**ASSESSEMENT OF SECONDARY SCHOOL STUDENTS’ PERCEPTION AND ATTITUDE TOWARD LEARNING SCIENCE SUBJECTS IN MVOMERO DISTRICT, IN MOROGORO REGION, TANZANIA**

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**REQUIREMENTS FOR THE DEGREE OF MASTER OF EDUCATION IN ADMINISTRATION, PLANNING AND POLICY OF THE OPEN UNIVERSITY OF TANZANIA**

**2017**

## CERTIFICATION

The undersigned certifies that he has read this dissertation titled; “Assessment of secondary school students’ perception and attitude toward learning science subjects in Mvomero District in Morogoro Region, Tanzania” and found it to be acceptable for examination by The Open University of Tanzania for the award of the degree of Master of Education in Administration, Planning and Policy Studies (MED APPS) of The Open University of Tanzania.

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…………………..

Date

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I, Lauden Mwampashi,do hereby declare that this dissertation is my own original work, and it has not been submitted for a similar degree in any other University or Institution.

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Signature

…………………………….…

Date

**DEDICATION**

This work is dedicated to my beloved father Late Reverend Bernhard Ntawila Mwampashi who firstly set my foot on the path to education. He could not witness my success in education, may his soul rest in eternal peace-Amen. I also dedicate this work to my beloved grandparents Ntawila Mponda Mwampashi and Nitisile Lengesera Mwazembe as well as my guardian Tusegelile Alinuswe Mlwafu may their souls rest in eternal peace-Amen.

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**ABSTRACT**

The purpose of this study was to assess secondary school students’ perception and attitude toward learning science subjects. The research objectives were; Assessment of students’ perception and attitude toward learning science subjects, examining teaching and learning strategies used in science subjects, and examining the role played by the teachers in influencing their students to learn science subjects. The mixed research approach was adopted. Eight randomly selected secondary schools. The study used cross sectional survey research design. The interviews, focus group discussions and questionnaires employed as a data collection methods. Stratified random sampling was used to select students, whereas and teachers were purposively selected. Quantitative data were analysed by descriptive statistics and qualitative data were subjected to content analysis. The finding from first objectives; the majority of students had negative attitude toward science subjects. The finding from the second objective revealed that questions and answers as well group discussionswere ranked as the mostly used teaching methodologies. Limited laboratories and teaching facilities, poor quality of classroom were noted as barriers that affect students toward learning process.From the third objective, teachers were motivating students to learn science subjects and encouraged to participate in conduct of experiments. The study also revealed that some teachers had never attended any In-Service Education Training (INSET) programs while some of them attended every time. It is recommended that effort should be made to encourage enhance many students to opt for science subjects and teachers to attend in-depth In-service Education Training and relevant workshops.

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**LIST OF ABBREVIATIONS**

GER Gross Enrolment Rate

INSET In-service Education Training

MOEVTMinistry of Education and Vocational Training

NECTANational Examinations Council of Tanzania

NET Net Enrolment Rate

PEDP Primary Education Development Programme

PSLE Primary School Leaving Examination

SEDP Secondary Education Development Programme

SPSSStatistical Package for Social Science

URT United Republic of Tanzania

# CHAPTER ONE

# 1.0 INTRODUCTION AND BACKGROUND TO THE STUDY

## 1.1 Introduction

This study aimed to assess secondary school students’ perception and attitude toward learning science subjects. Chapter one describes the background to the problem by explaining the general purpose of the study; it also presents the statement of research problem, objective of the study, significance of the study. This chapter also presents the limitations of the study and definition of terms.

## 1.2 Background to the Problem

Science has been valued in all societies since the origin of Man (ancient time). The process of utilization of science, to a large extent, is influenced by attitude of the individual, group of people or by the whole society. Attitude, as defined by Lyon (2005) is the predisposition or tendency to respond positively or negatively toward a certain idea, object, person or situation. Attitude influences an individual's choices of action and responses to challenges, incentives and rewards (together called stimuli). It has great influences in the learning process especially on performance and career development. The rate of the performance can either be good or bad, largely determined by the trend of attitude of the respective society (Simpson and Oliver, 1990).

The investigation of students’ attitude toward studying science has been a substantive feature of the work of the science education research community for the past 30-40 years. Concerns about attitude to science are not new. Nearly 40 years ago, Ormerod and Duckworth (1975) began their review on topic of pupils’ attitudes to science subjects in the UK with the following comment: In 1965 a thorough began into flow of students of science subjects in higher education. The final report (Dainton 1968) laid particular emphasis on phenomenon which become known as ‘swing from science’ Several explanations were suggested for swing, among them a lessening interest in science and disaffection with science and technology among students.

In similar study undertaken in the US provides some insight on significance of teachers (Tobias 1990). Tobias’ study aimed to explore why students turn away from science subjects. The study reveal some common problem in teaching and learning science subjects that were found to be alienating; the subjects focused on problem-solving techniques, and lacked an intellectual overview of the subjects, pedagogy was condescending and patronizing, examination were not challenging; there was no community or discussion and the atmosphere was competitive and isolation of the learner.

