

UNIVERSITY OF RWANDA

COLLEGE OF EDUCATION

School of Inclusive and Special Needs Education

**IMPACT OF ASSISTIVE TECHNOLOGY ON EDUCATION
PERFORMANCE OF LEARNERS WITH VISUAL IMPAIRMENT AT THE
UNIVERSITY OF RWANDA - COLLEGE OF EDUCATION**

BY

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**Thesis submitted in partial fulfillment of the requirements for the Master's Degree in the
School of Inclusive and Special Needs Education**

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Kigali, October 2019

DECLARATION

I, BOLINGO Amurani, declare that the dissertation entitled “**Impact of Assistive Technology on educational performance of learners with visual impairment at the University of Rwanda-College of Education**” is my original work and has not been presented for an award of Master’s Degree in any other institution.

Signature

Date

CERTIFICATION

This is to certify that Bolingo Amurani has conducted the research entitled “**Impact of Assistive Technology on educational performance of learners with visual impairment at the University of Rwanda - College of Education**” under my supervision and guidance.

Signature

Lecturer's names

Date

DEDICATION

To the Almighty God

To My wife NIYONSHUTI Anne Marie

To my children ISHIMWE Sam Heritier and MUCUNGUZI Agneau

To my colleagues

To my friends

ACKNOWLEDGEMENTS

First of all, my profound thanks go to the Almighty God who always protects and cares for me. Glory to his Name.

My sincere heartfelt gratitude, respect and appreciation, go to my spiritual family who has greatly supported me physically, morally, spiritually and financially to complete the present work.

My thanks also go to Dr. HABINSHUTI Gonzague whose supervision, encouragement and the correction of this study were crucial for its successful achievement. I recognize and appreciate all you have done. Without you, this work could not have been accomplished.

My earnest thanks are extended to the Dean of SNE and the Lecturers for having provided me any assistance requested during the conduct of this study. I would also like to acknowledge the contribution of many of my colleagues and supervisors who have given me support and encouragement, particularly my classmates during difficult times.

I also thank all members of UR-CE especially those of the School of Inclusive and Special Needs education, who helped me access the valuable data reported in this work.

Last but not least, my exceptional thanks as well go to everybody who, in one way or another, contributed to the realization of this work.

May the Almighty God bless you all.

LIST OF ABBREVIATION AND ACRONYMS

AT:	Assistive Technology
BECTA:	The British Educational Communication Technology
CBR:	Community-Based Rehabilitation
CEV:	Community Education Volunteers
DAP:	Data Analysis Procedures
DEO:	District Education Officer
DRC:	Disability Rights Commission
DTTs:	Digital Talking Textbooks
EFA:	Education for All
ESSP:	Education Sector Strategic Plan
FAST:	The Foundation for Assistive Technology
FGD:	Focus Group Discussion
IDEA:	The Individual with Disability Education Act
IEP:	Individualized Education Program
KSB:	Kenya Society of Blind
LD:	Learners with Disabilities
LRE:	The Least Restrictive Environment
MINEDUC:	Ministry of Education
NCLB:	No Child Left Behind
NGO:	Non-Governmental Organization
NJCLD:	The National Joint Committee for Learning Disabilities

OECD:	Organization for Economic Co-operation and Development
OTA:	Office of Technology Assessment
PTA:	Parent-Teacher Association
RCSNS:	The Resource Centers for Special Needs Services
RSA:	Rwanda Schools' Act
SEN:	Special education Needs
SEO:	Sector Education Officer
SGB:	School Government Board
SLD:	Students with Learning disabilities
SPSS:	Statistical Package for Social Sciences
SST:	Sight savers Tanzania
SWA:	Sector Wide Approach
TDD:	Telecommunication for the Deaf
TEA:	Tanzania Education Authority
UNICEF:	The United Nations International Children's Emergency Fund
UPE:	Universal Primary Education
UR:	University of Rwanda
USA:	United States of America
VCO:	Voice Carry-Over
VI:	Visual Impairment
WHO:	World Health Organization
UR-CE:	University of Rwanda-College of Education

LIST OF FIGURES

Figure 4.2: Perception on Lecturers' Training in Assistive Technology	23
Figure 4.3: Level of lectures that got Assistive Technology training	24
Figure 4.4: Familiarity of lecturers with the use of assistive ethnology	25
Figure 4.5: Simplicity of using AT in teaching and learning all subjects	26
Figure 4.6: Frequency of Using AT in classrooms	27
Figure 4.7: The efficiency derived from AT usage in teaching and learning	28
Figure 4.8: Views on the effect of AT on academic performance	29
Figure 4.9: Relationship between AT Usage and the increase of students' skills	30
Figure 4.11: Inappropriate disabled policies	32
Figure 4.12: Limited finances due to High cost of AT	33

LIST OF TABLES

Table 3:1: Target population distribution	19
Table 4.1: The respondent's gender	22
Table 4.2: Respondents ' age.....	22

TABLE OF CONTENTS

DECLARATION.....	ii
CERTIFICATION.....	iii
DEDICATION.....	iv
ACKNOWLEDGEMENTS	v
LIST OF ABBREVIATION AND ACRONYMS	vi
LIST OF FIGURES	viii
LIST OF TABLES	ix
TABLE OF CONTENTS	x
ABSTRACT.....	xiv
CHAPTER ONE: GENERAL INTRODUCTION AND BACKGROUND TO THE STUDY	1
1.1 Introduction.....	1
1.2 Background of the research	1
1.3 Statement of the problem	4
1.4. Purpose of the study	4
1.5 .The Objectives of the Study.....	4
1.6 Research questions.....	5
1.7 Significance of the study.....	5
1.8 Scope and limitation	6
1.9 Definition of key terms	6

CHAPTER TWO: LITERATURE REVIEW	8
2.2 Theoretical review	8
2.2.1 Assistive Technology and students with disabilities	8
2.2.2 Generally accessible assistive technologies for learners with disabilities	9
2.3. Theoretical background.	10
2.4. Empirical review	11
2.5. Impact of Assistant Technology on the progress of disabled learners.....	12
2.5.1. Factors impacting integration of Assistive Technologies	13
2.6. Conclusion of the chapter	16
CHAPTER THREE: RESEARCH METHODOLOGY	18
3.2 Research design	18
3.3 Study setting.....	18
3.4 Target population	19
3.6 Research tools	19
3.8 Position of the researcher	20
3.8 Data analysis procedures.....	20
CHAPTER IV: PRESENTATION, ANALYSIS AND INTERPRETATION OF THE FINDINGS	21
4.1 Introduction.....	21
4.2 Presentation of the findings	21
4.2.1. Demographics characteristics of the respondents and return rates	21
4.3 Access and use of Assistive Technologies.....	23
4.3.1 Availability of gadgets	23

4.3.2 Lecturer's education in the use of assistive technologies.....	23
4.3.3 Level of Lecturers who got training in the use of assistive technologies	24
4.3.4 Lecturers familiarity with assistive technologies.....	25
4.3.5 Simplicity of integration AT in teaching and learning	26
4.3.6 Frequency of AT use in classrooms.....	27
4.3.7 Efficiency of AT usage	28
4.4. Contribution of AT to effective learning and performance of students with disabilities	29
4.4.1 effect of AT on academic performance	29
4.4.2 Relationship between AT integration and students' skills.....	30
4.5 Assistive Technologies related challenges encountered at university	31
4.5.1 Availability related challenges.....	31
4.5.2 Policy related challenges.....	32
4.3 Finance related challenges	33
CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS	34
5.2 Conclusions.....	36
5.3 Recommendations and suggestions	36
REFERENCES.....	37

APPENDICES	45
APPENDIX 1: INTRODUCTORY LETTER	45
Appendix 2: QUESTIONNAIRE FOR DEANS	46
Appendix 3: QUESTIONNAIRE FOR LECTURERS, HEADS OF DEPARTMENTS, E-LIBRARIAN AND TEACHERS.....	49
Appendix 4: QUESTIONNAIRE FOR STUDENTS	53
Appendix 5: SOME OF ASSISTIVE TECHNOLOGY FOUND AT UNIVERSITY OF RWANDA- COLLEGE OF EDUCATION.....	54

ABSTRACT

The purpose of this study was to examine the impact of assistive technology on the academic achievement of students with disabilities at the University of Rwanda. The target population of this 145 individuals comprising 120 students (40 students with disabilities and 80 students without disabilities), 7 heads of departments, 5 staff members of the electronic library and 10 Lecturers of Special Needs Education, and 3 Deans of the faculties at the University of Rwanda-college of education. The research instruments were questionnaires, interview and observation. The results of the research were presented using frequency tables and percentages. Among key findings, the University of Rwanda provides various assistive tools including: Braille machine, slate and stylus, JAWS (allowing access to job the speech) or LVD (dux bury braille translator), talk of calculators, recorder (victor reader), Braillino or braille writer, embosser (braille printer), reading machine (scan words), magnifying glass (smart Viewer) and speech recognition programmes. Braille machines and computers are the most frequently used types of assistive technologies. Functional vision has been the most important considered factor during the selection of any type of assistive technology, and the limited number of computers has been the biggest challenge because sharing machines among learners with visual disabilities is not possible due to the sensory loss. The use of technology to improve learning is an effective approach for many students with learning disabilities. In addition, students with LD have often more successful experiences when they are allowed to use their abilities to work around their disabilities. Assistive technology tools combine the best of these two practices. The study recommends that the Ministry of Education should recognize the potential of assistive technology in support of education for students with VI. The teacher empowerment is also necessary to ensure adequate computer literacy for Lecturers so as to teach adequately the students with visual impairments. In the same line, teachers, parents, guardians and all stakeholders in the institutions dealing with students with visual impairments should be educated on the benefits that of assistive technologies.

CHAPTER ONE: GENERAL INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 Introduction

This section provides the history of the study, the issue explanation, the goals of the study, the research issues, the importance of the study, the restriction of scope and study, the operational definition of terms, and the conclusion of the chapter

1.2 Background of the research

Education for all is every individual's right or human being, including disabled people. However, owing to culture, religions, etc., some individuals with disabilities are victims of segregation. To react to their instructional requirements, those who go to college need assistance and distinct equipment.

Devices like braille and dedicated software devices to assist individuals read. However, owing to culture, religions, etc., some individuals with disabilities are victims of segregation. To react to their instructional requirements, those who go to college need assistance and distinct equipment. Devices like braille and dedicated software devices to assist individuals read (WHO, 2009).

Needs or priorities and feelings of stigmatization, have the main causes of underutilization of such tech devices.

In 1997, the U.S. Office for Technology Assessment (OTA) released a report on technology and people with disabilities that recognized the potential of assistive technology to compensate for disabilities and enhance the capacity of people with disabilities (Galvin, 1997).

The individual with Disabilities Education Act (IDEA) of the required change devices of technology assistance and services to be considered in the individualized instructional programmes (IEPs) to meet education goals (Turnbull, 2005).

Jwaifell and Gasaymeh (2013) performed a survey in Jordanian classrooms and discovered that the interactive whiteboard was easy to use by all respondents.

Jwaifell and Gasaymeh are confirming that a connection exists between the abandonment of assistive

technology among individuals with disabilities and a mixture of independent variables (comparative benefit, support, customer involvement, testing ability, customer change, reinvention and compatibility).

