

<Original Article>

Assistive Technology Use in Open, Distance and Blended Learning within TVET in Kenya and Zambia

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This paper describes a project undertaken in Technical and Vocational Education and Training (TVET) institutions in Kenya and Zambia which examined educators' awareness and use of Assistive Technology (AT) in open, distance and blended learning. A qualitative, symbolic interactionist approach was used to determine the types of AT that were familiar to the educators before and after training. The training was designed to provide a broad overview of AT, including low to high tech AT, and introduce some principles for including it in online and blended learning to support trainees with disabilities. The project used interviews with principals of each of four institutions (two in Kenya and two in Zambia), written responses of participants in group situations, and a post-training questionnaire to collect data. The results showed that while the TVET educators had some awareness of AT, they used a limited range of AT in their teaching. Post-training, as is to be expected, the educators demonstrated a greater awareness and understanding of a wider variety of AT. Both the principals and educators identified the need for ongoing training in inclusion and AT to ensure that skills were developed further in this area. Some of the challenges which may impact AT use included a lack of opportunity to access the AT, financial constraints, poor internet connectivity and inconsistent power supply issues. The project demonstrated that ongoing training in AT is an important consideration for the inclusion of trainees with disabilities to ensure that they can be successful in pursuing appropriate skill development which will ultimately lead to better employment outcomes.

Keywords: assistive technology, TVET, Technical and Vocational Education and Training, disability, AT

Introduction

UNESCO (2025), in a report on inclusion in Technical, Vocational Education and Training (TVET), indicates that many young people do not have access to education due to attitudes towards inclusion of those who are marginalized, including people with disability. Educators also indicated that they required additional training in teaching learners with special educational requirements. To reach the largest number of trainees and ensure training is relevant in a rapidly changing technological world, it is necessary to use a range of appropriate educational approaches to learning in Technical, Vocational Education and Training (TVET) institutions (Kanwar et al., 2019).

Open and distance learning (ODL) refers to distance education that aims to address barriers that might be experienced by participants, including financial, age, disability and geographical barriers.

The term 'open' means that any participants can access the learning as it is readily available, usually online and free of cost. Distance learning involves educators and trainees being in different places or working at different times during the learning. Distance learning may use a variety of media types for the delivery of the training and can also involve face-to-face meetings and learner interaction with each other as additional teaching approaches (Commonwealth of Learning (COL), 2023). Blended learning relates to training which may include face-to-face training, workplace learning, and online environments, or a combination of face-to-face and online learning (COL, 2023). Open, distance and blended learning may support people with disabilities to access learning opportunities more readily than face-to-face training alone.

Assistive technology (AT) refers to "refers to tools and technologies that assist with full participation of an individual in various activities, including, but not limited to learning" (COL, 2023, para. 6). The integration of AT into open, distance and blended

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environments within Technical and Vocational Education and Training (TVET) institutions is critical to enhancing accessibility for learners with disabilities and is one way that TVET can become more inclusive (UNESCO, 2025). The use of AT in TVET is recognized as a strategy that aligns with a Universal Design for Learning (UDL) approach (CAST, 2025). Not only does AT support the trainees to access the classroom or workshop, but it promotes independence, improves learning outcomes and skill development, and increases graduation rates (Chambers & Okinda, 2022; Fichten et al., 2020). To realize these benefits, educators at TVET institutions must be provided with appropriate professional development on assistive technology and be supported to embed it in open, distance and blended learning (UNESCO-UNEVOC, 2021).

Initial work conducted on the use of AT in TVET open and distance learning in 2021 and 2022 laid the foundations for the development of a pilot AT course delivered to TVET instructors across five countries in Africa and the Caribbean. The current project addressed the need for structured, evidence-based guidelines to support the use of assistive technology in open, distance and blended delivery by TVET institutions across Pan-Commonwealth countries, beginning with focused fieldwork in Kenya and Zambia. The fieldwork involved working with four TVET institutions in identifying areas of need while addressing further knowledge and understanding through open workshops. The research questions were:

1. What is the current usage and awareness of AT in open, distance and blended learning within selected TVET institutions in Kenya and Zambia?
2. What are stakeholders (educators, administrators, policymakers, technical teams) perceptions of their competence and confidence after receiving training in AT for open, blended and distance learning?

Research Design

A qualitative, symbolic interactionist approach was used to assess the current use and awareness of assistive technology (AT) in open, distance and blended learning in TVET in four institutions (two in Kenya and two in Zambia). Symbolic interactionism means that the researcher studies people's behaviour with an emphasis on the social process and actions that they take (van den Scott, 2019). People's behaviours demonstrate their understanding

of the world and how meaning is socially constructed. As the AT training is a group activity, symbolic interactionism is an appropriate choice of lens through which to view the participants interaction with AT.

