

INTERVENTION OF ASSISTIVE TECHNOLOGY ON PERFORMANCE OF VISUALLY IMPAIRED STUDENTS IN KISWAHILI LANGUAGE IN PUBLIC PRIMARY TEACHERS' COLLEGES IN KENYA

Francis B. Mutua

*Machakos University, School of Education, Department of Educational Communication and
Technology, P.O. BOX 136 – 90100, MACHAKOS*

E –mail: bfmtutua@mksu.ac.ke

Paper Received On: 21 OCT 2021

Peer Reviewed On: 31 OCT 2021

Published On: 1 NOV 2021

Abstract

Education is a universal right to all including those with disabilities. Students with visual impairments can struggle with a wide variety of challenges in a mainstreamed classroom setting. Assistive Technology intervention by use of assistive devices in teaching, use of assistive teaching methods, taking care of visually impaired severity and boosting positively the student-teacher related factors improve their performance. The purpose of this study was to examine the intervention of Assistive Technology on performance of Visually Impaired students in Kiswahili in Public Primary Teachers' Colleges in Kenya. The paper adopts a quasi-experimental design by use of a pre-test and post-test. It has been appropriate to analyze the treatment effect of using AT in teaching VI students in one group while applying the natural teaching methods on the control group. The target population was three teachers' colleges in Kenya (Asumbi, Machakos and Mosoriot). A standardized examination was given to the two groups. Another examination was given to the two groups after giving one group a treatment of use of discussion groups, peer consultation and use of teacher assistive teams. The AT devices were critical in teaching VI students in order to improve their performance in languages and therefore their adequacy in college determined the rate of students' performance. The researcher found out that the attitude of the teachers in teaching VI students was positive but the challenges in ensuring quality teaching of Languages included the students having a negative attitude towards languages, teachers have a negative attitude towards their career and lack of adequate teaching and learning materials. The researcher found out that the most significant methods that the teachers used to teach Languages to students with VI were: lectures, assignments and group discussions. The findings inferred that the partially blind students were better suited for the natural teaching methods than the totally blind students as they performed higher when taught using natural teaching methods. The paper recommends that the management of tertiary institutions should invest on interventions like the assistive technology in enhancing their academic performance. The researchers further recommends that other strategies for teaching VI students like use of peer consultations between the VI students with sighted students,

use of quieter rooms, teacher assistance teams; extended exam time for VI students and shorter assignments to the VI students should also be employed to enhance Language to students with visual impairment. The significance of the study is that AT device intervention such as use of digital recorder in teaching can improve students' academic performance.

Key Words: Assistive technology, attitude, instructional resources, teaching aids.



[Scholarly Research Journal's](http://www.srijs.com) is licensed Based on a work at www.srijs.com

Background to the study

The right to education is universal and is envisaged in the Convention of Rights of the children (2007) and the Convention on the Rights of children with Disabilities (2008). The right to education to all children is also addressed in several significant international declarations, including the World Declaration for Education for All (1990), the UNESCO Salamanca Statement and Framework for Action (2007) as well as the Dakar Framework for Action (2000). Visually impaired (VI) students have a right to access quality education that enables them to perform well in examinations. Visual impairment is either total blindness or low vision. It refers to a significant loss of vision, even though the person may wear corrective lenses. Being visually impaired is defined as “loss of sight that affects a student’s educational achievement in a negative way and which cannot be recovered” (Demir & Sen, 2009). The development of a student with a visual impairment is affected by: the type and severity of the visual impairment; the onset of the visual impairment; the nature and degree of intervention; the availability of equipment and resources; the presence of other disabilities; and cultural attitudes to visual impairment. A low vision student may be able to read large print while a totally blind one can use Braille prints to read. The nature and degree of visual impairment may vary significantly; so, each student may require individual adaptations to instructional practices and materials in order to learn effectively. The performance of VI students in academics is dependent on the teaching methodology used in school (Alonzo, 2006). Assistive technology (AT) is the use of assistive devices in teaching, assisting the VI students according to their severity, assisting in boosting positively the student-teacher related factors and use of assistive teaching methods to improve their academic performance.

