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Supporting visually impaired students in virtual learning environments in Ghana

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Abstract

Distance education (DE) has been in existence in Ghana for almost three decades guided by the philosophy of making quality education more accessible and relevant to all students. In line with best practices across the globe, Ghanaian institutions providing DE have been integrating digital technologies to augment traditional forms of delivery over the last decade. However, specific gaps have been identified in the provision for students with special educational needs and disabilities (SEND). To address this, the current study involves a multi-site exploratory case study using Accessibility4Equity principles to explore the challenges that distance providers face when enrolling visually impaired students (VIS). Fourteen participants comprising eight DE administrators and six IT personnel from four DE public higher educational institutions in Ghana were selected for this study. Findings identified several key themes, including access and equity, participation and imperatives for the inclusion of VIS. Based on this novel research approach, several implications emerged to drive the agenda for strategies to admit VIS into DE programmes in Ghana. Arising from this, recommendations suggest that future research is needed to address the gaps in the Accessibility4Equity supportive framework for VIS in virtual learning spaces.

Keywords

Ghana, inequalities, accessibility4Equity framework, A4ESupportive framework, visually impaired students

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Introduction

Inclusive education has been at the forefront of global discourse for many decades. At the turn of the century, Article 26 of the United Nations Declaration of Human Rights was emphatic on education being a right for all persons (UN, 2015). This was strengthened in 1960 by the UNESCO declaration that any form of discrimination in education was a violation and thus established the 1948 Universal Declaration of Human Rights (UNESCO, 1960). In 1994, the Education for All (EFA) agenda advanced by UNESCO in the Salamanca Statement also sought to enforce the inclusion of all children irrespective of their characteristics (UNESCO, 1960). A further policy boost to the issues of inclusivity in education was witnessed in 2015 when the UN Agenda 2030 articulated in its Sustainable Development Goal 4 (SDG 4) the need for inclusive and equitable quality education and the promotion of lifelong learning opportunities for all. In particular, target 4.5 of SDG 4 emphasises the elimination of all forms of disparity at all levels of education, a reason for which indicator 4.5.1 sought to bring parity among diverse groups of people including the disabled (UN, 1948). All of these targets point to one fact, namely, that access and inclusivity should occupy an important place on the global stage, especially policy wise.

Nonetheless, the benefits of these well-meaning policies have not yet been fully realised as higher education institutions struggle to accommodate the growing number of applicants. The most likely antidote to this is the rolling out of distance education (DE) modes of educational delivery for prospective students who would not be able to access main campuses. In this respect, the philosophy underlying DE aims to make quality education more accessible and relevant to all students at different levels. To further consolidate the issues of access and quality of education, online learning has been introduced, which invariably means the use of learning management systems and social media tools to enhance engagement. For instance, Kent (2015) outlined the potential role of learning management systems such as Blackboard, WebCT and Moodle for online classrooms. He further highlighted that web-based technologies such as Lectopia or massive open online course (MOOC) sites could be supported with social media tools to effectively expand the number of students studying online. Adarkwah (2021), therefore, notes that since its introduction in 1995, e-learning has been touted as a solution to the growing pressures on higher education institutions. Thus, its ability to democratise education through the provision of access to populations who might be restricted by space, status or physical disabilities remains beneficial to both instructors and students (Aljaraideh and Bataineh, 2019).

While online learning technologies have been touted to expand learning opportunities for the disabled, the reality suggests a rather nuanced picture. Generally, the disabled are underrepresented in higher education. Kent (2015) found that students with disabilities constitute eight to 14 per cent of students in the United States and the United Kingdom, while Ellis (2011) reported that the figure is just four per cent in Australia. In the Ghanaian context, reliable data on the number of disabled students in higher education could not be found as Braun and Naami (2019) note that these students are severely underrepresented. This is corroborated by Senadza et al. (2019) who found that colleges of education in Ghana do not collect data on students with special needs.

Moreover, Guglielman (2010) highlights that disabled students may only access e-learning platforms but not content, resources, activities or collaborative and interactive tools. Guglielman's observation throws further light on the fact that even where disabled students disclose their disabilities, they still experience ableist bias. Braun and Naami (2019) corroborate this in their findings that disabled students in Ghanaian higher institutions do not receive the needed academic support while buildings remain inaccessible to them. The findings of these research studies are in contrast with Liakou and Manousou's (2015) perception that people with disabilities should be able to live

with dignity and satisfaction in the technological age. In this regard, Ellcessor (2010) aptly identifies how technological barriers continue to limit students with disabilities from fully participating in studies even in this digital age.