Interviews and discussions with key stakeholders were key forms of data collection. Questionnaires provided at the completion of each training activity provided information into the training requirements, perception of competence, and confidence of participants, post training. In addition, researcher observations of AT and other technology at the institutions supplemented the interviews, along with tours of the institutions.

Participants

The primary participant focus for this project was TVET institutions in Kenya and Zambia. Four institutions were selected by Commonwealth of Learning (COL) staff to receive training via AT workshops, and provide information around AT use and blended, open and distance learning in the institutions. The stakeholders who were targeted during the project included administrators/ policymakers, technical teams, and educators/lecturers who worked at a TVET institution in the target countries. The institutions were:

- Sigalagala National Polytechnic (SNP - Sigalagala, Kenya)
- Machakos Technical Institute for the Blind (MTIB - Machakos, Kenya)
- Technical and Vocational Teachers College (TVTC - Luanshya, Zambia)
- National Vocational Rehabilitation Centre (NVRC - Ndola, Zambia)

Sigalagala National Polytechnic (SNP; 2025) was founded in 1950 as a Technical and Vocational Training Institute. In 2016 SNP was made a National Polytechnic by the government. SNP has courses at certificate level, diploma level and higher diploma level in areas such as hospitality, engineering, science and business. One of the elements of the current strategic plan involves the development and implementation of technology-based courses in collaboration with local universities.

Machakos Technical Institute for the Blind (MTIB; 2019) was established in 1958 to provide training in craft skills for people who had been injured during the war. It began training in orientation and mobility, braille, handcrafts, and telephony to male trainees. Female trainees were admitted in 1978 and knitting and garment making courses were

introduced, MTIB serves people with visual impairment in the East and Central Africa area in rehabilitation, habituation and technical and vocational courses. People who are sighted can also access technical and vocational courses at the institution.

The Technical and Vocational Teachers College (TVTC; 2021) was established in July 1975 to provide Vocational Teacher Education. In January 2000 TVTC was established as a management board through the Technical Education, Vocational and Entrepreneurship Training Act No. 13 of 1998. The College is an affiliate of the University of Zambia (UNZA) and Copperbelt University (CBU). TVTC offers programs in English, Mathematics, Business Studies, Design and Technology, Teaching Methodology, Civic Education, Special Education, Counselling and Sciences such as Chemistry, Biology and Physics both at diploma and degree level. The College offers programmes in Full Time, Open and Distance Learning and Short Course modes.

The National Vocational Rehabilitation Centre (NVRC; n.d.) offers vocational training to people with and without disabilities. It provides courses in metal fabrication, design tailoring, ICT, hotel management, machining, electronics, general agriculture, secretarial and office management, short computer courses, and computer maintenance and software installation.

In all institutions, the principal provided background on the institution and the AT that was used by staff and trainees during a discussion with the researcher. During the workshops each of the key stakeholders were asked to provide relevant information in relation to AT use and general technology availability in each institution from their perspective. In addition, a visual audit, including photographic evidence, of the technology that was available was undertaken by the researcher, in most of the institutions (Machakos, Sigalagala and NVRC).

Method

The three-month project was implemented in stages, including interview and questionnaire development, field visits, data analysis and drawing conclusions. The researcher designed an interview protocol for the principal of each college to assess use and awareness of assistive technology in the targeted TVET institutions (see Appendix A). The researcher then drafted a short training module on AT integration in open, distance and blended learning in TVET, based on previous training modules and expert knowledge. The training module incorporated

flexibility to ensure reference was made to the local contexts of the participants. For example, at the Machakos Technical Institute for the Blind, additional tools for people who have low vision were incorporated.

Over a one-week period, the researcher conducted interviews with principals in each of the four institutions. One interview was held online (via Zoom) with the head of Machakos Technical Institute for the Blind, due to a lockdown on the specified day of the visit because of civil unrest. The visit to this institution was rescheduled and undertaken at a later stage. Targeted observational assessments of the existing technology and assistive technology use in the institution were conducted where there was opportunity and access.

In-person training workshops, tailored to local needs where appropriate, were delivered at each of the four institution sites. Participants from other nearby institutions attended during training at Sigalagala National Polytechnic, due to the efforts of one of the administrative staff who sent invitations. Post-training questionnaires were provided for participants at the conclusion of each training session (see Appendix B) and collected before departing the site. Data were then entered into an Excel spreadsheet to allow for analysis.

Data Analysis

Upon return from visiting the TVET institutions, thematic analysis of the interviews with the principals and any field data, including observations of technology and assistive technology use, were undertaken. Thematic analysis in this study involved identifying and analyzing patterns in qualitative data (Braun & Clarke, 2020). There are six phases of analysis that were undertaken. These phases were familiarization with the data, generating initial codes, generating themes, reviewing potential theme/s, defining and naming theme/s, producing the report/paper (Byrne, 2022). Thematic analysis provided an overview of the participants' understanding of the use of AT in open, distance and blended TVET and provided insight into participants' views on any additional systemic considerations and support that they believe is required.

