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APA Citation

Amponsah, S. & Bekele, T. (2022). Exploring strategies for including visually impaired students in online learning. 1–23.

https://fount.aucegypt.edu/faculty_journal_articles/4736

MLA Citation

Amponsah, Samuel, et al. "Exploring strategies for including visually impaired students in online learning." 2022, pp. 1–23.

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Exploring strategies for including visually impaired students in online learning

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Received: 1 February 2022 / Accepted: 30 May 2022

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Abstract

Online learning has gained prominence in higher education institutions globally. Its actual and potential benefits are linked to improving access to and quality of education. It is also considered as a vital strategy for contributing to the UN SDG 4 agenda which aims at ensuring inclusive, equal and equitable lifelong education for all by the year 2030. Unfortunately, not much has been documented on how visually impaired students (VIS) have been included in online learning. To extend our understanding of this neglected but significant topic, this qualitative developmental phenomenographic study engages 14 faculty and six Administrators from two Ghanaian higher education institutions to explore challenges and possible strategies for the inclusion of VIS in online learning. The findings indicate that general policy frameworks are available in the studied universities but they are limited in salience and significance as they do not consider the inclusion of VIS in online learning. Some forms of digital technology are also available in the studied institutions but their accessibility and usability remain a challenge to the VIS. Besides, the universities have specialized units to support students with special needs generally but their practices to support VIS in online settings have remained a challenge. Consequently, universities need to develop adaptive and agile policies through inclusive and participatory approaches. Additionally, higher education institutions should strategically build the capacities of their faculty and staff to better serve VIS in online learning settings. The creation of strategic partnerships with civil society, intergovernmental and non-governmental organizations and the private sector generally is deemed vital for the mobilization of resources to support VIS in online learning spaces.

Keywords Developmental phenomenography · Inclusion · Social Justice Theory · Theory of Care · Visually impaired students (VIS)

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1 Introduction

Online learning is emerging as a vital strategy for higher education institutions (HEIs) worldwide. Singh & Thurman (2019) explain that online learning emerged as a web-based system with the introduction of WebCT in 1995 that became the first-ever Learning Management System (LMS) followed by the Blackboard. The LMS was primarily used for uploading files online (Bates, 2014). However, terms such as blended learning, e-learning, online education and even distance learning have been interchangeably used which has partly contributed to the ambiguity and confusion in defining online learning. Based on a systematic review of 46 studies published between 1988 and 2018, Singh & Thurman (2019) defined online learning as “learning experienced through the internet/online computers in a synchronous [or asynchronous] classroom where students interact with instructors and other students and are not dependent on their physical location for participating in this online learning experience. (p.302). Online learning has partly contributed to the internationalization, universalization, and massification of higher education (Karkouti & Bekele, 2019). It has also triggered the reconceptualization of teaching and learning methods, student assessment, and faculty professional development.

During the 2020 COVID-19 lockdowns, nearly 1.6 billion students had to discontinue their education momentarily (UNICEF, 2020). The adoption of technology allowed HEIs to somehow continue offering education during the pandemic. Though statistics on students learning online could not be found, the National Centre for Education Statistics (2021, par. 2) records that in 2021 about 5.4 million (representing 25.8%) college students in the United States of America (USA) took at least one online course while 12.5% of all college students took online courses exclusively and 13.3% engaged in hybrid modes of study. ThinkImpact (2021) also points out that around 98% of universities in the USA have moved online since 2020. This may not be an accurate representation of trends globally but at least a picture of the astronomical move to online learning, especially in the Global North. The prevalence of online learning in Africa is unknown. However, the International Association of Universities report indicated that only 29% of African HEIs were able to migrate to online teaching and learning during the pandemic (Koninckx, et al., 2021). The inclusion of visually impaired students in online learning in Africa becomes even more uncertain.

In Ghana, it is estimated that disability prevalence hovers around three per cent (roughly 800,000 people) of the country’s total population (Ghana Statistical Service (GSS), 2019) with a third of this group suffering from visual impairment (Senadza et al. 2019). Given the UN SDG 4 and the access to online learning made possible through computer-mediated instruction, one would have thought that no person willing and able to learn is left behind. However, there is no record of how visually impaired students (VIS) have been or are being included in online learning. Apart from a study (Amponsah, 2021) that focuses on the experiences of visually impaired students engaged in online learning, the few other related studies (e.g. Ampratun et al. 2016; Asamoah et al., 2018; Mamah et al., 2011; Odame et al., 2019) examined the experiences of such learners in conventional classrooms. Studies on student populations in web-based learning have largely overlooked visually impaired students.

To extend our understanding and then better inform stakeholders, this study explores strategies for the inclusion of VIS in online learning in Ghanaian higher education. To support a holistic understanding of the phenomenon, the prevalence of VIS online learning, its challenges, and relevant strategies for overcoming the challenges are interrogated. The study will identify implications for policymaking and planning, teaching and learning, and further research and theorization on this neglected but significant topic in higher education. The following questions guide the study:

- What is the context of VIS and online learning in the Ghanaian higher education ecosystem?
- What key challenges are militating against the inclusion of VIS in online learning?
- How can existing structures and technology be leveraged to ensure the inclusion of VIS in online learning in higher education institutions?

The remaining parts of the study are organized as follows. To situate this study within broader and larger contexts, the next section presents a review of the related literature. This is followed by a critical review of the Social Justice Theory and Theory of Care. These theoretical frameworks provide the analytical lenses through which the findings of the study are discussed. The [methodology](#) section highlights the research design chosen including sampling and research ethics. Considering the research questions as organizing logics, the findings of the study are then presented and discussed. Conclusions are drawn and implications for educational policymaking, practice and further research are identified.

