INFLUENCE OF SOCIAL ENVIRONMENT ON VISUALLY IMPAIRED CHILDREN'S DEVELOPMENT OF SCIENCE PROCESS SKILLS IN A SPECIAL SCHOOL IN KENYA

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DECLARATION

This project report is my original work and has not been presented for a degree in any other university.

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Signature

This research project has been submitted for examination with my approval as university supervisor

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DEDICATION

This work is dedicated to my wife Sibiah, and my mother Salome, who gave me the inspiration and impetus to carry on even when situations proved difficult.

ACKNOWLEDGEMENT

I wish to acknowledge the assistance offered to me by my supervisor, Dr. Justus Inyega, for his professional guidance and cordial friendship during the study. He was there for me when I needed him. The inspiration I received from him is unquantifiable and I appreciate him for this. I also wish to thank teachers and pupils from the study school for the visually impaired for accepting to participate in the study.

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ABSTRACT

The purpose of this study was to investigate influence of the social environment on the development of science process skills in a special school in Kenya. The social environment includes teachers, learning resources and functional learner attributes and abilities. Case study design was used to gather information. All the children in class one (18), two (16) and three (16) were sampled out of classroom learning environments. The findings of this study pointed out that there were great shortcomings in the whole process of giving science instructions and hence poor reception of the science process skills. There were limitations ranging from ill preparedness on the part of teachers, limited resources, learners entry behaviors, challenges brought about by visual loss and learners low motivational level. This then means that unless appropriate measures are put in place. The visually impaired learners can't develop the science process skills more appropriately. Teachers should involve the visually impaired learners fully. The study came up with recommendations on how well science process skills can be used for the benefit of the learners. The compensatory senses (olfactory, auditory and tactual kinesthetic) should be used maximally to seal disadvantages brought about by loss of sight. Instructors (teachers) should do their best to encourage the visually impaired learners. Teachers should help the visually impaired children to boost their self-esteem. Parental information can equally be instrumental to the visually impaired learner's success because through it teachers are able to discover strengths and weaknesses of these learners which in turn will help them to build on them.

LIST OF A CRONYMS AND ABBREVIATIONS

IDEA	Individual with Disabilities Education Act
KIE	Kenya Institute Education
MoE	Ministry of Education
SNE	Special Needs Education
UNCRC	United Nations Convention on the Rights of the Child
UNESCO	United Nations Educational, Scientific and Cultural Organization

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

All children have a right to education regardless of their handicap, ethnic background or social status as stipulated by the United Nations Convention on the Rights of the child, (UNCRC, 1989). Although this is fundamental to all children, a report by the United Nations Educational Scientific and Cultural Organization (UNESCO, 1997) notes that, in majority of the countries, this reality is bleak in terms of access and quality education for children with special needs. Children with special needs include those that experience conditions that hinder normal learning and development of the individual.

Under the Individual with Disabilities Education Act (IDEA), these conditions include mental retardation, hearing impairment, visual impairments, speech or language impairment, serious emotional disturbance, orthopedic impairments, autism, traumatic brain injury, other health impairments of the individual. The basis of the learning science is real manipulation and interaction with objects in the environment. Science is that which is around us and teachers should aspire to improvise teaching learning apparatus and resources. The whole process should be learner centered and hence from known to unknown.

Teachers should aspire to develop simple experiments which learners can understand and do on their own. In these experiments learners need to be subjected to process skills such as exploration, formulating hypothesis, observing, recording and evaluating. This approach helps to build children's positive attitudes towards science and technology. Interactive environment and hands-on experience arouse learners' questioning minds and

should be organized in such a way that learners come up with their own discoveries. In this regard, a learner derives pressure and satisfaction which helps in boosting self esteem and hence maximizing their potential. In schools for the visually impaired, learners are involved in various activities like modeling, drawing, grouping among many others.

These science activities help learners to explore and understand the world around them. Learning by manipulation (tactual kinesthetic sense) is important because it serves as a compensatory sense due to visual loss. Thus, tactual experiments should be offered since they help learners to develop concepts and skills in science. (Karaka, Nyangasi, and Githii, 2004).The process skills that learners should endeavor to promote include, identifying, comparing, classifying or sorting, recording, predicting, experimenting and controlling variables, analyzing and interpreting, inferring, concluding and communicating the results. All these combined with basic science facts forms a firm foundation in a child academic endevours (Karaka, Nyangasi, and Githii, 2004).

Children with special needs require Special Needs Education (SNE) which provides appropriate modifications or the curriculum, teaching methods, teaching learning materials, medium of communication and chiefly the environment, in order to meet the unique needs (Mwaura, 2002). Learners with visual impairment fall under two categories: the blind and the low vision. The learners who are blind have no usable vision which can be modified and be utilized in learning.

Studies carried out in Kenya by Onyango, (1982), Kabue, 1981, Marugi, 1996, Mwathi, 1998, Njoroge, 1991 and Nkinyangi (1982), found out that most visually impaired pupils have low self-esteem, negative self-concept and lack confidence. Visually impaired

children learn best in an interactive environment as opposed to an impoverished one. Children's own investigations are important in helping teachers to build on learners own experiences during the learning process so as to reap maximally during the learning process. Children hardly benefit from mere listening and watching passively as the teacher talks or demonstrates without them taking active part (Karaka, Nyangasi and Githii, 2004). Children learn by doing and get to understand the world around them by observing, hearing, exploring, experimenting and manipulating. Hence teachers ought to give concrete materials from their immediate environment (Njenga and Kabiru, 2005).

Although research has been conducted on various aspects of blind mobility, little has been done on the development of science process skills, especially those that are social in nature. As a consequence there are little or no specific body of knowledge on how these skills are best taught/acquired and which factors are involved in their development. Little attention is paid to learners with special needs more especially the visually impaired learners. Visually impaired learners' world of experiences is limited due to their visual loss. This kind of situation calls for humane characteristics and behaviors from those who are sighted. They need to "see and mentally understand" the environment in which they operate in its entirety through "others" by continuous exploration of the environment.

1.2 Statement of the Problem

The study investigated the influence of social environment on children's development of science process skills. Science and technology is significant in human life because it plays key role in national development. More resources targeting science have been channeled to institutions of learning. These include teacher's books and other physical

facilities. This is intended to boost technology and innovation as they happen to be key pillars of Kenya's realization of vision 2030.

Science is life and it enables learners to know much more about the world around them. The scientific process involves curiosity, discovery experiment organization of information and reporting. Science is a living subject and hence should be taught in an interactive environment as opposed to an impoverished one. Learners should be provided with abundant activities and materials. They should be subjected to real life experiences because this helps to widen the scope of their environment. Additional information about environmental factors to the visually impaired learners can be a means of improving self-image, reducing stress and an opportunity to develop basic science process skills.

1.3 Purpose of the Study

The purpose of this study was to establish the influence social environment has on children's development of science process skills in a special primary school for the visually impaired.

1.4 Research Objectives

The following research objectives guided the study:

i. To examine the influence of learner related attributes on the development of science process skills in visually impaired children.
ii. To find out the influence of teacher characteristics on the development of science process skills for the visually impaired children.
iii. To determine the influence of resource materials on the development of science process skills in visually impaired children.

1.5 Research Questions

The research study sought to answer the following questions:

i. To what extent do learner related attributes influence the development of science process skills of visually impaired children?

ii. How do teacher characteristics influence the development of science process skills in the visually impaired children?

iii. To what extent do existing science resource materials influence the development of science process skills in visually impaired children?

