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**Building Assistive Technology (AT) competency in academic librarians:
Perceptions of library personnel and students with visual impairments from three
Zimbabwean universities**

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Abstract

This qualitative study reflects on the perceptions of library professionals and students living with visual impairments from three Zimbabwean universities about the need for and ways of creating Assistive Technology (AT) competency in academic librarians. Some of the measures that may be used to increase the

AT competencies of academic librarians are discussed. Semi-structured interviews were used to collect data from 19 participants comprising 13 library personnel and six students living with visual impairments. The study highlights important types of AT for individuals living with visual impairments, emphasises the importance of competencies in AT for academic librarians and suggest appropriate measures for enhancing the AT skills of academic librarians in the context of participants' views. It is hoped that the study's recommendations will generate an urgent need to address AT competencies of academic librarians to drive effective adoption and usage of AT in the studied institutions of higher learning.

Keywords: assistive technology, assistive technology competence, academic libraries, assistive technology and disability, people living with visual impairment, assistive technology education and training

Introduction

Assistive Technology is widely acknowledged as a critical component in helping individuals with disabilities to live independently, carry out daily tasks, and actively engage in social activities (Tripathi and Shukla, 2014; Smith *et al.*, 2018). Assistive technology (AT) refers to technology that is used by people with impairments to do tasks that would otherwise be difficult or impossible (Kumar, 2013). It is well acknowledged that AT improves the lives of individuals living with visual impairment (Alnahdi, 2014; Clouder *et al.*, 2019; McNicholl *et al.*, 2021). AT empowers people with disabilities by reducing barriers and allowing them to participate more fully in developmental, educational, social, recreational, and vocational activities. Students with visual impairments in higher education settings rely on AT to access information and engage in a range of academic activities (Ahmad, 2015). As the case in other countries, the number of students with disabilities in Zimbabwe's higher education has been increasing (Majoko, 2018, 2019). Given that access to AT in universities is mainly through library facilities (Malcolm and Roll, 2017), academic librarians are expected to be at the

forefront in promoting effective access to and use of AT by students with visual impairments to improve their educational experience. To maximise the benefits of AT for people who are visually impaired, academic librarians who work with these students in higher education settings must be proficient in utilising and implementing AT. The new National Disability Policy (NDP) for Zimbabwe that was launched in June 2021 recognises the importance of training staff that works with persons with disabilities in the use of assistive devices for persons with disabilities (National Disability Policy (Zimbabwe), 2021).

Competency in AT is seen as a critical component for facilitating access to suitable assistive devices and ensuring their efficient usage by the intended users (Holloway *et al.*, 2018; Smith *et al.*, 2018; Tangcharoensathien *et al.*, 2018). Views on the concept of competence differ (Ellstrom and Kock, 2012). Based on Kirongo *et al.* (2019), competence is viewed as “a set of knowledge, skills, behaviours, and attitudes related to task success or failure”. In this study, AT competency refers to the knowledge and abilities necessary for personnel to integrate and deliver AT products, services, supporting systems, and appropriate processes. One of the primary challenges to the successful adoption of AT is a shortage of skilled personnel, which is constantly cited across the literature (Abner and Lahm, 2002; Copley and Ziviani, 2004; Zhou *et al.*, 2012; Ajuwon *et al.*, 2016; Holloway *et al.*, 2018; Smith *et al.*, 2018). As a result, more research is needed to reduce impediments to the effective deployment of AT in low and middle-income countries like Zimbabwe, where only 5-15% of individuals who need AT devices have access to them (Matter *et al.*, 2016).

Statement of the problem

AT competency is considered a crucial component for allowing access to appropriate assistive devices and ensuring that they are used effectively by the intended users (Holloway *et al.*, 2018; Smith *et al.*, 2018; Tangcharoensathien *et al.*, 2018). Trained personnel are necessary for assessing the need for and prescribing appropriate assistive products, as well as perform related support services (Khasnabis, Mirza and MacLachlan, 2015). With access to AT still a

global challenge, students in higher education primarily access AT through library facilities (Malcolm and Roll, 2017). Given that enrolment of students with disabilities in higher education is increasing (Kendall, 2016; Majoko, 2018), academic librarians must have expertise in AT to meet the requirements of students with visual impairments and enhance inclusive education.