Results

The four workshops were attended voluntarily, with the principal of each institution inviting staff to join. Participants from a wide range of teaching

fields/roles attended the workshops, including participants from health sciences, hospitality and tourism, business, education, computing and informatics, food production, rehabilitation, industrial arts, agriculture, career services, ICT, applied science, design and technology, open and distance learning coordinators, and entrepreneurship. The researcher had a conversation with each Principal either prior to the training or towards the end of the visit to the institution. At the beginning of each workshop, participants were asked to address questions in groups that were designed to elicit information about their current practices, including the use of AT. At the conclusion of each workshop, participants were asked to complete a questionnaire on their knowledge, use and intended use of AT. Each of these data collection measures will be reported on below.

Principal Interviews

Sigalagala National Polytechnic in Kenya has a large number of students (approximately 17,500, many who live close by), 360 staff and 50 trainees with disabilities. They also offer a wide range of courses including daycare, mechanical (automotive), bakery, nursing, electrical, business and construction, to name a few. In relation to assistive technology, the principal stated that the Polytechnic offered individuals with disabilities supports such as a loan of a computer, JAWS software, and NVDA (free software for vision impairments). They also use white canes, large print and magnifiers for trainees who have a vision impairment. For those who have a hearing impairment, visual aids are provided such as the use of the blackboard. The lecture rooms generally had ramps to accommodate trainees with physical impairment, and chairs to support different needs (it was not specified what types of chairs). It was also stated that approximately 90% of the students have access to smart phones. In relation to learning for trainees with a disability, slow writing was noted as a difficulty. Areas of concern around assistive technology were noted as cost and training (knowing how to use them), particularly in relation to braille devices and talking devices (such as a talking calculator).

The Machakos Technical Institute for the Blind in Kenya hosts approximately 300 students. Currently one hundred students have a disability – ninety-five have vision impairment and five have a physical disability. Trainees with vision impairments have access to computers that are enabled with software

such as JAWS and NVDA and can listen to content via headphones. Orbit readers are also offered to support trainees. As MTIB was originally established as a rehabilitation center for soldiers who had been injured in war, they retain some of the facilities in the Rehabilitation section. Trainees who have a visual impairment are generally introduced to, and learn how to use, the AT first before progressing to learning about individual subjects. While online learning is not yet available, it is something that is being considered and a system for supporting online learning is being investigated. Some concerns were expressed around the need for increased availability and use of AT in the institute, including computers. Since the collection of this data, MTIB has implemented a new computer lab with associated AT available to students. Funding was also noted as being an ongoing consideration as were challenges with stability of internet connections.

There are approximately 2,500 fulltime students at the Technical and Vocational Teachers College in Luanshya, Zambia, and 15 of those students have identified disabilities. In addition, there are 3,000 open and distance learning students and 10 of these students have disabilities. Open and distance education is taught using the Moodle platform, although it was not known by the principal if the accessibility features in Moodle were available for the students. There is a team who is trained in special education to assess student needs and adapt the curriculum where necessary. One staff member was also trained in inclusive education. TVTC has many computers available to students, with 100 in one room, 50 in another room and 40 in a third space. These computers can access the standard accessibility features found on all devices, such as changing the font size and screen display. The principal noted that the government had updated policies to move towards inclusive education and that further development was required in the college to achieve some of the goals of the policy. Challenges included the cost of additional resources and ensuring power supply was constant.

The majority of the 167 trainees at the National Vocational Rehabilitation Centre in Ndola, Zambia, live on site and have disabilities. The types of disabilities include physical impairments, intellectual disability, cerebral palsy, hearing impairment, visual impairment and dyslexia (learning disability). The centre offers a range of courses including general agriculture, secretarial and office management, food production, fashion and textiles, metal fabrication

and electronics. Some of the AT identified as being used in the NVRC included picture cues and a braille embosser. Trainees mainly use smartphones to provide accommodations, although not all trainees have access to a phone or can afford a contract (only 60–70% can access). For students with vision impairment there is a computer lab with 5 computers that run JAWS software. The remaining 55 computers in two labs do not have the JAWS software loaded due to cost of the software. There is limited online learning and most of the training is conducted in face-to-face mode. Some of the barriers identified included learner access to computers, internet speed challenges, and a lack of training on how to use AT.

Participant Pre-Training Questions

At the commencement of each of the workshops, participants worked in groups of between two and four, depending on the overall group size, to answer three questions:

1. What teaching strategies/ pedagogies do you use with trainees?
2. What tools or technologies have you used that have worked well? Why?
3. What tools or technologies have you used that didn't work? Why?