1.6 Significance of the Study

The study findings provide useful information to all education stakeholders such as the Kenya Government, Ministry of Education, Curriculum developers/ Implementers, Kenya National Examination Council and Special Education Institutions.

The study provides data, which may act as a basis for other related research on personal adjustment of visually impaired persons in Kenya. The findings also provide teachers and parents with important information in regard to social environment and how it can be adopted so as to maximally benefit the visually impaired learners. The study adds information to the available knowledge about the social environment and adjustment of persons with visual impairments.

1.7 Assumptions of the Study

The researcher assumed that, the respondents were to co-operate and provide reliable information. It was also assumed that the respondents underscored the significance of the social environmental factors and the position of science in contributing to technological

development. It was hoped that the respondents were in a position to give relevant and valid information that would guide the findings, conclusions and recommendations of the study. It was also assumed that the developments of science process skills are predominantly influenced by certain factors, which can be investigated empirically.

1.8 Limitations of the Study

There was a possibility of the teachers' respondents sharing in the process of answering the questionnaires. Therefore the researcher assured the respondents of confidentiality before filling in the questionnaires. It may have been difficult for the researcher to control the attitude of the respondents as they responded to the questionnaires. Equally, other variables like children's intelligence may be beyond the control of teachers for the visually impaired children. Also teacher abilities and methodologies employed in teaching science process skills was a limitation for this study.

1.9 Delimitations of the Study

The study was to investigate the influence of social environment on children's development of science process skills in a special school for the visually impaired. It was centered on children aged 6-9 years in pre-school classes in a special school for the visually impaired. The study also targeted the science teachers in the special school for the visually impaired.

1.10 Definition of Key Terms

Child: refers to pre-school going pupils aged between 6-9 years.

Development: refers to change (gradually disclose or manifest).

Environment: refers to the social (interactive) aspects that facilitate the learning process.

Influence: refers to the effect of thing (or person) on another.

Performance: refers to outcome after learning.

Process skills: refers to the basic abilities that help the learning by discovery.

Science: refers to a curriculum subject that explores nature and the surroundings.

Science process skills: refers to abilities such as identifying, sorting, modelling ,comparing, exploring among others.

Social environment: refers to the visually impaired learner's interactive world which include teachers, peers and resource materials.

Special School: refers to the institution for visually impaired learners comprising of the pre-school children aged 6-9 years.

Teacher: refers to a pre-school instructor imparting science knowledge to a visually impaired child aged 6-9 years.

Visually impaired child: refers to learners whose visual abilities are limited and can benefit from large print or braille.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Introduction

This section presents the literature review. It specifically focused on science activities for visually impaired learners, learner attributes, teacher characteristics and availability of resource materials in relation to development of science process skills of the visually impaired learners. The theoretical framework and conceptual framework have also been incorporated.

2.1 Sciences Activities for the Visually Impaired Learners.

Wellington, (1998) observes that we do not do practical work because science is a practical subject, but so as to build a bridge between realm of objects and observable properties on one hand, and realm of ideas on the other.Practicals are therefore done with a sole intention of making observations about particular scientific principles. Science is a practical subject. For the visually impaired learners to derive greater benefit they should be active participants in the teaching learning process. Given that they are disadvantaged visually, the multi-sensory approach should be used maximally, (Njenga and Kabiru, 2005). The learner's compensatory sense (tactual kinesthetic) should be exploited and hence the visually impaired learners should explore objects, feel textures, group objects according to shape and size imitate and explain object and animal sounds and appreciate the environment around them hence utilization of the auditory sense.

Bentley and Watts, (1993) indicates that teachers need to adopt new and different approaches to teaching and learning science. A single scientific concept can be explained

to the understanding of learners through different approaches. Learners should be involved in discussions from what they observe, and be able to conclude and tabulate results. The visually impaired learners learn abstractly. They should 'see' by touching and feeling when developing basic concepts on science process skills. The solar system for example can best be learnt by use of light bulbs hanged above them to represent the stars. Such demonstration should then be followed by succinct explanation and elaboration on what the solar system is all about. The olfactory sense (smell) should be exploited by exposing the visually impaired learners to various environments with different conclusions hence learning by discovering. However the teacher can use smelling flowers, smelling of overcooked food from the kitchen and learners experiences on the kind of smell they've been exposed to when they are in their toilets for example.

2.2 Learner related Attributes in Special Schools for the Visually Impaired.

According to KIE (2003), science gives learners an opportunity to think critically. The pre-school children should be given opportunity to learn science. Children should learn independently as they acquire knowledge skills and attitudes as they interact with the environment. According to Karaka, Nyangasi and Githii (2004) learning is highly personal and individual process. The children must be actively involved by carrying out investigations, developing curiosity and powers of observation and inquirely, explore basic questions and suggest solutions. They must manipulate a variety of materials in search for patterns and relationship while looking for solutions to problems (Karaka, Nyangasi and Githii (2004).The teachers ought to prepare appropriate materials for learning activities, motivate children discuss and coordinate activities to achieve desired objectives. Teachers should assess the activities and suggest solutions to problems. The

teacher must make an effort to children how to learn so that they work as independently as possible. According to Njenga and Kabiru (2005), children use their senses to explore the environment, manipulate objects and discover the nature of things how they and relate. They discover how things smell, taste, feel and how they look like. Children break things up and construct others to see what will happen. They experiment with different things making discoveries and this increases their knowledge and concepts.

As Mwaura (2002) underscores that there are various indicators of visual impairment in children. These may include problems in reading and copying from the chalkboard, reading books too close or very far from the eyes, quick eye movements from side to side, double vision, omissions while reading and writing clumsy movements and poor balance while walking, moving the head instead of the eyes while reading and watery and painful eyes. With regard to Mwaura (2002), blindness imposes three main kinds of implications and limitations on a child. The range and variety of visual experiences that blindness brings to and individual vary with the age of onset which the individual got vision loss. If the onset comes easily in life, the child will not have visual concepts and will therefore have a limited range of visual experiences.

Loss of vision restricts one's ability to move about as the individual doesn't have visual stimulate on and feedback that will stimulate them to change or modify their movements. This promotes some children to remain sitting for long hours. Blindness makes it difficult to familiarize with what is going on in the environment and thus the blind child can't control the environment and can't choose freely what they want to do. Blindness affects cognitive development restricting the range and variety of the child's experiences. The visual sense motivates the child to interact with people and objects, guides that

interaction and verifies the success of the interaction. Vision thus stimulates motor activity and exploration, forming the basis of cognitive growth (Hull, 1990).

2.3 Teacher Characteristics in Special Schools for the Visually Impaired Children

Wellington(1998) stresses that although sciences is practical subject, teaching and learning occurs through a medium of instruction both spoken and written .Development of science process skills may pose some challenges to visually impaired children given their loss of sight. They learn some concepts abstractly. They have unique deficiencies which if not well addressed can prevent them from attaining their life expectations.The teacher is encouraged to use specific objectives to evaluate learners.

Rai and Richardson (2003) observed that instructional activities should be properly planned. This is because once achieved, they lead to achievement of general objectives and goals of education. As part of preparation for teaching learning activities a teacher should prepare schemes of work and lesson plan. Schemes of work are teacher's plan of action for instructional activities. The lesson plan enables a teacher to systematically and effectively teach a particular lesson. Special education provides the modifications required to meet the unique needs, thus enabling them to acquire the skills essential to becoming fully functioning and fully participating members of society.