Omondi (2013) observed factors influencing the choice of science subjects in Kenya’s secondary schools. The study reveal that the students influenced by the following; negative attitude toward a subject led to lack of interest, existence of gender differences in high school aged students and gender influenced choice. When students face these difficulties lose interest and drop out in science career. There have been a lot of problems that affect students’ performance in science subjects in secondary schools in Tanzania. Chonjo *et al.,* (1996); Mafumiko, (1998) reported that limited knowledge and skills among Tanzanian science teachers in using alternative methods of teaching and learning affect students’ performance. Some of the factors that contributed to poor performance and teaching of science subjects were lack of laboratory facilities, large class size, the nature of examinations, the nature of the syllabus and inappropriate teaching and learning conditions (Chonjo *et al*., 1996; Mafumiko,1998). Science subjects are poorly performed in both O-level and A-level science examinations. Some of the factors that contributed to poor performance and teaching of science subjects were lack of laboratory facilities, large class size, the nature of examinations, the nature of the syllabus and inappropriate teaching and learning conditions (Chonjo and Welford, 2001).

Chonjo and Welford, (2001) observed that school teaching and learning environment influence the results for students who opt to take science subjects, hence contributes to drop in students’ interest in science subjects. Students' failure in science subjects in Tanzania as noted by Osaki (2007) was due to the fact that the implementation of curriculum and examination did not focus on what the students were actually learning in their science classes.

Osaki (2007) observed that the critical challenges hindering the promotion of students’ performance in science subjects in Tanzanian secondary schools included inadequate teaching and learning facilities in schools and poor quality of science classroom practice which reduce the enjoyment and effective learning of science subjects by students. There was also serious shortage of competent and qualified science teachers in many schools in Tanzania which influences the current provision of quality education in Tanzania. There is evidence of students developing negative attitudes to science subjects over the years in secondary schools (HakiElimu, 2008). According to the Performance Audit of the School Inspectorate Programme by the Controller Audit General (CAG), 47 percent of students who sat for their Certificate of Secondary Education Examination (CSEE) in 2009 failed in physics. A significant number of failures were also present in other science subjects (Figure 1.1). Such failures represent a loss both for individual students, whose ability to continue with higher education is compromised, and for the nation, whose ability to achieve its developmental goals is negatively affected both directly and indirectly (URT, 2008).

**Proportion of Students who Failed Mathematics and Science Subjects**

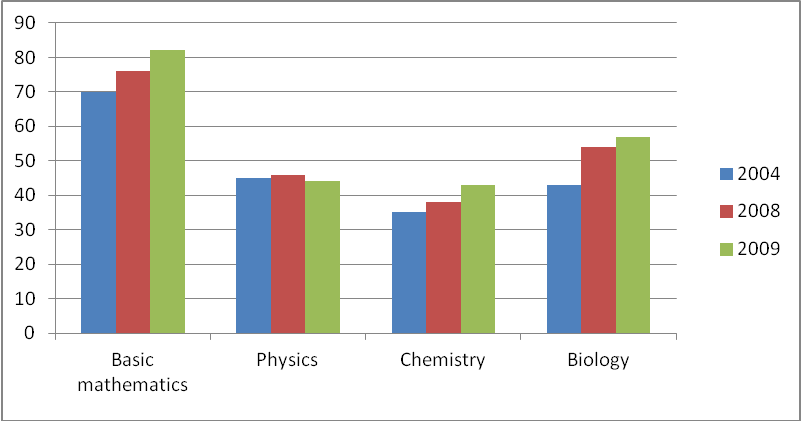
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Figure 1.1: Performances Audit of Secondary Schools’ Inspectorate Programme: NECTA, Examination Results Statistics

**Source**: Controller Audit

Moreover, there have been complaints from the public that the students were performing poorly in science subjects especially in physics. The then Tanzanian Prime minister, Honourable Mizengo Pinda acknowledged this fact in his 25th April 2008 speech to the members of Parliament. The premier pointed out that the overall performance had dropped drastically in primary and secondary schools. At ordinary secondary school level, the performance in Certificate for Secondary Education Examination (CSEE) was very poor in the year 2003. Students who had passed physics were 56.8%, chemistry 65.1% and biology 57.9%. The Prime Minister concluded that in the period of three years (from 2005-2007), there has been a decrease in performance in science subjects. This situation is reported to have been attributed to poor attitude toward science subjects (URT, 2008).

Attitude reflects the physical and psychological aspects of the students that are more susceptible to change and provide the preconditions necessary for teaching and learning to take place. Kajinga (2011) argued that the attitude is directly associated with the interrelationship of the buildings, head master/mistress and the teachers in that school, as it is based on their perception of behaviour common to the organization like school. Therefore, if the attitude of particular school is not conducive, the teaching and learning processes cannot be achieved at the predetermined levels.

HakiElimu (2013) notes that the attitude of students toward learning science subjects varies from one level of education to another. For example, in primary schools especially in standard one, most of the learners are interested in understanding basic mathematics such as counting because it is part and parcel of everyday life, but as a learner prospers in the following level especially in secondary education, the attitude toward science subjects tends to change. The attitude of students toward learning science subjects is one of a major challenge facing provision of quality education in Tanzania. It has greater influences especially in teaching and learning science subjects. This can be seen from the poor performance of students in examinations, and especially in mathematics and science subjects.

