Challenges in e-learning for visually impaired secondary school learners during the Covid-19 lockdown period in Masvingo District schools

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Abstract

The purpose of this study was to identify the challenges encountered by secondary school learners with visual impairment as they were preparing to write their examinations during the Covid-19 pandemic period in Masvingo District. Following the pandemic, most governments worldwide were forced to close all educational institutions in order to mitigate the spread of the virus. Zimbabwe also closed schools on 24 March 2020 and reopened for examination classes on 28 September 2020. It was during the lockdown period that online learning was implemented in Zimbabwe, with the WhatsApp platform inadvertently becoming the major medium of instruction used for teaching and learning in most institutions, including those for learners with visual impairment. The qualitative, phenomenological research design was used, with focus group discussions and semi-structured interviews as data collection instruments. The population of the study was all secondary school learners with visual impairment in Masvingo District, parents of such learners, as well as teachers who taught such learners in Masvingo District. A sample of thirty (30) participants participated in this study. Twenty-four (24) learners with visual impairment were randomly selected from the special school and purposively selected from the inclusive school. Four (4) parents, two (2) from each school, and two (2) teachers, one from each school, were purposively selected. The study established that most learners with visual impairment did not have the JAWS software that enhances screen reading in their ICT gadgets. Learners with low vision indicated that reading on a computer had a negative effect on their eyes if they took long on a computer. Some assistant readers for learners with total blindness were found to be incompetent in assisting on screen reading at home. Internet connectivity was also identified as a challenge since internet broadband was expensive and network connectivity was poor in some rural areas. The research found out that most learners failed to complete their online learning assignments during the Covid-19 lockdown. For online learning to be successfully conducted from home, parents should purchase or download the JAWS and screen readers for Visually Impaired (VI) learners to use.

Keywords: *E-learning, internet connectivity, software, visually impaired, Covid-19*

Introduction

The use of the internet is integral for communication in the twenty first century. However, there are many people with visual impairment who need to learn appropriate skills in order to take advantage of this facility (Permvattana, Armstrong & Murray, 2013). Learners with total blindness and low vision are among people who have previously been disadvantaged because

they cannot easily access learning materials and instructional media. The plight of this group of students worsened in 2020as the spread of Covid-19 intensified globally, and governments directed schools to be closed. Schools in Zimbabwe were closed on 24 March 2020 only to be re-opened on 28 September 2020 for examination classes, namely Grade 7, Form 4 and Form 6. This research was spurred by the recommendations made by UNESCO (2020), that schools use distance learning programs and open educational applications and platforms to reach learners and, thus, limit the disruption of education. The main thrust of this research was to identify challenges experienced by secondary school learners with total blindness or low vision during e-learning under lockdown.

Background to the study

The Covid-19 pandemic affected educational systems the world over, resulting in the closure of primary, secondary and tertiary institutions. Mahra (2020) avers that the Covid-19 pandemic took its toll on education systems around the world and cast a shadow on the future of education, as the crisis affected the education of 1.6 billion learners across different school levels. According to UNESCO (2020), the Covid-19 pandemic has caused disruptions in education and prolonged school closures all over the world. This affected 90% of the world's learners and forced countries to come up with alternative ways of teaching. Public and private education institutions put in place alternative methods for learners and teachers to continue with education in a new normal and safe environment (Reimers, Schleicher, Saavedra &Tuominen, 2020). Mahra (2020) also states that the Covid-19 pandemic has pushed education stakeholders into providing unconventional and alternative education modalities based on the use of the internet, radio and television. This has resulted in some constructive changes as well as concerns on the quality of the distance education provided.

In response to closures of primary and secondary schools, UNESCO (2020) recommended the use of learning programs and open educational applications and platforms that could be used to reach learners based in remote areas as well as limit the disruption of education. The World Economic Forum (2020) also proposed the harnessing of available technologies and the internet in education. Online education became an integral component of education. Countries embarked on online distance education using online platforms like ZOOM, WhatsApp, and Email, which set off an unplanned and rapid shift in the education sector. Though this opened the doors to many opportunities, it also resulted in disparities and gave rise to several challenges (Belhoul, 2020). Zimbabwe also embarked on online learning in

line with attempts to contain the spread of Covid-19. This study attempts to identify the challenges that secondary school learners who had visual impairment, and were learning at home in preparation for examinations, faced in online learning during lockdown.

Statement of the problem

Nowadays, VI learners can take advantage of a large number of effective assistive technologies such as computers with JAWS software, Pot set readers, talking books and audio CDs. However, while using electronic material for learning purposes, VI learners often encounter various accessibility and usability challenges. This study, therefore, intends to establish the challenges that the VI secondary school learners encountered as they learned and prepared for examinations using the online platform during the Covid-19-induced lockdown. The period covered in this research is between April 2020 and September 2020.