It is worrying that prior research highlight the scarcity of librarians with appropriate skills in AT and AT-related services (Munemo and Tom, 2013; Rugara, Ndinde and Kadodo, 2016; Chimhenga, 2017). Apart from literature, personal experience of the first author of this article as a client services librarian at one of Zimbabwe's university libraries from 2012 to 2019 revealed that the bulk of library staff is not sufficiently trained to provide AT services to students with visual impairments. A study interrogating academic librarians and students with visual impairments about the importance of AT competency, and measures to build AT competency in academic librarians can be an excellent starting point to address this issue from a developing country perspective.

Purpose of the study

This study focuses on library personnel and students with visual impairments from three universities in Zimbabwe to explore the need for and appropriate measures to build the competencies of academic librarians in AT.

Objectives of the study

The objectives of the study were to:

- Investigate the perceptions of research participants on the need for professional AT training of academic librarians;
- Establish the crucial training areas in which the librarians in this study feel they need training to improve their AT knowledge and skills; and,
- Determine which strategies participants in this research find most useful to improve the AT skills of academic librarians.

Research questions

The research questions of the study were as follows:

- What are the perceptions of research participants on the need for professional AT training of academic librarians?
- What are the crucial areas in which the librarians in this study feel they need training to improve their AT knowledge and skills?
- Which strategies do participants in this study find most helpful in enhancing the AT skills of academic librarians?

Literature review

At an international level, the rights of persons with disabilities are primarily addressed through the Convention on the Rights of Persons with Disabilities (CRPD). The CRPD represents a paradigm change from a social welfare response to a human rights-based approach to disability (Manatsa, 2015). Under the CRPD, persons with disabilities are no longer seen as objects of charity or as people in need of social or medical help, but as individuals with full rights and entitlements. At a national level, the National Disability Policy for Zimbabwe (2021) articulates the need for capacity building and continuous professional development in assistive devices of personnel that works with persons living with disabilities.

Students with visual impairments are challenged to use some kind of AT devices to access information and participate independently in academic activities. There exist a wide range of AT devices for use by students with visual impairments to access information and perform several academic activities such as reading, writing, researching, studying, browsing, communication, and note taking (Ahmad, 2015). Researchers employ a variety of approaches to categorise AT utilised in the education of persons with visual impairments (Chukwuemeka and Samaila, 2020). Nsofor *et al.* (2015) classified AT into three categories: low-tech, medium-tech, and high-tech. Low-tech or low technology gadgets are ordinary and affordable equipment that are purposefully created or

adapted to aid in many areas of difficulty. Few examples of low-tech devices include simple pencil grips, large print cardholders and eyeglasses (Chukwuemeka and Samaila, 2020). Simple electronic gadgets that do not have extremely complex advanced components are classified as mid-tech or medium technology. Electronic speech recorders, audio players, talking calculators, among others fall into this category(Nsofor *et al.*, 2015). On the other hand, high-tech or high-technology gadgets use complicated, multifunction technology and typically include a computer and related software (Kumar, 2013; Nsofor *et al.*, 2015).

As indicated by Kumar (2013), the following are some of the key AT devices for individuals with visual impairments:

- Screen Readers- A screen reader is a specialised type of software that translates electronic text to speech.
- Screen magnifiers- A screen magnifier is a software tool that enlarges the content on the screen.
- Optical character recognition (OCR) software- OCR software captures scanned text and transforms it into an electronic text file.
- Speech recognition software -Speech recognition software allows users to enter data using their voices rather than a mouse or keyboard.
- Braille embossers-Braille embossers are specialist printers that emboss papers in braille.
- Braille translation software- is used in combination with a Braille embosser to convert text into Braille.
- Refreshable Braille displays- Refreshable Braille is an output device that connects to computers and displays a braille reading interface.
- Large monitors- Large monitors are beneficial for those with low vision since they make on-screen reading simpler by offering more screen area.
- Book Readers/Voice Recorders: Hardware devices used by students with visual impairment to record lectures and meetings, as well as playback audiobooks, music, voice recordings, and text files.

- Alternative keyboards- For persons with limited eyesight, a conventional keyboard may not be adequate. Many persons with poor eyesight use keyboards with large font and high contrast colours.
- Electronic Magnifiers-Technology that projects a magnified text picture on a built-in display or a computer monitor using a camera.
- Screen Magnification-With screen magnification software, users may magnify text and images on a computer screen utilising a variety of functions such as colour, font size.