Development of students’ performance in science subjects especially in developing nations including Tanzania demands the preparation of skilled individuals in science disciplines from lower levels of academic and skill training (HakiElimu, 2013). This fact calls for the measures to promote effective science teaching and learning in secondary schools by examining the status of science teaching and learning, challenges facing the teaching and learning of science in schools as well as opportunities for improvements. The on-going trend in science teaching and learning in Tanzania schools is very dangerous to the national development especially with the science and technological developments which the nation is crying for (HakiElimu, 2013). It is now time to re-visit our science teaching as the nation in order to attract many students in science so as to prepare our own scientists for the development of the nation.

## 1.3 Statements of the Problem

For a long time science subjects have been studied by few students compared to the existing demand of scientists in Tanzania as there is a need of professionals such as doctors, engineers, science teachers and many others. This situation can be linked with poor performance caused by the way subjects are taught and learned, the degree to which students are motivated to master the content and the nature of assessment itself (Chonjo and Welford, 2001). The pass rates in Certificate of Secondary Education Examination (CSEE) results have been fluctuating from year to year. From the year 2000 to 2009, highest results were observed in 2004 (91.5 %) and lowest in 2009 (72.5 %), also the percentage of candidates who failed started to increase again from 2008 (16.3 %) to 27.5% in 2009 MoEVT, 2010). The worse CSEE results were experienced in 2012 where only 5.9 % passed (division I-IV) (HakiElimu, 2013) and after standardizing, the results were as follows; 6.4 % passed (division I-III), and 28.1 % passed at a level of division IV and the rest (65.5 %) failed the examination (MoEVT, 2012). This situation calls for revisiting of the learning environments (including students’ attitude) in secondary schools.

From the gathered evidences above it shows that there is a problem of students’ toward learning science subjects. It is therefore, the intention of this study to assess secondary schools’ perception and attitude toward learning science subjects in Mvomero district in Morogoro region in specific classes which are: Form two, three and four and suggest measures to improve and increase the numbers of students pursuing science subjects.

## 1.4 Research Objectives

## 1.4.1 The General Objective

The general objective of this research was to assess secondary school students’ perception and attitude toward learning science subjects.

## 1.4.2 Specific Objectives

The specific objectives of this study were to;

1. Assessment of students' perception and attitude toward learning science subjects.

## 2. Examine the Teaching and Learning Strategies used in Science Subjects

3. Examine the role played by the teachers in influencing their students to learn science subjects.

## 1.5 The Research Questions

This study aimed at answering the following research questions.

1. What i**s** the perception and attitude of secondary school students toward the learning of science subjects?

## What are the teaching and learning strategies used in science subjects?

1. What are the roles played by teachers’ in influencing students to learn science subjects?

## 1.6 Significance of the Study

The results of this study also would behove the ministry of education, educational administrator, head of schools, teachers and educational stakeholders to work hard toward improving learning environment and school climate in order to enhance the likelihood of perusing science subjects and high performance of students in Tanzania. In addition to that, the findings of this study will help to encourage policy makers and the community in general to strive to improve the learning environment and positive attitude especially in science subjects.

The school administration may use these study finding to strengthen students counselling services at various school with the intention of reducing dropout rates among students studying science subjects in secondary schools Tanzania’ Raising the morale to students by creating a positive perception and attitude toward learning science subjects and this will help schools to focus on providing a well-rounded educational programme in which teachers and students are willing to do. The result would be the alarm that prompts for educational stakeholders to call for immediate government intervention to revise the learning environments in secondary schools. This study is important as findings can help find ways of motivating girls to develop interest in science. Through this report, various employers in Tanzania may understand various needs of their employee who attempt to study and regular attendance in In-service Training and workshops.

## 1.7 Delimitation of the Study

The main focus of the study was to assess the secondary school students’ attitude toward learning science subjects. The study was limited to science teachers and students in ordinary level secondary schools, from form two to four. The study was confined to Mvomero district in Morogoro region as a representative district.

## 1.8 Definition of Terms

Attitude: In the context of this study the terms defined as the predisposition or tendency to respond positively or negatively toward a certain idea, object, person, or situation. Attitude influences an individual's choices of action and responses to challenges, incentives and rewards (together called stimuli). Secondary School: Secondary education in Tanzania consist of two cycles, viz. the first cycle which consists of four years of schooling and the second cycle which consists of two years of schooling. In this study, the focus will be on the first cycle (ordinary level secondary education). The entry qualification into this cycle is Primary School Leaving Examination (PSLE).

Science: Refers to a system of acquiring knowledge. This system uses observation and experimentation to describe and explain natural phenomena. The purpose of science is to produce useful modes of reality. In this study three science subjects namely: Physics, Chemistry and Biology.

# CHAPTER TWO

# 2.0 LITERATURE REVIEW

## 2.1 Introduction

This chapter presents literature review. The chapter is organized into the following sub-topics:Trend of performance in secondary schools in Tanzania and importance of science and science subjects. Other aspects of the chapter are government intervention toward improvement of performance in science subjects, the influence of attitude and school environment on studying science subjects, influence of gender on students’ attitude. Moreover other aspect include: Influence of attitude on students’ performance, attitude and its influence on choice of science career, research gap, and theoretical framework.