Guiding research questions

- What are the challenges encountered by VI secondary school learners during the lockdown period?
- To what extent can the challenges faced by VI learners affect them when preparing for examinations online?
- What can be done to mitigate the challenges faced by VI learners in online learning during the Covid-19 lockdown period?

Literature Review

According to Permvattana, Armstrong and Murray (2013), visually impaired relates to those learners who are categorised as legally blind, having a visual acuity of 6/60 or less in the better eye, and/ or a visual field of less than 10 degrees. Vuletic, Sarlija and Benjac (2016) and Kharade and Peese (2012) state that visual impairment includes blindness and low vision. Vuletic et al. (2016) and Molina, Moridonez, and Zeda (2016) aver that the degree of visual impairment is determined by the residual visual acuity and breadth of visual field, based on which blindness and low vision are defined in categories. Low vision is used to describe a loss of visual acuity while retaining some vision (Disabilities, Opportunities, Internetworking, and Technology, 2005 cited in Kharade & Peese, 2012). Mangal (2017) explains that visual acuity means vision between 20/70 and 20/400, with the best possible correction, or a visual field of 20 degrees or less.

Blindness is defined by Mangal (2017) as a visual acuity worse than 20/400 with the best possible correction, or a visual field of 10 degrees or less. Blindness refers to a complete lack of vision. However, people who are considered legally blind may have some useful vision (Disabilities, Opportunities, Internetworking, and Technology, 2005 cited in Kharade & Peese, 2012). It can be deduced, from the definitions above, that for a learner to be regarded as one with visual impairment, the learner does not necessarily have to have completely lost vision. Different types of visual impairment cause different kinds of challenges to individuals carrying out online assignments.

Information Communication Technology and learners with visual impairment

Bocconi, Dini, Ferlino, Martinoli and Ott (2014) explain that online learning covers those educational resources made available through inter-connected computer networks, comprising synchronous and asynchronous communication tools. Pacheco, Young and Lips (2017) state that technologies range from personal digital assistants with speech and Braille output to screen magnification systems, speech synthesisers, and more recently, mobility-aid solutions for mobile phones which support trip planning. Kharade and Peese (2012) assert that learners with VI use assistive technology (either screen-reading software or screen-enlargement software) to access the e-learning systems. Bocconi, Dini, Ferlino Martinoli and Ott (2014) explain that screen readers are used to translate text to audio for those learners who are totally blind, and that screen magnifiers enlarge text and objects on the screen display for those learners who have a small amount of usable vision. The same authors also note that screen reading software is designed specifically to translate text into audio, and features beyond this are limited.

Two of the softwares used by learners with visual impairment are the JAWS and the screen reader. According to Molina et al. (2016), JAWS is a program that is responsible for reading the screen for people living with visual impairment for them to know the option in which they are placed and the actions to be taken to continue. JAWS as a software reads the texts or any other materials which need to be read to the VI learners, giving the correct pronunciation and explanation. With the JAWS software, the VI learner may not need an assistant to read from the screen and, hence, could minimise the need for social distancing during the Covid-19 lockdown. Molina et al. (2016) also explain that the screen reader generates a text-only version of the page and transmits it to the user via speech synthesis or Braille, allowing JAWS screen reading. It can be noted that challenges are likely to be faced by learners with

total blindness whose ICT gadgets do not have JAWS or screen readers, because assistant readers will be required.

Problems faced by learners with visual impairment in using ICT gadgets

Kharade and Peese (2012) indicate that while there has been a great improvement in universal access to technology, VI learners still struggle with poorly designed computer interfaces that continue to lag behind in some web design features. Bocconi et al. (2014) assert that learners with disabilities may, in fact, face relevant difficulties both in accessing and in using e-learning tools. Depending on the type of impairment, the types of obstacles encountered may vary considerably. Some of the most common problems faced by learners with acute vision impairment include inaccessibility of Websites and inaccessibility of learning materials (Permvattana, Armstrong & Murray, 2013). Kharade and Peese (2012) affirm that learners with visual impairment face challenges with regard to the accessibility of e-learning tools and usability of assistive technology.

