

# Epistemic Access for Students using Assistive Technology in the Introduction of Online Teaching in South Africa

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## ABSTRACT

**Purpose:** *Epistemic access can be explained as a merely physical entry or entry beyond physical access that require supports. The epistemic access and success for students with disabilities remain a topical issue in higher education, more so during the transition to online teaching and learning that was ignited by Covid-19. This study aims to examine how the epistemic access of students using assistive technology was imperilled during Covid-19 lockdown restrictions.*

**Method:** *This qualitative study is based at this University of Technology in KwaZulu Natal Province in South Africa. A total of twenty-five students with disabilities who use different assistive technologies were identified through purposive sampling, amongst 57 registered students with disabilities. The data was collected through semi-structured interviews and as a means of triangulation, a focus group was also held with thirteen students. The data was thereafter thematically analysed.*

**Results:** *Students reported difficulties in accessing and utilizing assistive devices, due to lack of appropriate assistive technology, technical skills, poor network, and support. This perpetuated discrimination, social exclusion, and injustices in higher education for students with disabilities. Some had to double their efforts to access their lessons and assessments. Even though their epistemic access was disrupted; they displayed a resilient character.*

**Conclusion:** *Online or blended teaching and learning appear to be the future trend in higher education, thus; effective plans and systems alignment are required to avoid exclusion of students with disabilities in the digital learning space. To continue to promote social inclusion and inclusive education in higher education institutions, the provision and procurement of assistive technologies must be prioritised. Accommodation of students with disabilities should*

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*be amongst other key considerations in the planning of future teaching and learning.*

**Keywords:** *students with disabilities, social inclusion, social justice, inclusive education, Covid-19.*

## INTRODUCTION

According to the World Health Organisation (WHO) and United Nations Children's Fund (UNICEF) (2022) report, approximately 2.5 billion people rely on assistive technologies or devices to carry out their daily activities. Even though the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) of 2007 endorsed the use of assistive technology as means of promoting full realisation of human rights, quite a few people with disabilities still remain without assistive technologies (AT) or devices which adversely affect their lives (Matter and Eide, 2018). Many African countries are struggling to supply AT (WHO, 2021); for example, South Africa can only provide 25% to 65% of AT to its deserving population (Visagie, Scheffler, Seymour, 2020; Mji, 2020; McIntyre, Cleland, & Ramklass, 2021). This is likely to have dire consequences for African students with disabilities in terms of epistemic access.

The epistemic or epistemological access and success concept associated with Morrow's research advocates for equal physical access and teaching and learning that embraces diversity. Also, it advocates for gaining access to knowledge which could be extended to the content of knowledge, provider of knowledge, the environment or context where the knowledge is disseminated, tools and methods of disseminating the knowledge and the engagement of students in the process of receiving as well as utilisation of such knowledge (Mpu, & Adu, 2021; Kanga, 2020). ATs come in different forms but for a common goal to augment the functionality and support of students with disabilities (Visagie, et al, 2020; Govindaraj, 2022). Hence, AT forms a critical element in promoting inclusive education, social justice, epistemic access, universal design learning as well as social and medical model of disability (Berghs, Atkin & Thomas, 2019; Frederic, 2020).

This study stands on the principle of social inclusion theory which basically promotes access and equity of students with disabilities. Social inclusion theory is the brainchild of Max Weber who was concerned with the inequalities and social justice in societies especially for the minority groups (Mladenov, 2016;

Trauth, 2017; Rapp& Corral-Granados, 2021). Social inclusion is universal; hence, the United Nations has committed to the Sustainable Development Goals (SDG) of Agenda 2030, which revolves around social inclusion, equal access, equality, full and effective participation themes as well as SDG4 for education (Čavkoska, 2018; Farouk, 2021). In 2016, South Africa promulgated the *Policy Framework for the Realisation of Social Inclusion in Post School Education and Training*, to encourage and promote social inclusion.

## Objective

The purpose of this paper is to critically examine how the epistemic access of students using AT was imperilled during Covid-19 lockdown restrictions when online teaching and learning was introduced. The study was organised around the following two objectives:

- To list the types of disabilities and assistive technology used by students with disabilities.
- To investigate how assistive technology facilitated epistemic access for students with disabilities during the Covid-19 lockdown transition to online teaching and learning.