The teacher is often the primary intervening professional in the student's life and is responsible for all acts of his growth and development (Wanjohi 2003). Science teachers play a significant role towards determining the quality of the learner's performance outcomes. Our technologically advancing world requires that a greater emphasis is put on

the learning of science. Ironically most of teachers employed to teach the blind lack creativity innovativeness. Worse still they lack knowledge in braille and have negative attitude towards braille as emphasized by Spungin (1996). This greatly applies to school for the visually impaired in Kenya as they are in dire need of specially trained teachers.

Teachers of science need continuous in-service courses to be able to enrich themselves on current trends on meeting the unique needs of visually impaired children. Further still braille teachers of the blind learners are often ill equipped to teach and hence the learners receive inadequate training in reading and writing braille (Jones 1996). In a study with the totally blind pupils in Kenya, Okumu (2005) stressed the need for special education teachers in helping blind learners to develop accurate braille. Acute shortage of specialized teachers to handle blind learners may mean that general literacy for the blind persons will progressively decline. Blind learners require extra time allocation for instruction in both writing and reading braille. Braille uses contractions in order to reduce bulk. These should be learnt, memorized and practiced for mastery achievement. Teachers should make effort, should be enthusiastic, cheerful and motivated so as to transfer the same to their learners.

2.4 Resource Materials for Visually Impaired Children

It is axiomatic that learners who are visually impaired would derive greater benefit if they are active participants in the teaching/learning process. This would, to a large extent, be achieved if they're provided with learning materials that meet their individual unique needs, for example the braille materials and resources (Moodley, 2002). There is less material available for braille writers than for print writers. Many braille learners may come to school less well prepared in their experiences with the written medium than the

print writers. If blind learners have access to braille writing and reading materials they will have similar opportunities to learn as does with children with normal vision.

Songe (2003) commented that lack of braille resource materials is a major hindrance to effective teaching and learning of the visually impaired learners. Okumu (2005) also noted that there is a pressing need of providing relevant and adequate braille materials for learners with visual disabilities. According to Wanjohi (2003), visually impaired learners can't learn effectively in braille unless they're provided with resource materials that fit their needs.

Wellington (1998) stresses that although science is a practical subject, teaching and learning occurs through a medium of instruction both spoken and written. In early childhood education this is the language of the catchment area which can be English, Kiswahili and sign language (deaf) Braille (blind) or even vernacular. Concept words in science may present difficulties to learners may become more abstract no matter how easy they seem to the teacher. In the case of a visually impaired child (depending on the onset of blindness) learning Braille may prove difficult and the situation may be worsened if the child is undergoing stress and traumatic experiences bro0ught about by visual loss.

2.5 Theoretical Framework

The theory considered for this study is the Fitts three-phase theory. The theory was proposed by Fitts in 1962. It (theory) was developed from Fitts' own experiences and the

opinions of pilot trainers and sport couches concerning the problem and nature of skill acquisition observed in their trainees at Pittsburg University. As a result, Fitts postulated that the development of skills progressed through this stages. However it should be noted that there is no marked point where one phase ends and the next begins. The illustration is demonstrated in Figure I

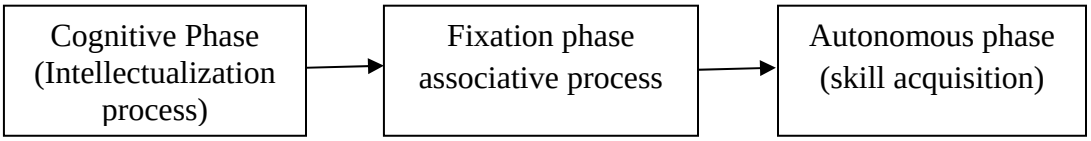

Figure 1: The Fitts Three-phase theory illustration

According to Fitts and Switzer (1962) cognitive phase is concerned with initial intellectualization process involved in learning a new task. Here both the trainee and the trainer attempts to verbalize what has to be learnt. The trainer is given some expectations about the nature of the task and procedures involved. Initial performance is error prone and further advice or demonstration has to be provided by the instructor. In fixation or associative phase correct patterns of behaviors are slowly established by practiced with errors being gradually eliminated. Generally this phase lasts than the longer the preceding cognitive one. For example Brailing speed, just like typing increases with time, errors of spelling and punctuation, spacing and others are gradually eliminated with time.

The final autonomous phase of skill acquisition has two main features from other activities that may be performed concurrently. At this stage skill becomes more automatic and requires fewer psychological resources such as memory and attention. Larger and larger chunks of behavior can be programmed and executed without conscious awareness. To reach this stage however learners have to practice frequent and the teacher has to give enough time.

2.5 Conceptual Framework

The conceptual framework model is adapted from Argyris (1957) immaturity to maturity personality theory as cited in Luthans (1989). According to the theory, a person who becomes blind is assumed to be maladjusted and portrays immature characteristics like: passivity, dependence, few ways of behaving, shallow interests, short time perspective, subordinate position and lack of awareness. Instructions in pre-vocational rehabilitation are expected to assist the individual to adjust and cope with blindness, reaching maturity level. She or he acquires characteristics such as: activity, independence, diverse behavior, deep interests, long-time perspective, super ordinate position and self-awareness and control. Figure 2 shows social environmental factors and how they influence the development of science process skills.