In addition, Ferrell et al.'s (2000) research found that disabled students in higher education institutions "*represent a group* that is *uniquely disadvantaged by contemporary distance learning technologies, which tend to rely heavily on visual perception"* (p. 200). The challenge identified by the authors brings to light the peculiar challenges of VIS who learn in the same environments with other SEND and able-bodied students. In as much as Braun and Naami (2019) aptly captured the plight of students with disabilities in terms of the unfriendly infrastructural arrangements, research suggests that the plight of VIS transcends the general challenges faced by other students. VIS struggle to navigate their way both in the physical and technological spaces in contemporary educational institutions and are heavily disadvantaged if the same materials and technology are used in course delivery for all students. Boussarhane and Daoudi (2014) as a result observed that visual impairment is the most restrictive type of disability. It is in this vein that Arditi (2012) asserted that the accessibility of DE programmes by VIS hinges on educational materials that are relevant and that ensure maximum usability and clarity. However, Jacko (2011) found in his study that DE programmes do not fully respond to the needs of the VIS.

Moreover, it is worth noting that the Ghana Statistical Service (GSS, 2019) estimates the prevalence of disability among the Ghanaian population to be three per cent out of which those with visual impairment constitute more than a third. These statistics establish the need for concerted efforts to address inequities in education against VIS. Agangiba and Agangiba's (2019) evaluation of the websites of 15 higher educational institutions in Ghana concluded that the web pages had critical accessibility errors for VIS. Similarly, a study by Senadza et al. (2019) showed that a variety of instructional materials appropriate for learner diversity had the lowest mean score. Another study in the Ghanaian higher education context found that VIS studying online during the 2020 lockdown could not wait to revert to face-to-face learning due to the numerous challenges they faced (Amponsah, 2021).

It is important to note that the studies mentioned are based on regular programmes and not online or DE. Admittedly, there are students with various forms of disability learning through DE in Ghana but there are no VIS currently participating. The review of research thus identifies the need for further research to examine the reasons for this gap in the age when digital technology, equity and social justice are increasingly becoming important.

Contextual review of online education: A Ghanaian perspective

Prior to COVID-19, online education was limited to a few tertiary educational institutions and pre-tertiary institutions that ran dual-curricular programmes in Ghana. Similarly, professional bodies were seriously involved in online education, particularly in the field of business, health and finance. This situation could be attributed to the ban on mobile phones in the pre-tertiary institutions in the country. For example, in some cases, mobile devices were seized and destroyed by the school authorites (Aggor et al., 2018). However, in March 2020, all levels of Ghana's education system had no option other than to embrace emergency remote learning to address the challenges posed by the COVID-19 pandemic. During this period online education became the ultimate approach to sustain teaching and learning, and for administrative purposes. Depending on the institutional capacity, Taylor's (2001) third generation of DE (e.g., two-way, synchronous tele-learning using audio or video-conferencing) or the fourth generation (e.g., flexible learning based on asynchronous online

learning combined with online interactive multimedia) was adopted by many higher education institutions.

The major challenge accompanying the paradigm shift was not limited to capacity building, lack of technology or data, Internet network issues or inclusivity but most instructors merely 'transported' the physical classroom practices into the online space without taking cognizance of the distinctiveness of the online learning environments. The numerous training sessions offered to both students and staff to respond to the migration to virtual platforms that took place during the lockdown confirm the lack of capacity for online education in Ghana. Ownership and device management continue to be significant issues that confront educators, students, administrators and parents when it comes to online learning. Available statistics indicate that 7.2% of people aged 12 years and above own laptops, desktops or tablets in Ghana, while the Northern Regions record the lowest rates of device ownership (GLSS 7, 2019). Devices such as mobile phones are the basic tools needed to drive online education but much remains to be improved in Ghana as the country's urban areas can only boast of 14.6% and 10.8% of device ownership for people aged 12 years and above (GLSS 7, 2019).

As of December 2021, approximately 45% of Ghana's population used the Internet (Internet World Stats, 2022) and interestingly, about 10% of the 74.3% of the population who use digital devices do not own the devices (GLSS7, 2019). Hence, Bariham et al. (2021) and Addae (2022) assert that financing Internet data use and inclusivity in online education in Ghana remain a barrier to online education. For instance, data on device ownership indicates that more males own devices than females (Reddy et al., 2022). From a Ghanaian point of view, this gender inequality is not only an inclusivity problem as people living with disabilities, especially those with visual impairments, face difficulties in integrating into online education (Amponsah and Bekele, 2022). Also, individual and institutional barriers rank high in the challenges that hinder the growth and expansion of online education In Ghana.

A brief synopsis of Ghana's inclusive education policies

In 2015, critical conversations and several discussions between the Ministry of Education (MoE) and key stakeholders in Ghana's education sector led to the introduction of Ghana's inclusive education policy (IEP). The policy arises from Ghana's 1992 constitution and other existing policies such as the Disability Act and the National Development Policy. The policy provides a broad definition of students with educational needs, including street children and children exploited for financial purposes, along with those with disabilities and permanent health impairments. The IEP is intended to create an education system that is responsive to learner diversity and ensures that all learners have the best possible opportunity to learn. It, therefore, seeks to provide equal educational opportunities for SEND children by creating learning environments that meet the needs of diverse learners.