Each group was provided with a large sheet of paper and pens to record their responses. Many of the groups had a variety of teaching areas (i.e., fashion/textiles, fabrication, sciences, food) represented within each group. A total of 71 participants attended the workshops (SNP– 20; MTIB– 7; TVTC– 30; NRVC– 14). Analysis of the questions required that the researcher compile all the answers and determine consistent themes across the responses.

For question one, participants stated that they used a range of pedagogies with the trainees including lectures, group work, working in pairs, one-on-one instruction, direct instruction, demonstration and problem/inquiry-based learning. The most popular pedagogy noted by almost all groups was the lecture, followed by demonstration. Some of the participants also noted practical activities such as study tours as pedagogies used.

When addressing question two, the tools and technologies that participants indicated worked well in the classroom when teaching all students were wide ranging, and included computers/laptops, mobile phones, projectors, smartboards, JAWS/NVDA, talking calculators, Orbit readers, hearing aids, magnifying glasses, eyeglasses, white canes, braille

machines, digital tools (i.e., LMS, Zoom, Google meet, WhatsApp) and using real/concrete objects. Some tools that were specific to a teaching area (i.e., sewing machine, welding tools) were also noted. The most popular responses were phones and projectors, mentioned by most participant groups. Reasons for why these tools worked centered around the ease of access and availability of the tools and in one case, the portability of the tools.

When asked about tools that did not work well (question three), fewer responses were noted. The participants indicated that the tools or technologies that did not work well for them included Orbit reader, smart phones, internet, JAWS, projectors, Zoom, braille displays, old computers and sign language. Once again, there was also mention of course specific tools such as manual sewing machines, soldering irons and old typewriters. Reasons for the tools not performing as needed included cost of purchasing, licensing and maintaining tools or devices; poor or intermittent internet connection; power challenges (unreliable); limited access (i.e., to computers after hours); or that it does not work appropriately. Additional reasons included low literacy levels among trainees or that the person had limited knowledge of the tool.

Participant Post-Training Questionnaire

All participants were asked to complete a post-training questionnaire. Fifty-five complete questionnaires were received, either as a paper copy or via an online link. Paper copies were input into the online Google form to compile all responses in one location for analysis. There were a varying number of participants in each institution, and the greatest number of responses were provided by the participants from Zambia with the Technical and Vocational Teachers College (Luanshya) providing 50.9% of total responses, followed by the National Vocational Rehabilitation Centre (27.3%). Sigalagala National Polytechnic and Machakos Technical Institute of the Blind in Kenya both had 10.9% each of the overall responses. The questionnaires were divided into sections which were: years of teaching experience; knowledge and understanding; application and practice; and reflection and needs. A section was also provided for any additional comments from participants.

In relation to years of teaching, many trainers had more than 10 years' experience (67.3%). Those with three to five years teaching experience (9.1%)

and six to ten years teaching experience (9.1%) were the smallest groups. There were 14.5% of participants with zero to two years teaching experience, indicating relatively new trainers in TVET.

Participants were asked to indicate agreement with several statements provided by the researcher. The statements ranged from knowledge of AT, selection of AT, identification of trainees requiring AT, integration of AT into their teaching, and confidence in supporting the use of AT. A five-point Likert scale was provided, and participants could select strongly disagree, disagree, unsure, agree or strongly agree in relation to each statement.

There was strong agreement or to the statement concerning knowledge and understanding of AT and its role in inclusive education in TVET (Figure 1), with 44 participants answering that they strongly agreed (n=32) or agreed (n=12) with the statement. This outcome is consistent with the training that had just been provided in this area. Nine participants were unsure, and two participants strongly disagreed with the statement, however, no additional comment was provided as to why they felt this way.

Figure 1. *Participant Self-Report of Understanding of AT*

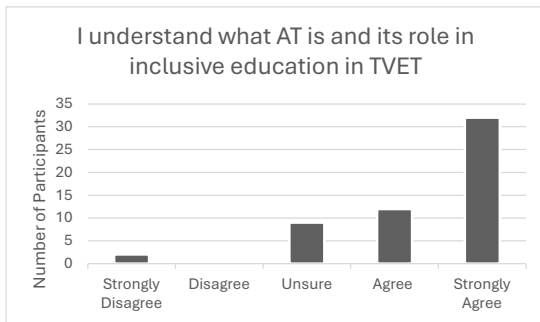


Figure 2 displays the results obtained when participants were asked to report on their awareness of the different types of assistive technology that may be used in open, distance and blended education in TVET. Once again, there was strong agreement (n=26) and agreement (n=15) in relation to awareness of AT, although there were others who were unsure (n=13) and only one person who strongly disagreed. Knowledge of a variety of AT is required to ensure that all students' needs can be met effectively.

