# Effectuality of relative advantage 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 relative advantage 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 relative advantage 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 relative advantage of AT and effective teaching and learning of VI. The researcher recommends that though not significant it would be important to consider whether an AT would make a difference to the students.

***Index Terms***- assistive technology, Relative advantage ,visually impaired

## I. INTRODUCTION

Relative advantage is the degree to which an idea is perceived better than the idea it supersedes (Rogers, 2003).

The United Nations defines assistive technology as "technology adapted or specially designed to improve the functioning of people with disabilities" (Borg, Lindstrom, & Larsson, 2009, p. 1863). Assistive Technology (AT) is a broad concept, covering anything that might be used to compensate for lack of certain abilities (Reed & Bowser, 2005).This range from low-tech devices like special grip for a pen, to more advanced items like hearing aids and glasses, to high-tech devices such as braillers and computers with specialized software for helping persons to read (WHO, 2009; Petty, 2012). Kapperman, Sticken and Heinze(2002) demonstrated that approximately 60 percent of the academic students with visual disability in Illinois who could have benefited from the use of special technology for individuals with visual disability were not receiving that opportunity.

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).

Rogers' Diffusion of Innovation theory has been the main starting point for much research into technology innovation and adoption domains, and still provides a widely used framework for forecasting purposes, service and infrastructure requirements, business modeling and policy measurements (De Marez, Evens, & Stragier, 2011). Rogers model is based on five aspects; compatibility, complexity, trialability, relative advantage and observability.

Rogers (2003) argued that innovations offering more relative advantage, compatibility, simplicity (less complex), trialability, and observability will be adopted faster than other innovations. Rogers does caution, "getting a new idea adopted, even when is has obvious advantages, is difficult" (p.1), so the availability of all of these variables of innovations speed up the innovation-diffusion process.

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). Relative advantage is examined in the present study to determine if they is applicable to continuance/discontinuance of assistive technology devices by students who are visually impaired.

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).

## II. Relative Advantage

For a person to choose to use a technology for a specified task, it should provide some form of benefit for the task concerned. To be more specific, the innovation should demonstrate a relative advantage over other options, ideally including the technology currently used for the task. Better technologies will be adopted, plain and simple. However, what defines "better" is rarely a single, simple statistic. Increased performance, cheaper costs, increased social standing, or even a wow factor may all contribute to the sense of relative advantage (Jacobsen, 1998).

Rogers categorized innovations into two types: preventive and incremental (non-preventive) innovations. "A preventive innovation is a new idea that an individual adopts now in order to lower the probability of some unwanted future. Preventive innovations usually have a slow rate of adoption so their relative advantage is highly uncertain. However, incremental innovations provide beneficial outcomes in a short period (Surendra, 2001).
When faculty members face the new demands placed on them, they will adopt technology (Casmar, 2001). If teachers see that technology has value in their instruction, then they will use it (Finley, 2003; McKenzie, 2001; Parisot, 1995; Spotts, 1999). To integrate technology successfully into teacher education courses, teacher education faculty should see the need providing helpful experiences for themselves and their students (Schmidt, 1995). To increase the rate of adopting innovations and to make relative advantage more effective, direct or indirect financial payment incentives may be used to support the individuals of a social system in adopting an innovation. Incentives are part of support and motivation factors.

Rogers' theory was helpful in categorizing and understanding. Internal where faculty members were in terms of instructional computer technologies and in suggesting directions for faculty change in these technologies. Faculty members' low levels of instructional computer use and expertise, the majority of the faculty members' self-placement in the last three adopter categories (Finley, 2003).

## III. 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 of relative advantage of AT in effective teaching and learning of integrated English among visually impaired learners in special secondary school in Kenya.

## IV. Purpose of the Study

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

## V. Objectives of the Study

The study sought to achieve the following objective:

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

## VI. Research Hypothesis

The study sought to test the following hypothesis.