The main goal of the IEP is to redefine the provision and administration of education services to respond to the different needs of all pupils/students within the framework of the Universal Design for Learning (UDL) model, and it is guided by four core objectives, namely: the participation of all stakeholders in the planning, implementation, and coordination of IE through effective advocacy and dissemination strategies; promoting a child-friendly environment for enhancing the quality of education; participating in educational accessibility; and enhancing the management of education services.

To achieve the core objectives, standards and guidelines for the Practice of Inclusive Education in Ghana were established, which articulate the basic access requirements relating to logistics needed

for its practice, which includes school buildings, ICT, learning equipment, and materials and curricula. Therefore, the IEP document aims to remove all barriers for learners in educational institutions. To achieve the above, acts such as the Persons with Disability Act, 2006 (Act 715), Ghana's Education Strategic Plan (ESP) 2018-2030 and Inclusive Education Policy (2015), and The Education Act, 2008 (Act 778) were promulgated to inform and advance the plight of VIS within the Ghanaian education system.

The Accessibility4Equity framework

The Accessibility4Equity (A4E) framework was developed by Shaheen in 2022 as an interdisciplinary and wholistic framework to guide scholars, practitioners and persons with disabilities (PWDs) as they collaboratively work towards disrupting systems and structures that work against them in their endeavours (Amponsah, 2023). It is imperative to add that the framework is hinged on principles of fairness and access for individuals to all kinds of services, opportunities, and societal privileges. It is in this light that Shaheen (2022) espouses that the A4E framework is designed to give PWDs a "voice" in relation to equitable technological opportunities, enabling them to participate and share in education for all.

To achieve such equity, MacKenzie and Wajcman (2001) have asserted that continual negotiations among human actors (abled and PWDs) and environmental issues influence the choice of technologies conducive to educational purposes. This calls for collaborative efforts between the abled and PWDs to plan, settle on the conducive environments and the right digital technologies for enhancing the learning of PWDs as well as its implementation and evaluation. However, since the voices of students with visual impairments have not been heard in Ghanaian DE institutions, the A4E framework provides essential counter-hegemonic insights that expose underexamined assumptions, viewpoints and limitations of such students.

Moreover, the A4E framework aims to drive an equitable approach in which access to technology-integrated media advances learning opportunities and practices to support PWDs (educators and students). Shaheen, therefore, argues for an "equitable technology-mediated education" that is driven by the principles of fairness and access for PWDs at institutions of learning to accommodate the needs of individuals. To drum this aim home, Kafer (2013) asserts that disability does not reside in individuals but in the relationship among humans, built and digital architectures, cultural norms and power structures. In support of the preceding, Reiger (2023) argues for the deconstruction of all forms of ableism and recommends that efforts are put in place to turn ableist architecture and designs into conducive environments free of hegemony and ableism to enhance the capacities of PWDs for effective learning.

Given the foregoing, we are convinced that the principles and components of the A4E framework are aligned to the objectives of the current study which aims to to address the complex and marginalized status of visually impaired students at institutions of higher learning. The novelty of this study also breaks ground for further research on this important but unresearched phenomenon in the Ghanaian context.

Methodology

Arising from the Ghanaian context, this multi-site exploratory case study was grounded in the constructivist paradigm. It employed the A4E theory principles to explore the factors that have prevented distance/online providers from enrolling VIS. Our inquiry into this area first touched on the ***institutional agenda towards access and equity***. Following Yin (2003), a case study design was

used as it offered a detailed exploration of a topic of interest while revealing the essence of the phenomenon under study. One fundamental premise of the constructivist paradigm is the social construction of reality (Creswell, 2014) which was reflected in this study through the experiences shared by the administrators, managers and IT staff who participated in this study.

Given the aim of the study, four DE pioneering public higher institutions in Ghana were selected due to their pioneering roles in providing DE in Ghanaian higher education. First, in 1993 the then University College of Education, Winneba (UCEW), now University of Education, Winneba (UEW) established the Institute for Educational Development and Extension (IEDE) and since 2017 it has been known as the Institute for Distance and E-Learning (IDeL). This initiative was followed by the University of Cape Coast (UCC) which established the Centre for Continuing Education (CCE) in 1997 and was upgraded to the College of DE (CoDE) in August 2014. The third public institution to provide DE in the country is the University of Ghana (UG) which established the then Institute of Adult Education to provide correspondence education in 1973. The University established a DE Department and rolled out full-scale DE programmes in 2007. Finally, DE at the Kwame Nkrumah University of Science and Technology (KNUST) began in 2005 as the Faculty of Distance Learning under the College of Science to augment the conventional face-to-face campus-based education. The vision of all four institutions is based on the philosophy of DE that aims to make education accessible and relevant for students at all levels and also to ensure that potential students who are unable to access education on main campuses are provided with opportunities through the distance mode. To achieve this aim, the following objectives were formulated:

- To determine the Ghanaian *institutional agenda towards access and equity* for VIS;
- To investigate the *reasons for a lack of institutional initiatives* on digital training, accessibility of infrastructure, and institutional learning management system (LMS) towards or for accommodating VIS;
- To explore whether there are sufficient imperatives for inclusion related to strategies, initiatives, preparation, and support for VIS.

