TUTOR TRAINING ON THE USE OF ADAPTIVE TECHNOLOGY DEVICES FOR VISUALLY IMPAIRED STUDENT TEACHERS IN PRIMARY TEACHER TRAINING COLLEGES IN KENYA

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Abstract:

This study assessed tutor training on the use of adaptive technology in the instruction of Visually Impaired (VI) student teachers in primary Teachers Training Colleges (TTCs) in Kenya. The study was based on the diffusion of innovation theory by Rogers which gives a basis for adoption of innovations in institutions and other settings. The study adopted descriptive survey research design. The study population included administrators, tutors and Visually Impaired (VI) student teachers in three primary teacher training colleges which admit student teachers with visual impairment in Kenya. Purposive sampling technique was used to select three deans of curriculum in the colleges while simple random sampling method was used to select nine Heads of Departments (HOD's) and 93 tutors making a sample of 105 respondents. The instruments used for data collection were questionnaires and interview schedules. Descriptive statistics such as frequencies and percentages were used to analyse the data. The findings of this study revealed that tutor training on the integration of adaptive technology for VI student teachers in primary TTC's was wanting since tutors' expertise in the integration of adaptive technology was insufficient or totally lacking. This study recommended in-service training of tutors on the use of adaptive technology devices especially on the use of braille and preparation of tactile diagrams so as to effectively teach VI student teachers in primary TTCs. In addition, the college administration should fully support the use of adaptive technology for VI student teachers and the tutors should be exposed to ways of integrating adaptive technology during the instruction of VI student teachers. The findings of this study are of importance in policy development and implementation on integration of technology in the instructional

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process for learners with special needs and specifically for those with visual impairments in Kenya and other parts of the world.

Keywords: technology integration; tutor training; adaptive technology; visually impaired students; instruction

1. Introduction

The current global trends in education have had a significant attention to special education as a result of the emphasis on Education for All (EFA). Learners receiving special education have education handicaps in various developmental domains such as physical, hearing, visual, mental, emotional, language, and multiple handicaps. These handicaps interfere with regular learning unless modifications and related services, equipment and specially trained teachers are provided (Republic of Kenya, 1999). Visually impaired (VI) students have difficulty in grasping concepts such as distance, size, shape, and thus they require different methods and more time to learn concepts. They also find gathering of information very difficult. Research has shown that performance by special needs students often lag behind other students in learning institutions (Mugo, 2008). Total loss of vision has three main limitations: Lack of variety and range of experiences; Lack of mobility thus limiting the amount of knowledge to be acquired from the environment; and challenge in interacting with the environment.

This situation can be addressed through the use of adaptive technology. Adaptive technology refers to any product, device, and equipment whether acquired commercially, modified or customized that is used to maintain, increase or improve the functional capabilities of individuals with disabilities (Bitter & Legacy, 2009). Some of the adaptive technology devices include; tactile maps and diagrams, braille embossers, screen readers, and dolphin pens among others.

Adaptive technology devices improve access to quality education, enable the learner to address individual and collective temporary social problems and be able to reach responsible judgment in seeking solutions to these problems. They enhance the performance of a target skill, including cognitive processes, learning, communication, and physical abilities. Adaptive technology therefore improves the functionability of learners (Republic of Kenya, 2005). They improve the quality of education and remove barriers to learning. Teachers should modify and adjust materials of learning so that the VI learners can access the curriculum content adequately. This can be done by using them in their original form e.g. braille clocks and watches, materials manufactured

specifically for visually impaired students may also be used. Real objects can also be modified by preparing models and tactile diagrams.

According to Disability Discrimination Act (DDA), inclusion of VI learners in mainstream education emphasizes that the teachers have two main duties: Not to treat visually impaired learners less favourably than others for reasons related to his/her disability without justification; and make reasonable adjustments with regard to learning aids to ensure that visually impaired learners are not placed at a substantial disadvantage. The teacher should therefore help foster learners' ability to gain fully functional aesthetic access to their environment. The basic approach and orientation employed by the teacher of the visually impaired learner differs from those employed to educate the sighted. A mere description of situations, incidents or concepts does not necessarily give a comprehensive picture in the mind of visually impaired learners and more so VI student teachers. Adaptive technology devices such as tactile diagrams, maps and graphics, greatly enhance the acquisition of the overall picture by the VI learners, as well as their experiences. Large scale cross national studies in western countries provides extensive information on the best practice for inclusive education. All of the studies recommended that tutor training should focus on enskilling classroom teachers in areas of pedagogy, curriculum development and adaptation (Casey & Rakes, 2002; 2003; Braslavsky, 2004). This study sought to investigate tutor training on the use of adaptive technology in the instruction of Visually Impaired (VI) student teachers in primary Teachers Training Colleges (TTCs) in Kenya.

1.1 Statement of the problem

A dominant problem for the Visually Impaired (VI) is lack of access to education. This is due to inadequate capacity among many teachers to handle students with special needs, lack of coordinators among service providers, inadequate and expensive teaching/ learning materials among others (MOEST, 2005). In order to increase access in the provision of education for the VI students, the Kenya government has implemented integrated special education programmes in pre-service teacher education in three primary teachers' training colleges in Kenya. In these programmes, VI student teachers are admitted and taught in the same classes with the sighted student teachers. With regard to the significance on the use of adaptive technology devices in the improvement of quality education for the VI students, the focus of this study was tutor training on the use of adaptive technology in the instruction of Visually Impaired (VI) student teachers in primary Teachers Training Colleges (TTCs) in Kenya.