Academic librarians must be competent enough to use all types of AT devices to ensure effective integration of the AT related services in academic library services. Previous research in Zimbabwe implies that staff in academic institutions and libraries lack the necessary AT knowledge and skills to assist users with visual impairments. A study by Chimhenga (2017) focusing on Zimbabwe Open University, Bulawayo Campus found that the institution's library staff lacked specialised training to assist students with visual impairments. This was because the personnel was not exposed to enough training in the form of seminars, workshops and formal training in AT related topics. A related investigation by Rugara, Ndinde, and Kadodo (2016) also revealed that library personnel lacked specialised training targeted toward serving users with impairments in four participating academic libraries in Zimbabwe. Moreso, Munemo and Tom's (2013) highlighted the absence of library personnel who were professionally trained to provide assistive devices in Zimbabwe's Open and Distance Learning Institutions. Prior research also implies that inadequate training of librarians in AT and disability services is a regional (Majinge and Stilwell, 2014; Chaputula and Mapulanga, 2017), as well as a global concern (Green and Blair, 2011). Thus, it can be deduced that academic librarians' AT competency is an issue that warrants more investigation.

To address the absence of AT skills in academic librarians, studies recommend using pre-service and in-service or professional development training techniques (Kumar, 2013; Wong and Cohen, 2015; Chimhenga, 2017).

Marasinghe, Lapitan and Ross (2015) believe that the paucity of appropriately qualified AT professionals in Zimbabwe can be resolved by the introduction of AT training programmes in the country's institutions of higher learning. Researchers concur that professionals who provide AT services should have access to training in the use of AT through curriculum-based AT education, formal training, and certification (Wong and Cohen, 2015; Chimhenga, 2017; Smith *et al.*, 2018; Saleem, Sajjad and Rauf, 2019).

Besides formal AT education courses, academic librarians participating in AT provision can receive AT training through a variety of channels. These have been summarised from literature (Coleman, 2011; Green and Blair, 2011; Holloway *et al.*, 2018) as follows:

- workshops;
- conferences,
- journal articles;
- researching on the internet;
- online courses;
- training/demonstration by an outside agency or vendor;
- training provided by AT organisations;
- training by hired AT specialists;
- use of digital technology and mobile Apps; and,
- learning by experience.

Prior research on AT staff training has revealed the need to utilise a variety of training routes and approaches to accommodate different learning styles and meet local circumstances (Green and Blair, 2011; McSweeney and Gowran, 2017). However, Holloway *et al.* (2018) emphasise AT training of professionals through the use of digital technology, online courses, mobile apps, as well as formalised career paths.

Methodology

This study is underpinned by an interpretive research philosophy, which is typically inductive and embraces in-depth investigations using small samples (Saunders, Lewis and Thornhill, 2016). A qualitative research methodology was employed which explores a phenomenon in detail and holistically using rich narratives and flexible data collection methods (Polit and Beck, 2014). The method was deemed the best for dealing with the current topic because of its strength in allowing the use of flexible methods when an issue under investigation is poorly understood (Rutberg and Bouikidis, 2018). Semi-structured interviews were used to enable the collection of in-depth responses and allow verbal exchanges between the interviewer and participants (Bell, Bryman and Harley, 2019). A sample size of 19 participants was used comprising 13 academic librarians and six students with visual impairments drawn from three study sites with experience in offering tertiary education to students with disabilities. Research participants were drawn from Midlands State University (MSU), Zimbabwe Open University (ZOU) and Univ03 (who requested anonymity). The category of academic librarians comprised both operational and middle management in the form of Senior Library Assistants and Assistant Librarians. The search for eligible students was undertaken with the assistance of student disability services departments, who are in charge of providing disability services in Zimbabwean universities. Purposive sampling was used in this study to choose study sites with strength in providing tertiary education to students with disabilities, identify participants that were particularly informative, and facilitate the use of a small sample ideal for qualitative research (Saunders, Lewis and Thornhill, 2016).

Before beginning the interviews, informed permission was obtained from all 19 participants. All interviewees were informed of their right to remain anonymous and to withdraw from the research at any time without suffering any prejudice. Thematic analysis was used to analyse data obtained from research participants.