## METHOD

### Study Setting

The study was carried out in a previously disadvantaged university of technology in KwaZulu- Natal Province in South Africa, where twenty-five students with disabilities using assistive devices for their learning agreed to partake in this study.

### Study Design

Qualitative design was deemed appropriate to gather the experiences of epistemic access for the students with disabilities who used various assistive technology during the introduction of online teaching.

### Sample Size and Data Collection

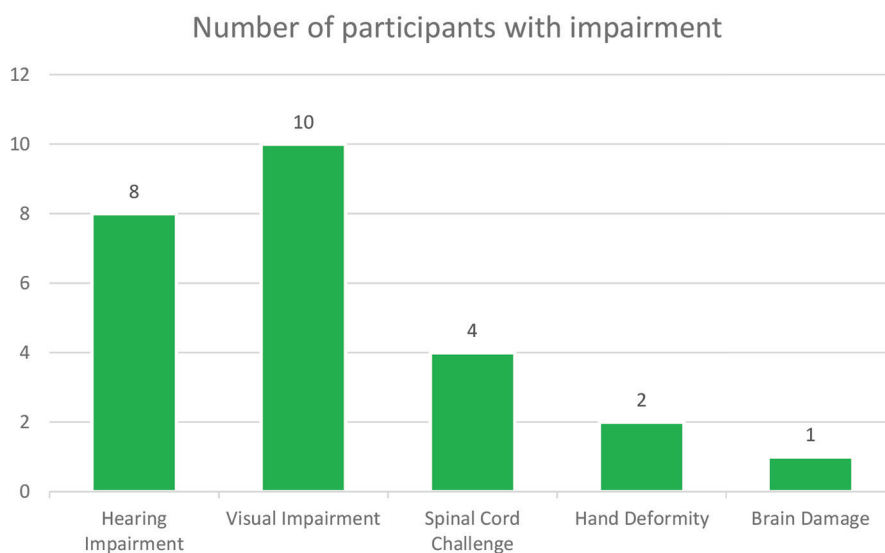
Purposive sampling was used to identify students who use assistive technologies.

A total of twenty-five students who use different assistive technologies consented to be part of the study. The participants were reminded about their rights in terms of participation in this research project. A brief explanation on consent issues, recording of sessions and ethical clearance principles were explained.

Semi-structured interviews and a focus group were conducted to engender a robust and deep explanation of the research objectives (Stahl and King, 2020). Whilst semi-structured interviews were conducted with twelve participants, each interview took about 20 to 30 minutes; focus group meeting took an hour and half with thirteen students. The discussion was guided by open-ended questions and participants probed for clarity where necessary. The data was thereafter thematically analysed.

Figure 1 shows the number of students with disabilities as per their impairment who participated in the study.

**Figure 1: Number of participants with different impairment**



### **Ethical Considerations**

The permission to conduct the study was awarded (REF: RD1/09/2022) by the university's Research Ethics Committee. For confidentiality purposes pseudonyms are used in this paper. There were no repercussions for students who chose not to participate or who later withdrew from the study.

## Data Analysis

Thematic analysis according to Braun and Clarke (2006) was used to determine the study's themes, which included familiarising oneself with the data, coding the data, developing themes, reviewing themes, defining and labelling themes, as well as writing up the story from the data.

## RESULTS

The results are presented in Table 1, addressing the first objective of the study. It is critical to identify the types of disabilities that students have and the (AT) and the challenges they experience during online classes.

**Table 1. Summary of findings**

<b>Disability</b>	<b>Assistive Technology</b>	<b>Challenges</b>	<b>Solution and support</b>
Hearing impairment	Smartphone, laptop and hearing device.	<p>Rely on lipreading a challenge-need lecturers to show faces-</p> <p>Difficult to ask them- fear of stigmatisation.</p> <p>Difficult to grasp new concepts if not clearly articulated.</p> <p>Painful, irritable ears if wearing hearing aids for a long time.</p> <p>Need visual material. Need annotated videos.</p> <p>Cell phone space is limited.</p> <p>Limited data package &amp; network.</p> <p>Limited/ no support from the university.</p> <p>Noisy environment, crowded and shared inconvenient spaces.</p>	<p>Self-taught through google. Used trial and error.</p> <p>Sign language in future</p> <p>Pre-reading before class where possible.</p> <p>Friends and family helped</p>