2 Online learning and visually impaired students

This study aims to identify strategies for the inclusion of VIS in online learning. Hence, the literature review in this section is needed to build a foundation and create a broader understanding of the phenomenon. As noted in the [introduction](#) section, the definition of online learning has been surrounded with confusion and ambiguity partly due to its varied modalities of application. For instance, Oblinger and Oblinger (2005) contest that online learning means learning that takes place fully online whereas Moore et al., (2011) state that accessibility, connectivity, flexibility and the ability to promote different forms of interaction as the determinants of online learning. To Ryan et al., (2016), online learning refers to courses that are offered completely online. Our study adopts this definition as our goal is to identify relevant strategies that Ghanaian higher education institutions can adopt to create enabling online environments for VIS.

Notwithstanding the controversies, Harasim (2017) accentuates that online courses have grown from marginal to the mainstream due to their actual, perceived or potential benefits. The author also adds that online education has been poorly theorized in terms of pedagogies, tools and environments to enhance learning. If such challenges have remained from the onset, then it goes with little surprise that VIS have not been accommodated in online learning even during the pandemic that presented

compelling challenges. In magnifying the challenges among VIS in online learning Mckenzie (2021) bemoans the incompatibility of digital materials for learning and delays in the delivery of physical materials such as computers, screen readers and other assistive devices for the VIS as major drawbacks. It is important to note that in developing economies, not only do the delivery of digital materials delay, but they may also be unavailable to the VIS.

Of the few studies associated with visually impaired students, Ferati et al., (2016) lament how financial constraints and stigma have militated against the chances of such potential learners to enrol in schools. They establish that only 86 out of a possible 5000 people in Kosovo are attending school. Besides, their evaluation of a localized Massive Online Open Courses (MOOCs) platform (Almooc) that offer over 70 courses to approximately 47,000 students proved that the platform was not accessible to blind students. Their findings are not different from that of Adarkwa (2020) who asserts that lack of technological infrastructure and other challenges have prevented Ghana and other Sub-Saharan African countries from rolling out digital learning. These findings have far more reaching implications for learners with visual impairments who are more challenged than their sighted colleagues.

In recent times, MOOCs has become the most popular platform that offers access to online learners and it is acclaimed as being open to all learners. Unfortunately, Bohnsack and Puhl (2014) challenge this claim and argue that openness and accessibility do not connote the same meaning. They further establish that most MOOCs platforms are not accessible to VIS. This assertion is corroborated by researchers (e.g. Amponsah 2021; Ferati et al., 2016; Singleton & Clark, 2013). This reality portrays how VIS have been left out of online education due to the pandemic and the need for emergency education models to perpetuate education amid the social/physical distancing and other COVID-19 protocols. To overturn this non-inclusion, Ferati et al., (2016) highlight the technical and financial benefits of designing accessible MOOCs/online learning platforms as compared to the re-engineering of the physical infrastructure to accommodate VIS in conventional schools.

The issue of access to Web-based infrastructure is another challenge for VIS. Irwin & Gerke (2004) found that most interface designs of home pages or the organization of the content of 51 colleges in the USA did not meet accessibility standards for VIS. Sloan et al., (2002) also audited the Web resources of over 300 institutions in Canada and the UK and found design errors that hindered both accessibility and usability for VIS. In 2019, Agangiba and Agangiba assessed the websites of 15 Ghanaian higher education institutions and recognized what they termed critical accessibility issues for VIS. The challenges with accessibility and usability of web-based infrastructure are global in scope and reflect in the literature on VIS learning even in traditional classroom settings. This gives impetus for the conduct of the current study to identify possible strategies for the inclusion of such a cohort of learners in online learning environments in higher education institutions.

There seems to lack conceptual clarity between accessibility and usability of Web-based learning infrastructure. From the literature, it seems many service providers, and institutions equate the two terms which present a major challenge to VIS. The confusion largely emanates from the universal accessibility guidelines that Web content designers, page authors and institutions generally follow (Web Accessibility Ini-

tiative, 1999). The fixation on accessibility has presented compelling challenges to VIS as the issue of usage seems to be off the table. Literature (e.g. Irwin & Gerke 2004; Leporini & Paterno, 2004) also highlight the improvements in universal access to technology but it does not correlate to its usage. To this end, Agangiba & Agangiba (2019) have recorded that blind people still struggle to use poorly designed computer interfaces. To overcome this challenge, Leporini and Paterno (2004) clarify that accessibility is focused on making websites available to a wider user population, whereas usability aims at making the user experience with websites more efficient and satisfying. Based on this, stakeholders should seek to ensure a balance between accessibility and usability to moderate the challenges VIS face learning online.

3 VIS Online Learning as Social Justice and Care Issues

To provide conceptual scaffolding, Social Justice Theory (Rawls, 1971) and Theory of Care (Soto, 2005) are chosen for this study. These theories provide conceptual tools to explore strategies for the inclusion of VIS in online learning. The overarching assumption made is that education can serve as a vehicle to empower people and help provide solutions to many of the global challenges. This has resulted in global, continental, national, and local policy drives such as the UN Convention on the Right of Persons with Disabilities, the UN SDG 4, and Ghana's 2016 National Inclusive Education Policy. However, the policies do not always translate into action, especially in the Global South (Mukhopadhyay & Moswela, 2020; Okyir, 2018). Such conditions often result in some forms of social injustice as denial of education constitutes an infringement on social justice principles and fundamental human rights generally.

John Rawls popularized the Social Justice Theory in 1971 with the foremost intention to ensure that the benefits and burdens of society are distributed fairly among citizens without any form of discrimination (Rawls, 1999). Unfortunately, access to education has not been in line with his ideals and the digital divide has been further exposed by the pandemic that has largely driven education online. It is in this vein that Zaparyniuk & Montgomerie (2005) maintain that the inaccessibility of academic websites infringes on the basic human rights of VIS. This situation perpetuates social injustice against VIS in the educational landscape. In effect, the VIS, instead of enjoying the benefits of society (Rawls, 1999), are only carrying the burdens since lack of education leads to joblessness, poverty, diseases and the likes.