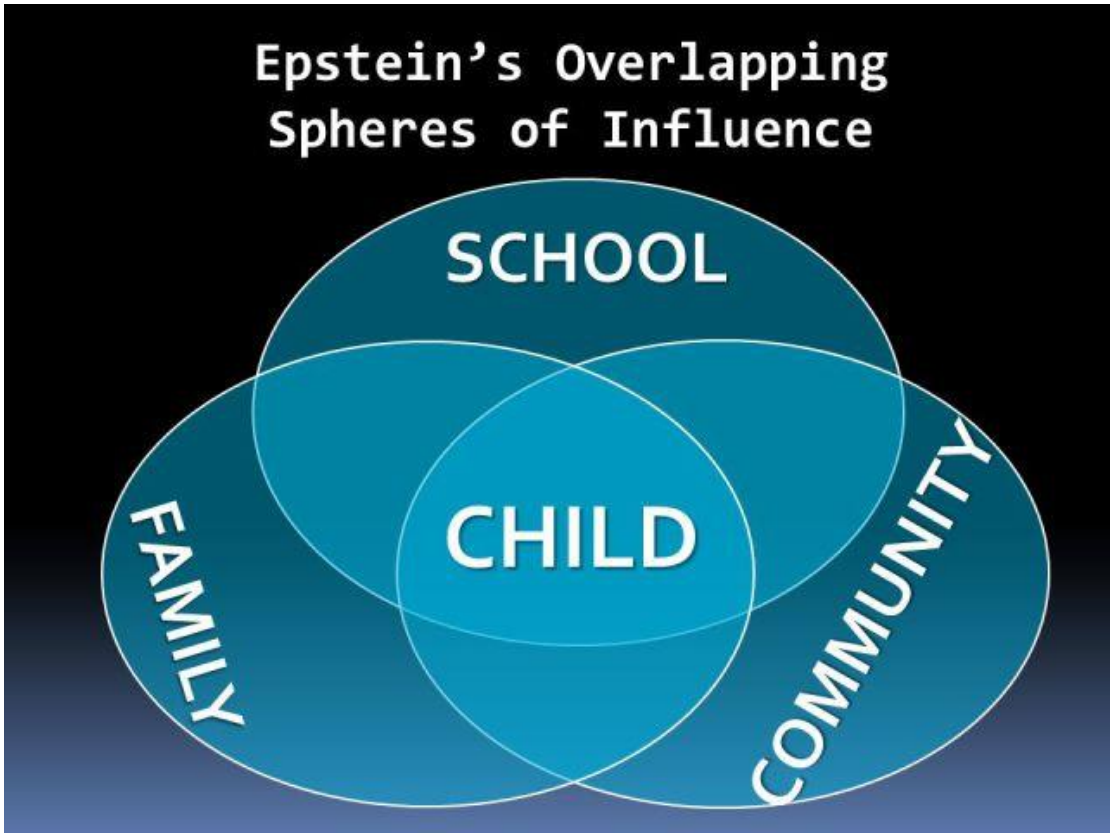
Gill (2017) observes that affordability of original software is one of the examples of problems to be addressed for learners with visual impairment. Gill (2017) explains that JAWS does not read picture or handwriting, among other features, and for that reason, any other screen reader cannot read graphical content. This suggests that JAWS is still limited as far as VI learners are concerned, especially with the need to protect them from Covid-19. In a research carried out by Kharade and Peese (2012), the main problems mentioned by learners with visual impairment with regard to screen readers were that it was difficult to interpret graphics (including photographs, drawings and image maps) unless text descriptions were provided. The same scholars say that scanned printed materials, videos, PowerPoint presentations and other visual materials (such as tables, graphs or figures) also create access challenges for VI learners.

In the case of writing and communication, using a pen and a piece of paper to work on assignments can be arduous and time-consuming for students who cannot see properly, and impractical for those who are totally blind (Presley & D'Andrea, 2009 cited in Permvattana et al., 2013). This implies that VI learners require more time to complete tasks as compared to their counterparts. Permvattana et al. (2013) postulate that e-learning materials are not frequently designed to integrate with the range of assistive technologies used. This may result in learners with visual impairment receiving incomplete or inaccurate translations, or, at

worst, no accessibility at all. Learning during lockdown was done either via ZOOM, Google classroom, WhatsApp or Email, among other social networks. In schools some problems might emanate from the type of online platform being used for learners with visual impairment. Against these findings in literature, the current researchers sought to identify the challenges encountered by secondary school learners with visual impairment in e-learning during Covid-19 lockdown in Masvingo District.

Theoretical Framework

This research is informed by Epstein's (2005) Overlapping Spheres of Influence model in its exploration of the challenges faced by VI learners in Masvingo District during the Covid-19 lockdown period. The model emphasises the importance of helpers in the child's (VI learners) E-learning during lockdown period.