Referring to the Malaysian research by Hussin (2013), some learners disclosed that they had encountered the technical problems of digital speech textbooks (CDI). These challenges have discouraged the use of DTTs. These results are in line with those of a Holcombe research (2000), which concluded that an innovation with less complexity has a greater opportunity of being adopted as an innovation with characteristics that are difficult to use.

The problem is that the fresh books using the recent version of the software must first be transformed into a version that can be interpreted as compatible with screen-reading machines.

In terms of content coverage, it requires a long time to place visually impaired learners at the same level with learners without visual impairment.

Kelley (2008) researched AT use among visually impaired learners in the United States.

The research estimated the amount of experience of assistive technology with text-to-speech software and screen reading peripherals nationally and some of the contextual conditions that may have led to the use of this particular technology for the blind.

The study's primary conclusion was that the vast majority of visually impaired learners in the U.S. were not sufficient using assistive technologies. On the other side, most learners have been discovered using Braille.

Because of the diversity of AT for visually impaired people, educators in the U.S. were unfamiliar with

the different kinds of AT available for particular requirements. Students need assistance, including access to the AT speech:

Braille access, extensive print access, or any mixture of these methods.

In addition, AT, Information Communication Technology and web-based instructional packages intended for general education as AT were jointly understood by educators

(Purrazzella & Mechling, 2013).

Not knowing what AT appliances are accessible and their overall apps mean that they are not fully embraced and used for students' advantage. While all educators have restricted knowledge and expertise in AT, as champions of AT, a handful of educators arise to varying degrees.

This undermines teachers' efficient use of AT, denying learners a comparable platform for sighted learners. It is also a challenge in a fair allocation according to the World Health Organization (WHO, 2009) classification among the 3 classifications of visual impairments (VI).

Examples of or absence of supporting technology integration point to the urgency of a thorough reaction to community education. People with disabilities, parents, districts and states are in bad need of guidelines to integrate assistive technology effectively (Hart, 2000).

Thanks to the implementation of appropriate technology, many career possibilities that need access to visual data are now available to visually impaired people.

Assistive technology is usually recognized as having a beneficial effect on the lives of visually impaired individuals (Kapperman, Broder, & Heinze, 2002 ; Strobel, Fossa, Arthanat & Brace, 2006).

On the other side, however, sophisticated technology has been quoted as a factor in refusing the use of learners with severe disabilities (Vik, 2008). The study found that the AT environment had a positive impact on the performance of visually impaired students, and 6 of them had outperformed their students in light, low, vision, and partially blind.

A study in Australia stated that the majority of visually impaired learners attended state-funded college (Jolley, Steer, Gale & Sweet, 2001). Estimates of the participants indicated that approximately 4,500 visually impaired learners attended main and secondary school systems or instructional programs at the Australian government and private levels.

Of the 4,500 learners reported, approximately 2,700 were unintellectual and could use characters or braille to attain literacy and numeracy. Sex estimates of 755 were women and 1,845 were males (Ake Nena & Hannu, 2010). When Australian public schools implemented the latest version of the AT and maintenance and tracking strategy, there was a large migration of pupils from private schools in public schools as well as an elevated rate of VI student registration.

According to Microlink (2015), Assistive Technology provides to people empowered to understand their real potential a higher inclusiveness in education and the job environment.

The outcome of AT supply and training has enabled individuals with VI on the level playing field to live, work and study.

Nasser (2015) positions that provide AT particularly learning access suite in South Africa. Microlink saw courses enjoy a fresh dimension of learning and support growth, particularly in serious instances of visually impaired learners.

Learning Access Suite generates a more inclusive commitment for learners and suppliers, educators / teachers are more effective in supporting their students, improving teaching and learning for visually impaired learners. The focus has moved to increasing use of ICT to satisfy teaching, learning, and administrative needs (Archer, 2003 ; Engelbrecht, Oswald Stephen, 2003) as well as visually impaired learners

1.3 Statement of the problem

Sight Saver Review (2016) revealed that the University of Rwanda needs to bridge the proportion of critical ATs and visually impaired learners. The reduction in the amount of disabled learners is a worrying element of the evaluation of the 2014 statistics, as one of the objectives of the ESP is to attain inclusive education (Ministry of Education, 2014).

Although the Rwandan government has launched inclusive education, there are still a number of problems facing individuals with disabilities to attend and complete their colleges. While each situation is distinct and more serious for some learners than others, in the traditional school setting, all learners with disabilities face many difficulties. These difficulties may include the lack of capacity.

It seems that due to the complexity and incompatibility of the ATs, most learners have had difficulty learning. Therefore, because of bad results arising from AT inadequacy, many individuals prefer to leave college.

Therefore, the correlation of college advancement between learners with disability and accessibility of AT needs to be established. The investigator then also evaluated how affordable and efficient use of AT can boost the educational achievement of a disabled student, particularly visually impaired students.

1.4. Purpose of the study

The research aimed to evaluate the effect of assistive technologies on the performance of the University of Rwanda learners with disabilities.

1.5 .The Objectives of the Study

The study's goals were to:

1. Assess the supportive technology used by learners with visual impairment at the University of Rwanda college of education ;

2. Find out how technology affect the output of the University of Rwanda's leaners with visual impairment;
3. Discover the difficulties faced by learners with visual impairment of the University of Rwanda college of education;
4. Suggest mitigate strategies to overcome the encountered difficulties.

1.6 Research questions

1. What are the assistive technologies used by the leaners with visual impairment at the University of Rwanda college of education?
2. How do technologies influence performance of learners with visual impairment at the University of Rwanda College of education?
3. What are the challenges that are faced by students with visual impairment at the University of Rwanda?
4. What are the strategies to overcome the identified challenges?

1.7 Significance of the study

The research is intended to contribute to a stronger knowledge of the advantages of integrating Assistive Technology in the education of visual impaired learners. The results of the research will assist increase the Ministry of Education understands of the actual status of assistive technologies for disabled learners. This research can also be helpful in informing specific public policies.

It can also report on the integration of assistive technologies in teaching and learning to the management of different secondary schools. The results will show how techniques eliminate or reduce the teaching of Disabled learners, particularly those with bodily disabilities as well as visual and hearing impairment. The research is also expected to enhance their learning due to its relevant concepts that will assist them conduct their learning and enhance their daily lives. It will assist modify the adverse attitude towards treatment and consideration of learners with disabilities from the society and the students themselves. This research will assist policymakers deal with and fix the issues faced by special needs students. And this will make a significant contribution to the education industry and programs. Many students with

disabilities may be forced to discontinue their education without assistive technology. This research tries to demonstrate that when learners have sufficient abilities through the use of educational technologies. The research will also serve as a reference and educate other scientists about the status of assistive technology in the nations of the Third World.

1.8 Scope and limitation

a. Scope

The research concentrated on visually, physically and hearing impaired students.

Rwanda has private tertiary learning institutions and only one public tertiary learning institution, the University of Rwanda, which includes colleges such as the college of education, the College of Medicine and Health Sciences, the College of Business and Economics, the College of Science and Technology, the College of Arts and Social Sciences, the College of Business and Economics and the College of Arts and Social Sciences.

b. Limitations

Investigator had constraints linked to his absence of braille abilities and sign language and visually impaired student communication.

The vibrant technological change and absence of internet connectivity during the study era, as well as the conditions related to the learners with disabilities, was a challenge because the investigator had to make sure that he was updated on the present assistive technology.

To overcome this barrier, the researcher had to consult the specialist in the school of education who are experienced in ICT integration in educational system.

1.9 Definition of key terms

Let us first have a clear understanding of key terms:

- **Assistive Technology:** Any device that would assist learners with visual and hearing impairments during the teaching and learning process, such as machinery or product system, whether commercially obtained, altered or tailored, used to boost, retain or enhance the functional capacities of a disabled learner.
- **Visual impairment:** relates to blindness and low vision
- **Hearing impairment:** relates to hearing impairment or partial impairment.

- **Inclusive education:** education practice based on the philosophical faith that all learners, those with special needs and those without, have the right to learn the suitable classrooms of community schools together in era.
- **Special Needs Education:** A holistic approach to student with special educational needs requiring the study of all variables that could have an impact on Training of a child with special educational needs and how these factors can be adapted to meet the critical needs of that child.
- **Disability:** relates to the loss of chances due to social and environmental obstacles to engage in culture at an equal rate with others.
- **Teaching and learning:** is the process of disseminating knowledge and learning is the process of internalizing the acquired knowledge.

CHAPTER TWO: LITERATURE REVIEW

2.1 Preface

This section describes the theoretical examination, general introduction, empirical review and conclusion of the chapter.

Conceptual framework

This section seeks to investigate appropriate literature as it relates to the key ideas underpinning this research. These include ideas such as Rwanda's inclusive education, the use of assistive technology in mainstream classrooms to improve assistance for a variety of learners, and the idea of instructional assistance.

The research should serve as a conceptual framework for the central issue of this study to determine the efficacy of Assistive Technology in facilitating educational support for all school students with visual impairment.

2.2 Theoretical review

2.2.1 Assistive Technology and students with disabilities

Assistive Technology and Disability Students Technological progress in today's culture has enabled the adoption of technology by school systems. Different technology systems have been developed to assist learners flourish in academics. Among the many innovations, assistive technologies have been discovered to have the biggest effect on learners to assist learners with disabilities.

Despite the proliferation of educational support systems, we understand little about the impacts of these techniques on users. Minimum studies have been carried out on the user's use of assistive technology. Generally, enabling innovations play a vital role in providing learners with special needs with access to quality education.

This is primarily because many unique students' needs require unique learning material and extra help in order to be without special needs at the same level with their colleagues.

2.2.2 Generally accessible assistive technologies for learners with disabilities

There are a number of appliances, as with reading, that can assist learners with LD. Word processor is an AT instrument that helps learners write very effectively.

Students using such a tool may be more effective than students with the same skill not using the tool (Sivin-Kameli & Bialo, 1994). Commercial procurement of all equipment is not required.

There are some equipment that educators can produce on their own without financial expenditure, such as using an empty gallon bleach bottle that can be used as a white board when sliced in a rectangular form.

Smart scanners and readers: convert Word papers and read nearly all printed materials aloud.

Braille embossers: making products for visually impaired students is particularly helpful for educators. The submission of classroom works, such as tasks and documents, is also helpful for learners.



Picture of braille embossers

Magnified screen on computer



Highly complex Assistive software, which includes the possibility of computer screens amplified to increase the font size or use magnification software, such as "Text Zoom."

The software 'WebEyes' extends Internet Explorer's web pages to 144 font size points and the same shapes and boxes are improved in size. Available screen louvers can be mounted on desktop computers, laptop computers.

Electronic telescopes

Students must also be able to see distant pictures, like a trip to a museum of art during field trips. The video telescope held by the hand resembles a tiny camcorder that fits into the palm and enables the user to view the extended pictures. The "Jordy" is a head-mounted display with a video camera pointing at the head's motion.

Technologies focused on auditing

Hearingbased assistive technologies for learners with visual impairment suchlike tape recorders that can be used to record and review a lecture later, use a talk calculator, software such as 'Jaws,' software that converts text to voice or braille, and recognition voice or computer devices such as the Kurzweil 1000 that converts text to speech on the desktop or from scanned websites. Because playback needs an increase in elderly learners, the use of registered books and voice recognition systems may be more important in saving time and energy.