## 2.2 Trend of Performance in Secondary Schools in Tanzania

Since 2002, Tanzania has seen ambitious set of policy reforms in primary education and later in 2004 in secondary education. These reforms have dramatically improved the state of education in the country, particularly in terms of classroom infrastructure and enrolment (Sumra and Rajani, 2006). Tanzania has taken major strides with Secondary Education Development Plan (SEDP) implemented from 2004 as it has led to significant improvements in the provision of basic education in the country (Wedgwood, 2006)**.**

Increased primary schools enrolments created increased pressure further up the pipeline at the secondary school level. The expansion of secondary enrolment has been equally impressive, though far from reaching the levels attained in primary education. The enrollment in Form one, the first year of secondary education, increased from 99,744 in 2003 to 243,359 in 2006. The Gross Enrollment Rate (GER) has increased from 10.2% in 2003 to 20.2% in 2006. Secondary Net Enrollment Rate (NER) was reported to have doubled from 6.3% in 2003 to 13.4% in 2006 (HakiElimu, 2008).

The trend of students’ performance in secondary schools especially in science subjects for a long time has not been progressing well compared with that in arts and other subjects. Mabula (2012) asserted that, most of the candidate’s performed better in arts than science subjects and were interested to pursue art subjects. That situation goes simultaneously with mushrooming of non-science secondary schools in Tanzania whereby those having science subjects are not well-equipped to handle the smooth learning of science due to inadequate laboratories, classes, laboratory technicians, science teachers and extreme shortage of power in most secondary schools (HakiElimu, 2008).

## 2.3 Importance of Science and Science Subjects

Science subjects play key role in socio-economic development in an increasingly interconnected world. It is therefore imperative that developing countries like Tanzania embrace science subjects at various education levels as a vital tool for accelerating the country’s socio-economic development (URT, 1996). Science subjects’ education is thus important to national development in Tanzania. The use and application of knowledge, skills, modern tools and materials of science and technology add value to human life everywhere in the world (UNESCO, 2009). This aspect of education can be manifested through advances in medical, environmental and engineering sciences. Science, therefore, plays a fundamental role in wealth creation, improvement of the quality of life, real economic growth, and transformation in any society (URT, 1996).

Science is the primary engine for economic growth around the globe and provides the key to unlocking any country’s potential (UNESCO, 2009). Countries that want to develop, therefore, must invest significantly in science and science subjects. This investment is achieved by developing knowledge and skills and the human capacity required to advance in a globally competitive world (Lyon, 2005). The developing countries such as Tanzania must apply science in a number of sectors/ areas. These include agricultural and fisheries sectors, as well as the ecological sciences such as renewable energies, water management, and waste management. All of these areas and sectors likewise demand the development of science and technology, and a rigorous system of science and technology education. Moreover, emphasis is on the use of science and technology in national growth strategies to include the development of higher education (Hamilton *et al*., 2009).

Science is just as important as learning other subjects like mathematics and history. Because the subject is so vast, learning the basics right from your early learning days will enable you to decide whether you want to pursue a higher education in the subject. UNESCO (2009) notes important aspects in our lives that are covered by this subject: develops problem-solving skills, awareness about technology, How to conserve natural resources and Instils survival skills.

## 2.4 Government Intervention toward Improvement of Performance in Science

The performance of students in secondary schools in Tanzania has been very poor for many years (Mabula, 2012). The situation has become worse over the years compared to non-science subjects. The impact of this state of affair is obvious, since sciences play major role in any country’s development. A country has a system of reviewing its education curriculum on various occasions in order to bring meaningful learning at different levels of education. The changes took place in different years and in various phases. For example, in 1976 and 1995 [Unified science which was just piloted in some schools for one year and abandoned], 1997, 2005 and lately in 2007 (URT, 2008).

Tanzania has been reviewing its education curriculum on various occasions in order to bring about meaningful learning at different levels. In attempt to improve science teaching and learning in secondary schools, the government introduced several projects including School Science Projects and School Mathematics Project (Hamilton *et al.*, 2009). The focus of these projects was to improve the teaching strategies and adequate use of available teaching materials in the school and students’ learning environment. The teaching materials and strategies for these projects focused on experimental approach for teaching and learning. These programmes also focused on laboratory activities and a great deal of outdoor activities (Osaki, 2007).

A limiting factor to the school expansion is the rate at which teachers can be produced. In recognition of this, it is planned to accelerate the rate of expansion of upper secondary schools in order to produce a large cadre from which to draw teachers. This expansion limited itself by the number of graduate teachers. In order to increase the output of graduates, a high school (Mkwawa in Iringa) and Chang’ombe Teachers’ Training colleges were transformed to education colleges under the University of Dar es Salaam in 2005. It was then proposed that the degree programme in education would be reduced from four to three years (HakiElimu, 2008). In the World Bank document (World Bank, 2004); it was proposed that the diploma course would change from two years to one year in colleges and one year in schools (as for primary teachers under PEDP).