Results and discussion

The analysis of data resulted in three themes (1) relevance of professional AT training of academic librarians (2) crucial AT training areas for academic librarians, and (3) strategies to enhance AT skills of academic librarians. Each of these themes, as well as the evidence supporting them, is provided in the following discussions. To ensure confidentiality, participants were randomly assigned numbers 1 to 19.

Relevance of professional AT training of academic librarians

This theme addressed research objective one which sought to investigate the perceptions of research participants on the need for professional AT training of academic librarians. The relevance of professional AT training for academic librarians was discussed with all 19 participants. All participants agreed that it is important to have academic librarians with appropriate AT knowledge and skills, owing to the growing relevance of the concept of inclusivity in higher education as well as in the sphere of information service provision. Some of the responses from interviewed academic librarians are as follows:

Professional AT training of academic librarians is essential to ensure they can carry out a correct assessment of the assistive technology needs of users and properly match them with appropriate AT devices (Interviewee 2).

Professional AT training of academic librarians is very important because of the increasing call to embrace inclusive education (Interviewee 8).

To enable librarians to deliver professional, quality and effective assistive technology services in academic libraries (Interviewee 16).

Professional AT training of academic librarians is very important because of the need to promote inclusivity in higher education so that people with disabilities are not left out. Proper training of staff help to promote standardisation in the provision of AT in academic libraries (Interviewee 19).

Students with visual impairments interviewed concurred that professional AT training for academic librarians is critical to address the AT skills gap that the majority of librarians exhibit. All participating students shared this view. For example, Interviewee 10 said:

Through assistive technologies, students who are visually impaired get a chance to learn by themselves and reduce overdependence on helpers. However, for these devices to fully benefit the students, there is a need for staff who are adequately skilled in the use of the devices so that they can offer proper training to intended users using language that is well understood by students with visual impairments. Some of the librarians still lack these skills and they require proper training in assistive technology-related services.

Interviewee 11 added:

It is important to have academic librarians who are better trained in assistive devices so that they can offer adequate assistance to students with visual impairments in the use of assistive technology when they require it. My own experience is that some librarians lack adequate skills to help students who are visually impaired to use different gadgets to accomplish a diverse of academic tasks. My suggestion is that librarians should be exposed to professional training in different assistive technologies for them to be fully equipped and be able to provide effective services related to assistive technology. Without proper training of personnel in academic libraries, I don't think assistive devices can be fully utilised in such institutions.

The responses suggest that all the research participants appreciate the importance of professional training of academic librarians in AT to enable the

effective utilisation of AT in academic libraries. It is important to understand the importance of professional AT training of academic librarians, given that some may find it difficult to justify to their employers the need to attend AT training in the presence of very few students with disabilities not enough to warrant the expenditure for training (Long and Perry, 2008). If those who interact with users living with visual impairments appreciate the need to have professional training in AT, they would be better positioned to advocate for and justify the need to equip personnel with proper AT knowledge and skills.

Implementing professional AT training of personnel should be informed by a commitment to the improvement of the lives of people living with disabilities as seen from a human rights perspective, a concept which is strongly advocated by the CRPD (United Nations, 2006; Phantachat and Parnes, 2007; World Health Organisation, 2011). The CRPD and the new National Disability Policy for Zimbabwe are useful policy instruments that can be used as strong justification and legal instruments for soliciting political, management and financial support to promote professional AT training of academic librarians. Professional AT training of academic librarians is critical to ensure effective and sustainable AT implementation in academic libraries as recommended in the literature (Special Education Technology British Columbia, 2007; Khasnabis, Mirza and MacLachlan, 2015; Smith *et al.*, 2018). In a nutshell, professional AT training of academic librarians is essential for varied reasons which include to: ensure compliance with international and national disability policies, empowering academic librarians in the delivery of standardised AT related services, improve inclusive academic library services, and ensuring that end-users effectively benefit from the use of AT in academic libraries.