<p>Partial visual impairment</p> <p>Artificial eye-uses glasses.</p> <p>One blind eye and clinical blind</p>	<p>Smartphone, laptop, glasses, and phones with large tactile buttons.</p> <p>Five students have no laptops.</p> <p>Three use magnifiers.</p>	<p>Laptop brightness strained their eyes.</p> <p>Lecturers low level knowledge of software.</p> <p>Large print material not provided.</p> <p>Limited screen size</p> <p>Time concession- not applicable on Blackboard (BB)-Learning. Management System (LMS).</p> <p>Limited data package.</p> <p>Limited support &amp; poor internet connection.</p> <p>Load shedding and insufficient lighting.</p> <p>Did qualify funding for AT.</p> <p>Cell phone not always ideal but it helps.</p> <p>Did not get support from the university.</p>	<p>Relied on recordings.</p> <p>Used goggle talk and screen readers.</p> <p>Friends and family supported.</p> <p>Text-to-speech systems using Optical Character Recognition (OCR).</p>
<p>Spinal cord-hands trembles and paralysis (multiple disorders)</p> <p>Nerve damaged</p>	<p>Glasses, smart phone, laptop and wheelchair.</p>	<p>Wheelchair not fitting in internet café.</p> <p>Difficult to get maintenance for wheelchair (live in remote area).</p> <p>No proper transport.</p> <p>No specific AT for multiple disorder.</p> <p>Limited data package.</p> <p>Limited support &amp; poor internet connection.</p> <p>Small inconvenient study places.</p>	<p>Google talk.</p> <p>Family, Peer helpers and friends helped type assignments.</p>

1-Hand deformity-weak right hand 1-Some fingers missing	Laptop, smart phone and hand support.	Does not have a hand supporter and writes slowly. Time constrains -BB uses or standardised time. Chances of failing are high.	Used to video record himself to learn from it. Peers helped. BB timed- selective in answering questions to save time & started with question comfortable. Ask someone to type his work.
Partially Brain damaged	Besides laptop and phone no other specific device used.	Had a laptop. No challenges.	Has enjoyed helping peers who are struggling.

The second objective of the study focused on whether the assistive technology facilitated the epistemic access of students with disabilities. Four themes as depicted in figure 2 were identified to respond to this objective of the study that is: lack of appropriate assistive technology, technological skills, connectivity issues and support. Central to these themes is the epistemic access of students who use AT.

**Figure 2: Epistemic access for students with disabilities**



The following themes were identified as projecting the true reflection of enablers and barriers of students with disabilities epistemic access when the online teaching and learning was introduced, lack of appropriate assistive technology, connectivity, support (academic family and friends) and communication, smart phones as well as technological skills.

### **Lack of appropriate assistive technology**

At least three students with visual impairment have no laptops and one of them was assisted by his family. Nosihle feels not having a laptop has negatively impacted on her academic performance:

*“It is very difficult to work without your own laptop, I relied on my sisters’ laptop. If you have a visual impairment like mine, you need a laptop with special settings. So, this becomes difficult if you share with someone, because it means before you do your work you first need to set it up, that is time consuming”.*

Victor on the other hand also with vision impairment, has a laptop but is not appropriate set-up for his condition:

*“I normally do not have challenges when I am on campus because we do have appropriate devices there. I struggled with small screen especially during assessments.”*

Sharon on the other hand no laptop and she stated:

*“As a first-year student I was still waiting for the procurement of my laptop ...waiting for a university medical doctor to check whether I qualify for assistive technology or not. I only got my device in June. Whilst waiting I was using my smartphone to access online classes...”*

### **Connectivity issues**

Many students cited poor connectivity, load shedding and cable theft during the introduction of online teaching and learning as one main challenge which did not only affect students with disabilities but the entire communities. However, such disruptions were unbearable for some students because they had no alternatives available to them. Thembi who uses a wheelchair mentioned that:

*“The loss of connectivity and having no lights are normal in our area given that we are in deep rural areas of the Eastern Cape Province. When we were sent home, I thought the academic year would be cancelled. I had mixed emotions because I knew it was going to be difficult for me. My friends told me that they go to town for better connection. That was*



*not possible for me because there is no specialised transport in my area, and you need the whole day to go town."*

Besides the transport issues for students who use wheelchairs, their wheelchairs do not fit in most internet café's. Pretty was very frustrated when she wanted to go to the nearest internet café' in her vicinity.