The nexus between VIS engaged in online learning and the Social Justice Theory is underlined in the principles identified by Hage et al., (2011) which are inclusion, collaboration, cooperation, equal access, and equal opportunity. Admittedly, online learning has democratized education and seems to have ensured social justice but the lack of inclusion of VIS rather results in social injustice. As accentuated by Kozol (2005), school environments with fewer resources and opportunities preserve and institutionalize systems of injustice. In the case where there is a lack of digital resources and qualified faculty to handle VIS, there are always challenges in the services rendered to them which amounts to inequity between the sighted and VIS.

The crucial link between social justice and the education of VIS lies in the overall well-being that the presence of the former presents and the adverse effects of

its absence. Hence, there is a call for systematic interventions to reduce inequity in education. To increase the competencies of VIS (Kenny et al., 2009; Wolf, 2005) recommends that interventions for VIS should equip them with knowledge and skills to effectively deal with issues of unequal social power while Coyne (2005) advocates for tools and motivation that create change and promote social justice. Closely knitted to the Social Justice Theory is Soto's (2005) Theory of Care which has as its central pillar, caring relationships, which transcend the classroom environment and encompass equal measures of relationships among diverse students. Amponsah (2021) highlights the traumatic experiences that VIS face when transitioning or learning online and thus calls for instructors to move beyond sharing information to provide the kind of care that will accord these students meaningful learning experiences.

This will result in a caring community where the social justice agenda can be pursued. In other words, Thompson (1998) intimated that caring communities leverage multidimensional pedagogies to accommodate disadvantaged and marginalized groups of students. Such strategies are bound to ensure justice and level the playing field for all manner of students. As noted by Gay (2018), the theory promotes a caring ideology that brings to light the lived experiences of marginalized students. In so many ways, it becomes easier to resolve the challenges the VIS face once the theory illuminates such challenges. As a result, stakeholders are more likely to find solutions to the challenges so VIS can receive equal treatment in online learning environments as their sighted colleagues.

In a nutshell, there are many areas where the Social Justice Theory intersects with the Theory of Care. However, Ling et al. (2007) opine that access to education and ubiquitous technology is a fundamental human right, which students with disabilities have been denied for too long. We consider this as the most profound intersection between the two theories as the theory of care has the propensity of eliminating such discriminatory practices through the caring communities enabled by the provision of relevant policies, digital technologies, and well-trained faculty, staff and VIS.

4 Methodology

The developmental phenomenographic research method within the qualitative approach, which is intended to produce practical outcomes that influence and inform practice, was adopted for this study. Qualitative methods support an understanding of “the concepts of intersubjectivity, multiple interpretive perspectives, relational meaning, co-construction of meaning, thick and thin descriptions, intentionality, lived worlds, shared journeys and defensible knowledge claims” (Åkerlind, 2005, p. 64). Marton & Pang (2008) claim that “phenomenography does not tell you what individuals’ ways of seeing something are. It tells you how their ways of seeing something vary” (p. 31). Consequently, researchers who conduct phenomenographic studies establish contact with minority groups to investigate variations in their understandings of the same phenomena or look at the inherent qualitative differences in their study participants’ experiences (Åkerlind, 2005; Marton & Pang, 2008). In addition, Cherry (2005) recommends this method based on its appropriateness to engage with complex or controversial viewpoints. This study adopted the method to explore

possible strategies for the inclusion of VIS in online learning from the perspectives of faculty and administrators from two Ghanaian higher education institutions by way of interviews. Figure 1 displays the research design of the study.

The starting point of phenomenographic research is planning where the purpose and strategies of the research are explicitly laid out (Bowden, 2000b). In this vein, Bowden recommends that the purpose of the study should be spelt out from the onset of the research and guide all the processes of the study. With the purpose of identifying possible strategies for enrolling VIS in online learning environments in Ghanaian higher education institutions, the lead researcher obtained the identities of faculty from the Websites of four Ghanaian public universities that provided online learning during the COVID-19 lockdowns in 2020. Quite a number of responses were obtained through the initial contact but after explaining the purpose of the study, many declined to correspond further for one of two reasons; either they had never taught VIS or they had not, or were not teaching online. In the end, eight and six faculty from two universities respectively agreed to be interviewed for this study. The faculty participants were made up of eight males and six females, who all agreed to have taught various courses in their respective institutions for not less than four years. The faculty shared the contact details of the administrators with us and through emails and telephone calls we contacted six of them (three from each institution) who agreed to participate in this study. All the six administrators had been on their job for

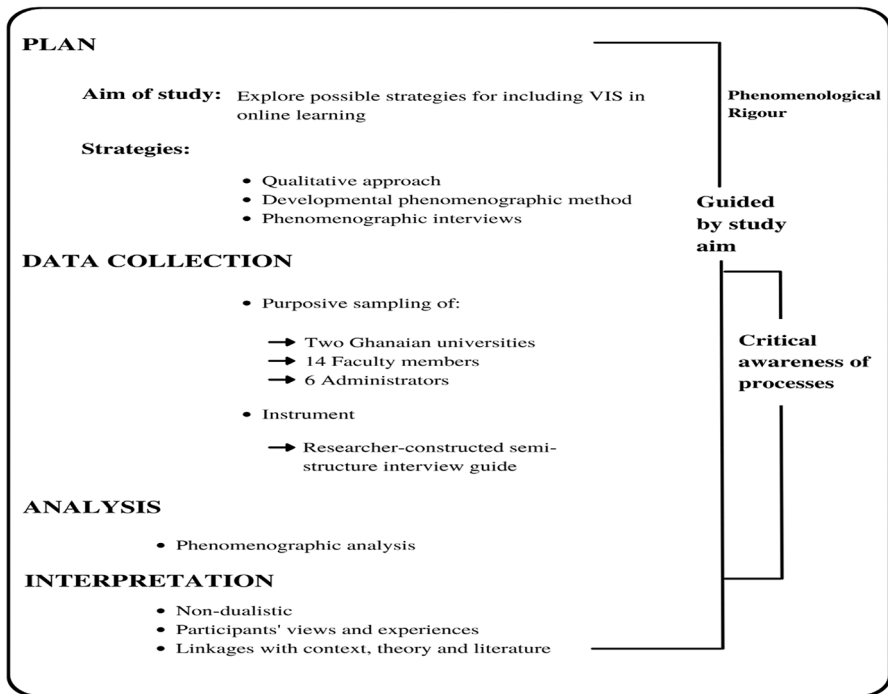


Fig. 1 A graphical presentation of the methodology. Adapted from Bowden (2000b)

a minimum of five years, worked closely with faculty and students and were abreast of issues regarding teaching and learning in their institutions. They were made up of three males and females each with portfolios ranging from two school administrators, two IT administrators and two college academic officers.