Globally, the challenge for educators of VI students, including those with other disabilities, is how to teach skills that sighted children typically acquire through vision. VI students have used a variety of methods to learn to read, write, and acquire other skills, both academic and non-

academic (Cole & Chan, 2000). VI students use a combination of AT devices including Braille, large print, low vision aids and audio devices in learning.

Many other countries such as South Africa, Tanzania, Uganda, Nigeria and Kenya, appreciate that all persons have a right to quality education, and thus are implementing inclusive education (Ndurumo, 1993). Quality education should yield good student performance in examination, and therefore it is research concern when students perform below expectations (Joyce, Weil, Calhorne, 2004).

Ndurumo (1993) reported that the majority of students with disabilities in developing countries including Kenya are either currently out of college or they perform poorly. Many of those enrolled are not given the special attention they deserve. Therefore, removing barriers to accessing education for students with disabilities is a pre-requisite for the realization of Universal Primary Education and Education for All (Burk, 1998). In order to achieve this, it is important to ensure that all students have access to quality education; education policies and practices must be inclusive of all learners and encourage the full participation of all in the society at large.

Languages are a key subjects in career development, hence compulsory in the Kenyan secondary schools and colleges' curriculum. Studies have shown that performance of students with disabilities in national examinations in Kenya has generally been poor. Performance of VI students in Languages in Primary Teacher Education (PTE) examination has been poorer compared to other subjects. However, a study has not been done showing the intervention of the visually impaired students' poor performance. The accessible population comprised of the principals, teachers and students with visual impairment in the three colleges.

Theoretical Framework

The study was guided by general System Theory which was developed by Ludwig von Bertalanffy in 1968 and others. Schools are social systems in which two or more persons work together in a coordinated manner to attain common goals (Scott, 2008). All schools are open systems, although the degree of interaction with their environment may vary. According to open-systems views, schools constantly interact with their environments and they need to structure themselves to deal with forces in the world around them (Scott, 2008).

A system can be defined as an interrelated set of elements functioning as an operating unit (Senge, 2006). All schools are open systems. An open system consists of five basic elements (Scott, 2008): inputs, a transformation process, outputs, feedback, and the

environment. In this study the inputs include the teachers, visually impaired students' assistive technology and teaching materials used. The students with visual impairment undergo some transformation through the use of AT in order to better their performance. In this study, the teacher used assistive intervention of teaching materials such as digital recorder to add value to visually impaired students and therefore boost their performance in language. The desirable outputs in this study are the achievement of quality grades by the visually impaired students in languages. The environment surrounding the school includes the social, political, and economic forces that impinge on the organization.

Literature Review

Visually impaired learners are faced with a broad spectrum of challenges and frustration that can easily cause stress and emotional volatility. Such learners may have tantrums, scream, cry, be sad, and withdraw themselves from others. Nail biting is quite common to them and they tend to be forgetful. They also sometimes lag behind in learning, which later contributes to more serious learning difficulties. Mastropieri and Scruggs (2000) confirm that such a lack of vision causes learning related problems in most learners. For example, they cannot read the words on a page; they hold the book too close to their eyes while they are reading, they repeat the same line, or jump lines while reading; or they frown while reading. These students may perform poorly in Kiswahili. This study focused on an intervention in teaching VI students who are disadvantaged.

Kim, et al., (2006) argues that as teachers aim towards a goal of having all students provided with the same educational opportunities despite of their differences, there is need to include Assistive technology (AT) in the process of evaluation of a student's needs. Assistive technology (AT) covers the wide range of adaptive techniques, as well as equipment used by anyone who has difficulty performing a task, especially reading, writing or using a computer. A student who displays difficulty performing any reading activity or play activity can benefit from an assistive technology evaluation to see if he is performing to the best of his abilities, or if an adapted or assistive device would be helpful. Holding material very close to the eyes, leaning very close to the desk in order to see what they are doing, requiring lots of light but being bothered by glare, these are all signs of a student requiring their vision assessed to determine what is going on with their eyes and what might be helpful. All students with a vision loss need to be provided with an assistive technology evaluation and follow-up training on how to use the technology while in college. These technologies, whether low or high tech, will be

lifelong supports to these students, for enhancing their ability to independently function as adults at school and at home.