*"That was the most frustrating moment in life, we were supposed to write a test and I was very prepared and knowing my connectivity, I asked my brother to take me to the nearest café' only to find that my wheelchair could not be driven inside because the internet cafe had staircases and the entrance is narrow. I cried and I tried to call my lecturer but unfortunately, I could not reach him on the phone."*

## **Support**

The transition from face to face to online was difficult for some students with disabilities since their support system was left behind. This became unbearable for some and were in the edge of deregistering. Johan, who has a spinal cord disability (hands tremble), desperately needed support as a first year:

*"Seeing everything not working out because of many frustrations with connectivity and not getting the necessary support from my lecturers and Peer helpers, I was getting stressed. I wanted to deregister however, my friends and family motivated me to continue. Sometimes that support and motivation is needed."*

Students with muscular disorders and hand deformity have slow writing pace, this poses a challenge when they type long essays or writing online assessment as they are timed.

Mbuso mentioned:

*"In most cases I relied on my sister to type my essays but the challenge was when she did not understand how I needed it (my essays) to be done but, I would submit it as it is just to meet the deadline."*

## **Technological skills**

Most students encountered challenges with technology particularly the first-year students. They were not yet familiar with the learning management system (LMS) of the university which is Blackboard (BB). BB is used by students to access their learning material as well as their assessments. Sbusi experienced challenges with the use of her assistive technology in accessing BB:

*"I was fortunate enough that I had received my first laptop ... before the lockdown, but the challenge was, I did not know how to use it effectively ... as a first-year student... The worse part, no one was around to help me I had to use google and You-tube. That required a lot of data, more than what the university provided us with. I missed most lessons at the beginning of online classes."*

Mbongeni has a hearing impairment and relies on lipreading to get to understanding what is being said. Due to fear of stigmatisation he could not ask the lecturer for assistance.

*"My main challenge I encountered during the online classes was lecturers do not always show their faces as they needed to project slides. In this case, I ended up not getting what was being said because I needed to lipread. Recordings ... are also not clear. Correct pronunciation of words is important. It is not easy to keep on asking people to repeat themselves because that holds back the entire class."*

Students with hearing impairment have their different challenges, for instance, Futhi with visual impairment had challenges with the screen, the font size and the colour of slides.

*"As a first-year student it becomes difficult to keep on asking your lecturers not to use certain colours when projecting their slides. I asked them at the beginning, but it did not change, they forgot, I think. Also, when they use videos, I only listen to the sound ... not see properly."*

Some students with multiple disorders saw challenges as opportunities to learn new ways of doing things although the experience was frustrating. For instance, Nduduzo had to train himself to use speech-to-text function on a laptop.

*"This was both frustrating and exciting because I was learning something new..."*

Whilst on the other hand Isaac shared experienced of exploitation and frustration:

*"I pay for my typing services because my hand gets easily tired. The main challenge is when someone types wrong things and try to paraphrase my work. When you ask the person to make corrections, they refuse. They will make you wait, and you don't have time for that. You just submit something that you are not happy with ... I am teaching myself speech-to-text."*

During assessments on BB students were treated in the same manner; there were no time concession for those students who needed it. Hlelo, who had multi-disorders and Mbuso who had a hand deformity, shared the same sentiments on time concession.

Hlelo mentioned:

*"I write very slowly because of my condition; online tests are timed and do not allow for extra-time. ...this hugely affected my academic performance. I was frustrated. I don't think lecturers know how to set BB properly for assessments."*

Similarly, Mbuso could not finish his assessment:

*"BB gave me challenges, time allocated for the test is the same for all students ... I learnt to start with question that I was most comfortable with so that I could get 50% at least"*

However, not all students endured challenges with technological issues and the LMS for instance Zamo stated the following:

*"I am a postgraduate student ..., I did not experience any challenges, and there were just minor glitches at the beginning like everyone else I had that anxiety, but I adjusted quickly. ... I provided support to many students who were struggling with BB as much as the university provided such support."*

Smart phone usage was used as alternative with some students preferring it over the laptop due to its affordability and accessibility. Contrarily, Sizwe who has a hearing impairment has challenges with using a cell phone for a long time. He stated:

*"I have a smartphone, which is convenient and affordable, but I cannot rely on it for a long time ... wearing earphones strain the only ear that is not impaired. The challenge with the laptop is that when you are not in a quiet space or in a space with poor connectivity; you need to move outside, it is not easy to move with the laptop."*

### **Other barriers**

For some students, either their condition was not considered sufficiently disabling to warrant assistive devices, or they had multiple disabilities that required more than one device.