Phenomenographic interviews uncover latent meanings and intentional attitudes people carry on a phenomenon under investigation (Åkerlind, 2005). Hence, in this study, the interviews went beyond ‘What’ questions that elicited what participants do, to include ‘Why’ questions to explore participants’ awareness or comprehension of their experiences concerning challenges and plausible strategies for the inclusion of VIS in online learning. Based on this, semi-structured interview guides were used for data collection for this study. The interview guides started with problem questions to establish participants’ understanding of why VIS have not been included in online learning. Beyond that, we probed with ‘Why’ questions to establish the nuances around the challenges of non-inclusion and the possible strategies that could best be used to ameliorate the situation. A researcher-developed semi-structured interview guide was developed for data collection. The instrument was scrutinized several times by the researchers to ensure it was fit for purpose. Two experts in online learning and inclusive education were also consulted to review and make inputs on the instruments before it was finally used for the interviews. Some of the key questions used to elicit participants’ responses included the following:

1. What is your institution’s policy on inclusion?
2. Why has the policy not been [fully] implemented to benefit visually impaired students in online learning?
3. How have instructors and staff of your institution been trained or prepared to use digital tools to assist visually impaired students in learning online?
4. What are the most significant challenges in teaching visually impaired students online?
5. How can existing structures and technologies be leveraged for the inclusion of visually impaired students in online learning?
6. Which strategies do you think will work best for the inclusion of visually impaired students in online learning in terms of technology, policy, etc.?

Three Research Assistants (RAs) were trained by the lead researcher to help with the conduct of the interviews. Their training involved an understanding of the aim of the research, the content of the interview questions, interview techniques, and data management. The interviews were conducted between July and September 2021. Due to the conditions of the pandemic, six faculty members and four administrators were interviewed via the Zoom online meeting application. The WhatsApp call facility was used to interview three faculty and the remaining two administrators. The remaining five interviews with faculty were conducted through phone calls. On average, the interviews lasted 35 min and were all recorded with the inbuilt recorders or software of the laptops or mobile phones used for the interviews. At the end of the interviews, the audio recordings were downloaded, transcribed and read repeatedly by the research team while comparing transcriptions with the audio recordings to ensure consistency between the recordings and the transcribed data.

The phenomenographic analysis strategy was used to help individual research team members identify emerging themes and sub-themes from the transcribed data (Bowden, 2000b) and compare the views of the two study participant cohorts. All team members agreed on emergent themes that best described the perspectives of the study participants (see details of themes in the [Study Findings](#) section). This was done after the research team had familiarized themselves with the data and agreed on the themes and sub-themes that emerged. The data analysis strategy used in this study answers questions raised by Cherry (2005) on the ontological and epistemological assumptions of phenomenography as it helped to represent the very character of the themes that emerged after the analysis of the data. Thus, based on the ontological assumption of phenomenography, the study participants' views were accepted as qualitatively different and constructed from non-dualistic viewpoints. A similar position is reflected in the epistemological stance as participants' understanding of the phenomenon is tied to their individual experiences (Yates et al., 2012). In this light, Cherry (2005) urges phenomenographic researchers to find the best ways of representing the character of the categories they develop from data. We did this by representing the views of the study participants without any biases.

Lastly, assurance or rigour is instrumental in the discourse of phenomenographic studies. It must, however, be noted that phenomenographic studies slightly vary from other qualitative methods in that interpretative awareness forms its main basis for rigour. We, therefore, ensured that the aim of this study guided every aspect of our work. Cherry (2005) identifies transparency as key in ensuring rigour. Consequently, the research team members had critical awareness of the data generation and analysis processes and were open in all aspects of the study through regular discussions and agreements on each step that was taken. Besides, the study report was based purely on the perspectives of the study participants. Finally, we were guided by Bowden's (2000b) recommendation on rigour to provide descriptions within the context of the participants' perspectives on the non-inclusion of VIS in online learning and how best the challenges could be addressed.

5 Study findings

The research questions set out for the study were used to organize the findings. This section consecutively presents findings linked to the context of VIS online learning, the key challenges, and relevant strategies to overcome the challenges. Where possible, themes and sub-themes are created under each heading.

6 The context of VIS and online learning in the Ghanaian higher education ecosystem

A shift to online learning means those involved should have some understanding of the new environment. Without such knowledge, their operations may run parallel to acceptable standards. In our bid to explore this, it is interesting to share that the two

participant cohorts' understanding of the context exhibited slightly different perspectives, yet they all touched on aspects of online learning.

6.1 Understanding and scope of coverage

The available literature on online learning rarely touches on the experiences of VIS learning online (Amponsah, 2021). This is reflected in this current study as the views of faculty on the phenomenon were rather generic than on the cohort whose issues are of interest to this current study. In sharing the context of VIS and online learning, a faculty stated, *"I understand it [online learning] to be the deployment of any modern device or technology that can facilitate ... teaching and learning to make learning simple for students as well as teachers."* Another faculty responded similarly but added what can be described as coverage of online learning. She noted,

Through technology, we have connected to all students in the country. At the advent of COVID-19, pre-loaded data SIM cards were distributed to all staff and students for their teaching and learning respectively. The University website and Learning Management Systems were zero-rated hence, access to the Internet was provided.