Participants were then asked to rate their ability to identify trainees who may benefit from using AT in open, distance and blended TVET. Figure 3 displays these results. Participants were generally quite certain about their ability to identify

trainees needs, with 47 indicating that they strongly agreed (n=34) or agreed (n=13) with the statement. A few participants were unsure (n=6) and two participants either disagreed (n=1) or strongly disagreed (n=1) with the statement. Confidence in identifying the needs of the trainees is very promising and indicates that the participants may be well equipped to address the needs of individual trainees who require AT.

Figure 2. *Participant Self-Report of Awareness of AT*

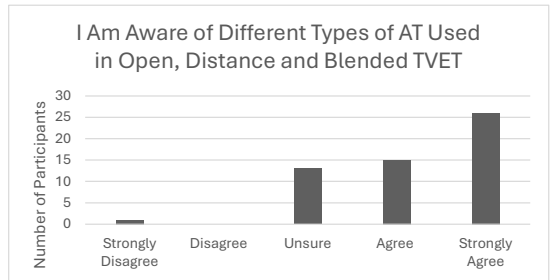
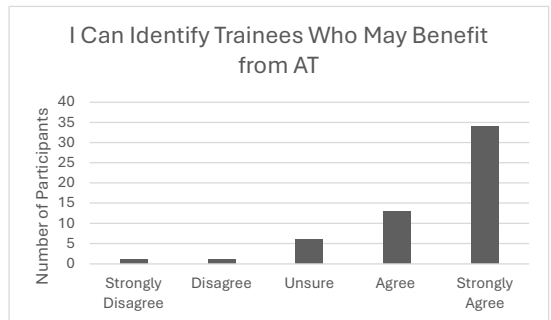
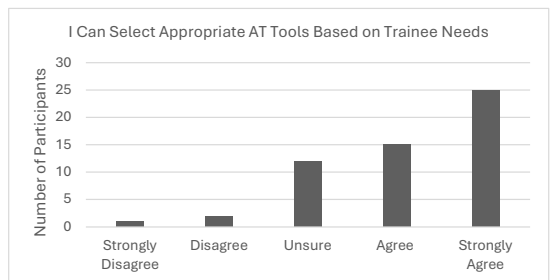


Figure 3. *Participant Self-Report for Identifying Trainees Requiring AT*



When asked about being able to select AT tools based on trainee needs, many participants indicated that they were able to select tools appropriately (see Figure 4). Twenty-five (n=25) strongly agreed with the statement, while 15 agreed. Twelve (n=12)

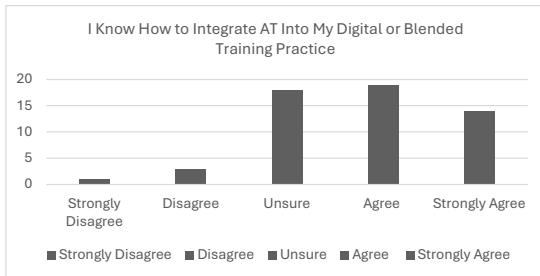
Figure 4. *Participant Self-Report on Selection of AT*



participants were unsure about their ability to select appropriate AT. Two participants strongly disagreed with the statement, and one strongly disagreed, indicating a lack of confidence in being able to select AT that meets trainees' needs.

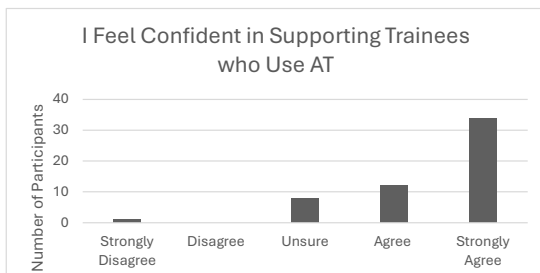
Participants had mixed responses when asked about their ability to integrate AT into their digital or blended training practices (Figure 5). In contrast to previous responses, the participants had an overall lower level of confidence in integrating AT in practice, with fewer participants strongly agreeing (n=14) with the statement than for previous questions. Many participants (n=19) suggested they agreed with the statement or were unsure (n=18). Three participants agreed with the statement, and one strongly disagreed, indicating that they were not at all confident about integrating AT into their digital or blended learning. Further learning, including application exercises, would potentially address some of the concerns.

Figure 5. *Participant Self-Report on Integration of AT into Practice*



The next statement asked participants to rate how confident they felt in supporting trainees who use AT (Figure 6). A majority of the participants indicated that they strongly agreed (n=34) or agreed (n=12) with the statement, indicating confidence in supporting students who use AT. Only one participant

Figure 6. *Participant Self-Report on Confidence for Supporting Trainees who Use AT*

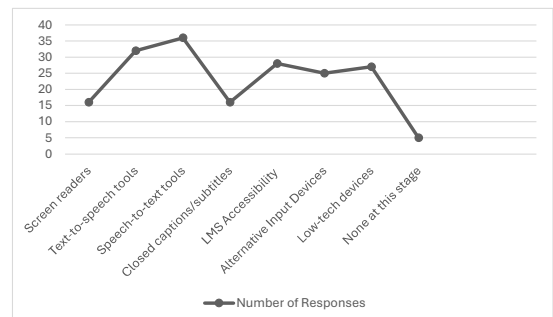


indicated that they strongly disagreed with the statement. These results are promising for the use of AT in the classroom.