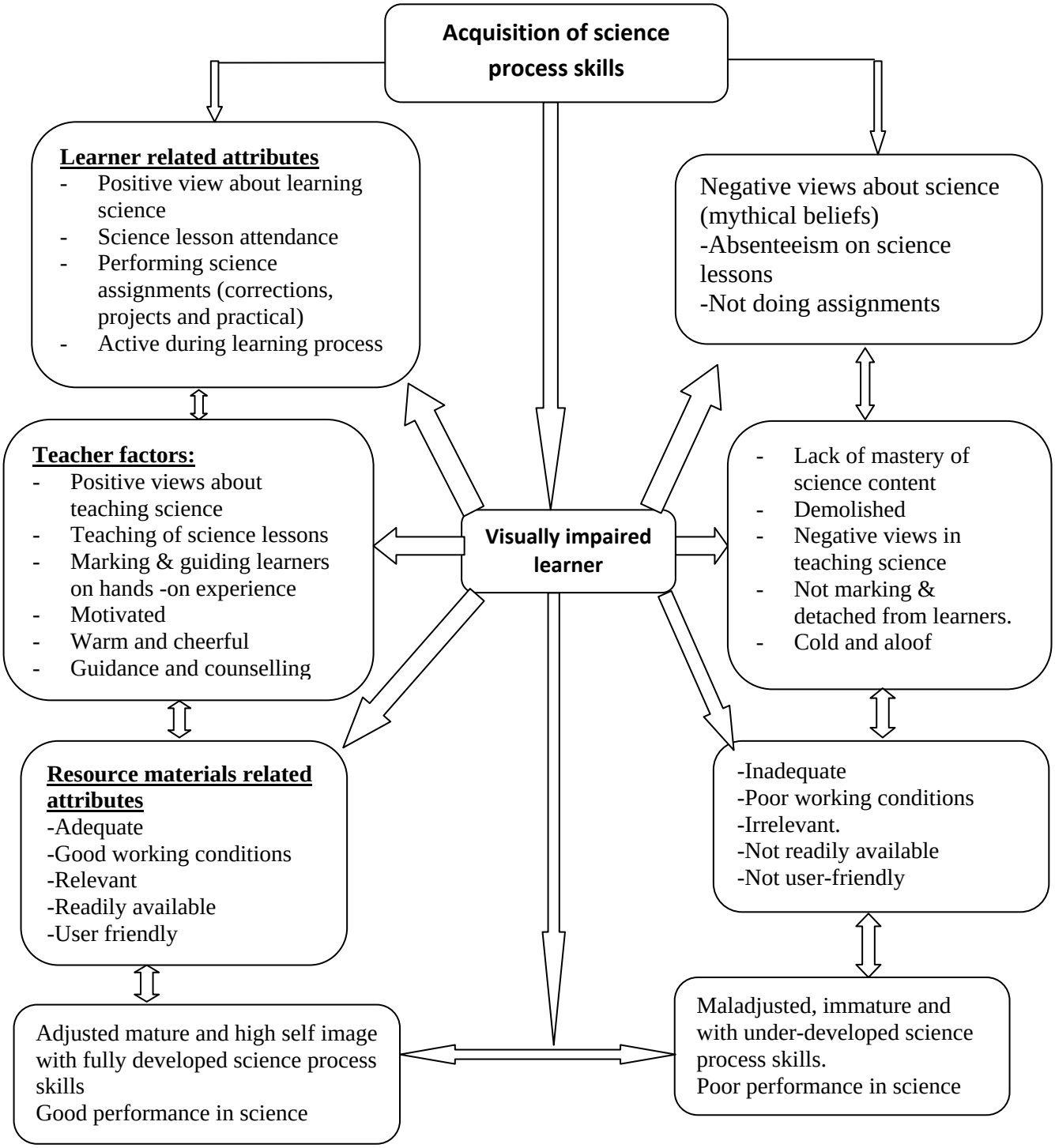

Figure 2: Social environmental factors influencing development of science process skills.

The conceptual framework in Figure 2. shows the influence of social environment on the development of science process skills for the visually impaired learners. The child own attributes can be negatively or positively influenced by certain social factors for example the mythical beliefs, absenteeism, lack of willingness do assignments and passive involvement during science lessons can lead poor development of science process skills and vice versa. Teachers are equally major social agents during the teaching learning process. Hence the teacher's general characteristics and role can either negatively or positively impact on a child. Resources materials are significant determinants for effective learning.

Lack of resource materials will mean that the visually impaired child becomes a mere recipient of information because he/she will not have had the opportunity to interact with the environment (learning by discovery approach) and this will impact negatively on the visually impaired child). A child who learns by hand on experience acquires characteristics such as activity independence, diverse behavior deep interests, long time perspective, self-awareness and control. The arrows in the Figure 2, show how the variables are related with one another. The resources and determine the activities, instructional methods, attitudes and conditions that affect the learning process.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter focuses on the research design, target population sample size and sampling techniques, data collection methods and instruments, pilot study, data collection techniques, data analysis as well as ethical and logistical considerations.

3.2 Research Design

The research adopted a case study. According to Borg and Gall (1989) a case study research design allows for an in depth investigation of an individual, group, institution or phenomenon and the case under the study was not looked at as an example of a class of events or a group of individuals. The study was concerned with understanding the processes which underlie various behavioral patterns. It also involved detailed verbal description of characteristics and settings as well as deriving data from interviews, that is, verbal interactions with the participants. It was of essence to quantify aspects like the number of learners, with or without science learning resources, the number of hours committed to the learning of science, number of science teachers and learners-text book ratio at school. At the same time it was important to pay attention to qualitative details that influence the interaction among the variables, self-interpretation and constructions around existing realities.

3.3 Target Population

The case study targeted a special school for the visually impaired. The target population was the pre-school children of classes one, two and three aged 6-9years. There are 50

pupils in class 1-3. It also targeted the science teachers who give instructions to the pupils.

3.4 Sample Size and Sampling procedure

The sample for the study consisted of one special school for the visually impaired. There were 18 pupils in class one, 16 in class two and 16 in class three. Because of a manageable number, all the 50 pupils were selected to participate in the study.

3.5 Research Instruments

The research study used interview guide for teachers, observation guide and questionnaires for learners. These instruments were developed/ constructed based on research questions and objectives. The researcher observed and examined the visually impaired children's behavior and performance in classrooms and out of the classroom during play. The values obtained were used to compare the development of the science process skills like how well the child could explore, explain, engage in elaborate and evaluate a concept learnt in science. The learners' questionnaire, appendix II, targeted elaborate information on how well science instructions were given to learners by their teachers. It wanted to discover whether learners prefer science and the challenges associated with it. Interview guides for teachers contained questions whose answers tried to reveal much on learners' development of the social environment and development of science process skills (appendix III).

3.6 Validity

Validity of an instrument represents the extent to which the instrument measures what it purports to measure (Borg and Gall, 1989). To determine validity of the instrument, a pilot study was carried in one pilot school which helped the researcher to evaluate the

validity, clarity of the questionnaires, suitability of language used in the instrument and the feasibility of study. Expert advice from the supervisor assisted to make corrections and modifications on the items of the instrument. Items that failed to measure the variable they were intended to measure were modified and others discarded completely.

3.7 Reliability

Reliability of measurement is the extent to which a particular measuring procedures gives similar results over a number of repeated trials (Orodho, 2004).for this study pilot tasting was done .The questionnaire was given to a pre-school science teacher later the same questionnaire worded differently and with same content was given to the same teacher and responses were found to be the same. The visually impaired learners were subjected to focus group discussion during piloting .questions were asked and the verbal and written responses given tallied with those that were given when the exercise was repeated later.

3.8 Data Collection Procedures

A research permit was obtained from the Ministry of Education. The sampled schools administration assisted in making the research instruments. The instruments were issued to participants (Visually impaired learners). Data was collected by the researcher personally during the giving of science instructions. Observation was a key aspect as much of science process skills could easily be exhibited by the visually impaired learners behaviour and involvement in participatory activities. This was in effort to find out whether teacher related attributes influence the development of science process skills. Tests were given and grades recorded to provide evidence. Other activity areas like learners involvement in play participation in class attitude and motivational level were

observed and grades awarded and then recorded. Questionnaires given to learners and some information from teacher, interviews were also used to grade the learners' performance according to their mean scores.

3.9 Data Analysis Procedures

After field work, data collected from observations, interviews and questionnaires was carefully organized. Kerlinger (1973) defines analysis as categorization, ordering, manipulating and summarizing data to obtain answers to research questions. In this study data was collected both qualitatively and quantitatively the researcher read through the responses from the study's instruments so as to identify issues and organize them into categorical themes. The responses came from 50 impaired children found in class one, two and three and eight science teachers giving instructions to visually impaired learners. Different percentages were calculated to show distribution by gender and age of the visually impaired children. Learner attributes like subject preference and learner attendance of science lessons were calculated in percentage forms and results collected were used to categorize respective categories like above average, average or below average. Verbal and non-verbal responses from visually impaired children were observed and noted by the researcher. Responses regarding teacher characteristics were then systematically categorized and indicated quantitatively. Information from group discussion guide for visually impaired learners was classified into categorical themes in regard to learner related attributes like teacher characteristics and resource materials. The information from these themes showed the influence social environment has towards the development of science process skills for the visually impaired learners. This information was hence useful in developing a summery report to show influence that the social environment has on visually learner's development on process skills.