The Administrators who participated in this study mostly operate behind the scenes, unlike the faculty who meet students either in-person or virtually, synchronously or asynchronously. The Administrators focused their attention on their institutions' learning management systems to define the context of online learning. One disclosed, *"There is a learning management system for all students, but we have experts who manage the learning system to suit students with visual impairments."* This is not much different from what his counterpart from another institution shared as follows, *"The learning management system was carefully selected to accommodate students with certain disabilities. Example, text to speech and screen readers for visually impaired students."* The responses from both cohorts mainly answer the question of accessibility but concerns with usability of the available technology and LMS still remain a key challenge as raised in the literature (Agangiba & Agangiba, 2019). The challenges of usability are disturbing as social justice principles initiated by Rawls (1999) are not being implemented in online learning.

6.2 Orientations towards support for the VIS learning online

Student support must be all-encompassing to enable them to successfully complete their academic journeys. As noted by Hage et al., (2011), education providers must create equal access, opportunities and support for all learners. In the case of VIS, the need for support should be a major priority due to their peculiar challenges and more so when they venture into online learning. Responses on support showed some variations in the orientation of the study participants. The faculty expected the university to fully take charge of providing support. In a typical instance, a faculty responded, *"The university has provided computers and assistive devices so my responsibility is to teach and assess my students including those with disabilities."* With such an

orientation, VIS may experience more challenges in their online learning nonetheless a faculty from another institution shared almost the same view. He echoed, *“The university made arrangements for students to get sim cards and data so ours was to make sure we delivered within the time given us.”* In both instances, it is clear that the faculty were either oblivious or not implementing the caring relationships espoused by Soto (2005) in their online teaching. Such situations do not also create the atmosphere to dispense social justice towards all students considering the challenges VIS are bound to face amid the radical shift to online learning.

Though the Administrators in this study saw the provision of support to be the responsibility of their respective institutions, they were also cognizant of the benefits therein for the VIS. One Administrator shared the following, *“For the visually impaired, the university has a unit that takes care of them, so these students access support via that unit and we work hand in hand with these units.”* The two universities involved in this study have coordinated units or offices and Information Technology (IT) Directorates with dedicated sections for special needs students. In addition to the support provided by the respective units, an Administrator expressed this view, *“The university has deployed a dedicated broadband to provide internet access for the main campus and other satellite campuses so all students can join when classes are held online.”* The Administrators explained that they are always on the ground to ensure that the internet is working and report to the IT Directorate to fix any challenges that come to their attention. They also emphasized that they offer advice to their universities, and advise faculty on how best to help the students to ensure the latter enjoy their educational journeys. Based on the Administrators’ responses, there is some hope that the institutions are ensuring some level of justice (Rawls, 1999) by way of creating special units for the VIS.

6.3 Shared understanding and privileges

The study findings point to a shared understanding between the study participants which leads to some privileges for the VIS. Such privileges are needed to assuage some of the challenges the VIS faced as they learned online. On this score, some faculty allowed personal contacts with such students and used diverse means for correspondence. It must be noted that such correspondence has not been well established in Ghanaian institutions as the relationships between teachers and students is mostly top-down. It should also be noted that Ghanaian lecturers mostly have large numbers of students to teach in their classes so may not be able to identify peculiar challenges with particular students. This could be worse in online spaces but thankfully, some faculty in this study expressed what is captured in the following statement, *“Once a student informs me of a visual impairment, I allow him or her to contact me through any means convenient to them and give them assistance with my course content.”* In one of the institutions which focus on education, an Administrator underscored the following, *“My institution appoints special education experts as lecturers and administrators who attend to the needs of such students for their success.”* VIS with such experts stand to benefit but that is, unfortunately, the case for only one institution and does not reflect all higher education institutions in Ghana. In all, the faculty and institutions involved are guided by the tenets of caring relationships to be step-

ping out of their way for the benefit of the VIS while ensuring that the VIS are not alienated from online learning (Hage et al., 2011; Rawls, 1999; Soto, 2005).

7 Key challenges in the inclusion of VIS in online learning

The dramatic shift to online learning, without doubt, has brought challenges to stakeholders in the education landscape globally. In this study, the challenges outlined by the participants range from general ones such as the digital divide to the peculiar usability challenges that have been almost ignored by educational institutions. These are expanded on under the ensuing sub-sections.

7.1 Access and technical-know-how deficits

Some faculty did not mince words in highlighting how the lack of requisite technological tools continues to affect their online teaching (Adarkwah, 2021). They also touched on how the lack of knowledge of online instructional techniques on their part and that of the VIS have remained a challenge for effective online teaching and learning. These challenges are highlighted by an Administrator that *“Faculty and staff have not been adequately trained to handle, teach and accommodate such category of students online.”* All participant cohorts registered their discontentment with the high cost of assistive devices to facilitate online teaching and their institutions’ inability to provide such for them. The challenges highlighted, coupled with issues of digital divide, erratic power supply commonly called ‘dumsor’ in Ghana, network downtime, data depletion or cost have become common knowledge and are established in extant literature (e.g. Adarkwah 2021; Amponsah, 2021). The current study, therefore, shifts attention to more nuanced challenges concerning VIS studying online.

7.2 Usability versus accessibility challenges

Irwin & Gerke (2004) have bemoaned how VIS continue to struggle with online learning due to the way accessibility has been equated to usability over the years. Unfortunately, institutions continue to expand access to education through technology integration without recourse to the usability of the technologies they adopt. This study interrogated the issue of usability and a faculty had the following to say, *“Most of the materials we upload on the LMS are scanned so they [referring to the VIS] come back to us for other formats so they can type in braille.”* Such a situation highlights the challenge of the incompatibility of materials highlighted by Mckenzie (2021). This limits the usability of the system and also challenges the essence of online learning.

An Administrator offered an explanation that seemed to indicate that the VIS don’t encounter challenges in their online studies in this statement, *“For now, blind people are already studying via other modes of education and interestingly taking online courses just like other students. I do not really see much of a problem.”* The Administrator provided a rather simplistic analysis of the situation without due consideration

to the compelling circumstances surrounding the COVID-19 pandemic that necessitated the abrupt shift. A contrary view was shared by another Administrator who highlighted key usability challenges with her institution's LMS. She elucidated, *"To the best of my knowledge, the LMS has no speech applications that can guide the students when they log into the virtual class. Specialized computers too have not been provided."* Once again, it can be adduced that the issue of accessibility and not usability has been fulfilled (Agangiba & Agangiba, 2019) thereby meting out some form of injustice to the VIS. Besides the issue of injustice, the challenges also portray that the institutions involved in this study have not done enough to ensure VIS are catered for in their bid to study online as enshrined in the theory of care (Soto, 2005).