Source: Epstein (2005)

The model recognises that some practices are conducted separately butothers are conducted jointly in order to influence the child's education and minimise his/her challenges. The

internal model shows where and how essential interpersonal relations and patterns of influence occur among individuals at home, school and in the community. Teachers and parents are known to be experts when it comes to the learning of VI learners, with each expert bringing in their own contributions. The levels of commitment and involvement by these parties determine the understanding of education by VI learners, hence reducing their challenges. Vygotsky's (1978) socio-cultural theory concurs with Epstein's model where social and cultural factors surrounding one's family affect the child's learning. As the child interacts with parents, family and community, his/her learning will be taking place. Epstein (2005) locates the learner at the centre of the sphere and elaborates the Overlapping Spheres of Influence model, which were attributed to having a direct effect on student learning. This model emphasises that when a child is getting support from the school, family and community, he or she will be motivated toovercome challenges in his or her learning. This means that stakeholders can work together as a way of improving the learning of the child. It is, therefore, the duty of the family, school and community to provide the necessary support, including equipment and gadgets which are user friendly.

Research methodology

This research adopted a qualitative, phenomenological design to identify the challenges faced by VI secondary school learners using e-learning during the Covid-19 lockdown period. The phenomenological design allowed the researchers to gain an understanding of the social phenomenon from the participants' perspectives in their natural settings (McMillan & Schumacher, 2010; Conrad & Serlin, 2012).

The population of this study comprised form four and form six VI learners who were preparing for the 2020 academic year examinations in Masvingo District as well as the parents and teachers of such learners.. The study was carried out at one special high school (a school with VI learners) and one inclusive high school (a school that comprises both sighted and VI learners) in Masvingo District, Zimbabwe. A sample of thirty (30) participants, that is, twenty-four (24) VI learners, four (4) parents and two (2) teachers, participated in this study. Sixteen (16) VI learners were randomly selected from the special school and eight (8) learners were purposively selected from the inclusive high school. Purposive sampling was used to select four parents (4), two (2) from each school and two (2) teachers, one (1) from either school, who were directly involved in the teaching and learning of VI learners.

Focus group discussions and interviews were used to collect data when examination classes commenced face-to-face lessons on 28 September 2020. Sixteen (16) learners from the special school participated in focus group discussions because their learning in a special class encourages collaborative learning and group discussion rather than individual work which constraints individual interview atmosphere. There were two (2) groups of focus group discussion comprising eight (8) participants each. The researchers used focus group discussions because they usually provide immediate ideas to improve particular products or concepts (Writing, 2019). The focus groups discussed on the challenges encountered by VI secondary school learners during the lockdown period and what could be done to mitigate the challenges faced by VI learners in online learning during the targeted lockdown.

Eight (8) learners from the inclusive school were interviewed on the challenges faced by VI learners during online preparations for examinations and how these challenges could be alleviated. On the same note, two (2) teachers and four (4) parents were interviewed on the challenges their learners/children faced with online learning during the Covid-19 pandemic. The teachers and parents were also asked to suggest solutions to the problems. The researchers held face-to-face interviews with these participants in full compliance with the demands of maintaining social distance, wearing masks and sanitizing hands. Face-to-face interviews are credited for more accurate screening since the interviewer has more control over the interview and keep it more focused (DeFranzo, 2019).The researchers explained the purpose of the study to the participants before data were collected and assured them of confidentiality and other ethical standards that would be adhered to.

In order to comprehend the presentation of findings, schools and participants were coded as follows:

School A (Special School)	a) Learners (SAL) from SAL1-SAL16 b) Teachers A c) Parents (SAP) from SAP1-SAP2
School B (Inclusive School)	a) Learners (SBL) from SBL17-SBL24 b) Teachers B c) Parents (SBP) from SBP3-SBP4

The findings are presented below.

Research findings

The results of the study show that online learning presentedmore peculiar challenges to VI learners compared to a traditional face-to-face classroom set up since the online learners were separated from their teacher whilst they were working with a computer. This scenario required the VI learner to have a skilled assistant reader.

Findings from learners

Lockdown related challenges

It emerged, from both focus group discussions and interviews, that there were challenges which were specifically caused by Covid-19. In all cases, both learners with partial and total blindness noted that the requirement to practice social distancing as a measure to reduce chances of contracting the coronavirus was unfortunate in the case of VI learners. Their concern was that VI learners require the services of skilled close-by assistant readers who have to correctly read for them what appears on the screen. The participants, thus, lamented the challenge posed to VI learners by this particular Covid-19 related precautionary measure. All the twenty-four learners stated that they depended on parents, colleagues or siblings to read, hence social distancing affected their learning.