2.3. Theoretical background.

The theoretical context of this study was based on Kincheloe and McLaren's critical theory (2008). A criticalist is a researcher whose work seeks to criticize certain oppressive aspects of a culture, according to Kincheloe and McLaren (2008). A critical theory strategy to studies therefore pays attention to the socially marginalized

Prasad (2005) claims that critical study should aim at empowering people and confronting society's injustice. Naturally, because individuals with disabilities are human beings, they have the right to all the freedoms that individuals appreciate.

However, in many fields of their lives, including education, individuals with disabilities are not treated similarly. The "Convention on the Rights of Persons with Disabilities" (CRPD) gives its beneficiaries the right to assistive technology to guarantee full and equal enjoyment of all human rights and basic liberties.

The Rights of Persons with Disabilities Convention of the United Nations(2007) in Article 21 talks on the rights of disabled people to access information in a timely manner in accessible formats and technologies suitable for different types of disabilities.

It also says that every individual has a right to education in Article 24. As far as education is concerned, LaNear & Frattura (2009) quoted by (Omoke, 2011) argues that learners with disabilities have undeniably and consistently taken on the position of "other" in classrooms.

This "other" stance adopted by disabled kids is unjustified and therefore unjustified. It means that children with SEN may need strong advocacy to enjoy their rights.

By investigating the effective use of assistive technology, this research project aims to examine and address issues of poor education services for these children in order to allow them access to adequate education irrespective of their disability.

2.4.Empirical review

It is possible to make broad statements of Assistive Technology by culminating the research described. So that A longitudinal study comparing two groups of elementary school students with and without access to a word processor seems that students using word processing had significantly higher writing skills in terms of meaning, content quality, writing and surface features.

Studies by Quinlan (2004) showed that speech recognition software eliminates the "bottleneck" that hinders the success of writers struggling with handwriting. Quinlan, huh? (also found that students with learning disabilities in writing increased fluency and reliability when using speech recognition. Zhang (2000) distinguished research that showed no difference with a word processor between handwritten work and writing. There was evidence of efficacy in Hetzroni and Shrieber's (2004) research.

Studies by Williams (2002) found students showing less anxiety about writing and producing longer texts using Assistive Technology. Englert et al. (2007) found

that students were more likely to use the teacher's writing tools when they had assistive technology.

Hetzroni and Shrieber (2004) cited research that found that technology can address the learning needs of students with learning disabilities when integrated into classroom instruction. They also noted a study that found that students with learning disabilities displayed better organization, motivation and performance consistency with the use of a computer.

Research conducted by Hetzroni and Shrieber (2004) showed that word processing contributed to a reduction in spelling errors, improved writing organization and decreased student errors when reading their own texts.

2.5. Impact of Assistant Technology on the progress of disabled learners

General Statements of Assistant Technology may be made or produced by completing the study described.

Hitzroni and Shrieber (2004) cite the work of State Owston and Wideman (1997) that a longitudinal study comparing two groups of elementary school students with and without access to word processors found that processor students had significantly higher writing skills in terms of context, content performance, type and structure.

A research by Quinlan (2004) found that speech recognition software decreases the weakness which hinders the success of writers struggling with handwriting.

Quinlan (2004) also found that the use of speech recognition allowed learners with disabilities to learn in writing to improve fluency and accuracy.

Quinlan (2004), on the other side, discovered that speech recognition did not affect learners who were more fluid writers with ease or accuracy. Zhang (2000) summarizes a study collection showing that word processor allowed learners to raise the quantity of text while others summarized as student studies wrote longer using pencil and paper texts.

Differentiated study by Zhang (2000) showing no distinctions between handwriting and word processor writing. There is proof of efficacy in studies by Hetzroni and Shrieber (2004). Work was quoted as the processing of the discovery resulted in improved performance for the K-12 authors. There was a marked improvement in quality for students with learning disabilities. Williams (2002) found

that less comprehension of writing was demonstrated through the use of assistive technologies by learners and generated lengthy text.

Englert et al (2007) disclosed that learners are more likely to use writing tools provided by the teacher when they have assistive technologies.

Hetzroni and Shrieber (2004) discovered that it can satisfy the requirements of learners with learning disabilities when assistive technology is incorporated into classroom training. They also realized that the use of computers, the organization of learners with disabilities, motivation and manufacturing clarity were improved.

Hetzroni and Shrieber (2004) showed that the word processor resulted in fewer spellings, facilitated writing organisation, and decreased student errors in reading their own texts.

Despite the variability in the search outcomes. Zhang (2000) has expressed optimism regarding assistive technology, acknowledging research that have shown that technology, including computers, has an excellent potential to support the educational needs of all ages of people with learning disabilities.

Evidence corroborates learners with learning disabilities ' use of assistive technology in writing. That being the case, further application studies need to be studied.

2.5.1. Factors impacting integration of Assistive Technologies

Evidence of the efficacy of assistive technology for learners with learning disabilities in writing is obviously appropriate for its use. Technical aids ' optimistic depiction indicates complete use. As with all the studies, a variety of issues have been developed by studies to date students with particular learning disabilities using assistive technology.

Zhang (2000) stated the need for further research to determine how the technology could be better introduced in the classroom. Englert et al (2007) pointed out that there is a need for more study to determine the connection between technology application and the level learners attain.

Zhang (2000) recommends that more study on how to integrate them into the classroom is required if assistive technology is discovered to pay off. Additional study suggestions invite educators to investigate the efficient application of assistive technology. Research reveals additional difficulties that educators face in their effort to integrate learning disability support technology for learners.

Lahm and Sizemore (2002) surveyed professionals, including educators, who were accountable for decision making in classrooms on assistive technology. Eighty three percent thought they had not been ready for assistive technology integration by their instructional backgrounds.

The interviewers were of the view that during their college years, assistive technology is not a prevalent intervention. Many wondered if the present teacher training could make their applicant better prepared for job in this region.

the dynamics of the absence of adequate teacher training, stating that while supporting technology is being investigated and created, training is often not efficiently handled. Thorkildsen also found that there was no training for many of the educators working with learners with special needs that included the use of the tools.

Synthesizing the literature on technology education, Edyburn (2004) investigated the wealth of information in technology, suggesting that with new technologies there is a high rate of change that teachers are challenged to remain up-to-date in their studies on such technology.

Zhang (2000) notes that practicing educators graduated at a moment without exposure to the technology currently available to graduates to tackle the problem of education. Zhang also observed that even more new graduates are noticeably unable to apply the available technology.

Moreover, if colleges integrate technology education into their programs, the extensive use of this information to the realities of the classroom poses an issue.

It has been shown that teacher training is desirable for the praiseworthy implementation of assistive technology. Continuous capacity building for educators has been suggested (Feiman-Nemser, 2001). Ball and Cohen (1999) stipulate that capability would help transform the process considerably, as academics in the field of assistive technologies have suggested (Edyburn, 2000).

A study conducted by Feiman - Nemser (2001) said educators should be familiar with the concepts and facts, how to link the topics thoughts and the knowledge in their subjects.

In addition, it has been approved that the suggestion of some of educators need to develop pedagogy in order to disseminate their understanding of material. To practice educators, learning is crucial not just before they begin their teaching career (Feiman-Nemser, 2001).

Ball and Cohen emphasized the promotion among professionals of collegiate cooperation. Extensive debates, including dialogue, improving practice through exchanging experiences on difficulties.

Teachers need autonomy in attempting new methods of doing stuff, addressing the issues of these new methods, and analyzing circumstances evolving with the new practice (Feiman-Nemser, 2001). It implies turning around Lahm and Sizemore (2002) talking about a number of research that have connected attitude to the application of assistive technology.

Zhang (2000) disclosed that fear made it impossible for educators to deploy assistive technologies.

Weston (2004) stated that individuals always attempt to prevent the confusion they are told about, try something, and study the impacts, and formulate fresh questions to broaden their knowledge (Feiman-Nemser, 2001).

Implementation of assistive technology could be addressed by practical research-based professional development. The attitude of teachers was recorded as another vibrant improvement in the use of assistive technologies by teachers. Some educators are unwilling to use Weston (2004) assistive technologies that educators are unwilling to rid themselves of their traditional methods.

Accessibility itself is a third factor affecting the intensive implementation of assistive technology, including the compatibility of the appliances with the school's current technology. "Fitting platform operating system, hardware, software plug-ins and other technical infrastructure on a purely technical level is compatibility" (Weston, 2004: 58).

Weston (2004) noted that compatibility involves designers' inability to predict how assistive technologies function in a classroom that is not monitored for experimental purposes.

Problems that usually affect a student's technology are related to programming and ability in instances where schools may not have specific characteristics such as video cards, ability to function monitoring to effectively run apps. Implementation may not be feasible if this is the case. This is to agree that the difficulties of accessing Assistive Technology are increasing hand in hand with their demand. The difficulties that have been raised include insufficient resources or not knowing where the funds can come from. Zhang (2000) noted that the challenge of obtaining gadgets is linked to regulations that do not allow students to access the computer lab on their own. This makes it impossible for educators to give individualized learning to learners with disabilities.

Weston (2004) and Bryant and Bryant (1998) established that teachers are strongly motivated by a passion for conducting changes in the implementation of instruction that integrates technology but faces challenges related to time and funding, which impede the acquisition of technological gadgets.

Access to Assistive Technology is disrupted by software complexity, time to learn how to use it, inadequate resources to pay for Assistive Technology, and day-to-day classroom specifications.

Lack of time to learn how to use technology, lack of technological compatibility, insufficient funding and daily classroom requirements have all been discovered to hamper acquisitions and the use of assistive technology.

Zhang (2000) noted that the obstacle connected with the application of assistive technologies sometimes has to do with laws that do not allow students in computer laboratories alone, which in turn hinders the individualized learning needed by the learners.

Sometimes the soft or difficult ICT infrastructure does not fulfill the needs of disabled learners. Similarly, Weston (2004) noted that the school climate is challenging the application of AT in the teaching and learning system, needing specific attention to behavior and time management. Lack of consciousness, insufficient support and facilities for parent training and lack of cooperative setting among and between educators, families, service suppliers and scientists have been recognized as a factor leading to the failure to integrate assistive technologies.

This corroborated the explanation that for so long Assistive Technology did not benefit visually impaired (Kapperman, Sticken, & Heinze, 2002 ; Brown, 1992). Kelly (2009) revealed evidence that 59% to 71% of visually impaired learners did not benefit from AT.

2.6. Conclusion of the chapter

The literature review was conducted in line with the goals of the research.

The section concentrated on the views of academics and professionals on the effect of Assistive Technology on the accomplishment of disabled learners and an empirical assessment that outlines the various research that have been undertaken in the region. the section also looked at the problems connected with teaching and learning inclusion on assistive technologies. However, in determining the effect of Assistive Technologies on the results of learners with visual impairment, the reviewed literature was seen wanting.

This research bridged the gap by evaluating the accessible Assistive Technologies and their effect on the academic achievement of visually impaired learners at the University of Rwanda-Education College in Rwanda, a developing country.

Orodho (2009a; 2012b) defines a structure as a roadmap that the investigator will follow when collecting, analyzing organizations and interpreting information. Kothari (20014) referred to the design as a scheduled and organized approach leading to issues being answered. The research chose the design of the descriptive survey.

The descriptive study design is used to define the features of a studied population or phenomenon. It does not answer questions about how, when, why the feature happened.