8 Strategies for the inclusion of VIS in online learning

Online learning has come to stay and looks probable in the scheme of reimagining and future-proofing education beyond crisis and emergencies as the world is battling different variants of the COVID-19 disease. On this score, the researchers elicited participants' responses on how existing structures and available technology could be leveraged as strategic initiatives for the inclusion of VIS in online learning. There was much convergence in the perspectives of the study participant and their views are reflected in what follows.

8.1 Available assistive devices and software

Harasim (2017) has emphasized the global shift of education online while Ryan et al., (2016) refer to online learning as running of courses completely online. In that vein, the first item that emerged from the analysed data was the need to use available assistive devices and software as springboards to effectively accommodate the VIS in online learning. Since it had already been identified that the content or materials shared by some were in formats that were not VIS-reader-friendly. In this light, some of the faculty advocated for all content to be made available in braille and audio for such students. A quote from a faculty points out, *"All materials should be available in braille and audio and released to all students suffering from visual impairments."* For other faculty, the solution was hinged on the expansion of the resources needed to aid the VIS in their online learning. They thus indicated, *"The university should procure every assistive device that will help us teach these people. We can't continue to leave them behind!"* The studied universities previously had policies that allowed their distance students to be billed and given tablets pre-loaded with course content. Some faculty recommended this as worth introducing to facilitate the online learning of the VIS. Reflecting on the said policy, a faculty quizzed, *"What happened to the policy that made the university give each distance education student a tablet?"* Another faculty expanded this idea, *"We need to give each of these students tablets pre-loaded with all the information they will need and every software needed to assist them in their online studies."*

The views of the Administrators corroborated that of the faculty as they also advocated for the introduction of tablets but added laptops and partnerships. One of them proposed:

It is time for our university to partner with government agencies and corporates to come to the aid of these students. Some cannot even afford a simple android phone yet they have to study online. Government should give them a special dispensation by providing them with laptops and tablets. Corporate entities can also do same; they can provide free assistive devices and software for the students with disabilities as part of their corporate social responsibilities so we don't leave these students behind.

The views expressed so far have amplified the principles of both the theory of care and social justice theories as making the provisions mentioned will be a way of ensuring inclusion (justice) and care for the VIS (Rawls, 1999; Soto, 2005).

8.2 Social media acceptance/incorporation

In addition to the above, there was a mutual agreement between participants to leverage social media as a strategy for including the VIS in online learning environments. One faculty, thus, shared this statement, *"The University must find a way of incorporating common social media platforms into the LMS as it is easier for us and students to use."* One Administrator regarded his institution's LMS as not active and argued for the use of social media for online teaching and learning. He stressed, *"The starting point is to use WhatsApp, Google Meet and other handles to deliver lessons. The blind students are familiar with that and many students. Besides, faculty don't even know about our LMS."* Both faculty and administrators highlighted that, students mostly copy materials and announcements from the institution's LMS and circulate them on their social media platforms so it would be better to accept social media like Zoom, WhatsApp and Instagram or incorporate them into the LMS as a strategy to eventually fully adopt the LMS. Besides, low socio-economic factors have mainly prevented VIS from accessing the necessary digital gadgets while usability challenges prevail for some who can access them (Bohnsack & Puhl, 2014; Ferati et al., 2016). With this in mind, it is expedient that educational institutions strategically heed the ideas postulated by the study participants to curtail aggravating the challenges VIS face studying or attempting to study online.

8.3 Individualized and equitable support

An important agenda of the social justice theory for institutions is to ensure that benefits are shared equally among students without any form of discrimination (Rawls, 1999). This is reflected in the views of the study participants at this stage. With the understanding that the VIS are challenged, the participants identified the need to provide individualized support for them. It is in view of this reason a faculty requested that *"The unit for special needs students should provide the needed assistance to each impaired student who may need support in navigating the LMS and other approved*

technologies.” One faculty took a personal initiative to assist the VIS. His initiative is captured in the statement that follows, *“I record my lectures and send to each of them [VIS] so they listen and understand what I teach.”* The views of the faculty reflect the need to ensure justice for the VIS and the kind of caring relationships that will guarantee their success (Rawls, 1999; Soto, 2005).

The perspectives of the Administrators pointed to training and advocacy as tools to enable faculty and staff to effectively accommodate the VIS in online classrooms. One of them shared, *“The university should provide us with continuous and adequate training to help us to handle issues such students bring to us and for lecturers to be able to connect to them well in their online classrooms.”* On the issue of advocacy, an Administrator explained, *“The university should identify champions among staff, faculty and students with disabilities to appeal to all to accommodate them and offer them the needed assistance.”* Others also urged the students to be bold and open to share their challenges with staff and faculty. This is reflected in an Administrator’s voice as follows, *“The visually impaired student should always find a means to contact lecturers to share their challenges so they don’t leave them out, especially in online classes.”* The VIS in this study enrolled in online learning as the only available option due to the exigencies created by the COVID-19 pandemic. Hence, the views of the study participants on equitable and individualized support for VIS invite all stakeholders to ensure students get the best experience and are aided to succeed in online learning. Bekele (2009) theorizes that students’ satisfaction with their first encounter with online learning will determine if they will enrol for further online courses.