Table 1. Participant information.

Institution	Position	Years in service
KNUST	Assistant registrar[a]	05
	Principal administrative assistant[a]	10
	University information system team member[b]	10
	IT officer[b]	10
UCC	Head of education programmes[a]	05
	Administrator[a]	06
	IT engineer[b]	05
UEW	Administrator[a]	21
	Centre coordinator[a]	14
	Instructional technologist[b]	05
UG	Unit coordinator[a]	07
	Centre coordinator[a]	05
	Sakai administrator[b]	06
	Educational technologist[b]	08

[a]DE Administrators (n = 8).
[b]IT Personnel (n = 6).

Within the institutions, 14 participants comprising eight DE administrators and six IT personnel from the four institutions were conveniently selected for the study. The basis of their inclusion was their experience as either administrators and managers or IT staff of the institutions (see Table 1).

Additionally, participants were required to have been involved in the working environment for at least 5 years to have adequate institutional memory and insight into the strategic plan of their institutions to contribute meaningfully to the discourse. To acquire access to the participants, initial emails were sent to the offices of the institutions in March 2021 to connect with contact persons who in turn linked the research team to potential participants. This was followed up with emails and telephone calls to 25 individuals whose details were released by their respective institutional offices. By the first week of April 2021, the researchers had purposively selected 14 participants as they were deemed to be the most experienced in the context of the study and had worked with the institutions longer among all those contacted.

Two sets of researcher-constructed semi-structured interview guides were used in this study. This approach is supported by Baxter and Jack (2008) who demonstrated that a variety of data sources helps to improve the rigour of case study research. Based on this approach, interviews with the administrators and managers of the DE programmes sought their perspectives on the 'whys', 'hows' and 'whats' of not admitting students with visual impairments into their programmes while that of the IT personnel probed the issues from the technological perspective.

This helped to produce nuanced data useful for uncovering the underlying factors and understanding the contextual issues related to the aims of this study. The interviews were conducted between April and June 2021. Each was done via telephone calls as this was the most convenient approach for the study's participants. The interviews were in English, lasted roughly 35 minutes and were audio recorded for later transcription. In line with the principles of the A4E framework, both semi-structured interview guides consisted of three sections apart from the initial question that elicited information on the background of the study participants. The instruments were chunked into three sections. Section one was made up of four (4) questions connected to the access and equity element of the A4E framework. The second section encompassed six (6) questions that sought to elicit responses on another significant element of the framework, participation, which identified the potential challenges participants anticipated if students with visual impairments were to be admitted to their institutions. The third section included two (2) main questions, three (3) sub-questions and three (3) follow-up questions that aligned with imperatives for inclusion, another notable element in the A4E framework. In sum, four (4) 'what' questions were asked to establish facts or for participants to assign reasons for actions and inactions of their institutions in the context of this study. We also asked four (4) 'how' questions and one (1) 'why' question to enable the study participants reflect and provide clarifications to the thoughts they had shared. The remaining questions further probed into the responses that had been offered.

A cross-case analysis procedure was adopted for this study. As Mathison (2004) explains, this analysis procedure is used when the unit of analysis is a case and a bounded unit (factors that have contributed to the non-admittance of VIS within four DE institutions in this case). Miles and Huberman (1994) add that a variety of devices including tabular displays and graphs can help to manage and effectively visualise qualitative data. Bearing in mind that qualitative data analysis is inductive and iterative, we adapted the three-step analysis suggested by Miles and Huberman (1994) for this study. Following this approach, we first summarized and coded evidence from each research site under three overarching priori themes based on the study's objectives. We then summarized and grouped the themes with brief citations and primary evidence. Lastly, we identified commonalities and differences between the data which led to the discussion of the findings. The strength of this analysis procedure was its ability to allow the inclusion of diverse evidence (Cruzes et al., 2011).

Finally, the study's participants were contacted to verify the data which allowed them to provide additional input or confirm what was shared with them before the discussion of the results.

Findings and discussions

The results of the study are divided into the perspectives of Administrators and IT personnel of the four (4) studied institutions. Each includes the following sections: Access and Equity, Participation, and Imperatives for Inclusion with respective subsections. The following section presents an analysis of the data from the eight administrators which are clustered under the three themes and several sub-themes. These were supported with extracts from the participants' voices. The first research question aimed to determine the Ghanaian *institutional agenda towards access and equity* for VIS.