Crucial AT training areas for academic librarians

The second research objective sought to determine the main areas in which the librarians in this study feel they need training to improve their AT knowledge and skills. All the 13 academic librarians in this study were asked to highlight what they perceived as the most crucial AT training areas for library personnel

working in academic libraries and the results are summarised in Figure 1. The data displayed in Figure 1 show that the responses revolved around the following issues by order of importance according to the frequency of being mentioned by participants:

- Identifying AT funding opportunities:13
- Types of AT devices for persons with disabilities: 13
- Training users in the use of AT:12
- Identifying AT suppliers/distributors: 12
- Working with specific devices: 11
- AT and e-learning requirements:9
- Disability terminology: 8
- AT evaluation and outcome measurement: 8
- Identifying AT professional development avenues: 8
- AT assessment and user profiling:7
- Identifying AT training resources:7
- AT related policies/ guidelines:6
- Accessibility concepts: 6

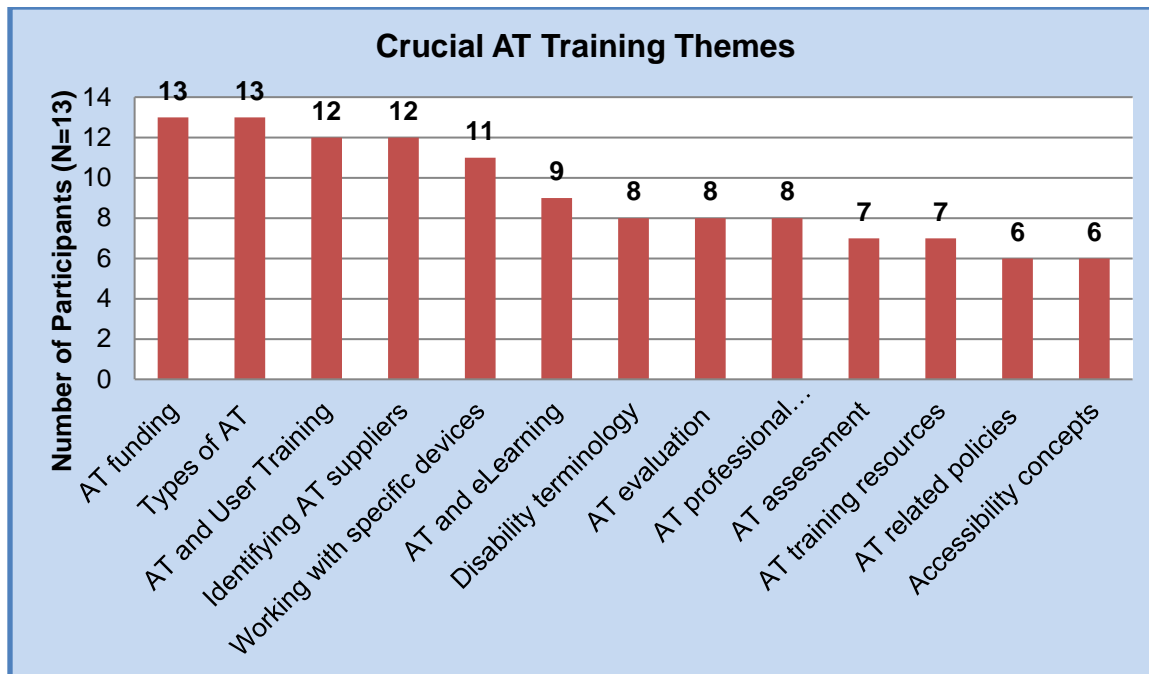


Figure 1: Crucial AT training themes for academic librarians

Identifying AT funding opportunities, as well as knowing various types of AT devices for persons with disabilities were perceived to be the top crucial AT training needs by the interviewed librarians. Given that underfunding is cited in the literature as a key challenge in AT adoption and training (Long and Perry, 2008; Green and Blair, 2011; Dziva, Shoko and Zvobgo, 2018; Tangcharoensathien *et al.*, 2018), academic librarians must be equipped with knowledge and skills to identify additional sources of funding to attend AT training as well as be exposed to various types of AT devices. A better knowledge of various types of AT devices for persons with visual impairments is important for academic librarians to facilitate their adoption and utilisation. When professionals lack adequate understanding or information about the existence and advantages of AT, they are unable to promote the adoption of free, low-cost, or affordable AT devices (Marasinghe, Lapitan and Ross, 2015).

According to responses, it is also critical for academic librarians to be empowered with AT user training skills and, identifying AT suppliers at a national, regional and international level, understanding AT requirements in the

e-learning landscape, being trained in disability terminology/language, AT evaluation or outcome measurement, as well as identifying AT professional development avenues. Besides, responses show AT assessment and identifying additional AT training resources are other training areas perceived to be crucial by the interviewed academic librarians.