Learning disabilities are professionally diagnosed learning difficulties with reading, writing, speaking, listening, spelling, reasoning or mathematics that are the result of a presumed central nervous system dysfunction. Learning disabilities are neither cured nor outgrown. Students with learning differences grow up to be adults with learning differences. However, with hard work and helpful tools such as assistive technology, students with learning differences can greatly improve their success and academic performance (Balajthy, 2005). Although teachers tend to think of learning differences in terms of the school setting, students with visual impairment must also function at home, in the workplace, at social gatherings and in recreational activities. Easily portable tools, many of which are pocket-sized, allow individuals to bring a bypass strategy into many different settings and assist the students to learn with much ease.

Assistive technology (AT) helps to increase the independence of students with learning differences. Many times, these students rely on parents, siblings, friends and teachers for help. Yet over-reliance on others may slow the transition into adulthood. It may also lower self-esteem, as it requires persons with learning differences to depend on others, rather than themselves, to solve a problem. Assistive technology provides a means for students with learning differences to accomplish specific tasks on their own (Kim, et. al., 2006). Barriers to the adoption of assistive technology include lack of appropriate training and support, negative staff attitudes, inadequate assessment and planning, insufficient funding, difficulties obtaining and maintaining the equipment and time constraints. Cost or lack of funding is a barrier mentioned in virtually all the research on the implementation of assistive technology, especially in regards to students with mild disabilities (Copley & Ziviani, 2004). An intervention can be done in teaching Kiswahili to visually impaired students by use of assistive technology. Digital recorder can help the visually impaired student to be independent in their studies and avoid reliance on the other students hence boosting Kiswahili performance. Kiswahili teacher (mediator) should understand the severity of the visually impaired students and use an intervention in teaching VI students in order to assist them to go through the college system hence getting quality grades in Kiswahili Language.

Research Design and Methodology

The study adopted Quasi-experimental design by use of a pre-test and post-test. This design was appropriate to analyse the treatment effect of using AT in teaching VI students in one group while applying the natural teaching methods on the control group. The purposive sampling techniques were used to sample the respondents with the desired characteristics. The total number of respondents was 57; comprising of 32 visually impaired students, 22 Kiswahili teachers, and 3 Principals, however Asumbi TC respondents were used for pilot study. In the final data collection and analysis Mosoriot teachers' college was used as control group while Machakos teachers' college was the experimental group in the study. The study used questionnaires, interview schedule and observation approach. A standardized pre-test was administered to two colleges (Mosoriot and Machakos teachers' college). A post test was administered to the two colleges after Machakos TC (experimental) group had received a treatment of AT teaching by the use of digital recorder to teach Kiswahili poetry to VI students. Analysis of data was conducted with the aid of the Statistical Package for Social Sciences (SPSS). The research hypotheses and the significance of the findings were tested using the paired t-test regarding the treated and the control group.

Discussion and Results

The findings of the study agreed with The National Centre on Accessible Information Technology in Education, (2008) found out that Assistive Technology (AT) is any item, piece of equipment, or system, whether acquired commercially, modified, or customized, that is commonly used to increase, maintain, or improve functional capabilities of individuals with disabilities. Balajthy, (2005) also cited that AT can provide support for students who struggle with reading regardless of the cause. Studies have found positive outcomes associated with the use of assistive technology for students with reading deficits.

Cowen and Shepler, (2000); Corn et al., (2002); Van Bon et al., (2004) further found out that the reading speeds of students who use Braille tend to be slower than those of students who use print and those of students with low vision who use magnification devices. They also found out that VI students tend to be slow in learning as compared to the sighted students in reading. Van Bon et al., (2004) and Corn et al., (2004) highlights the importance of the availability of material and human resources for teaching of VI students. It is important to determine the most appropriate reading medium for each VI student.