For the VI student teachers to graduate as skilled, confident and competent primary school teachers, tutors should modify and adjust materials of learning so that

they can access the curriculum content adequately. The syllabus stresses that the teaching of student teachers who are visually impaired demands that tutors use appropriate resources and be competent in development and production of quality tactile diagrams and maps. The tutors should also possess positive attitudes towards teaching student teachers who are visually impaired. Successful and effective completion of the syllabus ensures that student teachers who are visually impaired are fully integrated into the teaching profession (KIE, 2005).

For the VI student teachers to be adequately catered for in instruction, adaptive technology should be used. This involves training of tutors on preparation and use of these devices. Inclusive Education has been introduced in primary TTCs and thus there is need for research in the area to ascertain the state of affairs. Evidence is necessary because without training of tutors on the use of adaptive technology, VI student teachers will not be adequately prepared for the teaching profession. It is against this backdrop that the study was carried out on tutor training on the use of adaptive technology in the instruction of VI student teachers in primary TTCs in Kenya.

1.2 Research question

The research question of this study was: What is the state of tutor training on the use of adaptive technology for visually impaired student teachers in the instructional process in primary TTCs in Kenya?

1.3 Justification of the study

According to Berdine and Blackhurst (1985), greater integration of the visually impaired into classes with seeing children and more training of teachers about the capabilities of the visually impaired for regular classrooms would result in improved attitudes towards the visually impaired and more appropriate educational planning and placement. UNESCO (2005) asserts that well trained teachers have the potential to achieve social economic and cultural objectives thus helping the society to be better protected and served by its leaders equitably. With full integration of adaptive technology for visually impaired student teachers, the teachers will be well trained since they will access the curriculum.

According to the Kenya Education Sector Support Programme (2005-2010), as a result of the recent changes in education, the curriculum delivery requires continuous monitoring through evaluation to ensure that it is effectively implemented. Therefore, through this study, the status of training of tutors on the use of adaptive technology in the instruction of the visually impaired would be established. There was need to ascertain the training of tutors on the use of adaptive technology which would ensure

that VI student teachers are adequately prepared in the teaching profession. The role of teachers in curriculum development and implementation is very significant. The effect of trained tutors for quality teaching is significant in the country's economic development as well. Technology integration in the instructional process is a current trend that requires investigation especially for learners with special needs.

1.4 Significance of the study

The study was of significance since training of tutors on the use of adaptive technology devices for VI student teachers was studied and recommendations made on improvement. The findings of this study will be useful in policy development and implementation on integration of technology in the instructional process for learners with special needs and specifically for those with visual impairments in Kenya and other parts of the world.

1.5 Theoretical framework

The study was based on the diffusion of innovation theory by Rogers (2003). This theory gives a basis for adoption of innovations in institutions and other settings. Adoption is the process through which an organization decides to acquire systems (e.g adaptive technology for this case) while diffusion is the process in which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 2003). According to Rogers' definition of diffusion, there are four elements in the diffusion of innovation process. These elements include: Innovation, communication channels, time, and a social system. Innovation is an idea, practice(s) or objects that is perceived as new by individuals or a group of adopters. Communication channels are the means by which innovations move from one individual to another or group to group. Time is the non-spatial interval through which the diffusion events occur. A social system is a set of interrelated units that are engaged in joint problem solving activities to accomplish a goal or goals. Each element affects the rate of adoption of innovations. Rogers (1995) proposes five variables which affect the adoption rate of any particular innovation which include perceived attributes of innovations, type of innovation-decision, communication channels, and nature of the social system and extent of change agents' promotion efforts.

With regard to the nature of a social system, Rogers (2003) explains that a social system is a set of interrelated units engaged in joint problem solving to accomplish a common goal. The social and communication structure of a system can facilitate or impede the diffusion of innovations in the system. For example, training of tutors in adaptive technology devices can enable integration of adaptive technology in the

instructional process. In this study, the social system is the primary teachers training colleges (TTC) where VI student teachers have been admitted alongside sighted ones.

The extent of change agents' promotion efforts is another variable which affects adoption rate of any particular innovation according to Rogers (2003).Individuals within organizations who work to promote a specific innovation are change agents. There exists a relationship between the rate of adoption and change agents' efforts and a greater payoff from a given amount of change agent activity occurs at certain stages in an innovation's diffusion (Rogers, 2003). In this study, the tutors in the TTCs are regarded as the change agents, while adaptive technology adoption is the focus.

2. Literature review

The Kenya Vision 2030 recognizes education and training in the social pillar. Teachers are an important component of education whose services are indispensable the world over. According to Farrant (2009), teaching is a profession that has to do with equipping young people for life and influencing change in society thus, teachers require effective and sufficient education to be able to adequately carry out their roles and responsibilities. Farrant (2009) further adds that pre-service is given before the teacher begins to teach while in-service training is given as needs arise throughout the teachers' career. Teachers require both forms of education for effective teaching. In-service education equips teachers with the skills and knowledge required for the implementation of curriculum changes and innovations. Teacher training is an important ingredient in a successful curriculum implementation endeavour (Syomwene, 2017). This study was an investigation of tutor training on the use of adaptive technology in the instruction of VI student teachers in primary TTCs in Kenya.

