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Trialability of Assistive Technology on Teaching and Learning of Integrated English Among The Visually Impaired Learners in Special Secondary Schools in Kenya

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Abstract
The purpose of the study was to examine the extent to which trialability of Assistive Technology affect effective teaching and learning of integrated English among the visually impaired learners. The research design was descriptive research design. The target population was 4 principals, 48teachers and 480 students while the sample size was 4 principals, 218 students and 48 teachers. The sampling techniques were simple random sampling and purposive sampling. The data was collected using questionnaires, observation schedule and focus group interview.
The hypothesis was not rejected meaning that there was no significant relationship between trialability of assistive technology and effective teaching and learning of integrated English among visually impaired learners. The hypothesis test indicated that there was no significant relationship between trialability of AT and effective teaching and learning of VI. The researcher recommends though the relationship is not significant that it is important to consider the trialability of AT before purchase.

Key words
Trialability, Assistive technology, visually impaired

I. Introduction

According to Rogers (2003), "trialability is the degree to which an innovation may be experimented with on a limited basis" (p. 16). It refers to the period of time allowing the adopter of the technology to experience the innovation.

Assistive technology refers to the devices and services that are used to increase, maintain, or improve the capabilities of a student with a disability (Dell, Newton, &Petroff, 2012).The foundation For Assistive Technology (FAST) defines AT as any product or service designed to enable independence for disabled and older people (FAST,2001). The British Educational Communication and Technology (BECTA) defined AT as their software and technology which helps people with disabilities and special needs to overcome the additional barriers they face in communication and learning (Becta, 2003).

The American Foundation for the Blind classifies the types of assistive technology for students who are blind or low vision into four main categories, as shown in Table 1 (Presley & D' Andrea, 2008).

Table 1: Types of Assistive Technology for Students with Visual Impairments

Types Technology	Devices
Technology for accessing print material	Large print, reading stand, acetate overlays, lighting, handheld and stand magnifiers, telescopes, video magnification systems, scanning and optical character recognition (OCR) systems, electronic whiteboards, Braille reading, tactile graphics, digital talking books, e-book readers, talking calculators, talking dictionaries
Technology for accessing electronic information	Large monitor, adjustable monitor arms, cursor-enlarging software, screen magnification software, accessible personal digital assistant (PDA), large print, online dictionaries, refreshable Braille displays, touch tablet, text reader, self-voicing applications, e-book reader, digital voice recorder
Technology for producing written communications	Felt-tip pen and bold marker, dedicated word processor, imaging software, drawing software, math software and spreadsheets, slate and stylus Braillewriter, electronic Braillewriter, Braille translation software, Braille embosser, accessible PDA

No single solution for access to technology is appropriate for every student with a visual impairment. Even students with the same visual loss may require instruction in different types of assistive technology based upon their unique needs. Specifically, students with visual impairments may require assistive technology which may focus upon speech access, braille access, print access, tactile communication systems, or any combination of these access modes. Determination of access mode(s) must be guided by skilled specialists in the education of students with visual impairments who have comprehensive expertise in blindness and low vision specific assistive technology and who can also access individual learning characteristics (Augusto &Schroeder, 1995).

The increase in assistive technology use may be attributed to the federal laws passed which support funding for assistive technology devices and services. Although these laws increase the accessibility of assistive technology, many recipients are dissatisfied with devices and services. Dissatisfaction typically

results in discontinuance of assistive technology devices. A national survey on technology abandonment found that 29.3% of all devices obtained were abandoned (Phillips & Zhao, 1993). Discontinuance of assistive technology represents a waste of time and money. There is however, limited research documenting factors related to assistive technology discontinuance from consumers' perspectives. It is important to gain an understanding of these factors to aid professionals in designing assistive technology service delivery techniques. Assistive technology can improve teaching and learning in inclusive classrooms in various ways (Kleiman, 2010).

This research is guided by Rogers' theory of diffusion (1995) which offers a comprehensive philosophy regarding the processes involved in accepting or discontinuing use of technology. According to this theory, discontinuance is a decision to discard an innovation after previously accepting it.

The two types of discontinuance are replacement (rejection of an innovation for an improved one) and disenchantment (rejection of an innovation due to dissatisfaction). Relative advantage, compatibility, trialability and re-invention are concepts derived from the diffusion of innovations theory. Trialability was examined in the present study to determine if it is related to continuance/ discontinuance of assistive technology devices by individuals with disabilities.

Trialability, the degree to which the user can experiment with the technology prior to acquisition, was also related to continued use of technology (Rogers, 1995).

Research demonstrated, however, that individuals with disabilities are not often given the opportunity to try out assistive technology devices prior to purchasing them. For instance, Parette, VanBiervliet and Holbrook (1990) found that almost half of the individuals with visual impairments sampled were unable to try out their devices prior to purchasing them. Individuals denied the opportunity to try out technology before purchasing it must rely on the judgment of the professional who selects the device for them (Parette&VanBiervliet, 1992). Theoretically, and pragmatically, trialability has been noted as an effective means to prevent technological discontinuance and promote ongoing use (Parette&VanBiervliet, 1992). It has not, however been fully incorporated into the process of distributing technology to individuals with disabilities.