Access and Equity

Based on the UN Agenda 2030 and tenets of the A4E theory, access and equity should be the priority of any well-meaning organization. Thus, our inquiry into this area first touched on the ***institutional agenda towards access and equity***. It became apparent from the field data that all four institutions had an agenda whose purpose was to drive access and equity in general terms. For instance, UG's Policy for students and staff with special needs and the Core Values of UEW emphasises inclusion (UEW, 2021; UG, 2019). It is in this regard that the Administrators from KNUST and UEW admitted that their institutions have the agenda of making education accessible and inclusive for all persons. This sentiment was further expanded by other participants as follows:

> The main agenda towards access and equity has been done through the integration of technology in the deployment of teaching or instruction, learning and evaluation. (UCC Admi 1)

> To have parity or near parity in the number of males and females admitted. In addition, efforts have been made to provide access to persons with different types of disabilities including the establishment of the Office of Special Needs. (UG Admi 2)

> Based on this data, it was evident that the institutions seemed to operate in line with global and national frameworks governing access, equity and inclusivity such as the UN Declaration on Human Rights and the UN Agenda 2030, as well as Ghana's Inclusive Education Policy and Standards and Guidelines for the Practice of Inclusive Education in Ghana (UN, 2015; GES, 2015).

Achievement of agenda. In addition to the perspectives shared on the earlier sub-theme, we sought to establish how far the institutions had achieved their agenda on access and equity. The philosophy of DE to give access to students who could not gain admission to main campuses came into play at this point as both administrators from KNUST shared that using online technologies to deploy distance learning to their campuses and centres spread across the country, was ensuring that the agenda was being achieved. In addition, a participant recounted:

> So far, our online technologies have reached every student, though connectivity in some cases is weak, other varied forms of technologies/asynchronous means of reaching students have been deployed. (UG Admi 1)

A participant extended the thoughts already shared by touching on a more elaborate initiative in terms of faculty and student support in the areas of gender and disability as captured in the following narrative from an administrator:

> The institution has a gender and disability desk to support staff and students with disabilities. the university also has the brail unit under the Department of Special Education to support the learning needs of students. Examination and learning materials are transcribed for visually challenged students. Some buildings have been modified to support the movement of disabled students on campus. (UEW Admi 1)

Participants' perceptions on the agenda reiterate the propensity of e-learning to democratize education and the expansion of online learning (Adarkwah, 2021; Kent, 2015). These comments reflect how the participants enumerated the achievement of their institutions' agenda for access and equity.

Agenda for VIS. Attention shifted to issues concerning VIS. During the interviews, participants unanimously agreed that their universities admit VIS into their institutions but not in the DE programme. Varying viewpoints were expressed, however. For instance, administrator two from KNUST admitted that his institution has not been successful in admitting students with total visual loss. He further noted that "*there are only a few of such students at KNUST"*.

Extant literature highlights that VIS are largely underrepresented in higher educational institutions generally (Kent, 2015). According to Braun and Naami (2019), figures have not been assigned to such students in Ghana. The participants shared that some efforts have been made to accommodate such students. Notably, two Administrators recorded:

> The university has a unit that takes care of visually impaired students, so these students access support via that unit. (UEW Admi 2)

> There have been adequate investments in infrastructure that supports persons with visual impairments. (UG Admi 1)

Admission of VIS. From the participants' general perspectives so far, we closely examined the admission of the visually impaired (e.g., students who have total vision loss in the context of this research). The responses again indicated a non-representation of such students in the DE institutions. In this regard, the administrators indicated that their institutions do not admit totally blind students into their DE programmes as this comment by an administrator indicated:

> The University of Ghana has always admitted students who are blind. However, at the DE level, I am not aware of any student with visual impairment. (UG Admi 2)

Higher education institutions in High-Income Countries (HIC) countries have deployed technology to provide access to education for students with total vision loss (Alahoul et al., 2016; Liakou, 2015). Though the countries providing education for the visually impaired have challenges with the underrepresentation of such students, they have identified what can be improved in the future. Ghana still has zero representation of such students in its DE programmes and the situation questions both local and global initiatives and policies about equity, access and inclusivity in education.

The second research question aimed to investigate the *reasons for a lack of institutional initiatives* on digital training, accessibility of infrastructure, and institutional learning management system (LMS) towards or for accommodating VIS.

VIS' participation in online spaces

The extracts from the field data relating to participation mainly touched on digital training, accessibility of infrastructure, institutional learning management system (LMS) and critical challenges to admitting VIS. Analysis of these themes is captured under the sub-themes in the following sections.