3.10 Logistical and Ethical Consideration

The researcher obtained a research permit from the permanent secretary in the Ministry of Education (MoE) before administering research instruments in the field. Since the study participants were young, the researcher obtained permission from the head teacher to get access to them. To enhance rapport with the respondents, the researcher made preliminary visits to the school prior to the main study. The researcher ensured that the information obtained was kept confidential and was only to be used for the intended purpose of the study.

CHAPTER FOUR

FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter presents the findings of the study and the discussions organised around the three research questions

i. To what extent do learner related attributes influence the development of science process skills of visually impaired children?

ii. How do teacher characteristics influence the development of science process skills in the visually impaired children?

iii. To what extent do existing science resource materials influence the development of science process skills in visually impaired children?

4.2 Demographic Data

The respondents were asked to indicate their gender, age and class. The results are presented in Table 1.

Table 1: Distribution visually impaired pupils by age and gender

	Below 5 years	**Between 5-8years**	**Above 8 years**	**Total**
Boys	8 (29.63%)	12 (44.44%)	7(25.93%)	27 (54.0%)
Girls	6(26.1%)	8(34.8%)	9(39.1%)	23(46.0%)
Total	**14(28.0%)**	**20(40.0%)**	**16(32.0%)**	**50**

From Table 1, majority of the pupils were boys (54.0%) with 44.4% of them aged between 5-8years, while 29.6% of them were aged below 5 years and 25.9% of them were aged above 8 years. There were 46.0% girls in the study. About 39.1% of them were aged above 8 years, while 34.8% of them were aged between 5-8 years and 26.1% of them were aged below 5 years. This implies that all the ages found in pre-school to

class three were represented in the study. This age is important because it forms the bases of education for the children. When the children were asked to indicate their class, 14(28.0%) were in class one, 20(40%) were in class two and 16(32.0%) were in class three.

4.3 Findings on Research question 1:

To what extent do learner related attributes influence the development of science process skills of the visually impaired learners in special school?

The first research question sought to find out whether learners related attributed influence development of science process skills. During the study visually impaired learners were asked to indicate the order of their subject preferences. The results collected are shown in Figure 3

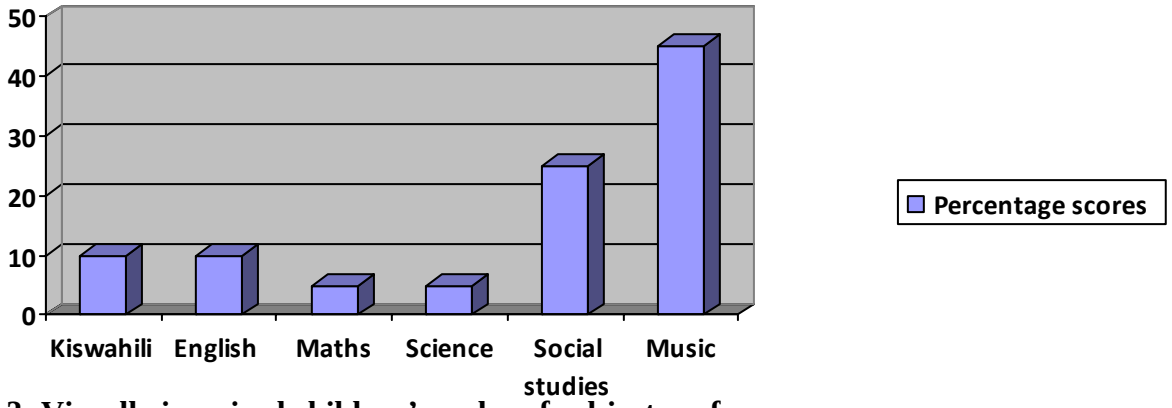

Figure 3: Visually impaired children's order of subject preferences

From Figure 3, it is evident that 45% of the visually impaired children sampled said that music was their favorite subject although it was not in their curriculum while 25% of them had social studies as their second best subject. Kiswahili and English came third with a percentage score of 10 % each. Maths and science took the tail with a score of 5% each.

This shows that the teachers do not use practical approach to teach science concepts and hence makes the visually impaired children to perform poorly when asked why they prefer music to science, the learners said there teachers were boring and that science was challenging because some concept are abstract to them due to their lack of sight. To discover whether attending science lessons influenced the development of science process skills. The lesson attendance records obtained from subject teachers were used and the findings are indicated in the Table 2.

Table 2: Visually impaired learner's attendance of science lessons.

	Frequency	**Percent (%)**
Number Present	45	90
Number Absent	5	10
Total	**50**	**100**

From the Table 2, it can be seen that most visually impaired learners attended their science lessons (45) or 90 percent, while only (5) 10 percent didn't attend. Because learning science activities in the pre-school was compulsory, the researcher wanted to discover why others (5) 10% exempted themselves and they cited their health concerns as being the reason for their absenteeism. This shows that the development science process skills can be enhanced if the visually impaired children promptly and adequately attend science lessons. Science teachers should aspire to encourage lesson attendance and active participation during the learning process.

4.4. Findings on Research Question 2:

How do teacher characteristics influence the development of science process skills in the visually impaired children?

The research question sought to find out whether certain teacher characteristics influence the development of science process skills. Teachers for visually impaired learners exhibit some characteristics which can be acquired through modeling and hence in a greater way influence the development of basic science skills like explanation and demonstration. Given their handicaps, the visually impaired children largely learn through imitation and it is on this ground that the researcher sought to know from the visually impaired learners whether they were warm, cheerful, friendly and innovative while teaching science. The responses were indicated in Figure 4.

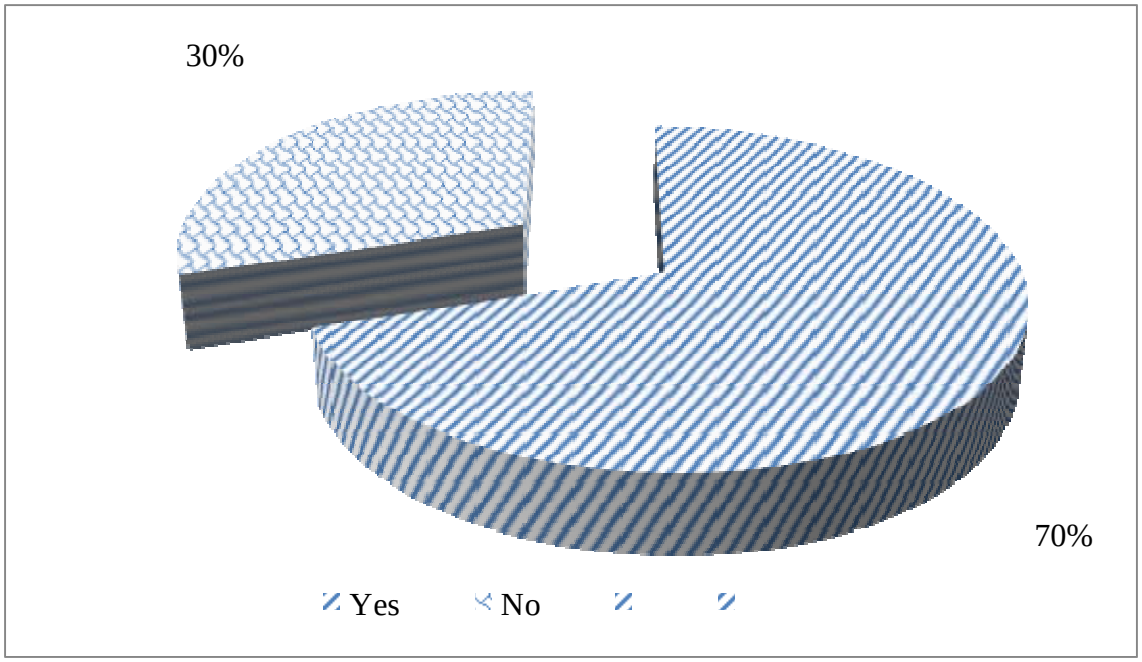

Figure 4: Motivational level and creativity of teachers for the visually impaired learners.