Participants were asked to indicate their confidence in using a variety of types of assistive technology in their teaching (see Figure 7). They were most confident in using speech-to-text tools (65.5%) and text-to-speech tools (58.1%). Just over half of the participants were confident in using learning management systems (LMS; 50.9%), and just under half were confident with low-technology devices (49.1%). Many participants also stated that they were confident using alternative input devices (45.5%). A similar small number of participants were confident in using screen readers and closed captions/subtitles (both 29.1%). Four of the participants (7.3%) indicated that they were not yet confident in using any of the assistive technology tools.

When asked if they had used AT previously, 67% (n=37) stated that they had applied AT in their teaching or planning. The types of AT used included: screen readers (i.e., JAWS, NDVA), text-to-speech, Natural Reader, 3D objects, video content, speech-to-text, computers, magnifying glass, voice control and generative AI. Participants were then asked to indicate whether they felt comfortable using AT with trainees and most answered yes (n=39) with only one respondent stating no. The remainder of respondents suggest that they felt somewhat comfortable (n=15). An additional question asked participants to elaborate as to why they only felt somewhat comfortable. Responses for this question included not having enough experience with people with disabilities, poor access to AT (expensive/not available), a challenge to apply AT in their context, additional training required, more time needed to put training into practice, yet to have used the AT in teaching, and a lack of confidence. One participant

Figure 7. *AT that Participants are Confident in Using*



stated that the workshop had given them the confidence to use the AT.

The participants indicated that overall, the training was very useful, highlighting low tech AT and knowledge about blended learning as being important. Areas where participants indicated they required further support included accessing assistive devices; integration of assistive technologies in teaching and learning; training in identifying trainees who may benefit from assistive technologies; closed captions/subtitles in video content; Google Chrome apps and extensions; creation of content for online learning for VI; AI assistive technology; and high-tech AT. All but three of the participants were prepared to adapt their training to support inclusion in open, distance and blended learning. One participant who was somewhat prepared, suggested that they lacked the appropriate technologies to use with learners.

A final question asked if participants had any further comments or suggestions. A common theme throughout the comments was the need for additional, ongoing training to address emerging issues and to further upskill staff. One participant stated it was necessary to "...organise for more of such trainings as a way of upskilling to cater for the emerging issues related to special needs training". Another requested "More frequent training to better equip trainers to handle students with disabilities". A third respondent said "There is need for us to be updated with latest innovations that are being discovered. Also to be invited to such kind of innovative workshops and training".

Many participants commented on the usefulness of the training for their needs. One participant found that "This program was very educative, and we are willing to start using this assistive technology", while another stated, "The training was very educative and interesting. I learnt new stuff and tools I had never seen. Thank you so much for your time". A third felt that "It was a great presentation, easy to follow, I was able to learn so much in so little time". While others felt that training was useful, they also stated that it required them to practice further to become more familiar with the AT, although this could be difficult if the AT was not available. For example, one participant stated, "I shall definitely need more practice to incorporate tools and technologies to cover more disability groups. Wider reading and formal training are needed. Appreciate your training". Another suggested that "I lack exposure, there is need to interact with other colleagues in the

same area handling persons with visual impairment. Need to exchange notes with other trainers with vast experience". Along similar lines, one participant noted "practical implementation of trained skills sustains learning and continuous improvement which is limited by lack of adequate resources".

Another theme in the responses was in relation to sharing of knowledge and resources and capacity building. One person shared that they felt the institution needed a "...special needs trainer who will champion usage of [AT] tools". Another believed that "...inclusive education should not only end at tertiary level but employers, especially CEOs, should be educated on the disability inclusion". A third respondent shared that "It is important that such information should be frequently shared so that more people should understand how to help people with disabilities".

Discussion

The participants in the workshops were generally able to identify some assistive technology that was used in their teaching practice, although this was often limited to consumer technologies such as smartphones and projectors, which were widely available. This finding was not unexpected as increasing use of smartphones is evident in all countries, although it is higher in Kenya, where mobile phone connections greatly outnumber the population (118%; Geopoll, 2025), than in Zambia, where the uptake of mobile devices is slightly lower (108%; Statista, 2025). In a review of the literature on portable technology, such as smartphones, Collins and Collet-Klingenberg (2018) identified many benefits of this technology for people with disabilities, including portability, accessibility and independence; all of which are vital for TVET.