Training on digital tools for instructors. The participants agreed that some faculty had been trained to accommodate students with disabilities, while special units had also been created for the same reason. For instance, the administrators from KNUST and UCC indicated that there are departments and special education units that attend to special needs students. Another administrator elaborated on the issue as follows:

> There is a department in the university called special education that deals with all kinds of disabilities including totally blind students. Instructors who teach such students have various expertise to handle these students. Instructors who handle blind students have been trained to teach these students using for example braille technology. (UEW Admi 2)

One administrator from UG, however, had a contrasting view. He shared that he was not aware of any training for faculty and staff except training in various administrative and management areas. The administrator stated *"I have never heard of any staff training to help us handle students with special needs"*.

Accessibility to institutional infrastructure and LMS. Though visual impairment has been recorded as the most restrictive type of disability which calls for improvement of access to educational provision (Arditi, 2012; Boussarhane and Daoudi, 2014), the studied institutions seem not to have bought into that assertion. In terms of physical infrastructure, the participants lamented that their available infrastructure was either too old and not disability-friendly or were fairly accessible to the visually impaired and disabled students.

With respect to the LMS in use, one administrator from UCC intimated that he was not aware of any in use, while another from UEW shared that though the university started using an LMS for its main campus students due to the outbreak of the COVID-19 pandemic, the DE students had not benefitted from that initiative. However, administrator two from KNUST shared that this applied to the main campus students, while administrator one from UG simply retorted, *"It is not that friendly to the totally blind students."* The extracts from the participants on accessibility buttress the findings by Jacko (2011) that VIS studying at a distance often suffer low accessibility since their institutions do not fully respond to their needs.

Finally, the last research question aimed to explore whether sufficient imperatives for inclusion related to strategies, initiatives, preparation, and support for VIS were in place.

Sufficient imperatives for advancing the inclusion agenda

Several interesting views were shared under this theme including strategies, initiatives, preparation and support.

Strategies for admitting totally blind students. The participants, who were all DE administrators, could not identify any clear-cut strategies used by their institutions to admit potential students with total vision loss into their DE programmes. The KNUST administrator one commented, *"I do not know of any institutional strategies to admit blind students in the future."* Despite the situation highlighted above, the administrators sounded very positive about the possibility of overturning the situation in the future due to efforts that have been put in place on their main campuses. A participant positively noted in this respect:

> This is highly possible. Once online learning has become a preferred mode of engagement, students with visual impairments will also find their spaces there. (UG Admi 2)

Policy and technological initiatives. Without a policy, there is always difficulty in prosecuting such an agenda, no matter how novel it is or how helpful it would be. Incidentally, half of the participants in this study indicated that policy initiatives for admitting VIS into the DE programmes were non-existent, while the other half indicated the policies did not touch on such important issues. Extracts from the two viewpoints are shared as follows:

> The institution's policies on VIS should be made known. (KNUST Admi 2)

> All institution policies should be formulated in such a way that the needs of students with disabilities are captured (UCC Admi 1)

Taylor (2001) built his third to fifth-generation approach to DE around technology, while Aljaraideh and Bataineh (2019) also emphasized the ability of technology to break through restrictions imposed by disabilities. The participants in this study advocated for a technological infrastructure that aided teaching and learning to be made available to students with disabilities. They also advocated for the training of instructors on the use of assistive devices. In sum, an administrator commented:

> Assistive technologies such as portable book readers that can allow voice-over, recorders, Braille and white canes should be procured and distributed among the VIS to facilitate their learning. (UG Admi 1)

Faculty/staff preparation and support. The analysis presented so far has highlighted lapses in faculty and staff preparation and support toward handling students with visual impairments in the future. Findings from a study by Amponsah (2021) indicated that VIS could not wait to return to face-to-face teaching and learning due to how some faculty treated them as a 'silent minority' and taught them online without due regard for their specific circumstances. To avert such a situation, all the participants advocated for regular, conscious and hands-on training for their institutions' faculty and staff to be able to effectively handle students with visual impairments. Items suggested for inclusion in the training included the use of specialized devices and facilities that support VIS and contemporary and current trends in handling such students. In this light, an administrator indicated that:

> The institution needs to train adequate number of experts in readiness to always receive such students and also make resources available so that they can effectively do their work. (UCC Admi 1)

The analysis has so far shed light on the perspectives of the eight administrators from the four studied institutions. In the next section, our attention now shifts to the data collected from the IT personnel.

DE IT personnel voices

The IT personnel shared similar views to those of the administrators except for the insights they shared on technological issues. Their views are also captured under the same three a priori themes as the previous participants. Several sub-themes also emerged from the views of the IT personnel. Due to the substantial convergence between their views and those of the administrators, only those that carried significant insights or variations will be discussed in this section of the analysis.

Access and equity

Institutional agenda towards access and equity. The voices of the participants resonated attempts to ensure that Ghana's legislation on equity, access and inclusivity as well as global ones are enforced at the higher education level in general terms. All participants agreed that their institutions are keen on making education accessible to all, irrespective of status, gender, and disability among other factors. A significant narrative was shared by IT 1 in what follows:

> My institute has as part of its core mandate to bring education to the doorstep of interested applicants. I must, however, state here that the mainstream University has totally blind students. At the DE outfit, however, we do not have totally blind students at any of our study centres. (UEW IT 1)

The latter part of the participant's comment shows that the agenda is biased towards a certain cohort of learners. This emphasis defies the UN's 2030 Agenda 4.1 as well as Ghana's policies on ensuring access, equity and inclusivity.