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

## VII. 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.

## VIII. Findings and Discussions

**Relative Advantage and Gender Cross tabulation**

This section presents the cross tabulation of relative advantage of AT and gender. 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. This as shown in Table 1

**Table 1 Relative Advantage and Gender Cross tabulation**

| | Scale | Gender | | Total |
|---|---|---|---|---|
| | | Male % | Female % | |
| Relative Advantage | 2.60 | 4.5 | 4.5 | |
| | 2.80 | 4.5 | 4.5 | |

| | | | | |
|---|---|---|---|---|
| | 3.00 | 4.5 | 4.5 | 9.0 |
| | 3.20 | 6.8 | 4.5 | 11.3 |
| | 3.40 | 6.8 | 2.3 | 9.1 |
| | 3.60 | 4.5 | 11.4 | 15.9 |
| | 3.80 | 2.3 | 9.1 | 11.4 |
| | 4.00 | | 2.3 | 2.3 |
| | 4.20 | 9.1 | 2.3 | 11.4 |
| | 4.40 | 2.3 | 4.5 | 6.8 |
| | 4.60 | 4.5 | 2.3 | 6.8 |
| | 4.80 | | | 4.5 |
| | 5.00 | 2.3 | | 2.3 |
| Total | | 43.2 | 56.8 | 100.0 |

Table 1 shows the cross tabulation of relative advantage and gender. Nine point one percent of male rated relative advantage at high extent while 11.4 percent of female rated relative advantage at moderate extent. Both gender (15.9 percent) rated relative advantage at moderate extent. This is contrary to Petty (2012) study.

**Relative Advantage of AT and School Cross tabulation**

The researcher determined relative advantage by doing a cross tabulation with the school. 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 cross tabulation of relative advantage and school.

**Table 2: Relative Advantage and School Cross tabulation**

| Scale | | Total |
|---|---|---|
| Relative advantage | 2.60 | 4.5 |
| | 2.80 | 4.5 |
| | 3.00 | 9.1 |
| | 3.20 | 11.4 |
| | 3.40 | 9.1 |
| | 3.60 | 15.9 |
| | 3.80 | 11.4 |
| | 4.00 | 2.3 |
| | 4.20 | 11.4 |
| | 4.40 | 6.8 |
| | 4.60 | 6.8 |
| | 4.80 | 4.5 |
| | 5.00 | 2.3 |
| Total | | 100.0 |

Overall 15.9 percent rated relative advantage at to a moderate extent and the lowest percentage 2.3 percent to high extent and very high extent. This results similar to Bennett & Bennett, 2003) and Casmar (2001).

**Influence of Relative Advantage of AT on Learners Achievement**

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

Table 3. Indicates the relationship between relative advantage and learners achievement.

**Table 3: Relationship between relative advantage and learners achievement**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .053[a] | .003 | -.021 | 1.05349 |

a. Predictors: (Constant), Relative Advantage

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | .131 | 1 | .131 | .118 | .733[b] |
| | Residual | 46.614 | 42 | 1.110 | | |
| | Total | 46.744 | 43 | | | |

a. Dependent Variable: Learners Achievement

b. Predictors: (Constant), Relative Advantage

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 6.336 | .959 | | 6.608 | .000 |
| | Relative Advantage | -.088 | .255 | -.053 | -.343 | .733 |

a. Dependent Variable: Learners Achievement

The coefficient of determination was 0.003 indicating that relative advantage of AT explained 0.3 percent of variation in learners' achievement among the visual disability learners.

The remaining 99.7 percent is explained by other variables not within the study. The overall test of significance using F-value statistic was 0.118 which was not significant because p-value (0.733) is more than 0.05 level of significance and the null hypothesis that there is no significant relationship between relative advantage of Assistive Technology and effective teaching and learning of integrated English among the visual impaired learners was not rejected.

Alper and Vaharihinna (2006) asserted that AT may not be fully beneficial to the users. Finley (2003) indicated that relative advantage of an AT has no significant effect on its usability by VI learners.

Table 3 indicates that the constant was significant (0.000) while relative advantage coefficient was not significant (0.733). From the principals data the overall test of significance using F-value statistic was 2.980 which was not significant because p-value (0.226) is more than 0.05 level of significance and the null hypothesis that there is no significant relationship between relative advantage of Assistive Technology and effective teaching and learning of integrated English among the visually impaired learners was not rejected. This implies relative

advantage of AT device has no significant effect on learners achievement.

## IX. Conclusion and Recommendations

The null hypothesis that there is no significant relationship between relative advantage of Assistive Technology and effective teaching and learning of integrated English among the visually impaired learners was accepted. This means the relative advantage of AT does not significantly affect teaching and learning in special secondary schools in Kenya.

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