Tanzania like other countries in the world is currently working toward improving the quality of its education so that it suits the future needs of the society and the demands of globalization (Nguni, 2005). The government of Tanzania has succeeded to make primary education universal through the implementation of the Primary Education Development Plan (hereafter PEDP) 2002 to 2006 and the Secondary Education Development Plan (hereafter SEDP 11) since 2005 to 2009 that is meant to increase the accessibility of secondary education to its citizens (Oluochi, 2006). The two programmes are geared toward implementing and attaining the Millennium Development Goals (hereafter MDGs) on education as per Dakar Framework for Action, Education for All (hereafter EFA) by 2015 (UNESCO, 2005).

Another intervention made by the Tanzania government was the introduction of the Crash Programme for training licensed teachers. The targeted trainees were form six leavers, who were to be trained both in science and arts subjects for four weeks. After training there were sent to teach in secondary schools. In August 2004, not less than 615 teachers were already in schools recruited for the first time in 2004 and posted to work across the country (Osaki, 2004). The crash programme was planned that after two years of teaching those teachers would get a place at university and that was considered to be more attractive than the alternative path of entering teacher training college although entry to the programme was relatively competitive in the first year.

In the Ministry of Education plan for SEDP (URT, 2008) it was proposed that the training of licensed teachers would become the main source of new teachers, with over 30,000 licensed teachers entering into schools by 2010 (**S**umra and Rajani, 2006). This represented almost half the proposed total teaching force. It appeared to be unlikely that these licensed teachers would receive much professional support if they constitute such a large proportion of the total number of teachers. Some of the new schools that were opened in 2005 were staffed almost entirely by form VI leavers (HakiElimu, 2008).

## 2.5 The Influence of School Environment on Studying Science Subjects

Several studies have shown the link between attitude and school environment in determining students’ performance in science subjects. Mvungi (2009) examined the schools based factors that influence science students’ choice of teaching science as a career. The researcher noted that most of science teachers were dissatisfied in their job and teaching and learning conditions. He contends that many secondary school students lacked career guidance and counselling services in their study schools. Teachers also had negative attitude toward teaching career that was attributed to the students not choosing science as their career. Moreover, Mbogo (2009) noted that, the problem of shortage of science teacher’s especially in rural areas influenced students not to take science subjects when compared to urban based schools.

Lihaya (2009) examined the perceived influence of the Pre-service short Term Trained Teachers (PSSTT) on students’ interest in science subjects in selected community secondary schools (CSS). The researcher noted that community secondary schools had positive attitude and interest toward science subjects when they joined secondary schools. However, they lost interest in science and science subjects due to various reasons. Mabula (2012) and Mbogo (2009) pointed out that shortage of teachers in Ward secondary schools affected the quality of education provided. Also, despite the adopted strategies, there was no sustainability of the strategies. The economic hardship and lack of awareness on the importance of education were the major challenges that affected the sustainability and effectiveness of the strategies. The researchers recommend the need for the improved teachers’ work conditions and sensitization of people as part of efforts meant to address the chronic shortage of teachers.

## 2.6 Influence of Gender on Students’ Attitude toward Science Subjects

The performance in science subjects is another aspect determined by gender perspective. Several studies have been conducted to verify the attitude focusing on it. Rukundo (2006) noted that there were no differences in attitude between rural and urban secondary school students in performance in mathematics. The majority of girls in the two locations were reported to have positive attitude toward mathematics. Mock (1983) examined students' perception toward biology by gender and noted that younger students, boys and those whose fathers had better socio-economic background (but poor socio-economic background of the mother) had more positive attitudes in biology.

Mabula (2012) noted that, a difference between rural and urban schools in students’ entry qualifications, parents’ socio-economic status in terms of their career, teachers’ qualification and adequacy. Mabula (2012) also showed difference in instructional materials, impacts of the community on students’ evaluation and feedback, school leadership and use of a variety of teaching strategies were more or less the same in the two locations. The researcher concluded that girls can perform well in mathematics regardless of school location, provided that schools provide a conducive climate, optimize pedagogical processes and select students on academic merits. Sumra and Rajani,(2006) noted that teachers should be adequate, well qualified and motivated to teach, also instructional and financial resources should be adequate.

Furthermore, the school administration, teachers and students should be co-operating toward the common goal of high academic achievement. The same observation was made by Mock (2002), where it was noted that female students had both higher developmental expectations of their schools and more positive perceptions of the classroom atmosphere.

## 2.7 The Influence of Students’ Attitude on Performance of Science Subjects

Kibani (2008) identified factors that underlie success in achievement in science subjects. The researcher noted that the level of contribution of chemistry practical marks in relation to the national examination at the ordinary level of secondary school education in Tanzania. Moreover, the researcher noted that marks obtained in practicals’ raised the performance of final examination by raising the marks obtained in the theory part of the examination, which signifies that scores of practical’s have a contribution to make in the scores of final examination which chemistry practical’s marks had significant to the national examination. Muhammad (2011) examined student’s interest’s motivation and satisfaction with the science subjects in the context of the number of students who took science subjects. The researcher noted that the trend of students who took science in secondary schools and higher secondary level was declining and the level of achievement was recorded to be diminishing steadily. Again Kibani (2008) and Yara (2009) noted that the teachers should develop positive relationship with students and stress classroom activities which will involve active teaching and learning process and students’ participation in the class.