Rather, it deals with the issue of "what." The features used to define the condition or population are gener

ally known as descriptive classifications as some types of categorical system.

For frequencies, averages and other statistical calculations, the description is used.

Often the best strategy is to perform a study inquiry before writing descriptive research.

Using the design, the investigator was able to define the status of the phenomenon being studied without variables being manipulated.

CHAPTER THREE: RESEARCH METHODOLOGY

3.2 Research design

Orodho (2009a ; 2012b) defines a structure as a roadmap that the investigator will follow when collecting, analyzing organizations and interpreting information. Kothari (20014) referred to the design as a scheduled and organized approach leading to issues being answered. The research chose the design of the descriptive survey.

The descriptive study design is used to define the features of a studied population or phenomenon. It does not answer questions about how, when, why the feature happened

Rather, it deals with the issue of "what." Usually the features used to define the condition or populations are some types of categorical schemes also known as descriptive classifications.

For frequencies, averages and other statistical calculations, the description is used. Often the best approach is to conduct a survey investigation before writing descriptive research. Using the design, the investigator was able to define the status of the phenomenon being studied without variables being manipulated.

3.3 Study setting

The study was conducted at the Education College of the University of Rwanda. College of Medicine and Health Sciences, College of Business and Economics, College of Science and Technology, College of Arts and Social Sciences, College of Agriculture and Veterinary Sciences. The Education College was the analytical unit for this study.

This locale's selection was driven by two factors. First, there are several students with different disabilities in UR / Education College, including visual impairment compared to any other colleges in Rwandan Education Institutions. Secondly, UR / College of Education has been selected because it is a representative teaching institution in Rwanda from which effective methods of teaching can be learned.

3.4 Target population

Orodho (2009) described the target population as all items or individuals to be considered in studies. The entire target population was 145 individuals for this study. These included three school deans, seven department heads, five ebookKeepers, ten special needs education teachers and 120 students. These population strata were chosen because of their familiarity with the instructional and teaching environment.

Table 3.1: Target population distribution

Category of respondents	SSEs
School Deans	3
Department heads	7
E-Librarians	5
Teachers of Special Needs Education	10
Students	120
Total	145

Source: Researcher's calculations (2019)

Table 3.2 demonstrates the sample sizes for all research participant classifications. The sample size for the research, as can be seen, was 117 informants, including 3 school deans, 7 Heads of Department, 5 E-Librarians, 10 teachers of Special Needs education and 92 students. The sample size produced 80.68% of the target population. This sample size was therefore statistically validated as it was above 10%, which is the minimum recommended to ensure adequate representation in social science research (Gay, 1992; Amin, 2005).

3.6 Research tools

Two primary research tools were used in this study. These were a question for school Deans, Heads of departments, E-Librarian and teachers and a questionnaire for students. The questionnaire comprised both open and closed ended questions.

A questionnaire was an appropriate way of gathering data within a very short time from a comparatively large sample of participants (Phellas, Bloch, & Seale, 2012).

3.8 Position of the researcher

During the data collection period, the researcher' attitude was neutral. Personal feelings and opinions were always avoided and transparency of methods was strictly observed. The researcher followed the principle of bracketing.

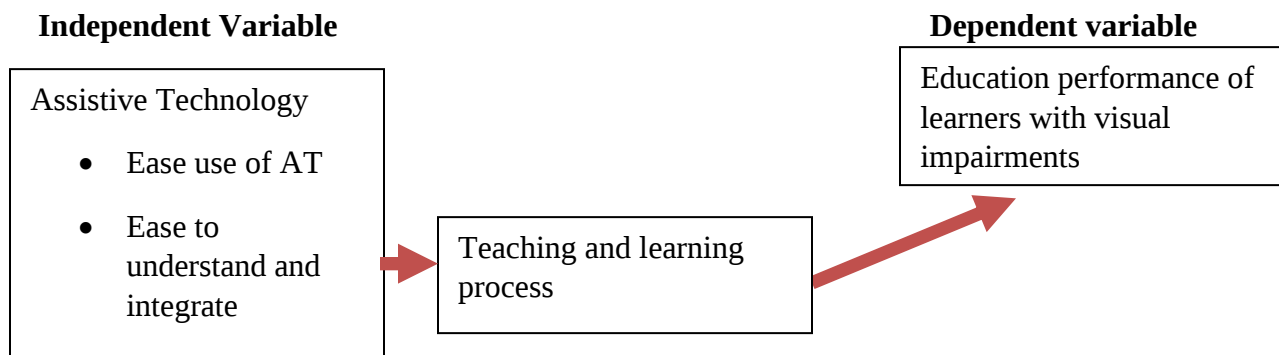
Bracketing is characterized as the suspension of preconceptions, biases and beliefs of the researcher so as not to interfere with or affect the experience of the participants (Parahoo, 1997). The researcher refrained from making judgment about what was observed or heard and remained open to data collected from respondents.

3.8 Data analysis procedures

The research design taken in this study was notified of the data analysis. Frequencies and percentages were generated to describe the status of affairs of the phenomenon under study. The frequencies and percentages generated were presented in graphs

3.9. Conceptual framework

This conceptual framework in figure below describes the relationship of independent variable, intervening variable and dependent variable



The research model has been outlined in this chapter. Research location, target population, sampling methods and sample size, research tools, accuracy and reliability, data analysis and ethical considerations are also outlined.

CHAPTER IV: PRESENTATION, ANALYSIS AND INTERPRETATION OF THE FINDINGS

4.1 Introduction

This section provides the study's results, interpretation and debate. The research aimed to determine the effect of assistive technologies on learners with visual disabilities' academic accomplishment. The study results are submitted in accordance with the research goal and thus concentrate on three thematic fields:

- Assess the assistive technology used by learners with disabilities of the University of Rwanda;
- Find out how technologies influence the performance of learners with disabilities of the university of Rwanda;
- Find out the difficulties facing University of Rwanda learners with disabilities.

4.2 Presentation of the findings

4.2.1. Demographics characteristics of the respondents and return rates

This section presents the demographic characteristics like, gender, age, marital status, occupation, and location (residence) of respondents.

Overall, out of 117 questionnaires distributed, 100 were responded and returned, leading in a total return rate of 85 percent, far above the minimum acceptable return rate for study research (60 percent), as Fincham (2008) specified.

4.2.1.1 Gender of respondents

The question on gender of respondents was asked to finally compare the views of respondents on who, between both male and female, knows more about impact where Table 4.1 presents assistive technology on the academic performance of disabled learners and the outcomes acquired on the issue.

Table 4.1: The respondent's gender

Gender	Number of respondents	Percentage
Male	37	37
Female	63	63
Total	100	100.0

Source: Primary data, December 2017

From the table above, talking about the gender of participants, results from the above table show that 65.3% are female and 34.7% are male, considering the national situation where 54% of national population are female.

4.2.1.2 Age of respondents

The question on age of respondents was asked with the aim of knowing who among inhabitants of different ages have more knowledge on the contribution and challenges of educated women to the socio-economic development, referring to how the sample was selected and after being aware of the gender of respondents, even considering the fact that among educated women some are still young and others old. And the results on the asked question are shown in Table 4.2.

Table 4.2: Respondents ' age

The age Range	Number of respondents	Percentage
18-27	45	45.00%
28-37	28	28.00%
38-47	27	27.00%
Total	100	100.00%

Source: Primary data, December 2017

As far as demographic characteristics are concerned, results obtained from the table above show that 45% are aged between 18-27 years old, followed by 28% aged between 28-37years old and finally come 27% those represented by 38-47 years old.

4.3 Access and use of Assistive Technologies

4.3.1 Availability of gadgets

The Figure 4.1 presents the kinds of assistive technologies available at the University of Rwanda-College of Education.

From the research discovery, the University of Rwanda encloses various assistive tools among which abbreviation expanders, alternative keyboards, Audio books and publications, talking calculators as well as speech recognition programs. These devices (tools) were considered both to be available by 89% of total participants.

4.3.2 Lecturer's education in the use of assistive technologies

Figure 4.2 depicts the perceptions of Lecturers' training for the Use of Assistant Technology

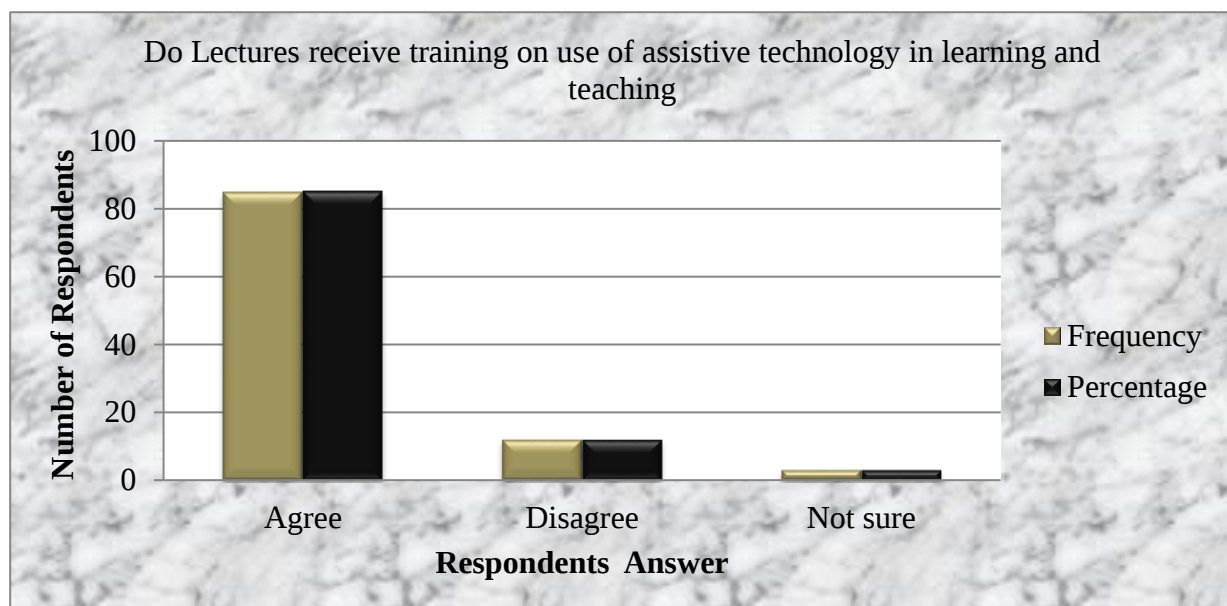


Figure 4.1: Perception on Lecturers' Training in Assistive Technology

Source: Research Findings, 2017

4.3.3 Level of Lecturers who got training in the use of assistive technologies

The figure 4.3 depicts the responses on the level of Lecturers who got trainings in the use assistive technologies.