Learner SAL3 who was interviewed said, "*Tinonzi tive negap re-one metre pakati pedu apa ini ndinobatsirwa kuverenga pacomputer neshamwari dzangu saka kuita zvekudanidzira takanyanya kuparadzana zvinobhohwa*" (It is just unusual and boring for someone to read aloud to you at a distance since we are encouraged to practice social distancing).

Similarly, learner SBL17 said, "Generally, someone reading out for you should be closer to you not from that far distance demanded due to Covid-19, it is a problem"

Learner SAL14 concurred when she said, "*Ndajaira kushandisa computer ine JAWS software iyo inondibatsira kuverenga pascreen kuchikoro. Computer iri kumba haina software iyi saka ndinoverengerwa nefriend yangu but kuverengerwa unorasika kunzwisisa nekuda kwedistance pamwe nepronunciation*" (At school I am used to a computer with JAWS software that assist me in reading. The computer that we have at home does not have this application. As such, my friend reads for me. But loud reading sometimes obstructs understanding due to distance and mispronunciation).

On the same note, another learner said, "The smartphone that I used during lockdown had no screen reader software, so I had to rely on my brother who read for me" (Learner SBL 21).

Another challenge raised by the learners was that reading through the mask affected the reader's voice projection, hence affected the audibility of the reader.During group discussions, learner SAL5 pointed out that "Sometimes, you hardly hear what is read by an individual reading for you from a computer or cellphone because of the mask."

This concurs with learner SBL24 who also lamented that: "Everyone is encouraged to wear a mask and we always do that. While doing our holiday assignments, my friend read for me with his mask on. But I kept asking him to repeat because I was sometimes missing some of the words."

Most learners in this research revealed that they did not have access to computers at their homes. Those with computers at home stated that they were sharing computers with their parents and siblings. As a result, they had challenges of accessing computers. Learners complained that adults tended to monopolise the computer, doing their own work. When the learner got home, he/she would have little time to do his/her homework.

Learner SAL 14 stated that "My father monopolises the computer at home as he always says that he is taking advantage of availability of power and Wi-Fi, which, in most cases, are not available. This is at the expense of my homework."

The current study established that learners with low vision have problems with their eyes when they take long on a screen. According to the learners, their teachers sent too much notes and past examination papers, among other assignments on WhatsApp. These notes needed to be read. The learners, however, complained as shown by one of the learners, SAL9 who said, "*Takangotumirwa mapepa akawanda wanda nemanotes zvinonzi tiite tigovadzorera tapedza kuita zvinodiwa asi ini zvinonditorera nguva kuverenga uye maziso angu anoremerwa ndikaramba ndichizviverenga"* (A lot of past examinations papers and notes were sent which required us to answer and submit, but taking much time on a computer strain my eyes).

Another one, SBL19, said, "*Maziso angu anovava achibuda misodzi kana ndikatora nguva yakareba ndiri pacomputer kuno kumba. Kuchikoro kuri nani nokuti tinoshandisa computer ine JAWS software."* (My eyes itch when I take a lot of time on a computer. It is better at school because at school I use a computer with the JAWS software).

Another problem raised by learners with total blindness was that of incompetent persons who read for them on the screen. The learners noted that their siblings and relatives who tried to assist them with reading from the screen tended to miss some words and gave wrong pronunciation in some cases. Learners with total blindness also complained that some assistant readers could not read fluently, which resulted in the distortion of meaning in some instances. One of the learners, SAL 16,who had total , commented during focus group discussion that "*Seni mufana wangu ari mugrade 5 anondiverengera kumba pano palockdown, anokakama zvekuti zvinondinetsa kunzwisisa zvaaverenga."* (As for me, my younger brother who is in grade five and reads for me at home during this lockdown, stammers and mispronounces when reading, so it is difficult to put ideas together).

SAL 1 added that "*Vamwe vanotiverengera havagoni kuverenganemazvo"* (Some people who read for us do not read accurately).

The learners further explained that the screen reader enabled them to understand better because the pronunciation of words was done correctlyexcept for Shona. It can be deduced, from the above, that during online learning the Covid-19 regulations requiring social distancing and the wearing of masks by both learners and their assistant readers had a negative impact on the part of VI learners.