Thulani, a student with a visual impairment did not qualify to receive an assistive device because the university medical practitioner found that his condition was not major. Thulani explains:

*"I noticed that my vision was deteriorating as online classes progressed. I started to skip classes because of my poor vision. Unfortunately, I could not afford to visit my local optometrist"*.

Nozipho explains her ordeal:

*“My conditions require more than one specific assistive technology, and the unfortunate part is that they are progressive. It means I have to consistently visit a medical practitioner for assessments. When the lockdown took place, I was still waiting for my results from my university practitioner.”*

## DISCUSSION

The findings revealed the barriers to inclusive education in higher education environment which has a possibility of hampering their epistemic access. These findings also demonstrated the students’ resilience, as they persisted despite the challenges.

### **Lack of appropriate assistive technology**

Discrimination, isolation, stigmatisation, lack of epistemological access, inadequate infrastructure, and a lack of ongoing support from their faculties are familiar occurrences (Ndlovu, 2021). However, the Covid19 was characterised with anxiety and stress (Mhlanga & Moloi, 2022; ) some students had lost their loved ones and yet expected to cope with new mode of learning.

Being treated as a second-class citizen is also normal for students with disabilities; their needs come as an ‘after thought’, there are always no proactive plans to accommodate them. Some universities including this university of technology tried to mail learning material which did not materialise anyway since post-offices were closed. Ngubane and Zongozzi (2021) found that even the University of South Africa (UNISA) the giant in distance learning was unable to provide suitable material because for their students with disabilities. They claimed that students struggled to access suitable material hence libraries were closed. Such cases threatened the social justice and inclusive education principles for students with disabilities, it could be confirmed that the students with disabilities were literally left out, and their epistemic access was threatened.

Ndlovu (2021) postulated that getting an assistive device in South African higher education could be a tedious process. Students with multiple disorders are likely not to get an AT that accommodates all the disorders they have.

People with disabilities go through several verification procedures to receive a social grant from the Department of Social Development and assistive devices

from the Department of Health. When students get to the university, they need to visit a Disability Unit in cases where this is available. For students with disabilities to receive disability funding and be considered for assistive device through the National Student Financial Aid Scheme (NSFAS), they may need to be examined and certified by a university medical professional. Such processes are necessary but long and infuriating.

The lack of proper devices might have far-reaching negative impact on students with disabilities which may include but not limited to depriving them right to education, epistemic access and may increase the level of dependency, inequality, frustration, poverty while also lowering their self-esteem and academic performance (Etieyibo & Omiegbe, 2017; Matter, Eide, 2018;). The literature shows that students with disabilities must double up their effort than their counterpart if they want to succeed (Ndlovu, 2021; Themane & Mabasa, 2022). Whilst the study confirms the challenges that the students with disabilities continue to experience in higher question, it also questions the social justice and social inclusion practices of the institution with regards to its inclusive education, the distribution of knowledge and resources.

### **Technological skills**

This theme is heavily loaded with arrays of challenges which included issues of stigmatisation, lack of proper training on BB, using smartphones as learning tools as well as emotional and financial exploitation of students with disabilities. Although literature reveals that both students and academics lack skills of operating the online technology, students believe academics were worse off particularly with material preparation (Magesa & Josua, 2022; Syam & Achamad, 2022; Irvan, Damayanto, Jauhari, & Aqilah, 2021; Wong & Cohen, 2015).

Whilst online learning has benefits; it requires good implementation strategies and effective systems and commitment from all stakeholders (Xhaferi & Xhaferi, 2020; Hongsuchon, Emary, Hariguna, & Qhal, 2022). Having basic computer skills assist in operating assistive technologies as well as accessing learning management system (Ro'fah, Hanjarwati & Suprihatiningrum, 2020) which is Blackboard (BB) in this case. Some first-year students lacked technical skills to access to BB and their assistive devices as they had not received proper training. Amongst other challenges that students with disabilities encountered were poor connectivity as noted earlier above which has a direct impact on their epistemic access (Abed and Shackelford, 2021; Syam & Achmad, 2022).