8.4 Policy enforcement

Issues of policy enforcement were distilled mainly from the Administrators’ voices which we deem as imperative because plans without legal backing may continue to gather dust on shelves. To this end, an Administrator stated, *“The University subscribes to the National Inclusive Education Policy. In addition, specialized units have been set up to focus on the needs of impaired and special students.”* Closely tied to this, an Administrator from another institution threw a challenge in the statement that follows, *“The University’s Inclusive Policy seeks to provide equal opportunity to every qualified individual to develop their potentials so we have no excuse not to include these students in online learning!”* The data from the Administrators demonstrated that their institutions have disability policies but enforcement was lagging. They, thus, advocated for the full enforcement of the policies. Though the faculty did not say much about policies, the few that emanated from the interviews corroborated the views shared by the Administrators. Among the few, one that stands out and captures the essence of enforcing policies noted:

As far as I know, Ghana is a signatory to almost all United Nations and African Union Conventions on education. Apart from my institution’s policy on disabled students, the 1992 constitution of Ghana makes education a right for all and there are several other policies like the Education Strategic Plan and Disability Act. I don’t know why no one thought of visually impaired students

when we started moving online. It is high time our management ensures the policies are enforced to the letter.

It is based on policy challenges like what is shared above that Okyir (2018) bemoans how most African countries fail to turn policies into action. Furthermore, Mukhopadhyay & Moswela (2020) lament how the government of Botswana had refused to rectify the UN Convention on the Rights of Persons with Disabilities for 10 years. These corroborate the views shared by the participants which beckon all and sundry to be part of the implementation of such policies as a matter of urgency if injustices in education against VIS can be reversed.

9 Discussion of findings

This section discusses the major findings of the study and their implications for educational policy making, practice and further research. The discussion centres around the opportunities available for accommodating VIS in online instruction and the factors that challenge their successful inclusion. Strategies thought to overcome the challenges, the limitations of this study, and implications for further research on this significant and timely topic are subsequently highlighted.

For theoretically informed discussions, this study draws on social justice and caring relationship conceptions. The fundamental assumption is that VIS have the right to be meaningfully included in online instruction. Proxy indicators of their successful or effective inclusion include fair distribution of resources including technology (Kozol, 2005; Hage et al., 2011; Rawl, 1999; Zaparyniuk & Montgomerie 2005), collaboration, cooperation, and equal access to opportunities (Hage et al., 2011), knowledge and skills to overcome inequality (Wolf, 2005), tools and motivation to promote change (Coyne, 2005), caring relationships (Soto, 2005), caring ideology (Gay, 2018), and multidimensional pedagogies to cater for their special needs. Fair access to resources, inclusive approaches and methods, meaningful engagements in instructional activities, acceptable performances in examinations, and access to other opportunities including employment are all implicated in our use of social justice and caring relationship conceptions. Overall, the absence of all forms of exclusion, discrimination, and marginalization of VIS in online learning environments could be considered a powerful expression of social justice or fairness. Our below discussion of opportunities, challenges, and strategies for VIS online learning centre around these social-justice-oriented conceptions of inclusion.

The analysis in the previous section generally indicates the presence of such crucial conditions and factors of inclusion as global, national, and institutional policy; some forms of technology; support units; and shared understanding. These could jointly support the meaningful inclusion of VIS in online instruction in the studied Ghanaian universities. Specifically, the UN Convention on the Right of Persons with Disabilities, the UN SDG 4, Ghana's 2016 National Inclusive Education Policy, and the special needs policies made by the studied universities express organizational and institutional intentions and positionings to support people with special needs includ-

ing the VIS. These policy provisions call for inclusion in social and educational contexts generally and can trigger and drive the inclusion of VIS in online instruction.

Although these policy provisions seem valuable opportunities, they, in their current form, seem to have limited salience and significance for the inclusion of VIS in online learning. One, the policies concern the rights, needs and challenges of people with special needs in general social and educational establishments; they do not factor out the special circumstances of VIS in online learning environments. This is partly why some faculty and university administrators voiced their concerns as to how to interpret and translate the policies into meaningful actions. Conceptions of adaptive policy (Walker et al., 2001) are not found accommodated in these policy provisions. The policies made for the inclusion of people with special needs in regular educational settings are not adapted to suit the needs of VIS in online learning contexts. Two, to ensure the successful implementation of social policy, experts underscore the need to conceive policy as text or discourse and policy as practice (Heimans, 2012). Our study indicates a decoupling between policy and practice. The actual inclusion of VIS in online learning environments is a challenge despite the existence of global, national, and institutional policies. The decoupling could partly be explained by the fact that the policies were made for supporting the provision of services to people with disabilities in general, with no consideration of VIS in online learning. Hence, such actions could be the starting point for averting the situation that Mukhopadhyay & Moswela (2020) and Okyir (2018) describe as the non-implementation of policies in the Global South. This policy-practice gap coupled with the limited technological pool available for the VIS could not meaningfully support their inclusion in online learning.

The public view of online learning assumes the availability of technological tools and the required infrastructure to support them. The findings of this study indicate that the studied universities seem to acquire basic technologies including learning management systems, Internet connectivity, and infrastructure. Although the technological tools or platforms lack special capabilities or functions that match the needs and challenges of the VIS, the basic elements are available. Media capability theory (Dennie & Valacich, 1999) explains that the capability of media and technology such as feedback immediacy, symbol variety, parallelism, rehearsability, and reprocessability are critical elements for success. In our study, some faculty try to audio record their lectures and post them on the learning management platforms so that the VIS can access them. Other than these individual efforts, which may not be scaled up and sustained, the available standard technologies in the studied universities do not seem to have the capabilities to better serve the visually challenged students. The incompatibility of digital materials for learning (Mckenzie, 2021) seems to be observed in the studied settings. However, with further upgrading and fine-tuning of the available technologies, the needs of VIS in online learning could be potentially served.

However, availability does not necessarily implicate or guarantee accessibility and usability (Agangiba & Agangiba, 2019; Amponsah, 2021; Bohnsack & Puhl, 2014; Ferati et al., 2016; Leporini & Paterno, 2004; Singleton & Clark 2013). The findings reveal several important challenges regarding accessibility. One, not all VIS have access to technology; there is a digital divide between those who come from well-to-do and poor socio-economic backgrounds. They may have access to computers

within their university compounds but not elsewhere outside of their campuses. Two, some available technological platforms including learning management systems do not have special features or capabilities to serve the needs of VIS. The infrastructure to support technology applications such as electricity is sometimes not dependable due to unreliable power supply. Three, the TPACK conceptual framework (Mishra & Koehler, 2006) explains that successful integration of technology requires faculty to possess demonstrated knowledge of technology, pedagogy, and content. In our study, faculty seem to lack adequate technical know-how to optimally use technologies in such a way to meaningfully support the VIS in online learning environments. Specialized training sessions that focus on effectively supporting VIS in online learning settings lack.