Socio-economic challenges

All learners participated in e-learning. However, 18 out of 24(75%) of the learners stated that they had experienced problems in accessing e-learning materials at home. They complained that these materials were so expensive that their parents and guardians could not afford to provide them. One of the learners, SAL2, had this to say: "My parents cannot afford to purchase these computers because they are poor and are also visually impaired. They do own cellphones but theirs are not smartphones. As a result, I could not easily do any holiday assignment during the Covid-19 lockdown." [Sic]

Learner SBL18 jokingly asserted that, "*Ndinogara nambuya vane chimbudzi hachiendi pawatsup. Ndakatokatyamara patakavhura chikoro teacher vedu voti ndakagadzira group reApp apo pandaiisa basa rekuita saka akaita ma1." (*I stay with my old grandmother who owns a cellphone which cannot connect to internet. I was surprised when our teacher told us that he had created a WhatsApp group where he sent assignments during the time schools were closed).

"*Isu hatina computer kumba saka ndinoshandisa smartphone asi kuverenga zvine mavara makuru zvinondinetsa nokuti unoramba uchichinja screen."*(We do not have a computer at home, so I had to rely on a smartphone, however reading enlarged print is strenuous as you keep on tapping here and there on the screen) (Learner SBL18).

Learner SAL5 said, "N*dajaira computer ine mavara makuru kuchikoro, zvino smartphone yekumba ine screen nemavara madiki zvokuti pandinoverenga zvinoda kuti ndiswededze phone yacho pedo nemaziso."* (I am used to a computer with a large screen at school. The screen of a smartphone is very small, so for me to read I need to put the phone too close to my eye).

It is clear, from the above excerpts, that learners with low vision struggle to read on devices that have small screens.

Both categories of learners with visual impairment, that is, those with total blindness and those with low vision, complained that access to internet connectivity was a challenge. They noted that receiving information on WhatsApp required them to change the font of the cellphone (for those with low vision) for the same phone they share with family members first. Sharing the same phone becomes a problem, especially when someone also wants to use the phone.

Although there were some learners who indicated that their parents owned either computers or smartphones with which the VI learners could have done the e-learning, learner SAL12 complained that: "My father has a computer and a smartphone but all my siblings and I are not allowed to touch or use them because he feels we may misuse and damage them. So I did not effectively participate in e-learning".

Socio economic problems appear to affect the VI learners much more than they affect the sighted ones because the researchers found out that JAWS and other screen reader software used by VI learners are too expensive to purchase or download. They further revealed that the software also expires and needs regular downloading, which is costly. They alluded to the fact that there were certain electronic gadgets where the software was inbuilt, although such gadgets were not affordable to the generality of parents. On the same note, some indicated that they neither had a computer nor a smartphone to use at home, hence could not do assignments.

When asked,during focus group discussions, about the gadgets they had used, Learner SAL1 stated that:

> *Mukoma wangu anodzidza kuuniversity ane phone inoenda paWhatsAup ndiyo yandaishandisa kuita homework but aiwanzo complainer kuti ndinokanganisa zvinhu zvake pandinochija font saka semunhu ane VI font yandinenge ndaisa pafoni yemukoma anoti inokanganisa zvinhu zvake* (My brother who is a university student has a smartphone which I used to do my assignment with during the Covid-19 lockdown period. However, he often complained of the font I use saying that it disturbs his document."

Learner SAL1's concerns were echoed by Learner SBL22 who narrated that:

> *My parents own each a computer and a smartphone. I too, own a laptop which I leave at home when I come to school. One challenge that I faced during e-learning was that we did not have Wi-Fi [nternet connectivity] at home. I had to rely on my parents' private social bundles. Sometimes, my parents ran short of money for data bundles.*

One of the participants (Learner SAL13) also reiterated, during a focus group discussion, that: "Most of us live in remote areas where network is a challenge. Network *unotoita yekutsvaka kwakakwirira because kwedu booster riri kurerinova dambudziko kwetiri vasingaoni*"(In our home area network connectivity is very poor. You have to go to high ground areas to search for network, a big challenge for a VI learner." It can be conjectured that it was difficult for VI learners to go up hills in search of network. Such learners might face other related dangers such as wild animals or falling and getting hurt.

As the results show, schools moved classes to online in order to reduce the spread of the Covid-19 virus. However, for many learners, particularly in certain rural areas, learners lacked reliable internet access or technology to participate effectively. Their parents and guardians, some of whom were also VI, could not afford the demands of e-learning. As a result, most VI learners found it very difficult to participate meaningfully in e-learning during the Covid-19 lockdown. Resultantly, these learners were disadvantaged.