Additional technologies that were identified by the participants generally related to trainees with vision or hearing impairment, with an occasional reference to trainees with physical impairments. After training, participants were able to identify a broader range of AT and reported a good understanding of AT and the different types of AT available, including low-tech and high-tech. Most of the participants felt able to select tools based on the student needs, although more training would be useful in this area.

While participants felt confident in supporting trainees who use AT, they were much less confident about integrating the AT in blended or digital practices, indicating the need for further examples of how to apply their knowledge to these learning

environments. Ongoing training which builds on the initial training provided would ensure that educators developed the skills and confidence to use AT in a wide variety of settings. Massey et al. (2023), when discussing training of staff at a vocational training center, suggest that a training series, where each session builds on the previous session, can help with embedding evidence-based practices for supporting trainees with disabilities. Ongoing training in AT would be useful for all educators in TVET. The World Bank (2023), when investigating TVET in Zambia also stressed the need for ongoing investment in digital skills and pedagogical skill training for educators.

The assistive technology that most of the participants were confident in using included the technologies with which they were most familiar. These technologies included speech-to-text and text-to-speech, learning management system accessibility features, and alternative input devices such as adapted keyboards and mouse controls. Fewer participants stated they were confident with other types of AT including screen readers, closed captions, and using subtitles in video. These AT are those which are beneficial in blended and distance learning. While not focused specifically on AT, Antonietti et al. (2022) found that Swiss VET teachers' beliefs around the skills that they need to integrate technology in TVET is significantly related to their perception of the usefulness of the technology and their intention to use it. Educators who have higher confidence in using the technology, and see a clear purpose for its use, are more likely to implement it effectively in their teaching practice. The participants suggested reasons why they may have only felt somewhat comfortable in using AT with trainees with disabilities and all responses could be addressed with additional, ongoing training and support for the educators. They were very open to additional training, having appreciated what was already provided.

An area of concern voiced by all Principals of the TVET institutions was related to inadequate funding for AT. This perspective is supported by a recent report from Timely Kenya (2025), which indicated that funding and equipment shortages were the most frequent challenges for TVET institutions. In Zambia, a World Bank (2023) report focuses on the need for substantial investment and strengthening of the TVET sector to re-engage youth and support economic development in the country.

Other areas that were noted as being challenges

for the use of AT included poor internet connections which are slow, or drop-out frequently, lack of access to computers (in some of the sites), and difficulties with power supply affecting the use of devices. UNESCO- UNEVOC (2021), in a report on TVET for disadvantaged youth, state that financial barriers were significant in being able to access resources such as access to technology at home. Internet connections and power considerations are generally beyond the control of the TVET institutions and require attention at a governmental level.

Further research on AT in TVET open, blended and distance learning could include the voice of trainees with disabilities as there is limited information about their experiences from the individual's point of view (Ripat & Woodgate, 2017), particularly in low-middle income countries. In addition, the participants of the current study suggested that champions of AT in the TVET institution would be beneficial for the development of educators' skills in utilizing AT, another area of potential exploration.

Conclusion

This research outlines an evidence-informed approach to identifying AT currently being used in TVET institutions in Kenya and Zambia and some of the challenges faced by educators and institutions in using AT. Awareness of AT was generally good, although this can be enhanced through further instructor and trainee interaction with the AT and ongoing training. Of particular importance is the need to instruct educators on how to use the AT in online and blended learning so that trainees with disabilities can gain the most out of the teaching experiences. The project demonstrated that ongoing training in AT is an important consideration for the inclusion of trainees with disabilities to ensure that they can be successful in pursuing appropriate skill development which will ultimately lead to better employment outcomes. Through direct engagement with institutions in Kenya and Zambia, the project generated valuable insights into AT tools that may be used across other nations to foster equity and inclusion in TVET education.

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APPENDIX A

Interview Questions – TVET Administrators

Initial Statement

Thank you for meeting with me today. The project I am undertaking with the Commonwealth of Learning (COL) aims to identify and examine the use of technology, particularly assistive technology, in TVET institutions. This information will ultimately be used to help with developing some guidelines for TVET institutions to incorporate assistive technology when teaching in both face-to-face, online and blended modes. As you are an administrator, your opinions are very important to this project. Please do not hesitate to ask any questions if you have any concerns or queries. I would like to audio tape the session for my own records only and it will not be shared with anyone else. Is this ok with you?