## 2.8 The Influence of Students’ Attitude on the Choice of Studying Science Career

To verify the influence of attitude in science career, Papanastasiou (2004) carried out a study to examine the major influence on attitude toward science career. The researcher noted that attitude is learned and therefore had influence to other people in the attitude toward science interim of quality of instruction correlates directly with science education and the nature of science instruction. Attitude strongly affects students’ choice toward science, level of aspiration exerted by the students, their families and their peers.

Similar observations were revealed for home level of aspiration examined by Simpson and Oliver (1990). The researchers found this factor to have direct as well as indirect effect of attitudes toward science. Involvement of parents in the form of interest taken by parents to discuss with their children's class and school experience influence attitude of students toward science. Parental involvement and peers have direct and indirect effects on students in science. Many researchers argue that attitudes are important factors that can influence a student’s achievement. Weinburg and Englehard (1994) found that positive attitude can be important factor toward achievement of education objectives. Also, factors such as aspiration, as well as the school climate should be attempted to be manipulated in the future in an international context to try to positively influence the students’ attitude toward sciences world-wide.

## 2.9 Research Gap

The literature indicates that secondary students’ perception and attitude toward learning science subjects in various levels of schooling play a significant impact in making students pursue science subjects. There have been few studies done in Tanzania to assess secondary school students’ attitude in the learning of science subjects. Therefore, this study aimed at assessing secondary students’ attitude toward learning science subjects in ordinary level of secondary school education could be an interesting undertaking.

# 2. 10 Theoretical Framework

This study was guided by the Theory of Planned Behaviour (TPB) which states that, attitude toward behaviour, subjective norms, and perceived behavioural control, together shape an individual’s behavioural intentions and behaviours (Montono and Kazprzyk, 2008). The theoretical view starts with the notion that the decision to engage in a particular behaviour is the result of a rational process. Various behavioural options are considered, the consequences or outcome of each are evaluated and the decision is reached to act or not to act. The combination of attitude, subjective norms, and perceived behaviour control can influence predictions of students toward learning science subjects or not. The theory was propounded by Ajzen and Madan (1986) taking into account the behaviour that was not under volition control. The theory is designed to predict and explain human behaviour in specific context. It is an extension of the Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980).

**2.10.1 Components of the Theory**

The theory is made up of five components, which are: attitude, subjective norms, perceived behavioural control, intention and behaviour. The three predictors of TPB that are attitudes, subjective norms and perceived behaviour control influence subsequent behaviour indirectly through behaviour intention. Perceived behaviour control may influence behaviour directly if the behaviour in question is not under complete volitional control.

In this theory, attitude refers to person’s positive or negative feelings toward performing the defined behaviour. Attitude consists of belief about the consequences of performing the behaviour (learning science subjects) and the person’s evaluation of these consequences. In this study the beliefs (whether positive or negative) that students learning science subjects in secondary schools in Mvomero. The studying depends on attitude developed on whether the perceived positive consequences of learning science subjects outweigh negative consequences.

The subjective norm refers to the students’ predictions opinions regarding the defined behaviour. Here it refers to the student’s perception toward learning science subjects. The opinion is evaluated to influence the intention to learn science or not. Behavioural intention is predicted and explained by attitude and subjective norms. The intention to perform behaviour is the most reliable predictor of behaviour. Therefore the attitude of a person leads to intentions and the intention leads to a particular behaviour. From this theory the students’ attitude (whether positive or negative) and reflected their intention and hence their behaviour (in learning science subjects).

**Figure 2.1: Components of Theory of Planned Behaviour**

Intention

(Knowledge on science subjects, employment etc

Attitude

(Beliefs, feeling and opinions toward leaning science subjects)

Perceived behavioural Control (Perception and ability to learn science subjects, employment opportunities)

Subjective Norms

(Individual beliefs. perceptions. willingness and ideology on the learning science subjects

Behaviour

(Learning science subject or not)

**Source:** Adopted and modified from Ajzen (1991)

The Perceived Behaviour Control (PBC) reflects the perceived ease or difficulty associated with the behavioural performance. For example, students struggle on learning science subjects. In this theory, the perceived behaviour control is used on a similar level with attitude and subjective norms as predictors of behavioural intention. Generally, the theory shows an important contribution on the decision toward leaning science subjects in Secondary schools. According to the theory, the student’s positive or negative attitudes toward learning science subjects are influenced by a set of control beliefs about the presence of several contextual factors. Learning of science subjects is influenced by the interaction of both contextual factors and individual factors.

**CHAPTER THREE**

# 3.0 RESEARCH METHODOLOGY

## 3.1 Introduction

This chapter deals with data collection and analyses. It includes the description of the study area, research design, methodology including population, sampling strategy and instrumentation. Data collection methods and analysis of data are also discussed in detail in this chapter.

## 3.2 The Description of the Study Area

The study was conducted in Mvomero district. Mvomero District is located in the North of Morogoro region and is administratively divided into seventeen wards. The district occupies a total of 7,325 square kilometres. For the case of secondary education development, in 2009 Mvomero district was administratively divided into three divisions, viz. Turiani, Mvomero and Mlali. The district has a total of twenty secondary schools and every ward in the district has at least one secondary school.