2.1 Tutor Training on the use of Adaptive Technology for VI Student Teachers in Instruction

Teachers at all levels require effective and sufficient education so as to be able to adequately carry out their roles and responsibilities thus stressing their importance in education. A tutor is a manager organizing his students so as to accomplish set objectives. He is a resource person providing his students with information and guiding them to other fruitful sources. He also stimulates and arouses the interests of his students so that they soon generate their own motivation (Farrant, 2009).

With the inclusion of visually impaired (VI) student teachers in primary teachers training colleges in Kenya, there is need for tutors to be in-serviced. In-service training is a life-long process in where the teacher constantly learns and adapts to the new

challenges of his job. The need for in-service training is being recognized by educational authorities. It helps in improving specific teaching skills thus coming to grips with new developments such as new curricula, new methods and other innovations. It may be provided to help in preparation to teach handicapped students (Farrant, 2009). In-service updating and renewal of knowledge, skills and capabilities is now widely acknowledged as a high priority (MOE, 2009). Tutors need regular training on special education, and on how to use adaptive technology devices for VI student teachers creatively and effectively. This could be done by KICD which is charged with the responsibility of conducting in service courses and workshops for teachers involved in carrying out experiments and trials of any new syllabi and teaching materials (Agumba et al, 2009).

According to Farrant (2009:370), in-service maybe done through:

a) Lectures, films and conferences in which teachers discuss with experts the problems they face at work.

b) Seminars and workshops in which practical solutions to current difficulties are discussed and materials required for implementing these solutions are devised and produced.

c) Exhibitions in which teachers are introduced to new textbooks, teaching materials and equipment to help them in their work. Also exhibition of children's work in neighbourhood schools to give teachers an idea of the standards being achieved.

Tutors that teach VI students require awareness, knowledge and skills on the use of adaptive technology devices in the instructional process. Once familiar with the adaptive technology devices and confident in their use, teachers are able to see its application within the curriculum (Bitter & Legacy, 2009). The special education teacher must be able to evaluate instructional materials and select the most effective ones. They must know how to use a variety of instructional materials and individual equipment (Berdine & Blackhurst, 1985). Teachers should also be supported in developing and sustaining alternative pedagogies and teaching strategies (Dede, 1997). Effective professional development needs to provide time for training, experimentation, and follow-up support (Casey & Rakes, 2002; Levine & Donista-Schmidt, 1998). A teacher should be able to update knowledge on a regular basis so as to keep pace with the new trends in the profession (Agumba et al, 2009:154).

According to the South Carolina Assistive technology program, the more fully integrated adaptive technology is into the materials used by a teacher, the more it helps a VI student learn and not merely perform. The primary TTC adapted syllabus for visually impaired students asserts that tutors who teach visually impaired students

should be proficient in English braille and be competent in the development and production of quality tactile diagrams and maps. (KIE, 2005).Thus the study sought to establish tutor training on the use of adaptive technology.

The tutor should also be able to select and operate adaptive technology equipment and software as well and use it in in-service and pre-service instruction. Songe (2004) in his study on curriculum barriers to successful inclusive education found out that there was lack of trained personnel among others. Songe's study was carried out at the Kenya polytechnic in Kenya and in this study, the researcher found it important to find out the situation at the primary TTCs in Kenya. This study sought to delve into this situation by examining the training of tutors on the use of adaptive technology in primary TTCs in Kenya.

Anderson, Klassen, and Georgiou (2007), found out that teachers in their study lacked the knowledge they needed to be effective in teaching and dealing with students with special needs. Farrant (2009), asserts that more needs to be done to allow teachers to add to their training and when their work calls for it. In order to provide quality education for students with special needs in the general education classroom, teacher training is a key factor to be considered.

2.2 College Administration's support in the training of tutors on Adaptive Technology in Instruction

The college administrators are the curriculum leaders and supervisors in inclusive education and thus should have knowledge regarding adaptive technology for VI student teachers. The entire process of introducing technology in any organization including educational institutions requires leadership (Mertz & Mertz, 2003). This is stressed by Ngigi (2007), who asserts that poor administrative procedures result in poor quality work. When teachers cannot teach well, it can lead to poor performance by the learners. The administration is supposed to motivate tutors and facilitate their professional development. According to Agumba et al, (2009), the educational administration ensures that those available human resources are effectively used for the achievement of stipulated educational objectives.

In a learning institution, educational management deals with planning, organizing, division of labour, directing coordinating and controlling physical resources for effective delivery of educational services. In planning, the administration looks at the objectives to be achieved strategies, effort, time and resources both human material by which to accomplish the objectives and measures in place to assess the success of what was set to be achieved. There is organization in acquiring human resources that are necessary to accomplish educational goals.

There should be linkages between the various administrative segments in an organization so that events are harmoniously attended to without delays. Division of labour means assigning responsibility to members of an organization depending on their skill, talent and experience. This kind of assignment enables a school to achieve its stated goals. In directing and controlling, the administration must provide clear information on what is expected at each stage, obtain feedback on performance and take the appropriate action if necessary to remedy the situation. Any tutor will acknowledge the importance of the administration. It is the responsibility of the school administration, faculty, and staff to develop their own understanding of technology and learning—and create a working environment that condones these efforts (Collier, 2001).College administrators should not only advocate the use of technology but also provide support mechanisms such as professional development among others (Earle, 2002; Groves, Jarnigan, & Eller, 1998).