The results resonate with prior studies that suggest various AT training themes for personnel such as funding for AT; collaborating; identifying qualified suppliers of AT, working with high-tech devices (Long and Perry, 2008); AT evaluation, AT outcome assessment, continual professional development, how to operate specific types of devices, user training skills, and AT legislation and policies (Coleman, 2011; Burgos, 2015). As Smith *et al.* (2018) point out, assessing AT personnel training needs is essential in providing a foundation for personnel capacity building programmes. In the absence of a well-established set of AT competencies for academic librarians, context-specific AT training needs assessment can be a useful starting point to plan for professional AT personnel training. However, much work is needed in the field of academic librarianship to conduct a large scale AT training needs assessment for academic librarians and to develop discipline-specific AT competency frameworks. These can be important tools in developing AT training programmes for academic librarians in Zimbabwe.

Strategies to enhance AT skills of academic librarians

This theme addresses the third research objective which sought to determine appropriate strategies to improve the AT skills of academic librarians. Both academic librarians and students with visual impairments in this study were asked to suggest measures that could be implemented at various levels to enhance the AT skills of academic librarians. Responses from participants were analysed and a summary of suggested strategies are displayed in Table 1:

Table 1: Participants' views on strategies to enhance AT skills of academic librarians

#	Theme	Count	Explanation
1	AT awareness initiatives	18	Increasing the academic librarians' level of AT awareness through related workshops and conferences.
2	Curriculum-based AT training	15	Colleges and Universities in Zimbabwe can offer short courses in AT or integrate AT training into library and information science (LIS) programmes.
3	Familiarisation tours and internship	12	Academic librarians to undertake familiarisation tours and internships at academic library institutions with more advanced AT resources and services
4	Effective partnerships	10	Fostering effective partnerships between academic libraries and AT experts as well as disability-related organisations at national, regional and international levels.
5	Creating AT knowledge hubs	10	Creating knowledge hubs where academic librarians can access and share resources on AT and disability issues.
6	AT training manuals	9	Developing AT training manuals to guide the formulation of AT training programmes of academic librarians.
5	Increasing AT research	5	Promoting AT research in the field of librarianship.
6	Online AT courses	5	The utilisation of digitally available AT courses and training programmes.

The majority of participants in this study suggested the need for academic libraries to increase the AT knowledge level of academic librarians through related workshops and conferences. In their study, Green and Blair (2011) also suggest the use of workshops and conferences as effective techniques for

raising AT awareness. Active participation in national and international AT related events such as the National Disability Expo, World Disability Day and many others is vital for increasing awareness on disability and AT related issues. Related to that, academic librarians can increase their level of AT awareness through educational/familiarisation tours and internships at library institutions with more advanced AT delivery services. However, as argued by Holloway *et al.* (2018), workshops and conferences should be complemented by a more sustained and hands-on AT training programme to increase their effectiveness.

Furthermore, the majority of participants suggested the need to introduce curriculum-based AT training to enhance the AT skills of academic librarians. Participants in this study view AT training of academic librarians as a significant issue that should be included in the LIS curriculum by Zimbabwean universities and colleges. One participant (Interviewee 12) had this to say:

...AT training of academic librarians is a serious matter worthy of inclusion in LIS education. This is so because librarians seem to lack adequate appreciation of AT and disability issues as strongly evidenced by inadequate promotion of such services in many library institutions in Zimbabwe.

Another participant (Interviewee 5) said:

....intergrating AT training into LIS education is an effective way to address the lack of AT skills exhibited by library professionals. It helps to formalise AT training for library professionals.

Providing curriculum-based AT training seems most appropriate as vigorously supported in previous studies (Marasinghe, Lapitan and Ross, 2015; Saleem and Sajjad, 2016; McSweeney and Gowran, 2017; Smith *et al.*, 2018; Saleem, Sajjad and Rauf, 2019; Waller, 2019). While AT education were previously delivered primarily as a component of health-related specialist

programmes (e.g., biomedical, occupational therapy), the adoption of AT in various disciplines has created a need to equip a diverse range of professionals with the necessary knowledge and skills to make effective use of such technology (Waller, 2019). However, it seems only a few professions such as computer science and special education have started to embrace the teaching of AT as a component in their degree programmes (Waller, 2019).