From the figure 4, it can be seen that the majority of the pupils (70%) noted that their teachers were warm, cheerful and friendly when teaching while (30%) of them felt that their teachers were not warm, cheerful and friendly when teaching. When asked to indicate what they like about their teachers the pupils said they liked when the teacher took time to explain to each and every pupil what they did not understand, (individual attention) they also noted that they like when the teacher explained something twice for the whole class to remember and when the teacher rewarded them for saying the correct answers. On the other hand what they hated most about their teachers included when the teacher beat them up for asking one question several times, when the teacher talked to them in harsh voice and when the teacher did not give them time to settle when they got to class. From the focus group questionnaire the pupils supported the individual answers. The teachers said that sometimes when they used hash voice to the visually impaired pupils would get scared and could not participate well in class. (They were demotivated) The pupils would get very uncomfortable and even try to stop coming to the class. It was also discovered that the visually impaired pupils enjoyed most when teachers allowed them some time to engage in such activities as sorting, manipulating, describing and classifying objects brought to class.

This then implies that science process skills can best be developed if teachers motivate their visually impaired learners. Teachers should aspire to be cheerful, warm and friendly when teaching to positively influence performance outcomes. The visually impaired learners were asked to indicate the factors that had assisted them in developing science process skills. The results are as shown in Table 3.

Table 3: Visually impaired children's perception of what assists them in the development of science process skills.

Skills	Frequency	Percentage(%)
Teacher competence	33	66
Peer contribution	15	30
Self efficacy	2	4
Total	**50**	**100**

From Table 3, it was found that most of the visually impaired learners 33 or 66% had learnt the science process skills from their teachers, 15 or (30%) indicated that their peers were instrumental in contributing to their thoroughness and development of science process skills, while on two visually impaired learners (4%) said they had exploited self skills.

This then means that teachers play a key role in imparting and developing the science process skills for the visually impaired children peers also have there role in the development of science process skills. From the focus group, discussion guide and the questionnaire, the pupils gave similar answers and they also indicated that they had been helped a lot by their teachers. Hence they attributed their learning skills to their teachers and their manipulation environment which help them cope with challenges they found as they grew up. When asked to indicate the factors that have been frustrating them when learning science, majority of the Visually impaired learners noted that they had been frustrated by their colleagues, other children as they grew up and also when they join with them back at home since others can have fun and their situation cannot allow them to have fun. In short they cited stigmatization as the most frustrating aspect. They also

felt frustrated since they did not have enough teachers who could use braille accurately and also they could only feel but could be able to see the colours, shapes, and many other things associated to the development of science process skills.

The researcher observed that visually impaired pupils had a challenge since there were no enough teachers who could transcribe and interpret materials from print to braille. Hence pupils would take long to get somebody who would give them instructions on braille. It was found that most learners lack proper role models and they were not motivated towards the learning of science oriented subjects. Their teachers either did little in terms of motivating them and thus many of them (visually impaired learners) preferred art oriented subjects and music. It was found that the environment in which the visually impaired child operates was wanting. This was a dangerous indicator especially to totally blind learners because it could lead to further accidents and injuries. These results agrees with those of Okumu (2005) who stressed that there is need for special education teachers in helping blind learners to develop accurate braille.

Acute shortage of specialized teachers to handle blind learners may mean that general literacy for the blind persons will progressively decline. Blind learners require extra time allocation for instruction in both writing and reading braille

The study wanted to find out which teacher related attributes influence the development of science process skills. The respondents (visually impaired learners) were asked to state the method used by their teachers during the learning process. The results were then indicated in Figure 5.

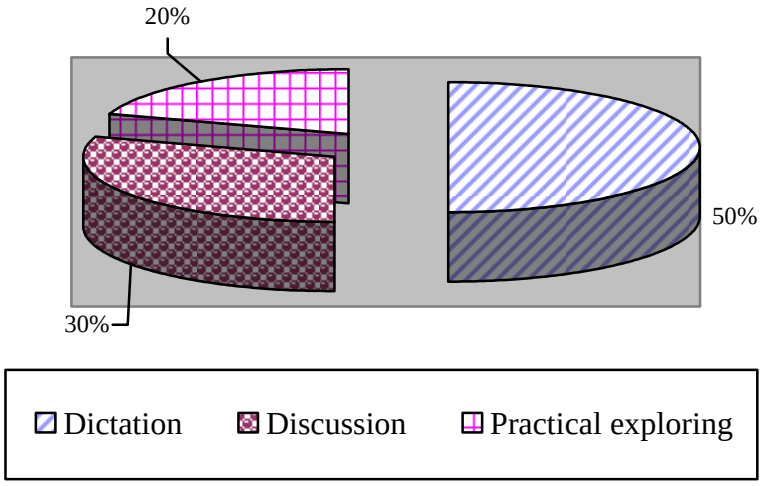

Figure 5: Methods teachers employ while teaching visually impaired learners.

Half of the respondents (25% or 50%) indicated that their teachers only dictated and did much of the talking without bringing them on board during the teaching learning process. On the other hand 15 or 30% of them indicated much of the learning occurred through discussions with the teacher and other peers, while 10 (20% of the participants said that much of the learning was through practical activity and exploring.

This shows that teaching methodology has influence in development of science process skills in visually impaired learners. The multi-sensory approach wasn't used maximally. The delivery of instructions didn't involve much of the learner's senses especially the tactile kinesthetic sense which is seen as a compensatory sense given that these are tactile readers. Teachers employed teacher centered approaches like the lecture method as opposed to learner centered approaches that fully involve the learner i.e. learning by doing, exploration, discussion etc. The study found out that much of the instructions given were teacher centered and that the teaching methodology employed didn't benefit the learner.

To discover whether guidance and counseling services were offered, the visually impaired children were asked how often their teachers organized for such sessions and the results are indicated in figure 6.

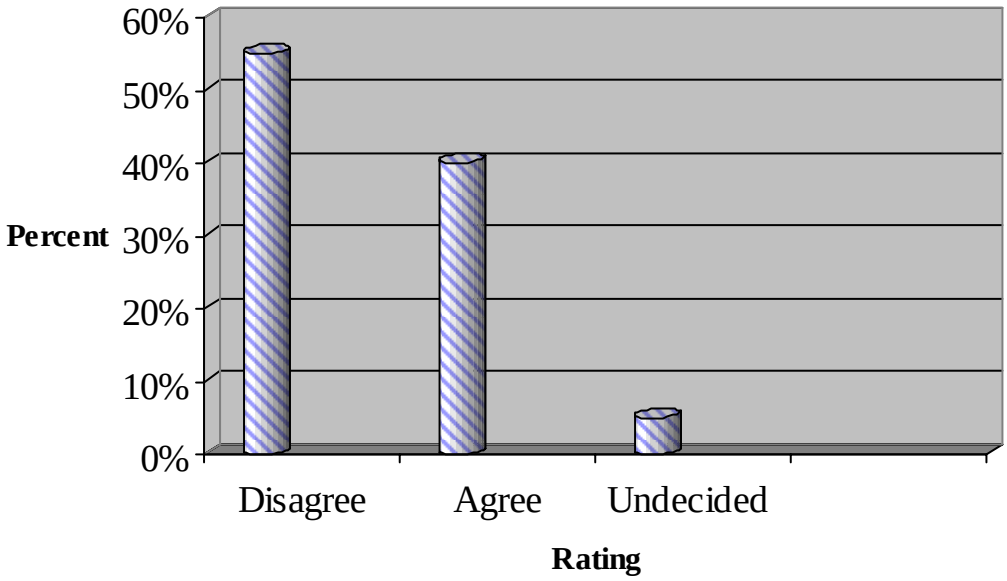

Figure 6: Provision of guidance and counseling services to the visually impaired children.