According to Morris (2002), necessary resources for use of technology include; adequate access to hardware and software, technical and pedagogical support, and professional development plans among others. Supportive leadership and administration within the school setting is an identified key factor in promoting successful training for staff and students in the use of assistive technology (Alliance for Technology Access, 2000; Overbrook School for the Blind, 2001). With regard to this study, tutors need to be supported by the administration through frequent training on how to use adaptive technology for VI students. Technology acquisition and on-going training for staff working with students using assistive technology influences assistive technology use (Male, 2003; Alliance for Technology Access, 2000; Overbrook School for the Blind, 2001; Lazzaro, 2001; Casimir, 2001).

Various studies have been carried out with regard to training of teachers. Too (1996) in his study on the availability and use of media resources in Mathematics instruction, in secondary schools in Nandi District, Kenya established that trained teachers are more inclined to use media than untrained ones. He further asserts that training provides a teacher with the skills and knowledge on how to handle a learner. Kimani (2011) in his study on assessment of Mathematics teachers' in-service training needs revealed that teachers needed to be motivated by taking part in in-service programs. In service programs improve teachers' level of innovation and creativity and therefore benefiting learners a lot.

Too (1996), also established that training gives a teacher confidence not only to plan and organize the learning environment so that it is conducive to the learner but also gives the teacher an insight in the use and production of instructional materials. Koech (2011) and Tuimur (2011) recommend that in service courses should be

developed and mounted for teachers for purposes of upgrading the teachers professionally. From these studies, importance of training of teachers cannot be underscored. There was need to establish the training of teachers on the use of adaptive technology during instruction so as to ascertain the state of affairs in primary TTCs who admitted VI student teachers.

3. Research Design and Methodology

The research design adopted in this study was descriptive survey. This kind of research was chosen because it answered questions concerning the status in this case, the training of tutors on the use of adaptive technology. This study used mixed methods approach which borrows from qualitative and quantitative approaches to guide the collection of data. Mixed method neutralizes bias and converge the results (Creswell, 2003).

The study was based on the constructivist approach where learners construct their own understanding and knowledge of the world through experiencing things and reflecting on those experiences (Piaget, 1985). Thus, it is based on the premise that (cognition) learning is the result of mental construction. Knowledge is not received from outside but by reflecting on own experiences, fitting new information with what one already knows and constructing knowledge. Cognitive tools are technologies that learners interact and think with in knowledge construction. They are cognitive reflection and tools that help learners to construct their own realities using the constructs and processes in the environment on a new content domain. Cognitive tools amplify and distribute the cognitive tasks through their design and application. Therefore, through the use of cognitive tools, learners actively process and organize information by making internal cognitive connections. In applying constructivism to the study, the tutor was seen as a constructivist who facilitated the VI student teacher's learning. Cognitive tools need the informed tutor to design and supervise the learning activities. Thus, the tutor has to be competent in development, production and use of adaptive technology devices.

The target population consisted of deans of curriculum, heads of department and tutors in primary TTCs in Kenya making a total of 220. They were distributed in three primary TTCs in Kenya which admit VI student teachers. The tutors were included in the study since they were involved in the use of adaptive technology in the classroom. The deans of curriculum and heads of departments were charged with the responsibility of implementing the curriculum through provision of tutors, provision of infrastructure and learning materials.

Purposive sampling technique was used to select three Deans of Curriculum. Simple random sampling was used to select nine heads of departments and 93 tutors giving a total of 105 respondents which was over thirty percent of the targeted population. The instruments used for data collection in this study were questionnaires for tutors and interview schedule for Deans of Curriculum and Heads of Departments.

4. Results

The study sought to find out the state of tutor training on the use of adaptive technology for VI student teachers in Primary TTCs in Kenya. Responses were sought on training in Special Needs Education, rating proficiency in English Braille, frequency of training on preparation of tactile maps and diagrams and expertise in the integration of adaptive technology for VI student teachers during instruction. This section presents the results for the study.

4.1 Training in Special Needs Education

The tutors were asked whether they had any training on special needs education. The results revealed that that 33% (31 tutors) had received training on special needs education while 67% (62) had not. This shows that some of them did not have any knowledge on how to deal with the VI student teachers. These findings were in agreement with the results from those realized from interview with the heads of departments and Deans of Curriculum who observed that some training had taken place but still not to the optimum. The interviewees felt that the training should thus be enhanced since once the tutors are familiar with the adaptive technology devices and confident in their use, they can be able to see their application within the curriculum.

The aspect of training was captured by this study because of its significance in professional development. It is observed that due to their role in education, teachers at all levels require effective and sufficient education to be able to adequately carry out their roles and responsibilities. There was need for the primary TTCs tutors to be trained in special needs education so as to be able to handle student teachers with disabilities. Teachers should also be supported in developing and sustaining alternative pedagogies and teaching strategies (Dede, 1997).