Achievement of agenda. This sub-theme also elicited the same responses as the earlier respondents. The only narrative that proved to be quite different came from IT 1:

> The university has deployed a dedicated broadband to provide Internet access for the main campus and other satellite campuses as well as campus-wide Wi-Fi. (UG IT 1)

Once again, the ability of technology to increase access to and democratise education (Adarkwah, 2021) was highlighted as a key theme. However, it is important to be cautious in noting that the deployment of Internet access may not necessarily translate in nonproblematic ways into the achievement of the institution's agenda, as other findings show how some students have not been guaranteed access and equity in Ghana's HEIs.

Agenda for admission of VIS. The data collected in response to this theme was that there is no agenda for VIS to be admitted into DE programmes. One participant thus explained, *"Because the Institution does not have the facilities or the structures to make teaching and learning easy for them* [VIS]*."* (UG IT 2). Another elaborated:

> Our institution has not yet admitted visually impaired applicants possibly because we have not gotten visually impaired learning facilities at our various study centres. (UEW IT 1)

Though both administrators and IT personnel agreed that their institutions had not yet admitted VIS into their DE programme, evidence from the voices of the latter showed that they were less optimistic with respect to the possibility of admitting VIS into their institutions.

Participation

Under participation, the only sub-theme that was different from those of the administrators was the ***training of IT staff on handling students with visual impairments***. The response was negative in a similar way to the responses of the administrators on training organised for instructors on the DE programme. In one participant's view, training had not been organised since they did not yet have VIS. The extract that follows represents a participant's view on this matter:

> We do not have totally blind students. More so we are not technically resourced to handle such training. (UEW IT 1)

Accessibility to institutional infrastructure and LMS. As in the case of the administrators, it was again clear that the institutional infrastructure was not supportive of VIS. A very compelling narrative touched on the rental of facilities by some of the institutions involved in the study as follows:

> None of the facilities at our DE centres is friendly to blind students. It should be noted that 90% of our study centres are facilities not owned by the institute but rather rented for teaching and learning purposes. (UEW IT 1)

The fact that some of the institutions were renting non-disability-friendly facilities for teaching and learning was not immune to those with their own facilities from this situation. It emerged in the narratives from both cohorts of participants that their facilities were equally unsupportive to this group of students.

The issue with institutional LMSs remains in the same situation as already shared by the administrators. One significant view from an IT personnel reflected this as follows:

> To the best of my knowledge, the LMS has no speech applications that can guide the students when they log into the virtual class. Specialised computers too have not been provided. The students have to make use of their own computers for learning. (KNUST IT 1)

Though students with visual impairments have been identified as the most challenged among students with disabilities (Kent, 2015), the participants' narratives show little to nothing has been done to remedy the situation for prospective students in the DE programme. Likewise, Agangiba and Agangiba's (2019) findings from an analysis of 15 universities' websites and LMSs indicated that there are critical accessibility errors for both low vision and totally blind students.

Imperatives for inclusion

Several interesting views were shared on this theme which interfaces significantly with that of the administrators. In terms of strategies for admitting VIS, the majority of the participants were not

aware of any such strategies. However, an IT personnel from UG admitted that since the university had a policy for admitting all manner of students, DE was mandated to do the same. Likewise, another IT personnel shared the following comment:

> UCC is constantly striving to provide equal opportunity to provide access to all persons regardless of status and physical ability. This is spelt out in its core values. (UCC IT 1)

The summary of views and narratives demonstrates a deficiency in policy initiatives to the detriment of VIS as the provision of education was deemed a right and not a privilege. Unfortunately, this right was not respected by the DE providers in the study as they denied VIS access to their programmes in opposition to the philosophy of DE to provide access to a diverse range of students. Unfortunately, these students may also not gain access to main campuses for various reasons.

Access. The response to this sub-theme is markedly different from those that emerged from the administrators' data. The participants' views were two-pronged, focusing mainly on access to technology and physical infrastructure. Their belief was that access to technology and assistive devices, such as customized cell phones, computers and software will increase access to higher education for VIS while making their learning experiences more beneficial. One participant thus intimated, *"Full integration of audio devices on all technology-related devices or services that they are expected to patronize"* was important *(UEW IT 1)*.

> On the issue of access to physical infrastructure, a participant commented, *"A special building or room should be created in a very friendly and easily accessible environment."* (UG IT 2)

The sentiments shared on access seem to be reactions to Braun and Naami (2019) regarding the unfriendly nature of infrastructure in higher education institutions and the critical accessibility errors identified by Agangiba and Agangiba (2019).

