present for students who use synthetic speech and/or braille assistive technology as for those who use screen magnification software. Some barriers are "built in" to the environment itself, while others are the result of poor design choices and the use of inaccessible content.

During the first decade of the 21st century there was a strong focus on the development of strategies for improving the availability of curricular materials in accessible formats. During the second decade, the widespread introduction of online learning has not been accompanied by a similar sector-wide focus on how students who are blind or have low vision can access the many advantages that online learning offers. The result has been the proliferation of accessibility barriers that have been identified in this report which, in turn, are having a significant impact on the lives of students who are blind or have low vision.

Of course, Australian universities are not unique in their uptake of online learning, and many of the companies that develop online learning systems have a global market. If accessibility barriers with a particular online learning system are identified in one country, there is every reason to suppose that they will be present for students in another country. Conversely, if an accessibility barrier is removed by an international software developer, then users in all countries will benefit. While any one university in Australia may have limited ability to achieve improvements to the accessibility of a particular online learning system, the sector, acting as a whole, has a much greater ability to influence change, and if the Australian university sector

works collaboratively with its international counterparts, then there is an even greater capacity to achieve improved accessibility.

The development and adoption of accessibility standards and guidelines have also become increasingly internationalised, beginning with the release of version 1.0 of the Web Content Accessibility Guidelines (WCAG) by the World Wide Web Consortium in 1999.
The current version of these Guidelines is 2.0, and version 2.1 is in the final stages of development.
The WCAG have become the international benchmark for the accessibility of websites and they have been adopted with various levels of mandate in many countries, including Australia.

In 2016 Standards Australia adopted AS EN301.549:2016 *Accessibility* Requirements Suitable for Public Procurement of ICT Products and Services. This Standard was developed in Europe and is now an Australian Standard. Although it has not yet been incorporated into any legislation in Australia, this Standard has already been recognised by the Commonwealth and some state/territory governments as an necessary part of public procurement processes. The Standard is comprehensive, and should be considered for adoption by the university sector as a way of ensuring the accessibility of online learning systems and other ICT products and services.

An important theme in the responses from participants in this research is that there is insufficient training available, both to staff who provide support and for students themselves to become familiar with university resources and software in the context of adaptive technology. The result is a lack of equity and an exacerbation of barriers that already exist. Universities have clear obligations under the Disability Standards for Education to provide adequate training, both to specialised support staff and to students who require specialised equipment such as adaptive technology, and this is one area where further action is needed.

The Australian Government has developed various initiatives aimed at asserting and promoting the rights of people with a disability. The Disability Discrimination Act 1992 makes it unlawful to discriminate against people with a disability in certain key areas of public life, including education, access to premises, and the provision of goods, services and facilities. The Australian Government has also ratified the UN Convention on the Rights of Persons with Disabilities, developed a National Disability Strategy, and most recently has implemented the National Disability Insurance Scheme (NDIS), which represents a paradigm shift in the way people with a disability receive care and supports. As noted previously, the Australian Government is also a significant contributor of funds to Australian universities, and it provided significant input into the National Forum that was held in 2002 to consider ways of making curricular materials more

readily available in accessible formats. In the context of access to online learning, the Government also has an important role to play, by clarifying the accessibility outcomes it expects as part of its contribution to university funding.

The extent and pervasiveness of the barriers to online learning that have been revealed through our research also raises legitimate questions about the effectiveness of and compliance with a number of the standards that form Part A of the Higher Education Standards Framework. It is appropriate that the Tertiary Education Quality and Standards Agency (TEQSA) consider this report in the context of the part A standards and work with the sector to address the barriers that our research has identified.

If students who are blind or have low vision are to continue to have access to full, equal, and independent access to university education in Australia, then the university sector as a whole, together with Government and regulators, must take urgent, coordinated and decisive action to remove the accessibility barriers to online learning that currently exist. We believe that the following recommendations provide a framework for such action.

1. That Universities Australia, in its role as the peak body representing Australian Universities, receive and give urgent consideration to the findings in this report.
2. That as part of its response to the findings in this report, Universities Australia undertake a comprehensive technical accessibility audit of the online learning environments used by Australian universities, and that the results of this audit form the basis of an Action Plan to achieve remediation and change.
3. That Universities Australia adopt the Australian Standard AS EN301.549:2016 for use in the procurement of online learning and other systems and software used by Australian universities.
4. That Universities Australia work with Vision Australia and other organisations in the blindness and low vision sector, to develop guidance material about best practices in the provision of assistance and reasonable adjustments in the context of online learning for students who are blind or have low vision.
5. That Universities Australia work with Vision Australia and other organisations in the blindness and low vision sector to develop a comprehensive training program for all staff involved in the provision of support services to students who are blind or have low vision.
6. That Universities Australia develop a tool that can be used by individual universities to provide consistent and comprehensive information to prospective and current students

about the accessibility of all online learning components and the reasonable adjustments that are available.