Respondents were asked how they had acquired their training in special needs education. 57 teachers (61.3%) indicated that the question was not applicable in their context, 26.9 % (25) indicated that their training was acquired as a university course, 6.5% (6) acquired privately while 4.3% (4) and 1.1% (1) stated that it was provided by the Teacher Training College (TTC) and Kenya Institute of Curriculum Development

(KICD) respectively. It is evident that most tutors had received their training at the universities. However, some of them had interests on it and had opted to acquire it privately. This implies that very little had been done to in-service tutors on integration of adaptive technology for visually impaired student teachers. In-service in updating and renewal of knowledge, skills and capabilities are now widely acknowledged as a high priority (MOE, 2009). Teachers need to be motivated by taking part in in-service programs (Kimani, 2011).

4.2 Rating Proficiency in English Braille

The primary TTC adapted syllabus for visually impaired students asserts that tutors who teach visually impaired students should be proficient in English Braille (KIE, 2005).This would enable the tutors to cater for tactile learners. Therefore it was necessary to rate the tutors in terms of their proficiency in English Braille. The results are summarized in Figure 1.

Figure 1: Rating tutors' proficiency in English Braille
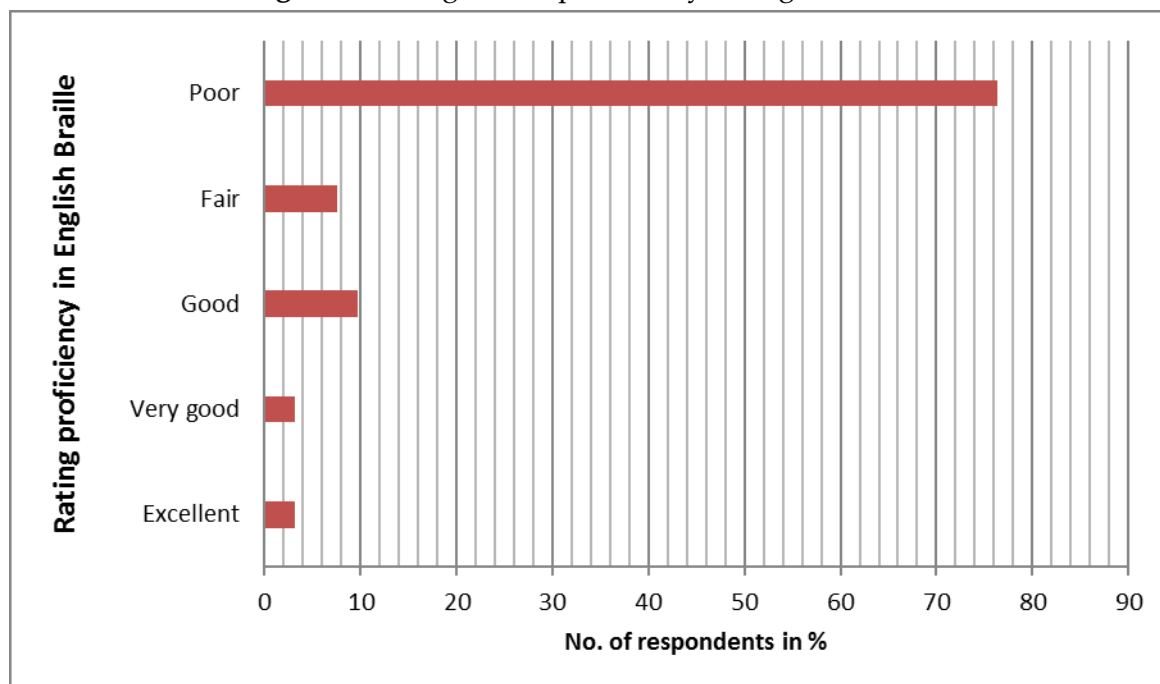
It is clear from Figure 1 that majority of the tutors, 76.3% had rated their proficiency as poor, 9.7% good, 7.5% fair and an equal proportion of 3.2% rated it as excellent and very good. More in-service training needs to be given to the tutors to improve their work output. This was in line with findings from interviews with the heads of departments and Deans of Curriculum who observed that very few tutors were proficient in English braille. This discouraged the tutors from preparing tactile diagrams to be used for

illustrations during instruction. Most of the work was done by the support staff for braille which overburdened them. The primary tactile medium used by VI student teachers is the braille code developed by Louis Braille in 1829.Those teaching learners using braille should be well trained (Berdin & Blackhurst, 1985). According to the Kenya Constitution, any person with disability is entitled to use braille (RoK, 2010).Tutors should be proficient in braille so as to easily communicate with visually impaired student teachers using different media.

4.3 Frequency of Training on Preparation of Tactile Maps and Diagrams

The primary TTC adapted syllabus for visually impaired students asserts that tutors who teach visually impaired students should be competent in the development and production of quality tactile diagrams and maps (KIE, 2005). Therefore, it was necessary to find out the frequency of training of tutors on preparation of tactile maps and diagrams. Responses are shown in Figure 2.