Faculty/staff preparation and support. The final sub-theme also produced responses that mainly touched on the training of faculty in preparation to handle VIS on DE programmes. The IT personnel, however, extended the discourse due to their technological inclinations and elaborated on the skills to handle tools and VIS as well. For instance, two of them shared what follows:

> Lecturer professional development on inclusivity and pedagogies that support inclusive education e.g. on how to implement universal learning design, UDL. (UCC IT 1)

> Instructors need to be trained on how to handle with care, persons with visual impairments. In addition, they should be conversant with the use of assistive technology tools like scribe, a proctor for exams, notetakers, recorders and other assistive technology-based tools. (UEW IT 1)

The participants' views have demonstrated the need to find novel strategies to admit VIS into DE programmes in Ghana. There is no shortage of local and global policies on access, equity and inclusivity in higher education institutions as indicated in the review of the research presented above (e.g., Persons with Disability Act, 2006 (Act 715), Ghana's Education Strategic Plan (ESP) 2018-2030, Inclusive Education Policy (2015) and The Education Act, 2008 (Act 778). Yet, the lack of a workable framework for implementing the admission of VIS was missing according to the

participants in this study and the will or perhaps courage to implement existing policies has remained a challenge even in the 21st century.

Conclusion

The findings reported in this study suggest that higher education institutions in Ghana appear to operate in line with global and national frameworks governing access, equity, and inclusivity such as the UN Declaration on Human Rights and Agenda 2030, as well as Ghana's Inclusive Education Policy and Standards and Guidelines for the Practice of Inclusive Education in Ghana. During the interviews, participants unanimously agreed that their universities admit VIS into their institutions but not into their DE programmes. The participants disputed the issue of admissions and access of the visually impaired into their universities by stating that their institutions have not been successful in admitting students with total visual loss.

Furthermore, participants expressed concerns that the *reasons for a lack of institutional initiatives* on these matters stemmed from their lack of appropriate digital training, the accessibility of infrastructure, and the poor design of the institutional learning management system (LMS) vis-à-vis accommodating VIS. Several participants mentioned that departments and special education units at their respective institutions were created to deal with the special needs of these students. However, participants echoed views related to poor physical infrastructure (e.g., outdated desktops and software), online accessibility, and insufficient Internet connectivity for VIS as they were either outdated or not disability-friendly.

Finally, it was revealed that a plethora of local and global policies on access, equity and inclusivity in higher education institutions abound but it seems Ghanaian institutions of higher learning lack the will to advance the needs of VIS in their educational institutions. A policy agenda involving the development of strategies for admitting VIS into DE programmes in Ghana does not exist at the current time.

Based on the timely and original research presented in this study, several policy implications have been identified which should help to raise awareness of the need to more comprehensively consider the role of VIS in DE programmes in Ghana in the future. First of all, we advocate for a policy as a starting point to revert this unfortunate perpetuation of blocking access to an already vulnerable population which is against national and international conventions. We thus, align with Amponsah (2021; 2023) in his assertion that flexible and futuristic policies should be developed by governments, educational institutions and concerned stakeholders to ensure equitable online learning for all manner of students. We also add our voice to Shaheen's (2022) recommendation to enhance the capacities of instructors to enable them to adopt flexible innovative pedagogical approaches that accommodate and optimize the learning experiences of visually impaired students. In the estimation of Seale (2013), such innovative pedagogical approaches will help visually impaired students benefit from digital social capital as they engage in DE institutions.

Moreover, decisions that affect visually impaired students should be made collaboratively with them. Shaheen (2022) refers to such collaborations as cripped discourse and findings from a study by Amponsah and Bekele (2022) revealed that lopsided decisions exacerbate the challenges of visually impaired students. Thus, the more they are included in decisions, the higher the chances of ameliorating their challenges and creating a more conducive learning environment for them. Lastly, recommendations from Adarkwah (2021) to provide digital tools for learning in Ghanaian higher education institutions will go a long way to facilitate the learning experiences of visually impaired students if they are admitted to Ghanaian DE institutions.

Statement of limitations

One limitation of this qualitative study was that the number of participants and controls was relatively small. The criteria for participant selection, willingness to participate and timing for the study shaped these limitations. Due to this limitation, we have no intention of generalizing the results of this study to other settings. To address these limitations, future research is needed to drive forward a specific agenda for VIS in DE public higher educational institutions in Ghana. To explore this agenda, evidence from this study suggests that disabled-sensitive policies and practices for VIS within the Ghanaian education sector are not inclusive. Therefore, a modified Accessibility4Equity supportive framework for VIS in virtual learning spaces is necessary. Such an approach is recommended to underline the importance of the A4E framework to address inequalities in education and makes a strong case for considering specific environmental factors as a critical addition to the framework's key social justice principles.

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The datasets used and/or analysed during the current study are available from the corresponding author upon reasonable request.

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