7. That Universities Australia develop a national, consistent strategy for identifying students who may be at risk of falling behind in their studies due to barriers in accessing online learning.
8. That Universities Australia develop training resources to assist students who are blind or have low vision to become familiar with specialised software used as part of university courses.
9. That the Australian Government consider and act on the findings in this report, and that it work with Universities Australia to review current funding arrangements to allow universities to provide adequate support for students with a disability, and to ensure that accessibility outcomes in the area of online learning are consistent with legislative requirements, community expectations, and the principles of disability rights and Government policy.
10. That the Tertiary Education Quality and Standards Agency (TEQSA) consider this report in the context of the standards in Part A of the Higher Education Standards Framework (HESF), and work with the university sector to identify any relevant gaps in the standards, and any deficiencies in the application of and compliance with the standards in the context of online learning environments as experienced by students who are blind or have low vision.

Endnotes

[1] Prior to the National Forum, the Commission distributed a discussion paper that provided comprehensive background to the issues, as well as sketching some possible solutions. This discussion paper is available at https://www.humanrights.gov.au/publications/storm-or-sea-change-meeting-challenges-providing-tertiary-materials-accessible-formats

[2] For further details about the outcomes of the National Forum, see https://www.humanrights.gov.au/accessible-education-materials-update

[3] Notes from meeting of the Steering Committee are archived on the Australian Human Rights Commission website, e.g., https://www.humanrights.gov.au/steering-committee-accessible-curricular-materials

[4] We prefer the term "inclusive design" to the somewhat more widely-known "universal design" when discussing the digital space. For a comparison of the two terms see http://www.inclusivedesigntoolkit.com/whatis/whatis.html . For a historical overview of these and similar terms see Persson, H., et al.: " Universal design, inclusive design, accessible design, design for all: different concepts—one goal? On the concept of accessibility—historical, methodological and philosophical aspects, *Universal Access in the Information Society*, 14(4), pp505-526.

[5] Some of the material in this section is taken from the universities Australia website, https://www.universitiesaustralia.edu.au/australias-universities#.WoOiyD9DvIU. Accessed February 14, 2018

[6] The National Register maintained by the Tertiary Education Quality and Standards Agency (TEQSA) lists 157 Higher Education Providers. The term Higher Education Provider is defined by S.5 of the Tertiary Education Quality and Standards Act 2011, and includes universities and other institutions that provide similar awards.
[7] The University College London's Australian campus in Adelaide closed in early 2018, however its Faculty of Engineering Sciences (FES) operates a partnership with the University of South Australia
[8] https://www.open.edu.au/about-us/our-board-and-management
[9] https://www.education.gov.au/higher-education-0. Accessed February 22, 2018
[10] https://www.education.gov.au/funding. Accessed February 22, 2018
[11] This review was also known as the Bradley Review. See https://www.teqsa.gov.au/what-we-do
[12] http://www.budget.gov.au/2009-10/content/glossy/education/html/education_overview_05.htm
[13] https://www.teqsa.gov.au/what-we-do
. Accessed February 23, 2018
[14] Tertiary Education Quality and Standards Agency Act 2011. The HESF was established by S.58 and the HESP by S.166
[15] https://www.teqsa.gov.au/contextual-overview-hes-framework-2015. Accessed February 23, 2018
[16] NCSEHE (2016): *Briefing Note: Equity Student Participation in Australian Higher Education: 2011 to 2016*. Available at https://www.ncsehe.edu.au/publications/briefing-note-equity-student-participation-australian-higher-education-2011-2016/
[17] Australian Bureau of Statistics: *6202.0: Labour Force Australia, September 2017* http://www.abs.gov.au/ausstats/abs@.nsf/0/46DFE12FCDB783D9CA256B740082AA6C?OpenDocument . Access on October 19 2017
[18] Vision Australia (2012): Employment Research Survey Report 2012, Melbourne, p4
[19] Ibid., p4
[20] Ibid., p4
[21] Social Research Centre (2016): *2016 Graduate Outcomes Survey National Report,* Melbourne, pii. Available at https://www.qilt.edu.au/about-this-site/graduate-employment
[22] Vision Australia (2016: Employer Attitudes Survey 2016 – Result Highlights, Melbourne
[23] https://mailman.sydney.edu.au/pipermail/usyd-e-learning/2005-September/000076.html . Accessed on October 20 2017
[24] Archived at http://archive.is/ZUoq . Access February 8, 2018

[25] Feldman, Scott (2005): "Reasonable Accommodations? How Blind-Visually Impaired Graduate Students Negotiate Print Accommodation". Doctoral Dissertation, University of Illinois at Chicago
[26] Ibid., p4
[27] Ibid., p58
[28] Ibid., p58
[29] Ibid., p50
[30] Some TAFE colleges also provide higher education courses, and these courses are subject to the Higher Education Standards Framework. (TEQSA: Pers. Comm., February 27 2018)
[31] See, for example, https://sydney.edu.au/students/cross-institutional-study.html and https://www.westernsydney.edu.au/currentstudents/current_students/applying_to_study/cross_institutional_studies
[32] It is worth noting, however, that none of the participants who had experienced the Moodle platform described it as accessible, regardless of the assistive technology they used. Also, none of the participants who had experienced the Blackboard system were able to use the discussion boards or Collaborate functionality using assistive technology.