In summary, diffusion theorists claimed that innovations that are perceived by individuals as having greater relative advantage, compatibility, trialability and re-invention will be rapidly adopted and slowly discontinued (Rogers, 1995). Trialability is examined in the present study to determine if it is applicable to continuance/ discontinuance of assistive technology devices by individuals with disabilities.

Bennett and Bennett (2003) showed that trialability, compatibility, relative advantage and complexity influenced faculty members' likelihood of adopting a new technology into their teaching. A study in Canada examined how one can help students with special needs use assistive technologies to smoothly transit from elementary to secondary school (Specht, Howell & Young, 2007).A Norwegian study examined how environmental factors, braille and assistive technologies affect the learning and literacy of 11 severely visually-impaired students (Vik, 2008).

The academic success of students who are blind or vision impaired, whether in special, integrated or inclusive schools setting depends on a variety of factors. Among these is their ability to access the classroom curriculum. Curriculum access for blind and visual disability students requires provision of books and resource materials. However, these need to be provided in an appropriate format for example Braille, large print, e-text and audio at the same time and at the same level including book edition (Kelley et al, 2001).

The Kenyan government's education policies and goals are geared towards achieving Education for All (EFA) by 2015 in tandem with national and international standards. In an effort to achieve these goals, the government launched a special needs education policy framework in 2010 (Republic of Kenya, 2010).

Mugo (2013) established that the Blind and VI students in Kenyatta University used the AT for the blind to perform various tasks including writing notes using braille machines and braille papers, using computers to type their work and communicate through emails and even browsing using screen readers for academic materials.

The World Health Organization (WHO) estimated the number of persons with visual disability in Kenya was 620,000 in 2011 (WHO, 2009). In Kenya, Kenya Society for the Blind (KSB) in partnership with the Ministry of Education and Sight Savers, the Kenya Integrated Education Programme (KIEP) has made EFA a reality for learners with visual impairment.

According to Kenya Institute Special Education (KISE) some special school have AT but in others they are not available or adequate due to cost. According to Ministry of Education (2012) there are 4 high schools for the blind in Kenya; Salvation army School for the Blind ,Thika, St. Lucy's High School for the visually impaired (Meru), Salvation army special secondary School Kibos (Kisumu) and St Francis Kapenguria.

The examples of assistive technology integration (or lack of it) point to the pressing need for a comprehensive response from the education in the community. Individuals with disabilities, parents, districts and states desperately need, and are aggressively seeking, guidelines for effective integration of assistive technology (Hart, 2000). This study focuses on special secondary schools rather than mainstream school because the special secondary schools are expected to have put some measures in place to facilitate effective teaching and learning of visual disability students. Most studies have been done in America and Europe but few in African context. The empirical studies mentioned in the background have not determined the effect of AT on a subject area apart from Bisi (2013) who studied impact of AT on visually impaired student performance in Kiswahili in public primary teachers college. The AT were not available or adequate in all special secondary schools in Kenya.

A. Trialabilityof Assistive Technology in Teaching and Learning

According to Rogers (2003), "trialability is the degree to which an innovation may be experimented with on a limited basis" (p. 16). It refers to the period of time allowing the adopter of the technology to experience the innovation. Trialability is positively correlated with the rate of adoption. The more an innovation is tried, the faster its adoption is.

Jwaifell and Gasaymeh (2013) found that participants had the opportunity to try the Interactive White Board and they were free to continue or discontinue using it. Innovation may be changed or modified by the potential adopter. Increased reinvention may create faster adoption of the innovation. An AT would be expected to be used in a greater way if it allows for opportunity to be used on small scale before being used by all the visual disability learners in the school.

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B. Statement of the Problem

In 2009, the Ministry of Education (MOE) released a report which indicated that only 21 percent of visual disability children were attending school. This indicates that the majority79 percent of visually impaired children do not have access to education. It is estimated that there are approximately 15,500 visually disabled children in Kenya. The MOE report (2009) shows that 1527 children were attending special schools and 1637were attending integrated /inclusive schools in Kenya.

KISE has assistive technology such as Duxbury Braille Translator, dolphin pen and jaws for windows (Ministry of Education, 2012). These technologies are too expensive and are not available in all schools. This indicates there is a problem of teaching and learning of visual disability students due inadequacy or unavailability of AT. KISE has assisted in facilitating availability of AT devices in some schools but have not been effectively utilized to enhance teaching and learning among visually disabled students. According to Bisi (2013) assistive technologies such as talk book were available but inadequate. Therefore there was need to determine the effect oftrialability of AT in effective teaching and learning of integrated English among visually impaired learners in special secondary school in Kenya.

C. Purpose of the Study

The purpose of the study was to investigate the effect trialability of assistive technology on effectiveness of teaching and learning of integrated English amongst visually impaired learners in special secondary schools in Kenya.

D. Objectives of the Study

The study sought to achieve the following objective:

To examine the extent to which trialability of Assistive Technology affect effective teaching and learning of integrated English among the visually impaired learners.