1. What technology is commonly used in your institution?
Prompts – is this used every day, occasionally? Are there some areas/fields that use more/less technology? Why?
2. Does the institution use an online or distance learning mode with trainees?
Prompt – When is this mode used? What technology is involved?
3. What, if any, training is provided to lecturers and trainees to use the technology?
Prompt – when is the training available (i.e., on demand, once a year, etc)?
4. Who is responsible for technology use and maintenance in your institution?
Prompts – how often is the technology replaced? Are current technologies accessible?
5. How many trainees with disabilities are at your institution? What types of disability do they have?
Prompts – Do they bring their own technology, or use what is at the institution?
6. Please tell me what you understand by the term 'assistive technology'.
Prompts – do trainees with disabilities use assistive technology?
7. What assistive technology does your institution use or promote for trainees with disability?
Prompts – do they bring this from home or is it provided at the institution only?
8. What benefits do you see when trainees with disabilities use assistive technologies?
Prompts - Are they better able to access the content? Can they complete assignments/tasks easier?
9. What barriers exist for the use of assistive technology at your institution?
Prompts – are there any physical barriers, financial barriers, cultural barriers, access barriers?
10. Is there any further information you would like to share about technology and assistive technology use at your institution?

Thank you for your time in responding to the questions, it is greatly appreciated. If you feel that there is anything further you would like to contribute, please do not hesitate to contact me.

Appendix B

Post-Training Questionnaire on the Use of Assistive Technology in Open, Distance and Blended Learning within TVET

Instructions:

Please complete the following questionnaire to help us assess your knowledge, confidence, and readiness to use assistive technologies in open, distance and blended learning environments. Your responses will guide future support and development.

Section A: Background Information

1. Name (optional): _____
 2. Institution:
 - Sigalagala National Polytechnic
 - Machakos Technical Institute for the Blind
 - Technical and Vocational Teachers College Luanshya
 - National Vocational Rehabilitation Centre
 3. Department/Faculty: _____
 4. Years of teaching/training experience:
 - 0-2 3-5 6-10 10+
-

Section B: Knowledge and Understanding

Please indicate your level of agreement with the following statements:
(1 = Strongly Disagree | 5 = Strongly Agree)

Statement	1	2	3	4	5
I understand what assistive technology is and its role in inclusive education in TVET.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am aware of different types of assistive technologies used in open, distance and blended learning.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can identify trainees who may benefit from assistive technologies.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can select appropriate assistive technology tools based on trainee needs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I know how to integrate assistive technology into my digital or blended training practice.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel confident in supporting trainees who use assistive technologies.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section C: Application and Practice

5. Which of the following assistive technologies are you confident using?
(Tick all that apply)
 - Screen readers (e.g., NVDA, JAWS)
 - Text-to-speech tools (e.g., NaturalReader)
 - Speech-to-text tools (e.g., Google Voice Typing)
 - Closed captions/subtitles in video content
 - Learning Management System accessibility features
 - Alternative input devices (e.g., adaptive keyboards, switches)
 - low-tech devices (e.g., page holders, reading windows)
 - None at this stage

 6. Have you already applied any assistive technology tools during your training practices or planning?
 - Yes No
 If yes, please provide an example: _____
-

Section D: Reflection and Needs

7. What aspects of the training were most useful to you?

8. What areas do you feel you need more support or training in?

9. Do you feel confident in your ability to use assistive technologies to support trainees with disabilities?
 - Yes No Somewhat (please explain): _____

10. Are you prepared to adapt your training practices to support inclusion in open, distance and blended learning contexts?
 - Yes No Somewhat (please explain): _____

11. Any additional comments or suggestions?

Assistive Technology Use in Open, Distance and Blended Learning within TVET in Kenya and Zambia

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本稿では、ケニアとザンビアの技術・職業教育訓練（TVET）機関で実施された研修事業について解説する。本研修事業では、公開学習、遠隔学習、ブレンド学習における支援技術（AT）に関する教育者の認識と活用状況を調査し、質的かつ象徴的相互作用論的アプローチを用いて調査した。研修前後で教育者が熟知していたATの種類を特定するために、同様の方法を用いた。この研修は、ローテクからハイテクまでATおよび関連トピックの概観を提供し、障害のある研修生を支援するためにオンライン学習やブレンド学習にATを含めるためのいくつかの原則を紹介することを目的として設計された。この研修事業では、4つの訓練機関（ケニア2機関、ザンビア2機関）の校長へのインタビュー、グループ学習における参加者の記述式回答、研修後のアンケートを用いてデータを収集した。その結果、TVETの教育者はATについてある程度認識していたものの、授業で活用しているATの種類は限られていたことが示された。研修後、予想通り、教育者はより幅広いATに対する認識と理解を深めた。そして、校長と教育者双方が、インクルージョンとATに関する継続的な研修を実施し、この分野のスキルをさらに向上させる必要があることを認識するようになったことも分かった。ATの利用に影響を与える可能性のある課題としては、ATへのアクセス機会の不足、財政的制約、インターネット接続の不安定さ、不安定な電力供給などが挙げられる。この研修事業は、障害のある研修生が適切なスキル開発を成功させ、最終的により良い雇用成果につながるためには、ATに関する継続的な研修がインクルージョンにおいて重要な考慮事項であることを実証した。

キーワード：支援技術 TVET 技術職業教育訓練 障害 AT