Cognitive challenges

Results of the study show that for e-learning to be successful, learners should demonstrate the ability to operate computer systems. However, not all VI learners were able to work comfortably with computers and smartphones at the time of the Covid-19 lockdown. Of the twenty-four learners who participated in this study, only eight learners who were partially blind indicated that they could operate computers, with the remainder arguing that computers were not user-friendly, although they appreciated the use of the WhatsApp platform for learning. As such, they noted that they relied solely on the assistance of parents, siblings or friends as they cannot operate the computer by themselves. During focus group discussions,Learner SAL6 exclaimed:

> *Tine zvimwe zvatinodzidziswa zvinonetsa kunzwisisa nekungotsananguriwa zvakaita sekuMathematics. Kudzidza Maths paWhatsapp zvataiitiswa naticha vedu zvainetsa. Teacher vedu vanotibatsira nekubata madots mumabhuku kana tiri muclass. Saka paholiday pavaitumira basa rekuti tiite paWhatsapp shamwari dzangu dzichindiverengera dzaikonewa kunditsanangurira nemazvo*(There are some abstract concepts for instance in Mathematics which require the teacher to assist the learners to handle the braille dots in textbooks. During the holidays my colleagues who read for me what the teachers had posted on WhatsApp failed to interpret some concepts correctly).

Learner SBL23 observed that "Parents and other siblings lack WhatsApp skills that can be applied to assist me as a VI learner, as a result I did some of the homework given by the teacher."

Another challenge that was pointed out during group discussions was that of lack of feedback from the teachers. Some learners complained that they did not get any feedback on marked assignments and coverage of content, despite the fact that the teachers kept posting assignments on social networks. Other learners, however, complained that they could not understand some of the teachers' comments where feedback was given. Generally, students concurred that their homes could not provide them with a conducive environment for e-learning since they require a quiet environment with minimum disturbances (from siblings or other family members). They said they had challenges of accessing websites and experienced shortage of learning materials including user-friendly gadgets.

Findings from teachers

On the question of the mode of teaching the teachers used during the Covid-19 outbreak, Teacher A from an inclusive school indicated that "because of the Covid-19 pandemic, I used WhatsApp to conduct online lessons with my learners since most of them did not have computers at home". On the same note, Teacher B from the special school which has JAWS-installed laptops, said,

> *Despite the availability of JAWS, I used WhatsApp with most learners for both notes and assignments because it's not all learners who have such gadgets at their home. WhatsApp was however expensive to me because VI learners need a lot of explanation both through word and audio for them to understand the concept.*

On being asked about the accessibility of their learners during the Covid-19 period, Teacher A responded thus: "Some of the learners in my class were not reachable. They did not access my notes nor did they sent back their homework. I had to check with the school administration and discovered that they did not have contact numbers."

Teacher B indicated that,

> *the work I gave my learners reached them but most of my students did not respond to the given work. I think it's all because some learners did not have bundles to open and reply to my work because they shared the gadgets with the parents. Some of the learners' parents have zvimbudzi, as a result they did not see the WhatsApp message.*

On cognitive challenges, Teacher B noted that it was very challenging to teach VI learners online because for such learners to fully understand and grasp concepts, there was need for face-to-face teaching. According to the participant, the presence of the teacher motivates VI learners and creates a conducive learning atmosphere. However, this was disrupted by the Covid-19 outbreak. Teacher A also observed that the problem was compounded by learners getting help from unqualified helpers who, in some cases, interpreted the given lessons wrongly.

Findings from parents

The researchers interviewed four (4) parents, two (2) each from either school. These had been selected because their children with VI challenges had already been selected on the basis of their being accessible to the researchers under the restrictive conditions.

On Covid-19 challenges the parents noted that the use of masks presented problems to the e-learning of their children at home. Parents SAP1 and SBP3 expressed concern that they hesitated to share their gadgets with the children because the gadgets had important and personal information which they thought could be accessed by their children. Two (2) parents, SAP2 and SBP3, explained that they had smartphones which were ideal for e-learning but they did not have enough money to buy their children bundles for everyday use for lessons. They also noted that network availability was erratic.According to these parents, the power utility, ZESA, had increased its tariffs such that most families could not afford domestic use, let alone lessons for children. Parents SAP1 and SBP4 also stated that the local Econet network service provider for WhatsApp bundles was charging prohibitive fares that compromised their efforts to assist their children.

Another parent,SBP4, also lamented that her two-roomed house which was under construction could not accommodate both the assistant reader and the learner for lessons whilst all other household chores were underway. All these findings pointed to the fact that the challenges in e-learning during the Covid-19 pandemic had a particular negative effect on VI learners.

Discussion of findings

An important revelation is that the learner participants indicated that their ICT gadgets did not have the JAWS or screen reader software they could use at home. The participants lamented that the screen reader software that could have assisted them to retrieve information on the screen easily was not available. The sentiments of the participants are supported by Kharade and Peese (2012) who said that VI learners still struggle with poorly designed computer interfaces.