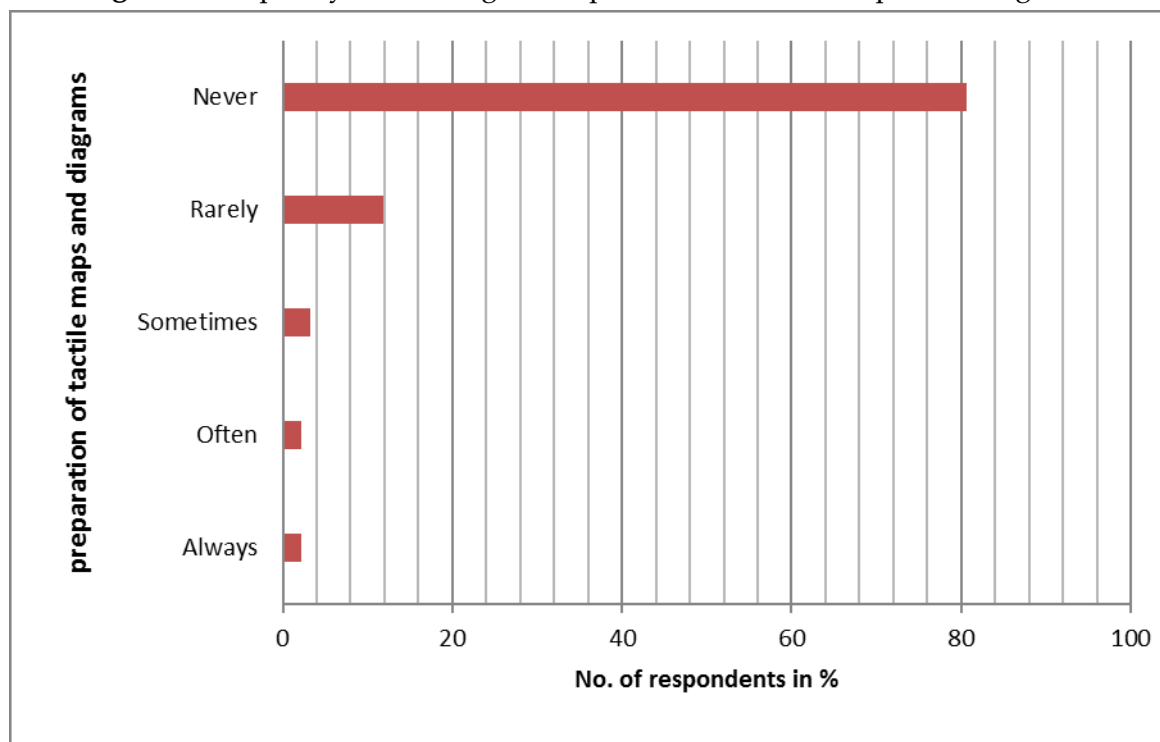**Figure 2:** Frequency of Training on Preparation of Tactile Maps and Diagrams

Figure 2 shows that 80.6% of the respondents stated that they had never had any training, 3.2%, sometimes while an equal proportion of 2.2% stated often and always respectively. Those who indicated that they rarely trained were 11.8%.This implies that since a large proportion had not been trained on the preparation of tactile maps and diagrams, integration of adaptive technology was hampered. For instance in the

teaching of phonetic transcriptions in English, the student teacher is supposed to conceptualize the correct pronunciation of words in English using the IPA table to translate spelling of English words into phonetic symbols. This may be difficult for the VI student teacher to conceptualize without the use of a tactile diagram. An adapted syllabus for VI student teachers has been prepared to cater for their needs. The syllabus stresses that the teaching of student teachers who are visually impaired demands that tutors use appropriate resources and be competent in development and production of quality tactile diagrams and maps (KIE, 2005).

4.4 Expertise in the use of Adaptive Technology for VI student Teachers during Instruction

The study sought to find out the expertise of the tutors in the use of adaptive technology for VI student teachers during instruction. With full use of adaptive technology, the visually impaired student teachers would be well trained since they would access the curriculum adequately. The tutors were required to rate themselves in terms of their current ability to use the devices. Table 1 shows the results.

Table 1: Expertise in the use of Adaptive Technology for VI Student Teachers during Instruction

Adaptive Technology Device	Poor		Fair		Good		Very good		Excellent		Total	
	F	%	F	%	F	%	F	%	F	%	F	%
Tactile diagrams	51	54.8	20	21.5	14	15.1	6	6.5	2	2.2	93	100
Tactile maps	59	63.4	15	16.1	14	15.1	4	4.3	1	1.1	93	100
Tactile globe	66	71.0	14	15.1	8	8.6	5	5.4	0	0.0	93	100
Screen readers	66	71.0	12	12.9	8	8.6	5	5.4	2	2.2	93	100
Braille clock	66	71.0	16	17.2	5	5.4	4	4.3	2	2.2	93	100
Tape recorded text	48	51.6	19	20.4	13	14.0	7	7.5	6	6.5	93	100
Brailed textbooks	59	63.4	16	17.2	12	12.9	3	3.2	3	3.2	93	100
Real objects	28	30.1	19	20.4	20	21.5	14	15.1	12	12.9	93	100
Talking tablets	55	59.1	15	16.1	10	10.8	7	7.5	5	5.4	93	100

According to the results in Table 1, majority of the respondents were poor in the use of adaptive technology for VI student teachers during instruction. This concurs with findings from interviews with the heads of departments and Deans of Curriculum who observed that the level of expertise among tutors in the use of adaptive technology was extremely low. They further explained that most of the tutors taught VI student teachers the same way as the sighted students. Large prints were only used during examinations.