As further highlighted by participants, documentation about AT training in Zimbabwe is non-existent. Introducing structured AT training for library professionals in the country is a great step towards promoting formalised AT career paths in Zimbabwe. Education in any field of practice is critical and is related to the delivery of high-quality services and best practices (McSweeney and Gowran, 2017). Given that lack of professional AT training has been blamed for poor AT provision in developing countries (McSweeney and Gowran, 2017), formalised AT education and training for library personnel should be viewed as a key requirement for improving AT implementation and provision in academic libraries.

Responses from the interviewed students emphasised the need for academic librarians/libraries to partner with relevant stakeholders in the AT and disability sector. As strongly supported by previous studies (Kusekwa, Munyoro and Chikonzo, 2016; Sanchez-Rodriguez and Logiudice, 2019), academic librarians are encouraged to identify opportunities for collaboration with Disability Support Services departments and special education experts in universities, disability organisations and AT experts available at country, regional or international level. Collaboration is vital for academic librarians to increase their exposure to relevant knowledge resources and training opportunities. Through collaboration with important stakeholders in the AT sector, academic librarians can link up with AT experts and share knowledge and training resources.

Other important measures that were suggested by participants are creating an online knowledge hub that provides access to AT resources,

developing AT training manuals and resources, as well as promoting AT research in the field of librarianship. Participants pointed out that there is a lack of information among library professionals about what AT is, hence an online knowledge hub that facilitates sharing of AT information is vital. Besides, there is also a need to utilise digital technologies to harness existing global AT training initiatives and resources and design locally-suitable AT training programmes (Holloway *et al.*, 2018). Academic librarians can benefit immensely from already existing global AT training resources and initiatives which can be freely accessed via the Internet or various online platforms.

Conclusions

The results from this study strengthened the view that academic librarians must be proficient in the use of all types of AT devices to enable effective integration of AT-related services in academic library services. The responses from both academic librarians and students with visual impairments emphasised the importance of professional training of academic librarians in AT to ensure compliance with the CRPD and National Disability Policy for Zimbabwe, facilitate the delivery of standardised AT related services in academic libraries, and ensure that end-users effectively benefit from the use of AT in academic libraries. Based on the views of interviewed academic librarians, perceived crucial training areas by order of importance are: identifying AT funding opportunities, types of AT devices for persons with disabilities, training users in the use of AT, identifying AT suppliers, working with specific devices, AT and e-learning requirements, disability terminology, AT evaluation and outcome measurement, identifying AT professional development avenues, AT assessment and user profiling, as well as identifying AT training resources. This demonstrates that the AT training needs of the interviewed academic librarians are multiple and can only be addressed through comprehensive training programmes.

To enhance the AT skills of academic librarians, strategies that were suggested in this study include the use of workshops and conferences to increase AT awareness, embracing curriculum-based AT training, undertaking familiarisation tours and internships at library institutions with better AT services, fostering effective partnership with AT experts and other key stakeholders, creating online knowledge hubs for AT resources, developing AT training manuals, promoting AT related research in academic librarianship, and making use of existing global online AT training courses or initiatives. Therefore, various strategies can be utilised to enhance the AT skills of academic librarians depending on the local circumstances and available resources.

In making use of the results from this study, caution must be taken since the views expressed in this study are based on the participants who were interviewed. The study results may not apply to other settings. For the results to be generalised to a broader geographical setting, a national study on the AT training needs of academic librarians utilising either quantitative or a mixed-methods approach is recommended.

Recommendations

Basing on the findings, the researchers propose the following recommendations to address the issues identified in this paper to improve AT competence building for academic librarians in the participating institutions.

- There is a need for participating academic libraries to conduct appropriate AT awareness initiatives for academic library personnel at the operational and management level;
- Local library professional bodies like Zimbabwe Library Association (ZIMLA) and Zimbabwe University Libraries Consortium (ZULC) must promote AT related topics in their conference themes;
- Participating academic libraries must foster capacity-building partnerships and knowledge sharing initiatives with AT experts and relevant stakeholders at national, regional and international levels;

- Participating institutions must spearhead the development of a national knowledge hub of AT information which could benefit academic librarians as well as other professionals;
- LIS schools in the country must provide curriculum-based AT education in the form of short courses or as a component of undergraduate or postgraduate degree programmes; and,
- A large scale study of AT training needs of academic librarians in Zimbabwe must be undertaken to inform the development of a robust AT training programme for academic library personnel.

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