Slightly above half of the respondents disagreed that guidance and counseling services were offered while 40% agreed that there were guidance and counseling services and only 5% of them who noted that they were undecided on the provision of guidance and counseling in their school. Figure 6 above shows a greater percentage saying that little is done as far as offering guidance and counseling services is concerned.

This implies that provision of guidance and counseling services have a great influence on development of science process skills for the visually impaired children. The researcher observed that since all these visually impaired pupils were in the same school, then there could be no reason as to why some disagreed on the provision of the guidance and

counseling in the school. The reason may be was that some of these visually impaired learners had not sought for the services hence did not acknowledge the availability of this essential service.

4.5 Findings on Research Question 3:

To what extent do science resource materials influence the development of science process skills in visually impaired children?

The study wanted to investigate the influence that science textbooks had on the development of science process skills.

Visually impaired learners were asked whether they had science textbooks. The results were indicated in Table 4.

Table 4: Influence of Science textbooks on development of science process skills

	Class one	**Class two**	**Class three**	**Total**
Those in possession	12 (24%)	10 (20%)	12 (24%)	34 (68%)
Those without	6 (12%)	6 (12%)	4 (08%)	16 (32%)
Total	**18**	**16**	**16**	**50 (100%)**

From Table 4, it can be seen that 34 (68%) of the visually impaired learners possessed science text books, as opposed to 16 (32%) who said they did not. It was however noted that much of the content had been transcribed (translated to braille form) to benefit those visually impaired who were totally visually impaired. Other textbooks had been adapted (written in large print) for the low visioned learner. Some visually impaired learners still used assistive devices like hand lenses to be able to read.

This shows that textbooks have influence on development of science process skills for visually impaired learners .adequate provision of textbooks can ensure that learners learn with ease and hence readily develop these science process skills. The researcher went further to investigate whether other science resource materials like the braillers, slate and stylus, thermophoming machines were enough and who played key role in sponsoring education. These resources were found to be enough though most of them especially the braillers were out of working order and hence needed servicing.

On the aspect of funding and provision of these resources, the participants were asked to state the source and the results found were indicated in Figure 7.

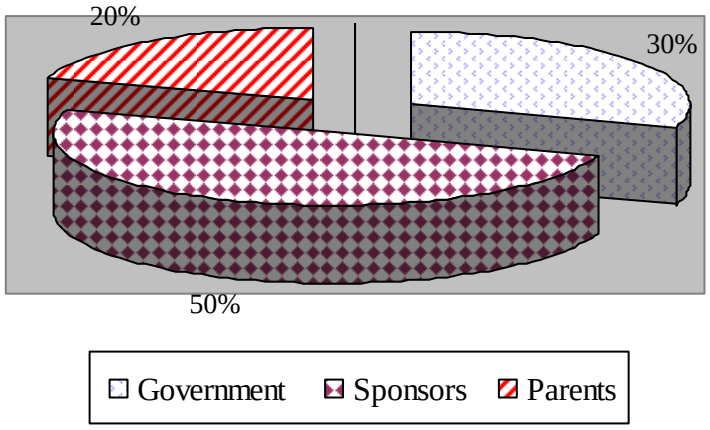

Figure 7: Provision of teaching and learning resources

From Figure 7, it is evident that the sponsor contributes up to 50% in contributing to the school in terms of physical facilities and monitoring resources. The government efforts are up to 30 % while the parents pumped in 20%. This shows that adequate funding and proper co-ordination of stakeholders in provision of physical and monitoring resources has an influence on the development of science process skills for visually impaired

learners. Lack of funds will mean that things are in a stand still especially in terms of resource provision. The government should aspire to provide the teaching learning resources and should play a pivotal role in the whole process of providing education. By and large the child's role in learning of science has been found to be passive in that a child could hardly learn by touching and doing much during the learning process was verbal instructions from the teacher and direct responses from the learner. These results agree with those of Songe (2003) who noted that lack of braille resource materials is a major hindrance to effective teaching and learning of the visually impaired learners. They also agree with Okumu (2005), who noted that there is a pressing need of providing relevant and adequate braille materials for learners with visual disabilities and they are also echoed by Wanjohi (2003), who found out that blind learners can't learn effectively in braille unless they're provided with resource materials that fit their needs.

CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter contains the summary of the study and findings, conclusions, recommendations and suggestions for further research.

5.2 Summary

The purpose of this study was to explore the influence of social environment on the development of science process skills of the visually impaired learners in a special school, for the blind. To establish these factors the study sought to establish learner attributes, teacher characteristics and assessment on learning materials used. The study also sought to find out what went on during the teaching learning process on the teaching of science.

The study found out that all of the teacher gives academic instructions were trained and possessed qualification to handle learners with visual impairments. It was however, noted that their attitude towards the teaching of science was very cold and many could not wish freely to be timetabled for the same. This may be due to technicalities involved and the in availability of some teaching learning materials required handling the subject.

The resources available were inadequate and this includes: adequate space, the braillers, slate and stylus, thermoforming machines, braille papers etc. It was found out that most learners have phobias on science. The situation was found to be worsened by their visual handicaps. Issues on science that are observable were found to be their undoing and as a result, learners could develop a negative attitude towards science or even take much longer time to learn a concept though abstractly.

Most learners were found not to be actively involved in science activities as they were either withdrawn and a few were found to be passive throughout science lessons hence poor performance. This was not however the case with other subjects like social studies and music.

5.3 Conclusions

The learners naïve beliefs on sciences can be eliminated by providing the visually impaired learners with an enabling environment. The larger society can be sensitized to have a positive attribute towards the visually impaired and help in shaping them to realize their potential. Teachers play key role in shaping the life of the visually impaired learners. They should do their best because the visually impaired learners see the world through them. They should employ learner centered methodologies and ensure that the visually impaired learners develop these basic science process skills earlier enough in time to enable them lead a meaningful and fruitful life. Special education programmes, like regular education programmes are aimed at making the learners acquire knowledge and skills to positively function in the society and contribute to its development. With the biased curriculum and exam system, most handicapped children are denied the opportunity to develop themselves and attain their optimum potential. They have met stiff competition for the few available resources. The resources establish that if there are political (government) and societal will, a lot can be achieved by learners who are visually challenged. Evidence has it that the visually impaired persons have excelled in music as a compensatory activity on their loss of visual sense. This means that there is much more in store that can be done in order to maximize their potential, and this can be

achieved if they (visually impaired learners) develop the science process skills earlier enough so as to enable them realize their dream.