E. Research hypotheses

The study sought to test the following hypothesis.

HO: There is no significant relationship between trialability of Assistive Technology and effective teaching and learning of integrated English among the visually impaired learners

II. Methodology

This study used mixed-methods research design, quantitative and qualitative method for example the focus group discussion. Descriptive survey design is a method of collecting information concerning the current status of the phenomena to describe "what exists" with respect to variables or conditions in a situation (Orodho, 2003). According to Ministry of Education (2012) there are 4 public high schools for the blind in Kenya; Thika School for the Blind, St. Lucy's High School for the Blind (Meru), Kibos High School for the Blind (Western Region) and St Francis Kapenguria (Rift valley Region). This study target population was 4 principals, 48 teachers and 480students.Asample of 218 students was used while the principals and teachers were purposively selected.

III. Findings and Discussions

A. Trialability and School Cross tabulation

The researcher determined the trialability of AT and school cross tabulation. The key used was as follows: 1) Not at all (2) to a less extent (3) To moderate extent (4) to a large extent (5) to a very large extent Table 2 shows the cross tabulation of trialability and school.

Table 2: Trialability and School Cross tabulation

Scale		Total
Trialability	1.50	4.5
	2.00	4.5
	2.50	11.4
	3.00	27.3
	3.50	29.5
	4.00	13.6
	4.50	4.5
	5.00	4.5
Total		100.0

Overall 29.5 percent of teachers rated trialability of AT to a moderate extent and the lowest percentage of 4.5 percent to no extent and little extent each.

Table 3 Trialability and Gender Cross tabulations

Scale		Gender		Total
		Male %	Female %	
Trialability	1.50		4.5	4.5
	2.00			4.5
	2.50	6.8	4.5	11.3
	3.00	11.4	15.9	27.3
	3.50	11.4	18	29.4
	4.00	6.8	6.8	13.6
	4.50	4.5		4.5
	5.00	2.3	2.3	4.5
Total		43.2	56.8	100.0

Table 3 shows the cross tabulation of trialability and gender.11.4 percent of male rated trialability at a moderate extent and 18.2 percent of female rated trialability of AT, moderate extent. Both

gender rated (29.5percent) trialability at moderate extent.

B. Influence of Trialability Learners' Achievement

The objective was to examine the extent to which trialability of Assistive Technology affect effective teaching and learning of literature among the visual disability learners. To test this objective the null hypothesis HO**:** there is no significant relationship between trialability of Assistive Technology and effective teaching and learning of integrated English among the visual disability learners was tested at 0.05 significance level.

Table 4 indicates the relationship of trialability and learners achievement.

Table 4: Relationship between Trialability and learners achievement

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.077[a]	.006	-.018	1.05186

a. Predictors: (Constant), Trialability

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.275	1	.275	.249	.621[b]
	Residual	46.469	42	1.106		
	Total	46.744	43			

a. Dependent Variable: Learners Achievement

b. Predictors: (Constant), Trialability

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.347	.691		9.189	.000
	Trialability	-.102	.205	-.077	-.499	.621

a. Dependent Variable: Learners Achievement

The coefficient of determination was 0.006 indicating that trialability of AT explains 6 percent of variation in learners achievement of visual disability learners in special secondary schools in Kenya. The remaining 94 percent was explained by other variables not within this study.

The overall test of significance using F-value statistic was 0.249 which was not statistically significant because p-value of 0.621 was more than 0.05 significance level. This implies that the null hypothesis that there is no significant relationship between trialability of Assistive Technology and effective teaching and learning of integrated English was consequently not rejected. This implies that trialability of AT has no effect on learners achievement. This in contrast to Finley (2003) who indicated that trialability increases the chances of adoption of an AT device. This also supported by Rogers(2003). However Kapperman,et al 2002 indicated that AT may not always benefit the users. The Table 4 indicates that constant was significant but trialability coefficient was not significant (-.102).

The coefficient of determination was 0.623 indicating according to principals, trialability of AT explains 62.3 percent of variation in learners achievement of visual disability learners in special secondary schools in Kenya. The remaining 37.7 percent was explained by other variables not within this study.

The overall test of significance using F-value statistic was 0.249 which was not statistically significant because p-value of 0.621 was more than 0.05 significance level. This implies that the null hypothesis that there is no significant relationship between trialability of Assistive Technology and effective teaching and learning of integrated English was consequently not rejected.

The overall test of significance using F-value statistic was 3.300 which was not statistically significant because p-value of 0.211 was more than 0.05 significance level. This implies that the null hypothesis that there is no significant relationship between trialability of Assistive Technology and effective teaching and learning of integrated English was not rejected.

IV. Conclusion and Recommendations

The hypothesis that there was no significant relationship between trialability of Assistive Technology and effective teaching and learning of VI was failed to be rejected and the researcher recommends it is important to consider the trialability of AT before purchase. This is because the trialability of AT explains 0.6 percent of learners achievement. It is important for the school management to carefully consider to what extent an AT device can be tested on a small scale before the school invests in buying more AT devices. The school management should consider liaising with schools which already are using the AT device they require and work an arrangement where they can check on their trialability before they buy.

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