The findings revealed that each category of disability/ impairment had a share of challenges (refer to table 1.1) with the transition to online learning and access to learning management systems (Catalano et al, 2021; Abed & Shackelford, 2020). These findings have also indicated that lack of technical skills is not limited to students but the academic staff as well (Mpu & Adu (2021). However, that will need to be further investigated. When systems are inaccessible the implementation of inclusive education, the use of AT as well as epistemic access and success cannot be guaranteed for students with disabilities (Mpu & Adu, 2021, Rapp & Corral-Granados, 2021).

### **Connectivity issues**

The long-standing issue of the poor supply of electricity and cable theft which have made load shedding a norm in South Africa also exacerbated the situation for students with disabilities. Most rural areas where a bulk of students come from do not have electricity or its supply is intermittent and this adds an extra burden on students with disabilities as many technological devices use electricity (Adnan & Anwar, 2022; WHO, 2022). Students with disabilities faced numerous challenges as they attempted to adjust to a new mode of learning due to the disabling environment. There are many lessons that can be construed from Pretty's tribulations (refer page 7) who could not write her assessment due to connectivity challenges in rural areas.

The following can be deduced from this experience:

- Poor Connection
- Poor infrastructure in rural areas
- Forced to depend on others (family support is critically important)
- Public facilities not universally design to accommodate diverse needs of their customers
- Unavailability of support (lack of inclusive pedagogy)
- Epistemic access denied (student could not write the test)
- Feelings of frustration and exclusion

Such experiences of social exclusion are dehumanising (Rambe & Mawere, 2011; Florian & Beaton, 2018) and cause unnecessary dependence (WHO, 2022). The

students with disabilities barriers are multiple-faceted and interlinked; the issue of connectivity is linked to transport challenges, academic performance, transport and emotions. According to Duri and Luke (2022), access to public transport is restricted and being in rural areas further exacerbates the condition given the poor road infrastructure.

While the dysconnectivity described above means literary connectivity that mostly affects everyone in the country, students with disabilities have an additional experience of social exclusion. Disability on its own disconnects people from others, especially in spaces that are not universally designed and in institutions where inclusive education is not fully implemented.

### **Support**

Higher education institutions do have structures in place to provide necessary support to students on campus. Such assistance ranges from, support from academics, students counselling and from Peers Helpers (these are students who mainly offer assistance to students with disabilities) to other administrative departments (such as library, IT, transport department and the clinic). However, these kinds of support services were not available during the Covid-19 lockdown. As a result, students felt a vacuum of being isolated from their support systems (Ahmed, 2018). Depending on the severity of the disabilities and assistive technology students may require specialised support otherwise, they may not cope in higher education (Mpu & Adu, 2021; Ndlovu, 2021; Govindarajan, 2022).

Whilst students may need help, they are sometimes cautious of being stigmatised. Florian and Beaton (2018) state that students do not want to be treated differently as this may draw unnecessary attention. Florian & Beaton (2018) and Sanger (2020) thus advocate for inclusive pedagogy, where teachers themselves take responsibility of addressing diverse needs of their students without putting them on the spot.

## **CONCLUSION and IMPLICATIONS**

The forced transition to online teaching and learning was not only difficult for some students; it showed gaps in the implementation of inclusive education in higher education (Synam & Achmad, 2022; Adnan & Anwar, 2020). Online teaching and learning provided another opportunity for higher education institutions to refocus on inclusive education and reconsider how social inclusion, social

justice and inclusive education principles could be used to improve teaching and learning. Higher education institutions are mandated to provide education that is fair, equitable, fair, and non-discriminatory in order to empower people while also boosting the country's socioeconomic state (Rapp & Corral-Granados, 2021). Providing students with disabilities with the necessary assistive devices is necessary to avoid exclusion of this minority group. While laptops and phones may be seen as luxuries by other students, they are essential learning tools for some students with disabilities.

### Limitations

The study focused only on the challenges of the students with disabilities mainly those who used assistive technologies during the introduction of online learning. Another limitation of the study is the single focus on a university in South Africa, which, by extension, was limited to only students pursuing higher education.

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