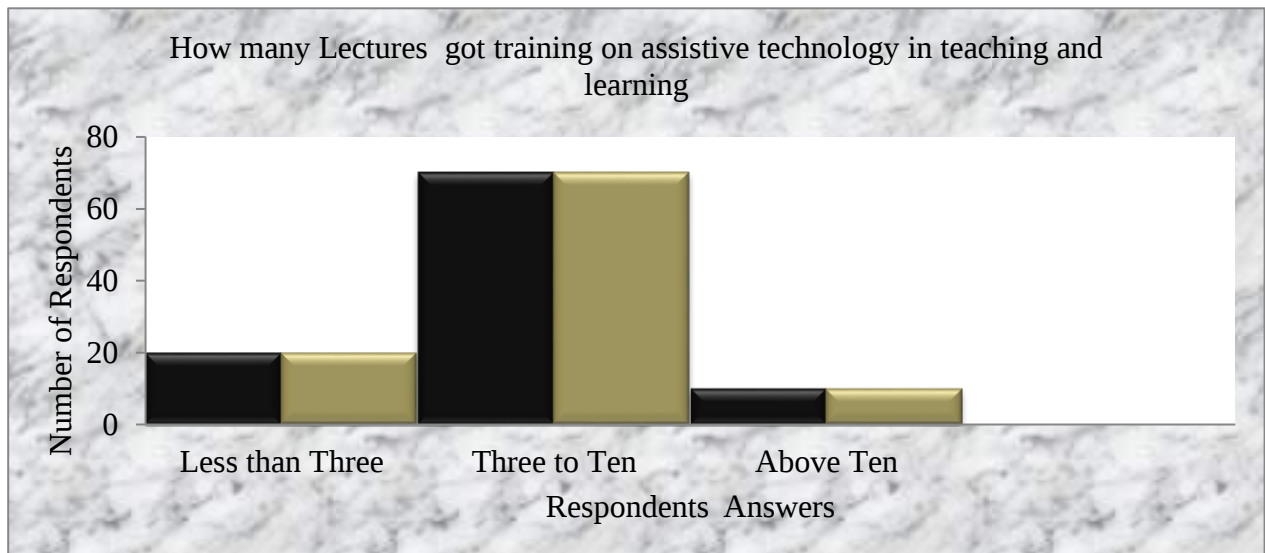


Figure 4.2: Level of lectures that got Assistive Technology training

Source: Research findings, December 2018

Research results from the above show that university lecturers receive training on the use of assistive technology in learning and teaching, where 85% of respondents agreed that teachers would receive periodic training.

Only 10% of respondents have disagreed while the remaining 5% of participants are not sure whether lectures receive trainings or not.

Assistive Technology can provide support for students and teachers in the classroom, but for this to happen both the student and the teacher must understand and know how to use the device.

In most settings, teachers are still not receiving the pre-service and in service training they need in both general and special education.

“Lack of technology training and technology support services” inside the classroom and at home can also be a barrier to “implementing Assistive Technology” (Judge, 2000). The researcher was interested to find out the level of lectures that got Assistive Technology training to offer quality assistance for learners with disability.

Twenty percent of total participants said that less than three of university' Lectures have at least got trainings, 70% of total participants affirmed that lectures that got trainings range from three to ten while the remaining 10% of our respondents declared that these vary with the number above ten.

4.3.4 Lecturers familiarity with assistive technologies

The Figure 4.4 depicts the levels of Lecturers' familiarity with assistive technologies.

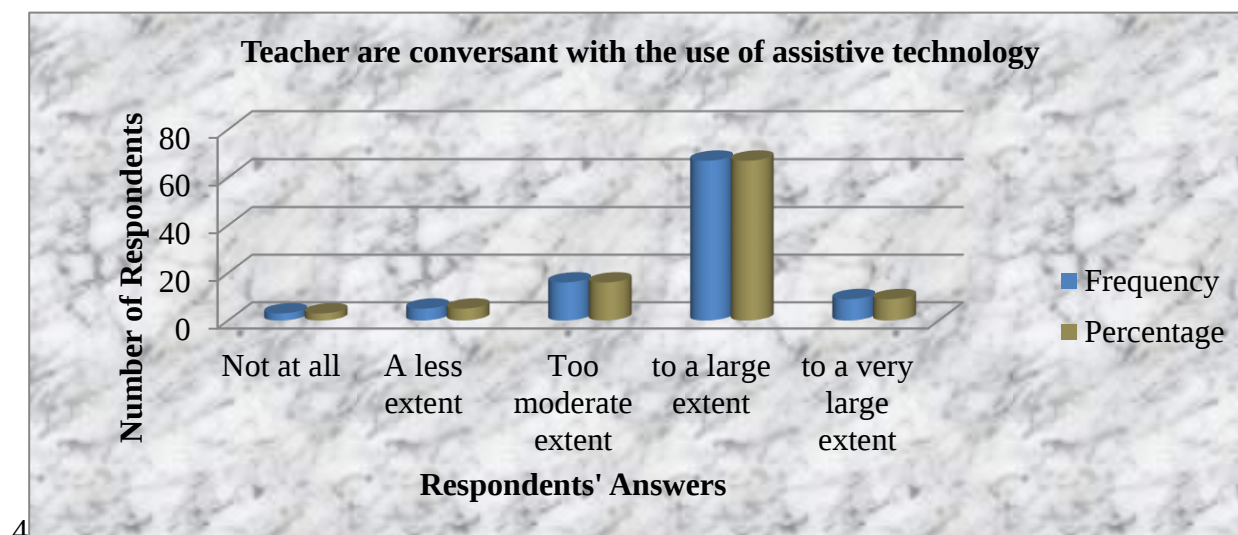


Figure 4.3: Familiarity of lecturers with the use of assistive ethnology

Source: Research Findings, 2017

Findings from a number of studies have shown that most students with disabilities are not adequately equipped to use AT (Alkahtani, 2013; Alsalem, 2010; Lee & Vega, 2005).

Providing practitioners with the knowledge and skills required is very necessary for the successful implementation of Assistant Technology in the classroom (Gustafson, 2006). Ultimately, not many educators have the knowledge or skills required to empower them to make effective use of AT.

Therefore, the researcher was excited to find out whether even if trained, the lecturers would be familiar with the use of Assistive Technology devices. Ten percent of participants affirmed that lecturers are moderately familiar with AT, 69% declared that lecturers are familiar with the use of AT to a large extent while 15% of the total respondents asserted that lecturers are familiar with AT to a very large extent. Generally, 95% of respondents affirmed the familiarity of Lecturers with the use of AT

4.3.5 Simplicity of integration AT in teaching and learning

Presented on the Figure 4.5 are the views on the simplicity of AT integration in the teaching and learning process.

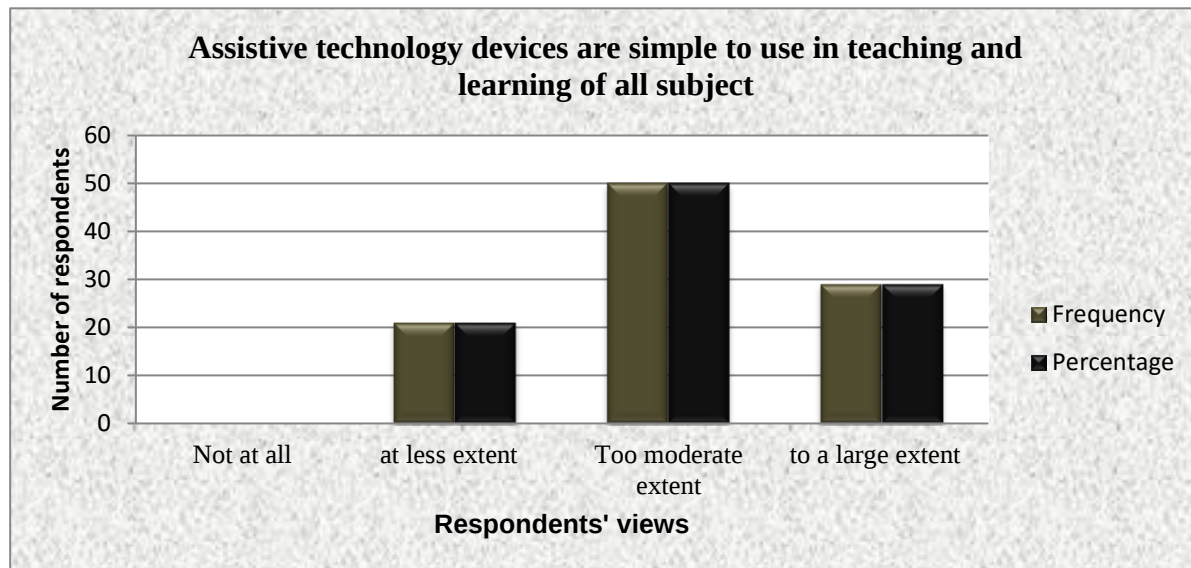


Figure 4.4: Simplicity of using AT in teaching and learning all subjects

Source: Research findings, December 2017

The findings on the simplicity of Assistive Technology use have shown AT is easy to use due to various trainings and practical experiences as time varies. 21% of respondents said AT usage is simple at less extent while 50% of respondents declared that AT is effortless to use in teaching and learning of all subjects, and then, 29 % of participants find AT to be simple to a large extent.

4.3.6 Frequency of AT use in classrooms

The Figure 4.6 presents the views on the frequency of integration of AT in the teaching and learning process.

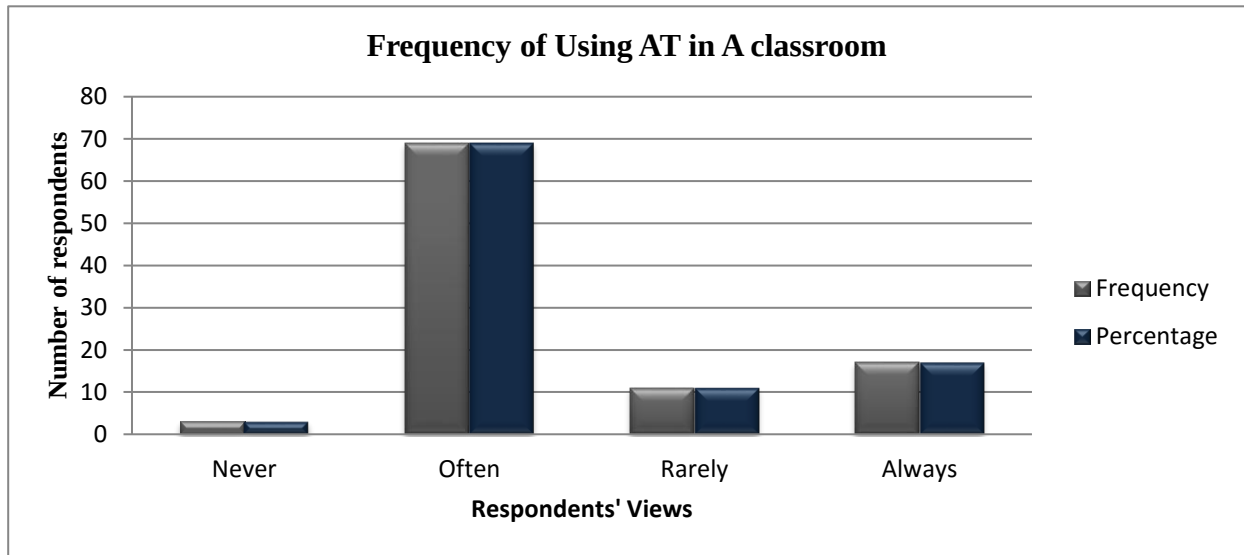


Figure 4.5: Frequency of Using AT in classrooms

Source: Primary data, December 2017

The findings of the survey showed that the majority of respondents that were surveyed pointed that AT usage in classroom is often made, where 69% affirmed this to be done often, 11% say that University Classroom rarely use AT while the remaining 17% of total participants judge the usage to be always done.