In this study it was established that although the special school supplied most of the requirements for VI learners during the Covid-19 lockdown period, the learners could not access them since they were not allowed to come to school and were learning from home. At the inclusive school the JAWS software had not yet been installed. However, during the Covid-19 outbreak learners from both schools had similar experiences since they were all

learning from home. As such, the study revealed that VI learners need to be supplied with assistive learning gadgets that can facilitate their learning from whatever point.

The results of this study also show that the problems faced by VI learners are different from those experienced by sighted learners in the sense that the sighted learners can read on their own, observing spellings, word division, sentence construction and any other orthographical aspects. Whereas VI learners need assistance on all aspects, the VI learner's assistant ought to be someone who observes accuracy in all aspects including pronunciation. The latter has been noted to pose a challenge to the VI learner and to create wrong meaning to material learnt. The researchers also learnt from learners with total blindness that some of the persons who assisted them were incompetent readers who were either too slow, too fast, stammerers or mis-pronouncers. The results show that learners' comprehension was limited due to poor reading by their assistants. It can, therefore, be argued that the use of the screen reader and JAWS soft-wares has an important role since it ensures the exchange of information between the computer and the student using touch when using the keyboard and ear to capture information through speech synthesiser. This confirms what Moliner et al. (2016) found in their research, in which they stated that JAWS software provided information accurately to totally blind learners.

Quizzed by the researchers on what learners with total blindness thought about what should be done, the learners in this study advocated that schools should install screen reader software in their private gadgets so that they could use them even from home. It was also revealed,by the study, that learners with low vision faced problems with their eyes if they took long viewing the screen. The learners also lamented that completing tasks was strenuous since they were expected to do lots of work. This is in line with what Permvattava et al. (2013) discovered in their research, that working on a computer was more time consuming for VI students than sighted students.

The study also found out that internet connectivity was a challenge even for the lucky learners whose parents and relatives or siblings owned smartphones, as internet tariffs were very high. The findings of this research were backed by researches carried out by Eurostat (2019) and Tawil (2020), who note that access to broadband internet connection varies significantly by household income. Their studies were mainly for developed countries. This

study (carried out in a developing country), established that parents who participated in this study generally agreed that access to internet and its connectivity remains a problem for most Zimbabwean families. The study revealed that most parents who participated in this study are aged between 35-50 years. These are the parents who benefited from Zimbabwe's educational policy for all which ensured that all learners should attain basic education which enabled them to read and write regardless of gender, race, tribe, disability and age. As a result, the parents who participated in the study have basic understanding of Covid-19 and the challenges its regulations placed on VI learners struggling to prepare for national examinations.

From the results, it was evident that many VI learners were not reachable for e-learning during the Covid-19 lockdown period as stated by their teachers and parents. Sammi (2020) concurs with these findings when he postulates that over a billion learners worldwide, which represents a large percentage of the global learner population, were deprived of education during Covid-19 lockdown as poor and marginalised groups were disproportionately affected.

Teachers in this study asserted that under normal circumstances, their VI learners as well as the teachers used speech at school more. As such, a virtual classroom was needed to supplement the classroom and its setting. This is the reason why the teachers opted for the WhatsApp platform. This research also established that all learners agree that masks and social distancing negatively impacted on audibility. During the interviews and focus group discussions, VI learners concurred that some assistant readers have problems in articulation while reading from the screen. They further noted that masks often affected the audibility as some of the words could not be heard properly, hence making it difficult to comprehend the messages. The challenges discussed above need to be addressed so that learners with visual impairment benefit from online learning.

Conclusion and recommendations

It can be concluded that both learners with total blindness and those with low vision experienced several challenges from using e-learning gadgets during the Covid-19 lockdown period. It was also realised that shortage of e-learning tools such as computers with the JAWS and screen reader software was a big obstacle to online learning and presented problems such as misunderstanding of concepts. It was also concluded that the WhatsApp

platform was the most popular delivery mode despite its own peculiar challenges for VI learners. Network problems and internet connectivity were identified as some of the barriers to the successful completion of online learning assignments during the Covid-19 lockdown period. The study concluded that in order to assist VI learners during such pandemics, it is of paramount importance that these learners be provided with gadgets that have appropriate software to use at home.

The study recommends that:

- Schools, with the assistance of the School Development Committees, ensure that they install more screen readers software on VI learners' electronic gadgets.
- Parents provide a conducive and supportive home environment.
- Electronic gadgets with large screens like laptops be provided so that learners can enlarge the prints.
- Schools and parents work together for the benefit of VI learners.

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