Some wards, for example, Mtibwa, Diongoya and Mvomero have two secondary schools each (Mvomero District Council, 2009). Mvomero was chosen because of its easy accessibility to the respondents as well as low performance in science subjects including mathematics in recent years (HakiElimu,2013). Eight (08) government secondary schools were randomly selected in Mvomero district.

## 3.3 Research Approach

This study used mixed research approach. Quantitative data were analysed by descriptive statistics.

**3.3.1 Quantitative Approach**

This study used also involved quantitative research approach. Kothari (2004) define quantitative approach as the systematic empirical investigation of observable phenomena via statistical, mathematical or computational techniques. In case of this study quantitative approach was deemed appropriate because of the following reasons:

1. The study intended seek causal determination, prediction, and generalization of findings
2. A quantitative approach was adopted because the study sought measurement from questionnaires and complimented information from interview and focus group discussion.

**3.3.2 Qualitative Approach**

The qualitative approach also was employed for this study. According to Cresswell (1998), a qualitative study is defined as an inquiry process of understanding a social or human problem based on building a complex, holistic picture formed with words, reporting views of informants, and conducted in natural setting. Denzin and Lincoln (1994) define qualitative as a multi-method in focus involving an interpretive and naturalistic approach to its subject matter.

According to Ary, Jacob and Razavieh (1996), human behaviour is always bound to the context in which it occur, attempting to make sense or interpret phenomena in terms of the meaning that people bring them. It involves collection of variety of empirical materials, case study, personal experience, introspective and life stories. In case of this study qualitative approach was deemed appropriate because of the following reasons:

1. The study intended to assess the secondary school students’ perception and attitude toward learning science subjects in Mvomero district in Morogoro region. The researcher found it rational to employ interviews in order to gain deep understanding on the perception and attitude of students toward learning science subjects.
2. A qualitative approach was adopted because of it flexibility in research. Basing on the assumption that human behaviour can not be predicted, the researcher found the need to adopt this approach because at some instances the researcher could use flexible and open probe questions rather than standardized questions. Flexible and open ended questions enable the researcher to gain understanding of secondary school students’ perception and attitude toward learning science subjects
3. Further, the approach was chosen because of its methods of data collection (Interview). This method allows thick data collection which provides room for thick description and narration on students’ perception and attitude toward learning science subjects. Audiences comprehend easily research result presented by this method.

**3.4 Research Design**

The study adopted a survey research design, the type of survey was cross sectional survey where the selected sample was studied and the information was collected in respective schools. Survey design was preferred because it offers information concerning characteristics of people in terms of their opinions, abilities, knowledge, perceptions, beliefs and attitudes about a particular topic or issue and allows information to be collected from the sample rather than from any member of the school (Fraenkel and Wallen, 2000). Furthermore, the design is relatively a quick way of obtaining information from a relatively large sample in order to describe the population (Creswell, 1994).

## 3.5 Population

The population is the entire group of people or items from which a sample is being selected (Kothari, 1990). The target population in this study included all science teachers and students.

## 3.6 Sample Size

Leedy and Ormrod (2001), a random sample is defined as a truly representative of the population. In this study, the samples consisted of 40 teachers and 192 students from form two, three and four in eight secondary schools in Mvomero District, Morogoro Region and wereselected at randomly (Table 4.1).

## 3.7 Selection of Schools

These schools were selected because of the following reasons, (i) they are found in divisions (administrative authority) which are close to each other (Turiani and Mvomero), (ii) the divisions are close by, hence, the Social Economic Status (SES) of the community in those divisions was assumed to be almost the same and (iii) these schools performed poorly in the national form four exam (CSEE) of 2013.

## 3.8 The Sampling Procedures

The students from the schools were selected by stratified random sampling within form two to form classes using lottery system. These classes where students started to develop interest of pursuing certain category of subjects (Osborne 2003). Teachers were purposively selected. This was done to cater for diversity as well as to gauge the basis for allocation of schools. Thirty six (36) teachers and 232 students from form two to four in eight (08) secondary schools were selected in this study. The number of teachers varied according to the total number in respective schools. The actual distribution of the respondents who participated in this study is shown in (Appendix 5)**.**

## 3.9 Data Collection Methods

The interview, focus group discussion and questionnaire methods were used for data collection as described below.

## 3.9.1 Interview

Interview was administered to teachers in secondary schools using an interview guide (Appendix 1). Before the interview, the researcher ensured conducive atmosphere by approaching the potential candidates/interviewees and requesting them to participate in the interview. For those who agreed to participate, they were assured and confidentiality for the conversation to be made during the interview. The researcher also ensured friendly interview environment so as to make the interviewees feel free to respond to questions during the interview process. The actual interviews were conducted individually for each respondent.

That is, the researcher posed the questions to the interviewee and interviewee responded orally. The time of thinking when the interviewee was trying to provide the best answers was considered important. The general interview lasted for about twenty minutes per session. This reduced tedious factors and loss of concentration that would otherwise have occurred if the time for the interview was longer.