The findings shows that assistive technology intervention could be adopted in teaching

language and in order to improve VI students' performance. The findings of the study agreed with Kim, et al., (2006) who argues that as teachers aim towards a goal of having all students provided with the same educational opportunities despite of their differences, there is need to include Assistive technology (AT) in the process of evaluation of a student's needs. AT can assist learners to improve their academic performance. Copley & Ziviani, (2004) found out that many times, these students rely on parents, siblings, friends and teachers for help. Cost or lack of funding is a barrier mentioned in virtually all the research on the implementation of assistive technology, especially in regards to students with mild disabilities and an intervention can be done in teaching Languages to visually impaired students by use of assistive technology.

Table 1: Machakos Teachers College Test Results of both the Control and Experimental Groups.

Results of Control Group Which Used Natural Teaching Methods (7 Students)				Results of Experimental Group Which Used Assistive Technology(7 Students)			
Impairment	Pretest score	Post test score	Increase in Score	Impairment	Pre test score	Post test score	Increase in Score
Totally blind	9	13	4	Totally blind	9	14	5
Totally blind	7	12	5	Totally blind	10	13	3
Totally blind	8	11	3	Totally blind	7	11	4
Totally blind	6	8	2	Totally blind	9	14	5
Totally blind	6	10	4				
Impairment	Pre-test score	Post test score	Increase in Score	Impairment	Post test	Pre - test	Increase in Score
Partially blind	7	12	5	Partially blind	8	10	2
Partially blind	8	11	3	Partially blind	6	8	2
				Partially blind	9	13	4

As illustrated in Table 1, the study established that while using the natural teaching methods, (2 out of 5) of the totally blind students had an increase of 4 marks while a single student had an increase of 5, 3, 2 mark respectively. On the other hand while using the natural teaching methods, (1 out of 2) of the partially blind students had an increase of 5 marks while the other one had an increase of 3 marks. The findings shows that the partially blind students were better

suited for the natural teaching methods than the totally blind students as they performed higher when taught using natural teaching methods.

The findings also infer that an intervention in terms of assistive technology in teaching and learning for VI students is of great help to them in boosting their performance of Kiswahili. Meanwhile while using the assistive technology as a teaching method, (2 out of 4) of the totally blind students had an increase of 5 marks while a single student had an increase of 4 and 3 respectively. On the other hand while using the assistive technology as a teaching method, (1 out of 3) of the partially blind students had an increase of 4 marks while 2 out of 4 students had an increase of 2 scores respectively. This depicts that assistive technology was a better method for teaching the totally blind students than the partially blind students as they performed better when taught using this method.

Noghoi, (2007) argues that it is important to identify the strengths and weaknesses of each of the teaching methods, and provide instruction in those that will be of greatest value for the visual impaired student to be given immediate and future needs.

Conclusion and Recommendations

In conclusion, the management of tertiary institutions should invest on interventions like the assistive technology in enhancing students' academic performance. The study recommends that VI students be provided with specialized teaching like the adoption of AT in teaching them to enable them perform well in their studies. The study also recommends adoption of modern technology such as AT.

Students with visual impairment have a very negative attitude towards Languages. However, the study recommends that teachers should motivate students with visual impairment to perform better in Languages. Further, the study recommends that the braille prints, /TV/CD/ Video, text books and magazines be made available and adequate. The study also recommends that Braille machines, thermo phonic machines, embossers, the talking books /assistive technology be made available and adequate. The study further recommends that students should carry on their studies beyond what they were taught in class, since teaching/learning resources enhanced the memory of the taught concepts as they had a chance to revise what they were taught by their teachers. The study further recommends that other strategies for teaching visually impaired students like use of peer consultations between the VI students with sighted students, use of quieter rooms, teacher assistance teams; extended exam time for VI students and shorter assignments to the VI students should also be employed to enhance Language

performance to students with visual impairment.

The study recommends that the college administration should organize sensitization programs to equip the teachers with necessary skills, facilitates the teachers to attend training seminars to increase their knowledge and skills in their profession and also the administration should motivates the teachers through incentives. The teachers should be better equipped with different teaching strategies because they are the teacher trainers preparing teacher trainees to handle many learners in the field. The study further recommends that students and teachers should have a positive attitude in Languages for better academic performance.