Four, the perceived attributes theory of diffusion (Rogers, 2003; Surry & Farquhar, 1997) states that potential technology adopters, faculty and students in our case, evaluate the innovation (the technology) based on its attributes of triability (time to try the technology), observability (technology's observable results), relative advantage (advantages of the new technology compared to old technologies), complexity (user-friendliness and simplicity), and compatibility (match with existing values and/or practices). Mainly due to the decisions made by universities to embrace emergency online learning following the onset of the pandemic, most of these attributes of technology are missing from online learning environments which could adversely affect the learning experiences and performances of students generally and the VIS specifically.

Interestingly, the studied universities have specialized support structures or units which aspire to better support VIS in online learning settings. If well resourced, these units have the potential to spearhead initiatives geared toward overcoming the challenges discussed above. The shared understanding and awareness faculty and university administrators have regarding the needs and challenges of students with special needs in online learning environments is another crucial factor that the support units could scale up and sustain.

10 Conclusion and implications

Generally, studies conducted on online learning in higher education identify the availability of policy, technology, support structures or units, and a shared basis of understanding among stakeholders as vital elements needed for success and the scalability and sustainability of online learning environments (Bekele, 2009; Karkouti & Bekele, 2019; Lim & Wang, 2016; Wang et al., 2015; Wagner et al., 2008). The present study reveals, albeit on a limited scale, the availability of these elements in the studied universities. These factors coupled with universities' intentions to scale up technology integration can likely trigger and drive more significant inclusion of VIS in online learning environments in the years to come.

The following policy-practice implications are found relevant for addressing social injustice, discrimination, and marginalization of VIS in online learning settings. One, the available institutional policies need to be adapted to meaningfully address the special needs and challenges of VIS in online learning. The process of policy appro-

priations or adaptations needs to be inclusive, participatory, and meaningfully engaging VIS, faculty, and university administration. This approach can create a sense of policy ownership which can contribute to the relevance and significance of policy to online instruction involving VIS.

Two, the adapted policy should be considered more as a working guideline than as a permanent directory. This is significant as online learning environments are by their nature dynamic. Based on emerging circumstances, policies need to be constantly revised and calibrated to keep their salience. That is why policy making is advised to take a learning design perspective; policy revisions and adaptations are by themselves learning avenues for improvement (Cobb & Jackson, 2012). This approach is thus consistent with the idea of public policy making as a cycle.

Three, to avoid decoupling and the resulting misunderstanding, policy should be conceived also as a practice. Considering policy as merely text or document restricts or overshadows the very idea of having a policy in the first place - to more directly and authoritatively inform and impact practice. A more productive and comprehensive approach conceives policy as text, discourse, implementation/practice, monitoring, and evaluation. To that end, the policy making process needs to identify relevant and effective monitoring and evaluation strategies and systems. This approach can overcome the policy-practice gap rhetoric existing in education and social studies generally.

As discussed above, ensuring the availability and accessibility of technology is a critical factor in online instruction. This study, however, indicates that the technologic pool is limited and their capability to meet VIS special needs and challenges is currently not intelligible. To ensure the inclusion and engagement of VIS online, ample technologies which have varied capabilities including audio functionalities are needed. Strategically including social media and braille text as well as audio-digital assistants to the regular learning platforms could be the starting point. However, due partly to the massification of higher education and the limited public funding of the sector could not allow the acquisition of ample technologic tools which have the required capabilities. Creating strategic partnerships with civil society, intergovernmental and non-governmental organizations, and the private sector generally could enable the mobilization of resources (material, financial, technologic, and human) to further build the capacities of universities to better serve VIS in online learning settings.

Availability of and accessibility to technology could not always lead to optimal applications. This is mainly due to the faculty's limited knowledge of and skills in using wide-ranging technologies for varied instructional practices. Continuous professional development or training is thus required for scalability, sustainability, and impact of online instruction. Training should empower faculty through promoting their knowledge of technology, pedagogy for students with special needs, and the psychology and sociology of special needs students generally.

However, it needs to be pointed out that our understanding of VIS online learning is yet to gain momentum. Our current understanding mainly draws on our understanding of regular online learning, which itself does not yet enjoy rich theoretical explanations. To contribute to the scholarship on VIS learning online, this study captured the views and experiences of faculty and administrators in only two public

universities in Ghana. Although the findings and policy-practice implications identified above hold valid primarily to the studied settings, they could be considered relevant for the inclusion of VIS in similar online learning environments in the country. For broader applicability and impact, multi or interdisciplinary studies that account for varied learning settings and using multimethod are recommended. For substantially informing iterative or adaptive policy making and online teaching and learning, studying the views and experiences of policy makers and instructional designers as well as the lived experiences and views of special needs students and faculty from several institutions are warranted.

Acknowledgements We express our deepest appreciation to the Andrew W. Mellon Foundation for the postdoctoral fellowship award through the Building Capacity for Early Career Humanities Scholars in Africa (BECHS-Africa) to the lead researcher that resulted in this study. We are also grateful to Professors Samuel Adjei-Mensah and Samuel Kwame Offei (Co-PIs from the University of Ghana) and Professor Javed Maswood (PI from the American University in Cairo) for their kind consideration and Mr Benedict Fosu Adjei for the support. Finally, to all the study participants, we say be blessed for your time, patience and contributions.

Data availability All datasets associated with this study are not publicly available as part of measures to ensure the confidentiality of the participants. However, the corresponding author may release may make the data available upon reasonable request.

Conflict of interest There is no conflict of interest associated with this study.

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Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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