4.3.7 Efficiency of AT usage

The Figure 4.7 provides a synoptic presentation of the views on the efficiency of AT usage.

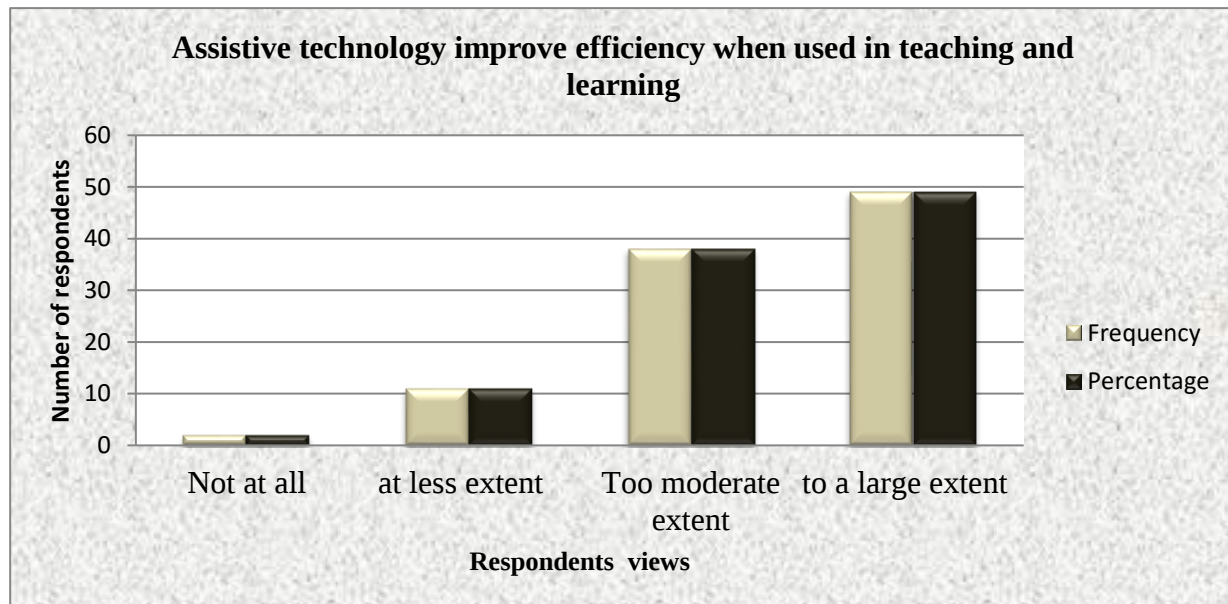


Figure 4.6: The efficiency derived from AT usage in teaching and learning

Source: Research findings, 2017

Holzberg (2011) pointed out that AT helps increase students' motivation to learn and personalize classroom lessons to suit the individual needs of the student. Even those learners with the most severe and significant disabilities could use AT to enter ordinary learners' classes, and their ability could be fulfilled in ways that were not possible in the past, when assistive technologies were not there (Blackhurst & Morse, 2014).

Assistive Engineering plays an important role in improving education for students with disabilities (Adebiyi, Liman & Longpoe, 2015). There are many advantages found from the use of Assistive Technology with students with disabilities.

Access to engineering tools and software offers students with disabilities greater opportunities to be autonomous and develop their talents in a variety of environments (Burgessahler, 2003; Gustafson, 2006).

The researcher exploits the same authors' views to find out whether AT once applied in teaching and Learning for learners with disability could improve the teaching efficiency.

The results presented a positive feedback of the statement where 10% of participants criticize AT to offer efficiency to a less extent, 39% said that AT usages provide effectiveness at moderate extent while 49% of total respondents judged this to improve the efficiency.

4.4. Contribution of AT to effective learning and performance of students with disabilities

4.4.1 effect of AT on academic performance

The figure 4.8 shows the views on the effect of AT on academic performance

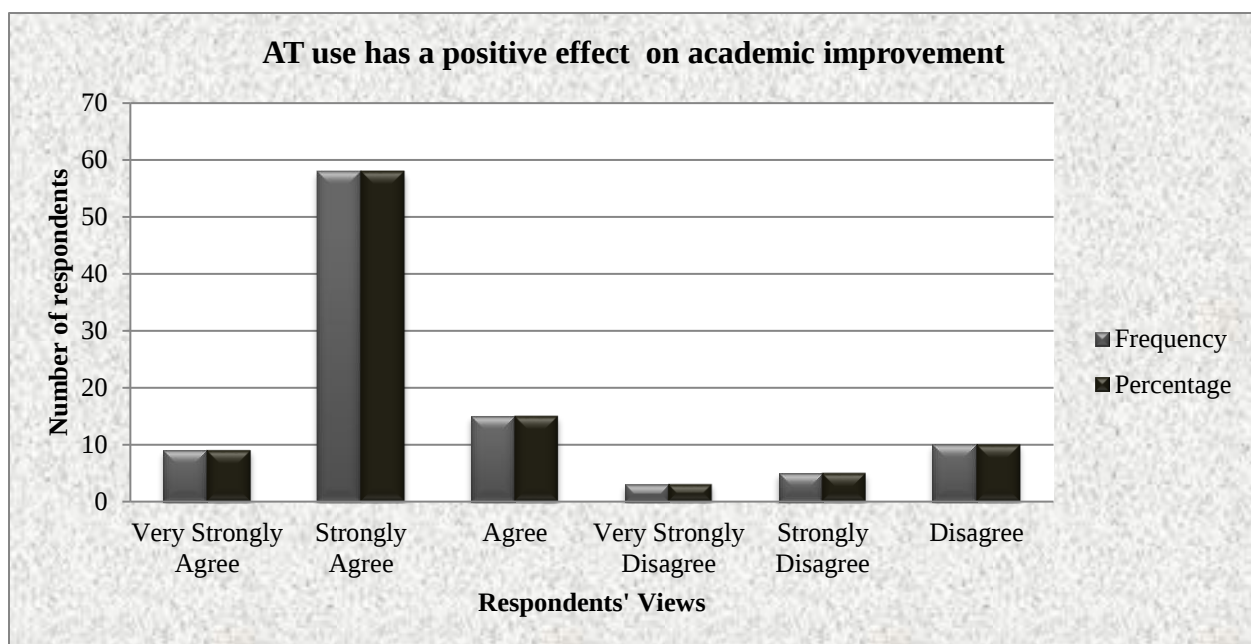


Figure 4.7: Views on the effect of AT on academic performance

Source: The research findings, 2017

According to Hetzroni and Shrieber (2004),

AT use decreased spelling errors and increased coordination were found when using word processing technology compared to hand-written resources for students with learning disabilities.

Findings from a research undertaken by Garrett et al (2011) have shown that speech recognition called Dragon Naturally Speaking is efficient software to improve writing fluency with physical disabled learners.

For disabled students, the technology could be an significant equalizer that could stop their complete involvement in college. This is most evident for learners with impairments in vision, hearing, and mobility, although it also applies to those with perception and behavioral constraints (Quinn et al, 2009).

A student who is unable to speak mentally with technology could interact with synthetic spoken English: a mobile speech synthesizer can be used to answer and ask questions in the periodic classroom.

This technology would enable this student to overcome a physical barrier that could have caused him or her to be placed in a unique separate class or to require a fulltime educational translator or assistant to provide a voice (Levin & Locke, 2011). Students with disabilities can engage completely in school activities and classroom duties and assignments with such technology.

4.4.2 Relationship between AT integration and students' skills

The Figure 4.9 show the views of respondents on the relationship between AT use and students' skills.

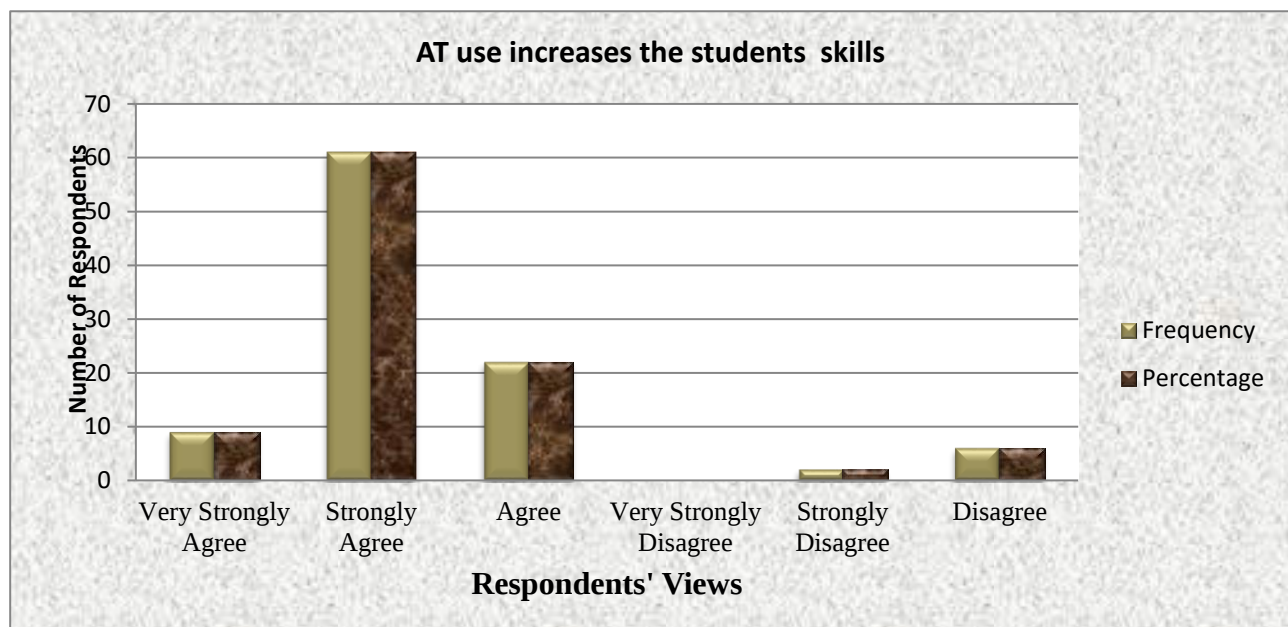


Figure 4.8: Relationship between AT Usage and the increase of students' skills

Source: Research findings, December 2017

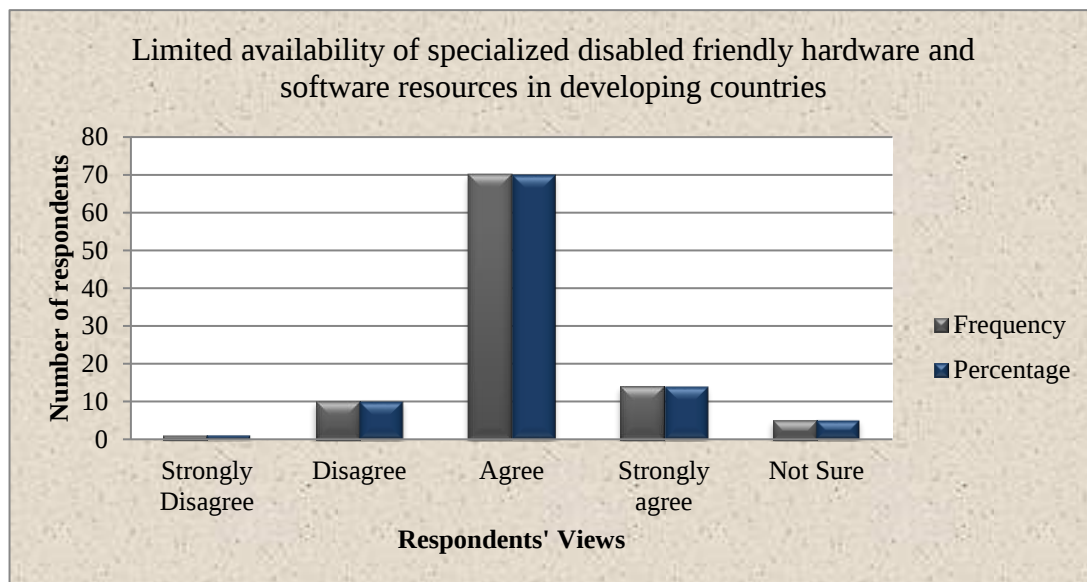
The use of technology to enhance learning is an effective approach for many students with learning disability. Additionally, students with LD often experience greater success when they are allowed to use their abilities (strengths) to work around their disabilities (challenges). AT

tools combine the best of both of these practices. 61% of participants strongly agreed that AT use leads to the positive increase of students' skills, 9% participants very strongly agree to the statement and 22% agreed and 8% of total respondents have disagreed to the research statement.