5.4 Recommendations

The study makes the following recommendations: That visually impaired learners should be provided with a rich environment to enable them maximize their learning potential. They should learn by doing, manipulate the environment and they should be involved in own investigation activities. Science learning should be practical oriented as opposed to theoretical. Verbal explanations should be followed by demonstrations and explanations to enable the visually impaired learners to “see” the world around them. The government, parents and other stakeholders should work hand in hand to ensure that the teaching learning resources are provided. This includes both physical and monitoring resources. Guidance and counseling is key for the visually impaired learners hence teachers should organize for individual and group sessions so as to reduce stressful situations and help in boosting their self- esteem. Teachers of visually impaired leaners should be trained and given instructions on how they can best handle the visually impaired children. They must be braille proficient and be able to engage the compensatory senses of the visually impaired learners. The society and peers need to be sensitized on the visual condition of these learners. Positive attitudes must be adopted to ensure essential social and conceptual experiences which underlie learning are provided in spite of disability. The naïve beliefs about science should be eliminated through motivation and reinforcement. The wrong notion that science is a difficult subject should be discarded and teachers can help in alleviating this.

The government in coordination with the curriculum developers should adjust the curriculum to suit the unique needs for the visually impaired learners. Aspects such as observing colour are challenging. Extra time need to be allocated to the visually impaired learners to enable them finish assignments and perform tasks hence need for time table adjustment. To boost the social skills it is of essence that the visually impaired learners are engaged in debating “mjadala” and play so teacher should encourage participation in these activities because they assist in expressive language hence development of science process skills such as explanation and elaboration. Since the visually impaired use braille as a mode of written communication, the braillers and other machines should be serviced to ensure they are in proper working condition. Textbooks should be made available and they should be adopted to large print and others brailled to cater for the learners disabilities. Assistive devices like hand lenses should be made available for large print readers. This will ensure that learners are able to compete favorably well with their sighted peers because they are subjected to same exams when being tested.

Lastly, the government should intensify and monitor quality assurance services in school for the visually impaired children. This will help in discovering how best these learners receive education, methods teachers are using and other challenges that are encountered during the teaching/learning process so that necessary steps can be taken.

5.5. Suggestions for further research

Learning is a continuous process and it is because of this reason that this suggestion for

further researcher on much more findings which are not only limited to the social environment but also other environmental factors like physical, cognitive, psychological emotions just to mention a few, can be investigated.

Equally this study was centred on one subject (science) further research will help in targeting other examinable subjects like maths, social studies, Kiswahili and English. This will help make rich history of findings and hence improve teaching learning process.

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APPENDICES

APPENDIX I: QUESTIONNAIRE GUIDE FOR VISUALLY IMPAIRED LEARNERS

1. What is your age?

   Below 5 years ( ) Between 5-8 years ( ) Above 8 years ( )

2. What is your gender? Male ( ) Female ( )

3. In which class are you?

   Pre-unit ( ) One ( ) Two ( )

4a. Which is your favourite subject?

   Kiswahili ( ) Science ( ) English ( )

   Social Studies ( ) Maths ( )

b. Please comment on your choice in number 4a above

   ……

   ……

5a. What is science? (Give a brief definition)

   ……

   ……

b. What is its significance in our daily lives? (Give brief notes)

   ……..

c). Can learning science be limited to classroom alone?

   Yes ( ) No ( )

d. How well would you like science to be learnt? (Kindly comment)

   ……

   ……

6a. Are your teachers worm cheerful and friendly when teaching?

Yes ( ) No ( )

b Kindly give a brief description on virtues of your teachers and what you hate and like most on them?

……

……

7. Are guidance and counseling sessions offered in your school?

Yes ( ) No ( )

If so how often?

Weekly [ ] Monthly [ ] Rarely [ ]

8. Which factors have assisted you in learning science (in braille) skills- Exploration skills?

Teacher related [ ] Peer related [ ] Self [ ]

9. What factors have been frustrating you in learning science?

Please comment briefly

……

……

10. Do you consider the science materials used during the science lessons to be enough? Yes [ ] No [ ]

11. How often do you carry on clubs and play activities in your school?

Quite often [ ] Often [ ] Never [ ]

12. Is time provided for learning and practice in science reasonable / enough?

Yes [ ] No [ ]

13. Do your teachers engage in learning by inquiry?

Yes [ ] No [ ]

14. Who funds your education?

Parents [ ] Sponsor [ ]

Government [ ] NGO [ ]

Thanking you in advance

APPENDIX II: FOCUS GROUP DISUSSION GUIDE FOR VISUALLY IMPAIRED LEARNERS WHO AND VISUALLY IMPAIRED

Research Notes:

Researcher and the learners introduce themselves

Researcher explains the purpose of the study

Researcher explains the methodology of the discussion

Researcher leads the discussion and intervenes

With short narratives to enhance attention span

1. Ice breaker

a. Do you know what science is?

b. What is its (science) significance?

c. Can you learn science inside the classroom alone?

d. How well would you like science to be learnt?

Main questions (issues)	Probing notes
Do you look forward to science lesson	What they enjoy most during science lesson
Which/ what are some factors that have assisted you in learning braille (explorations skills)	What learners like most about how they are taught science
What are the issues that have been frustrating you in learning science?	What they dislike about how they are taught science
Are teachers friendly?	
Are classrooms enough and spacious?	

Are there enough science materials used during lessons? Do you share them during learning?	Materials/ resources available Working conditions of the science resource and facilities like braillers and slate
Do your teachers give assignment? What is the nature of the assignment given in science and how does it compare which other subject?	Do you get time to ask questions Do teachers answer questions asked Which teaching learning techniques does your teachers use
Is time provided reasonable/ enough for learning and practice in science? Do your teachers engage you in learning by inquiry? How do you do it?	Are you able to finish science assignments Is your work masked? Is remedial leading practiced by your teachers? Any other comments on time allocated and teaching techniques employed
What do you think should be done to help you improve development of science process skills? By who and when is it appropriate?	In relation to social environment i.e. teachers, facilities and learner attitudes, guidance and counseling lime allocation play and many others

Thanking you in advance

APPENDIX III: INTERVIEW GUIDE FOR TEACHERS FOR VISUALLY IMPAIRED LEARNERS

1a. For how long have you been teaching in this school?

……

……

…..……..

b. Which is your area of specialization (science oriented or arts)?

……

……

…..……..

c. Are you able to read braille?

……

……

…..……..

2a) What are your comments on learners thoroughness in development of science process skills and the performance of science academically?

……

……

…..……..

b. Which subject is popular and why?

……

……

…..……..

c. Which subject is least popular and why?

……

……

…..……..

Main questions/ issues	**Printing notes**
What/ which social environmental attributes do influence the development of science process skills?	Comment on schools social preparedness for the visually impaired learners
How is your school adapted environmentally to cope with the learner visual handicaps?	Comment on social stability of your learners
Would you consider learners in your school to be socially stable?	Support with comments on learners behaviour
Are learner involved in social activities like debate, singing, play and guidance and counseling?	Adequacy of time allocated to particular activities Which are these activities? Any issues or compliments?
What is the school policy regarding time allocated to science (tactual practical) teaching?	Comment on time allocation and methodology used
Which teaching methodologies used during the teaching learning process?	
What other challenges does the environment pose in the teaching and	Other environmental challenges Comment on development of science

learning process?	process skills
What do you recommended towards the development of science performance among blind learners?	Other recommendations
Can you consider teaching learning resources, adequate in your school?	Comment on adequacy
How do you get funding in your school?	Donor ( ) NGO ( ) Sponsor ( ) Self ( )

Thanks for your cooperation