REFERENCE

- Alonzo, L. (2006). *Reflections on transition*. *Journal of Visual Impairment & Blindness* 80, 979-984.
- Balajthy, E. (2005). *Text-to-speech software for helping struggling readers*. *Reading Online*.
- Bertalanffy, L. von, (1968). *General System Theory*. New York: George Braziller, pp. 39-40
- Boyle, E., Rosenberg, M., Connelly, V., Washburn, S., Brinckerhoff, L., Banerjee, M (2003), *Effects of audio texts on the acquisition of secondary-level content by students with mild disabilities*. *Learning disability quarterly*, 26, 2003.
- Burk, M. (1998). *Computerized test accommodations: A new approach for inclusion and success for students with disabilities*. Paper presented at the office of Special Education Program Cross project Meeting 'Technology and the education of Students with disabilities: Steppingstones to 21st Century.'
- Cole, P. & Chan L. (2000). *Methods and strategies for special education*. Sydney: Prentice Hall
- Copley, J., & Ziviani, J. (2004). *Barriers to the use of assistive technology for children with multiple disabilities*. *Occupational Therapy International*. 11(4), 229 - 243.
- Corn, A. L., Wall, R. S., Jose, R., Bell, J., Wilcox, K., & Perez, A. (2004). *An initial study of reading and comprehension rates for students receiving optical devices*. *Journal of Visual Impairment & Blindness*, 96, 322-334.
- Cowen, C., & Shepler, R. (2000). *Activities and games for teaching children to use magnifiers*. In F. M. D'Andrea & C. Farrenkopf (Eds.), *Looking to learn: Promoting literacy for students with low vision* (pp. 167-186). New York
- Dakar Conference (2000). *Child Rights and Child Protection*. Right Based Approached to Education. Senegal
- Demir, T. and Sen, U. (2009). *Visually impaired students learning styles*. A Survey of different variables *Respect. Int. Soc. Work Break* 2(8):154-161.
- Individuals with Disabilities Education Act, Amendments of 2004*, P.L. 108-446. 20 U.S.C 1400.
- Joyce, B., Weil, M., & Calhoun, E. (2004). *Models of Teaching*. 7th Ed. Boston: Allyn & Bacon.
- Kenya Institute of Education (2006). *Adapting instructions for students with disabilities*. Nairobi, Kenya.
- Kim, A., Vaughn, S., Klinger, J., Woodruff, A., Reutebuch, C.B., & Kouzekanni, K. (2006). *Improving the comprehension of students with disabilities through computer-assisted collaborative strategic reading*, *Remedial and Special Education*, 27(4), 235-240.
- Mastropieri, M. A., & Scruggs, T. E. (2000). *Effective instruction for special education*. Boston: College-Hill.
- Ministry of Education (2011). *Primary Teachers Examination*.

- Mugenda M. O. and Mugenda AG (2003). Research methods: Qualitative and Quantitative approaches. Nairobi: Acts Press.*
- National Assessment of Educational Progress (2008). The Nation's report card. Institute for Education Sciences, Washington DC. National Center on Accessible Information Technology in Education (2008), University of Washington, www.washington.edu/accessit/articles?109*
- Ndurumo M. M (1993). Exceptional children: Development consequence and interventions. Nairobi: Longman.*
- Noghoi, H. (2007). The problems of visually impaired students integrated in Jordanian school and their relation to variables of impairment severity, gender and educational stage, unpublished thesis. Amman Arab University from higher studies, Amman: Jordan*
- Republic of Kenya (2005) Ministry of Education. Sessional Paper No.2005.A Framework for Education, Training and Research .Meeting the challenges of Education, Training and Research in Kenya in the 21st Century.*
- Salamanca Conference (2007). Child Rights and Child Protection. Education for all.*
- Scott, R. W. (2008). Organizations and organizing: Rational, natural, and open systems perspectives. Upper Saddle River, NJ: Prentice Hall.*
- Senge, P. (2006). The fifth discipline: The art and practice of the learning organization New York, NY: Currency/Doubleday.*
- Van Bon, Gompel, M., W. H. J., & Schreuder, R. (2004). Reading by children with low vision. Journal of Visual Impairment & Blindness, 98, 77-89.*