4.5 Assistive Technologies related challenges encountered at university

4.5.1 Availability related challenges

Figure 4.10 presents the views of respondents on limited availability of AT



Source: Research findings, 2018

It has been discovered in the current studies that most respondents agree that technology gives importance to the teaching of students. However, it has been disclosed that respondents minimally use Assistive Technology.

Compared to individuals with disabilities, the availability of AT funds in developing nations, such as Rwanda, is not yet adequate. 70% Research Participants agreed that the University's use of Assistive Technology was challenged by the limited supply of specific friendly hardware and software resources, while 12% agreed to the declaration, while 11% disagreed. It was suggested by the majority of respondents that enhanced training and accessibility of resources would prompt further application of assistive technology.

4.5.2 Policy related challenges

Figure 4.11 presents the challenges related to policy

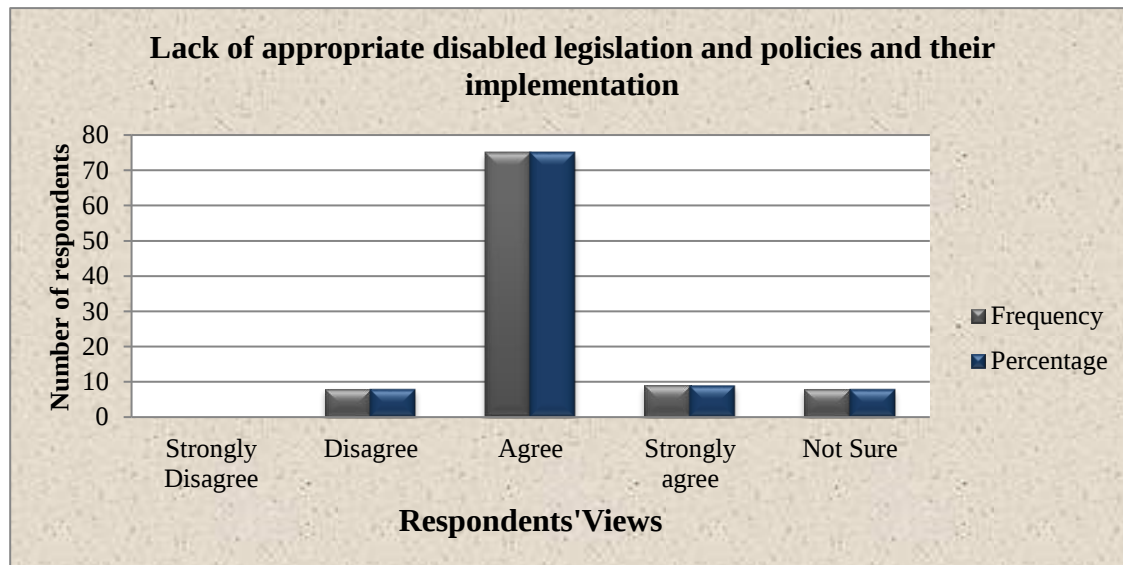


Figure 4.9: Inappropriate disabled policies

Source: Research findings, December 2017

Many legal instruments have been supported by Rwanda. Ministerial orders, industry policy and strategic plans for people with disabilities are plentiful, but several of them are still in early or unimplemented execution.

Since December 2008, Rwanda has signed both the UN Convention on the Rights of Persons with Disabilities (UNCRPD) and its optional protocol. Through these legal instruments, Rwanda is fully committed to assisting individuals with disabilities integrate into society.

Rwanda is fully dedicated to helping people with disabilities to integrate into society through these legal instruments. The state has scheduled various types of services so that disabled people can be handled in Rwandan culture like any other individual.

Despite government projects, there is a problem with its design and provision. The generic designs characteristic of being manufactured commercially. AT, in many instances, does not fulfill individuals' specific, complicated and frequently changing requirements.

In addition, AT acquisition is often a costly and lengthy method that does not fully take into account the requirements of people with disabilities owing to a absence of consultation and participation of customers and their caregivers.

One result of these shortcomings is evident in the outcomes of adoption research that have shown that its consumers abandon about a third of AT.

Most participants said these policies are being adopted without a full census of stakeholders facing daily barriers to their lives. 75% of respondents felt that Rwanda's policies on disabilities were unsuitable; they said that certain policies should be reviewed and moved to local societies where most individuals with disabilities reside.

4.3 Finance related challenges

Figure 4.12 presents the views of respondents related to finance challenges.

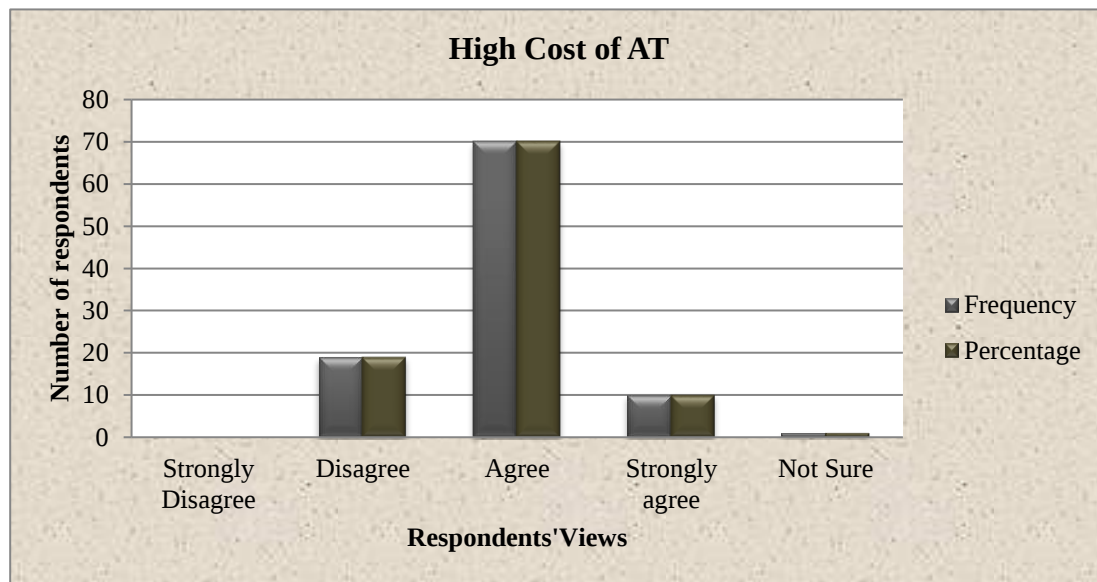


Figure 4.10: Limited finances due to High cost of AT

Source: Research findings, 2017

AT's expense was also discovered to be a major issue for many. AT's vital specificity leads to high development expenses, tiny batches of manufacturing, and therefore elevated prices. As a consequence, disabled individuals and their caregivers often depend on financing from government and charity to buy and keep AT.

Finite resources and eligibility criteria, however, mean that these channels can not always fund the AT that the individual needs.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1.: Summary of Study

With respect to the primary research goal of examining the types of assistive technology presently used by visually impaired and physically disabled learners at the University of Rwanda in inclusive school, based on the results of this research, it can be concluded that learners with VI have hardly used any contemporary assistive technologies such as the screen reader, the portable note taker, the digital book reader and Braille books. Nonetheless, it was evident that the only modern assistive technologies used by a minority of the SNE teachers who participated in the current study were screen reader scans and Braille books. These results were echoed by a huge majority of SNE teachers who reported that although they had heard of the availability of assistive technologies, they had not even interacted with them. The students with VI on their part maintained that they over-relied on the less modern technologies such as the Braille spectacles, and magnifying machines.

From the research discovery, the University of Rwanda encloses various assistive tools among which abbreviation expanders, alternative keyboards, Audio books and publications, talking calculators, Braille transcribers as well as speech recognition programs. These devices (tools) were considered both to be available by 89% of total participants.

The research findings indicated that 90% of total participants absolutely agreed that National University of Rwanda has various students among which visually and hearing impaired students are included, 10% of respondents have denied the research statement. This articulates in the sense of Rwandan inclusive education as a process of addressing and responding to the diversity of needs of all learners through increasing participation in learning, cultures and communities, and reducing exclusion from education and from within education. The goal is that the whole education system will facilitate learning environments where teachers and learners embrace and welcome the challenge and benefits of diversity.

University lecturers receive instruction on the use of assistive technology in learning and teaching, with 85% of respondents agreeing that lecturers are regularly trained. Only 10% of respondents have disagreed while the remaining 5% of participants are not sure whether lecturers receive trainings or not. Therefore, the researcher was excited to find out whether even if trained, the lecturers would be familiar with the use of Assistive Technology devices 10 % of participants affirmed that lecturers are moderately familiar with AT, 69% declared that lecturers are familiar with the use of AT to a large extent while 15% of the total respondents asserted that lecturers are familiar with AT to a very large extent. Generally, 95% of respondents affirmed the familiarity of Lecturers with the use of AT.

The findings on the simplicity of Assistive Technology use have shown AT is easy to use due to various trainings and practical experiences as time varies. 21% of respondents said AT usage is simple at less extent while 50% of respondents declared that AT is effortless to use in teaching and learning of all subjects, and then, 29 % of participants find AT to be simple to a large.

Assistant Engineering plays an important role in improving education for students with disabilities (Adebi si, Liman & Longpoe, 2015). There are many benefits found from the use of Assistant Technology with students with disabilities.

Exposure to engineering tools and software offers students with disabilities greater opportunities to be autonomous and develop their talents in a variety of environments (Burgessahler, 2003, Gustafson, 2006)

The researcher exploits the same authors' views to find out whether AT once applied in teaching and Learning for learners with disability could improve the teaching efficiency. The results presented a positive feedback of the statement where 10% of participants criticize AT to offer efficiency to a less extent, 39% said that AT usages provide effectiveness at moderate extent while 49% of total respondents perceive this to improve the efficiency.

5.2 Conclusions

From the research results, visually impaired schools use braille machines, abacus, embossers, thermo formers, slate and stylus as main aid technology facilities

Current technology composed of more effective, timesaving and reliable pcs, ipads, ipods, intelligent braille machines is not prevalent and well used by Visually impaired learners due to scarcity, lack of purchasing resources, lack of a legal framework and policy to guide the teaching of such technology, and lack of skilled teachers to provide such essential services to learners.