These findings are similar to what MOEST (2005) asserts, that the problem in special education has been inadequate capacity among many teachers to handle learners with special needs. Special educators and related professional personnel need to be aware of and know how to use various technologies if they are to be maximally effective in helping exceptional learners. They must be able to modify their instructional approaches to accommodate the special needs of students. They need to know how to use adaptive equipment. Berdin and Blackhurst (1985) and Agumba et al (2009) state that it is vital for a teacher to be familiar with a wide range of resources for use because what is finally adopted depends on the competency of the teachers.

4.5 College Administration Support on training of tutors on the use of Adaptive Technology for VI Student Teachers in the Primary TTC's

The college administrators are the curriculum leaders and supervisors in inclusive education and thus should have knowledge regarding adaptive technology for visually impaired student teachers. It is observed that administrative support (or lack thereof) can make or break teachers' undertakings to integrate technology into the classroom. The study therefore sought to find out from the respondents their feelings or opinions about college administration's support on the training of tutors on the use of adaptive technology for VI student teachers in primary TTCs and their responses were summarized in Table 2.

Table 2: Tutors responses on college administration support on training on the use of adaptive technology for VI student teachers in the primary TTCs

Statement	SA		A		UN		D		SD		Total	
	F	%	F	%	F	%	F	%	F	%	F	%
The college administration provides workshops and training for tutors on the use of adaptive technology	7	7.5	14	15.1	13	14.0	37	39.8	22	23.7	93	100
The college administration offers technical support and maintenance of adaptive technology devices	12	12.9	33	35.5	18	19.4	22	23.7	8	8.6	93	100
The college administration provides a supportive staff on braille to assist tutors	39	41.9	42	45.2	2	2.2	8	8.6	2	2.2	93	100

The findings implied that the college administration did not fully support training of tutors on the use of adaptive technology devices. The head of the institution should provide the necessary teaching materials and promote staff welfare (Agumba et al, 2009).

In the interviews with the heads of departments and deans of curriculum with regard to college administration support in the training of tutors on the use of adaptive technology for VI student teachers in primary TTCs, it was revealed that the administration rarely provided workshops and training on the use of adaptive technology for tutors. When the heads of departments and deans of curriculum were asked on how the college administration offered technical support and maintenance of adaptive technology devices. Their responses indicated that they serviced and maintained braille machines. A support staff on braille had been employed in each of the colleges and a technician would be called once in a while. The support staff assisted tutors and VI student teachers on the use of adaptive technology. With minimal support, even the most talented teachers will have little success in technology integration (Becker & Ravitz, 1999; Zhao et al., 2002). The entire process of introducing technology in any organization including educational institutions requires leadership (Mertz & Mertz, 2003).

Trainings offered by colleges were sponsored by NGOs thus; the training was rare and irregular. With regard to challenges facing tutors in using adaptive technology in their instruction, the deans of curriculum and heads of departments mentioned that they lacked knowledge and skills. This, they said was due to lack of training on use of adaptive technology. Lack of proficiency in English braille made the tutor limited in checking if the VI students had written the correct things in braille and relying on the support staff who could easily mislead them. They were also not able to prepare tactile diagrams since labelling would be in braille. Rogers (2003), in his theory of innovation asserts that the nature of the social system and extent of change agents affect adoption of innovation. The social and communication structure of a system can facilitate or impede the diffusion of innovations in the system. The college administration being the social system in this context needed to provide training of tutors on the use of adaptive technology for VI student teachers for the innovation to be infused at the primary TTCs.

5. Conclusions

Based on the findings of this study, the following conclusions were made:

1. Tutor training on the integration of adaptive technology in the instructional process for VI student teachers in primary TTC's was wanting.
2. The college administration provided minimal support on the use of adaptive technology in the instruction of VI student teachers to the tutors.

6. Recommendations

The following recommendations were made for this study:

1. In-service education should be provided to the tutors on the use of adaptive technology in the instruction of VI student teachers.

2. The college administration should fully support the use of adaptive technology for VI student teachers in the primary TTCs by facilitating the training of tutors on integration of adaptive technology in the instructional process.

References

1. Agumba, N., Kipsoi, E., Misigo, B., Simiyu, C., and Ongek, M. (2009). *Primary Teacher Education: Social Studies.* Nairobi: Jomo Kenyatta Foundation.

2. Alliance for Technology Access. (2000). *Computer and web resources for people with disabilities: A guide to exploring today's assistive technology*. (3rd Ed.). Alameda: CA Hunter House Publishers.

3. Becker, H. & Ravitz, J. (1999). The influence of computer and internet use on teachers' pedagogical practices and perceptions. *Journal of Research on Computing in Education*, *31*(4), 356-384.

4. Berdine, W. & Blackhurst, E. (1985). *An Introduction to Special Education* (2nd Ed.). Boston: Scott, Foresman & company.

5. Bitter, G. G. & Legacy, J. M. (2009). *Using technology in the classroom.* (7th Ed.) New York: Pearson International Edition.

6. Braslavsky, C. (2004). Quality Education and Learning Materials in the 21stCentury. Switzerland: Worlddidac, Basel

7. Casey, H. & Rakes, G., & (2002). An analysis of teacher concerns towards instructional technology. *International Journal of Educational Technology*, 3 (1). Retrieved April 11, 2013, from http://www.ed.uiuc.edu/ijet/v3n1/rakes/index.html

8. Casimir, G. (2001). *Enhancing learning with assistive technology, In Integration and inclusion in action* edited by P. Foreman, pp. 360- 388. Harcourt: Marrickville NSW.