The global society's desire to digitalize and bring technology into many facets of life has made technology crucial in our time and more urgent for visually impaired students who risk being left behind if policy guidance and technology making for all is not developed and implemented.

The study emphasizes technology that addresses special needs issues as a necessary requirement, especially for the visually impaired from this type of understanding. Students with visual impairment compete comparatively with those without special needs in the education and job market.

5.3 Recommendations and suggestions

1. SNE teachers and students with visual impairments should be targeted at training in the use of modern technology.
2. Research should be conducted to determine the role of government in offering assistive technology to visually impaired learners.
3. Research should be conducted to identify the best instructional strategies to ensure better delivery of technological curricula among visually impaired learners
4. A research should be carried out to create steps to guarantee that learners with other kinds of disabilities have quality access to education

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APPENDICES

APPENDIX 1: INTRODUCTORY LETTER

Dear respondent,

I, **BOLINGO Amurani**, Student of Master's in Special Needs at UR University of Rwanda, I am conducting a research on **“THE IMPACT OF ASSISTIVE TECHNOLOGY ON EDUCATIONAL PERFORMANCE OF LEARNERS WITH VISUAL IMPAIRMENT AT UNIVERSITY OF RWANDA COLLEGE OF EDUCATION”** in fulfillment of the requirement for the award of Master's in Special Education Needs. The purpose of this questionnaire is to collect data on effect of Assistive Technology on students with visual, Physical handicapped and hearing impairment.

Your participation in facilitating the study is highly appreciated. You are requested to fill in the questionnaire attached to this letter. (Strict confidentiality is guaranteed in respect of information that will be provided by you). The research work is strictly an academic exercise and is not intended to undermine your operations. I hereby solicit your honest answers to the questions as I promise to treat your responses with utmost confidentiality.

Thanks for your cooperation and response.

Yours faithfully

BOLINGO Amurani

Appendix 2: QUESTIONNAIRE FOR DEANS

Respondent's education level:

a) Master's degree

b) Doctorate degree

1. How many students with physical, visual and hearing impairments are there in your school?

.....
.....

2. What is the total number of lecturers?

.....
.....

3. What is the total number of students?

.....
.....

4. How many lecturers are trained on the use of Assistive Technology?

.....
.....

5.What types of Assistive Technology tools are available at your College?

- ✓ Abbreviation expanders
- ✓ Alternative keyboards
- ✓ Audio books and publications
- ✓ Electronic math work sheets
- ✓ Freeform database software
- ✓ Graphic organizers and outlining
- ✓ Portable word processors
- ✓ Talking calculators
- ✓ Speech-recognition programs
- ✓ Variable-speed tape recorders

☐
☐
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h) Others.....

6. Use the key provided to answer the following questions

(1) not at all (2) a less extent (3) to moderate extent (4) to a large extent (5)to a very large extent.

Statement	1	2	3	4	5
Lecturers are conversant with the use of Assistive Technology					
Lecturers are involved in teaching students with visual impairment					
Lecturers are involved in teaching students with hearing impairment					
Lecturers are involved in teaching students with physical disabilities					

7. Use the key provided to answer the following questions below:

(1) Not at all (2) a less extent (3) to moderate extent (4) to a large extent (5)to a very large extent.

Relative advantage indicator	1	2	3	4	5
How dependable are the Assistive Technology					
How hard is Assistive Technology device to use					
Assistive Technology improve efficiency when used in teaching and learning of social studies					
Assistive Technology improve efficiency when used in teaching and learning of mathematics and sciences					
Does Assistive Technology meet the need of learners with disabilities					
Assistive Technology devices are simple to use in teaching and learning of all subject					

8. Does the school have documented policy on use of Assistive Technology in teaching and learning?

Yes.....

No.....

If yes explain.....

9. How would describe the learners' achievement after use of Assistive Technology?

.....

Appendix 3: QUESTIONNAIRE FOR LECTURERS, HEADS OF DEPARTMENTS, E-LIBRARIAN AND TEACHERS

The purpose of this questionnaire is to collect data on effect of Assistive Technology on the performance of student with disabilities at UR

- 1 What is your gender.....
- 2 How many students with visual, physical and hearing impairment are there in this school?.....
- 3 What is the gender of the students?
Male
Female.....
- 4 Which are different types of Assistive Technology devices are you familiar with
 - a. Braille
 - b. touch window
 - c. JAWS for window
 - d. Dolphin pen
 - e. Magnifier
 - f. Talking word processor
 - g. Touch tablets
 - h. Others please specify.....
.....
.....
- 5 Use the key below to rate the following statement
1) Not sufficient, 2) Sufficient, 3) Moderate, 4)High, 5)Very high

Statement	1	2	3	4	5
Adequacy of Assistive Technology					
Usage of Assistive Technology devices by students					
University investment in Assistive Technology					

6 How would you describe learners achievement in all subjects using Assistive Technology?.....

7 Have you gone through any form of training on Assistive Technology?

Yes

No

If yes, what type of training?.....

Has the training been relevant?.....

8 Use the key to rate the statement below?

(1) To no extent (2) to little extent (3) to moderate extent (4) to high extent (5)to a very high extent.

Statement	1	2	3	4	5
Assistive Technology increases student performance when properly implemented					
Lecturers, students, parents and other university representative collaborate together in selection of Assistive Technology to ensure success					

9 Is there any advantage of Assistive Technology in teaching and learning of all subjects among students with physical, visual and hearing impairments?

If yes explain.....

Is there any advantage?

If yes explain.....

10 Could you have thought a course to physical, visual or hearing impairments just as well without the use of Assistive Technology?

Explain.....

.....

11 How well do you feel Assistive Technology use fits with the way you teach?

.....

12 How complex or easy to use do you feel is the Assistive Technology devices that are available to you?

-
-
- 13 Do your colleagues use Assistive Technology devices in teaching?
-
-
- 14 In what ways in your opinion has Assistive Technology affected the teaching and learning among students with physical, visual and hearing impairments?
-
-
- 15 Kindly indicate your opinion on effect of Assistive Technology in teaching and learning of all courses among visual and hearing impaired learners

Strongly disagree (SD)=1, Disagree(D)=2, Agree(A)=3, Strongly agree(SA)=4 and Very strongly agree (VSA)=5

Statement	1	2	3	4	5
The benefits of Assistive Technology(AT) will make me continue to use them in the future					
The ease of use of Assistive Technology will make me continue to use them					
The difficulty in learning to use Assistive Technology will make me not use them in future					
What I have observed about the use of Assistive Technology in my department will make me keep using them.					

1) Challenges of Assistive Technology encountered by University

Strongly disagree(SD)=1, Disagree (D)=2, Agree(A)=3, Strongly agree(SA)=4 and Very strongly agree(VSA)=5

Statement	1	2	3	4	5
• Limited flexibility in training options for children with learning disabilities					
• Limited availability of specialized disabled friendly hardware and software resources in developing Countries					
• Lack of formal involvement of the government organizations and support structure for ICT for the persons with learning disabilities					
• Attitude barriers towards children with disabilities					
• Lack of appropriate disabled legislation and policies and their implementation					
• Limitation of finances					

Q.10. Do you think the use of AT can benefit certain content areas more than others?

- Yes
- No

Q11. Which content area/s do you think benefit/s more from use of AT? Please select only one.

- Reading
- English Language Arts
- Math
- Content areas (Social Studies, Science)
- All content areas benefit from use of AT equally
- Other

Q12.If you selected other, please explain.

Appendix 4: QUESTIONNAIRE FOR STUDENTS

Strongly disagree (SD)=1, Disagree (D)=2, Agree(A)=3, Strongly agree(SA)=4 and Very strongly agree(VSA)=5

Statement	1	2	3	4	5
AT use has a positive effect on academic improvement					
AT use increases the students skills					
AT use helps to increase learning outcome of SD					

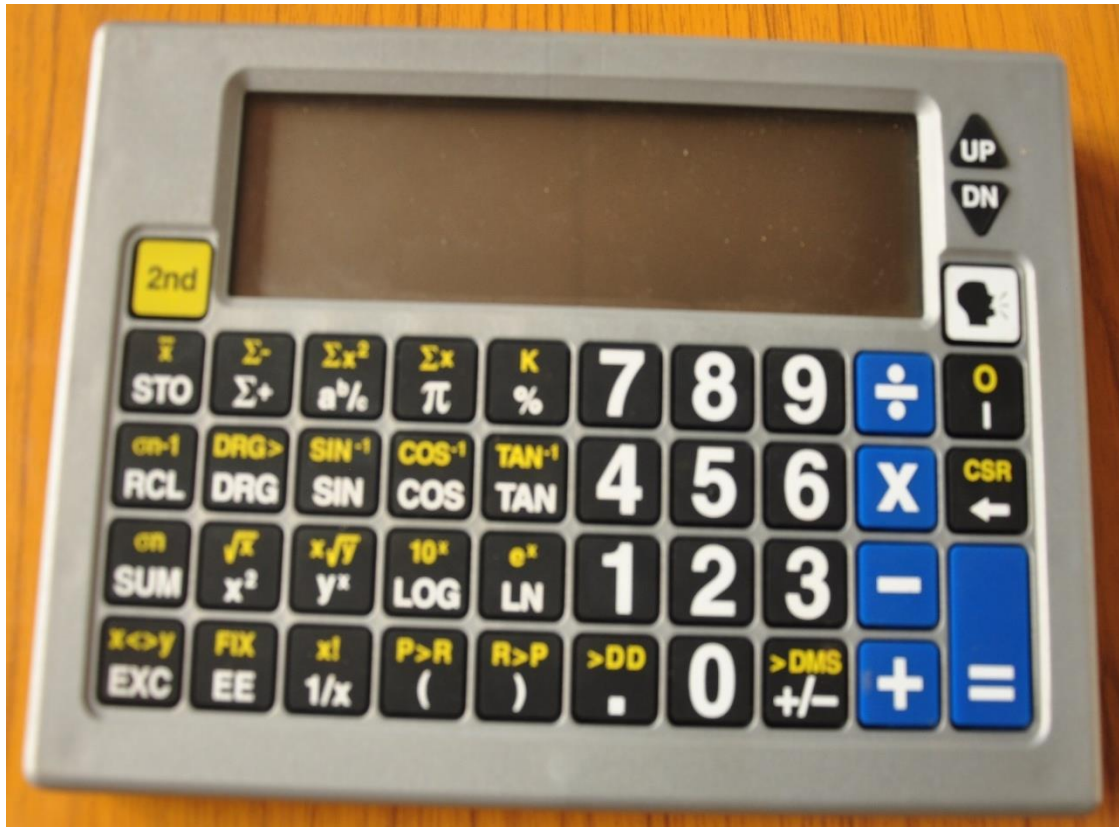
Appendix 5: SOME OF ASSISTIVE TECHNOLOGY FOUND AT UNIVERSITY OF RWANDA- COLLEGE OF EDUCATION



Resource room of University of Rwanda- College of Education



Perkins braille



Talking calculator



Brailino

Braille Displays





Slate and stylus



Sara CE



Smart view



Image enhancer



Readmaster



Victor recorder



Recorder



Embosser (Braille printing)