9. Collier, C. (2001). Staff development for technology integration in the classroom. In J. Lebaron, & C. Collier (Eds.). *Technology in its place: Successful technology infusion in school* (pp. 61-72). San Francisco: Jossey-Bass.

10. Creswell, J. W. (2003). *Research design: Qualitative, quantitative and mixed method approaches.* Thousand Oaks, CA: Sage Publications.

11. Dede, C. (1997). Rethinking how to invest in technology. *Educational Leadership, 55*(3), 12-16.

12. Earle, R. (2002). The integration of instructional technology into public education: Promises and challenges. *ET Magazine, 42*(1), 5-13. http://www.bookstoread.com/etp/earle.pdf April 6th 2013,

13. Farrant, J. S. (2009). *Principles and Practice of Education*. Harlow: Longman Group UK.

14. Groves, M., Jernigan, M., & Eller, K. (1997). But how do we use it?: Discovering hidden barriers and unanticipated successes in integrating computers in a preschool curriculum. *Proceedings of the Families, Technology and Education Conference* (pp. 57-62), Chicago, IL. (ERIC Document Reproduction Service No.ED424998).

15. Kenya Institute of Education (KIE) (2002). *Primary Education Syllabus*. Vol. 2. Nairobi: Ministry of Education Science and Technology.

16. Kenya Institute of Education (KIE) (2005). *Social Studies Adapted syllabus for Primary Teacher Education*. Nairobi: Ministry of Education.

17. Kimani, S. M. (2011). An assessment of mathematics teachers' in service training needs in lower division of Kandara. Unpublished M.Ed. Thesis, Moi University, Kenya.

18. Koech, J. (2011). Availability and utilization of instructional resources for the teaching of science in primary schools: A case of Kosirai Division, Nandi North District. Unpublished Thesis, M.Phil Thesis, Moi University, Kenya.

19. Lazzaro, J. (2001). Adaptive technologies for learning & work environments. (2nd Ed.). Chicago: American Library Association. *Learning Strategies, Supports, and Interventions*. Retrieved on 5/12/2013 from www.edu.gov.mb.ca./../4.pdf

20. Levine, T., & Donista-Schmidt, S. (1998). *Computer use, confidence, attitudes, and knowledge*: A causal analysis. *Computers in Human Behaviour*, *14*(1), 125-146.

21. Male, M. (2003). *Technology for Inclusion. (*4th Ed.) Boston. Allyn and Bacon,

22. Mertz, E. & Mertz, K. (2003). Managing technology integration in schools: A South African perspective. *Journal of Educational Administration.*41(2):186-200

23. Ministry of Education (MOE), (2009) *National Primary Teacher Trainers Induction Course: College level training of tutors.* May 22nd to 5th June 2009. Nairobi: Government Printers.

24. Ministry of Education (MOE), (2005). *Kenya Education Sector Support Programme 2005-2010.* Nairobi: Government Printers.

25. Morris, M. (August, 2002). *How new teachers use technology in the classroom*. Paper presented at the Annual Summer Conference of the Association of Teacher Educators, Williamsburg, VA.

26. Mugo, B. C. (2008). *Adaptive/Assistive Technology for learners with visual impairment*. Proceedings from a workshop on Adaptation of Maps, Diagrams & Pictuers (Graphics) for the Visually Impaired at the Kenya Institute for the Blind: Nairobi.

27. Ngigi N. J. (2007). The constraints to advancement of gifted and talented students in Kenyan secondary schools: A case of Nairobi Province. Unpublished M.Phil Thesis, Moi University, Kenya.

28. Piaget, J. (1985). *The equilibration of cognitive structures.* Chicago, IL: University of Chicago Press.

29. Republic of Kenya (ROK) (2010). *The Constitution of Kenya*. Nairobi: Government Printers.

30. Republic of Kenya (ROK) (1999). *Totally Integrated Quality Education and Training. Report of the commission's inquiry into the education system of Kenya.* Nairobi: Government Printers.

31. Rogers, E. M. (1995). *Diffusion of innovations* (4th Ed.). New York: Free Press.

32. Rogers, E. M. (2003). *Diffusion of innovations.* (5th Ed.). New York: Free Press.

33. Songe, E. O. (2004). Identification of curriculum barriers to successful inclusion of students with Visual Impairments in Kenya Polytechnic. Unpublished M.Ed Thesis, Kenyatta University, Kenya.

34. Syomwene, A. (2017). Change and management of change in curriculum. In Syomwene, A. Nyandusi, C. & Yungungu, A. (2017) (Eds). *Core Principles in curriculum.* Eldoret: Utafiti Foundation.

35. Too, K. J. (1996). A survey of the availability and use of media resources in Mathematics instruction: The case of secondary schools in Nandi District, Kenya. Unpublished M.Phil Thesis, Moi University, Kenya.

36. Tuimur, H. N. (2011). An investigation into the teaching of the topic conflict and conflict resolution in Social Studies: A case of selected primary schools in Kosirai Division, Nandi North District. Unpublished M.Phil Thesis, Moi University, Kenya.

37. Zhao, Y., Pugh, K., Sheldon, S., & Byers, J. (2002). Conditions for classroom technology innovations. *Teachers College Record, 104*(3), 482-515.