## 3.9.2 Questionnaire

Interview by questionnaire was used to collect data where close-ended questions with few open ended questions were employed in this study. The questionnaires for teachers and students were used as the main instruments for collecting quantitative data after being piloted in one of the schools. The researcher then made rectifications found to be necessary. The questionnaire covered arena of teaching and learning science subjects in secondary schools(Appendix 2 and 3).

## 3.9.3 Focus Group Discussion

Focus group discussions (FGD) were used to assess of students’ perception and attitude toward learning science subjects in Mvomero district. Students from form two to four in both science and arts classes were invited for the discussions. The theme was on the assessment of students’ perception and attitude. The focus group discussions generally took an hour and the discussion was recorded through note taking and keeping of key issues that were raised during discussion. During the discussions, the facilitator posed a few predetermined questions with considerable flexibility and follow up questions(Appendix 4).Students from form two to four in eight (08) secondary schools were invited in respective schools and there were six (6) students for a particular discussion.

## 3.10 Validity and Reliability

In order to check for validity and reliability of instruments, first the instruments were developed and given to classmates and staff to comment on them and then to the research supervisor after incorporating the peers' comments. They were then pilot-tested by administering them to a few students in Magole secondary school to check for consistency in the responses after which, the researcher made the necessary corrections of some sections of the questionnaires, interview schedules and guidelines for focus group discussion.

## 3.11 Data Analysis Procedure

Qualitative and quantitative data were obtained through interview, questionnaire and focus group discussions. The qualitative data were analyzed in terms of content analysis while quantitative data were summarized in the tables and statistical figures generated. The analysis of data were first based on summarizing the findings from the respondents, explaining, interpreting and clarifying system developed to record the information collected. Content analysis of the qualitative data obtained from interview and focus group discussion were used in which the intensity of the words and phrases used by the respondents were considered to be important information of interest and were systematically presented in quotations from the respondents for further references in the discussion and conclusions of the research findings. Then the researcher scrutinized the collected data and identified information which was relevant to the research questions and objectives and was summarized to make interpretation possible according to the objectives of the study.

## 3.12 Ethical Consideration

The basic ethical principle in organizing data collection is that no harm should come to participants as a result of their participation in the study (Cohen *et al.,* 2007). Therefore, the researcher ensured the protection of human rights to all participants involved in the study by considering the following issues.

## 3.13 Research Permit

Permission to conduct this study was obtained by having a letter from the Director of Morogoro Regional Center, who issued an introduction letter for data collection. The letter enabled the researcher to have access to Morogoro Region Administrative Secretary (RAS) and finally to Mvomero District Administrative Secretary (DAS) who in turn issued a permit that allowed the researcher to conduct the study(Appendix 6).

## 3.14 Informed Consent

The researcher sought consent from participants to provide information and data after having explained to them the research objectives and assuring them that all information and data volunteered would be treated as confidential and would be used for the research purposes only. This assisted participants to have a clear understanding of the aim of study and exercise their right to participate or not.

## 3.15 Privacy and Confidentiality

This is the state of the freedom from interference or public attention. It is considered in two perspectives: the sensitiveness of the information given and the use of names of people providing information. Sensitive information refers to how personal or potential threatening the information is. In order to ensure privacy among participants, all data collected were stored carefully so as to protect them from unauthorized persons. The right of confidentiality insists that individuals identified are not silent features to the research. Cohen *et al.*, (2007) argue that a participant is considered anonymous when the researcher or person cannot identify the participant or subject with the information provided.

**CHAPTER FOUR**

# 4.0 ANALYSIS AND INTERPRETATION

## 4.1 Introduction

Chapter four contains the description and analysis of the data. The chapter has been further divided into two sections. Section one provides background information that is students’ and teachers’ and profile, demographic information and questionnaires returning rate. The second section presents the major finding of the study. The findings are presented under three research objectives. These objectives were; (I) Assessing students’ perception and attitude toward learning science subjects, (II) evaluating students’ perception and attitude of teaching methodologies on the learning science subjects and (III) examining the role played by teachers in influencing their students to learn science subjects.

## 4.2 Background Information

## 4.2.1 Students’ Profile

Two items in students profile are sex and class; these are shown in Table 4.1.

#### 

#### Table 4.1: Summary of Students Involved in Filling Questionnaires from Eight Schools

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Class | Male students | | Female Students | |
| Number | Percent | Number | Percent |
| Form two | 26 | 35.6 | 23 | 36.5 |
| Form three | 22 | 30.1 | 19 | 30.1 |
| Form four | 25 | 34.2 | 21 | 33.3 |
| Total | 73 | 53.7 | 63 | 46.3 |

**N=136.**

**Source:** Field data (2014)

## 4.2.2 Teachers’ Profile

In this study teacher’ profile include sex, teaching experience and level of education as shown in Table 4.2.

#### Table 4.2: Profile of Teachers Involved in the Study

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Sex | | Teaching experience in years | | | | Qualifications | |
| M | F | <1 | <5 | 6-10 | >10 | Diploma | 1st Degree |
| Frequency | 22 | 07 | 14 | 11 | 03 | 01 | 13 | 16 |
| Percentage | 75.9 | 24.1 | 48.2 | 37.9 | 10.3 | 3.4 | 44.8 | 55.2 |

**N=29.**

**Source:** Field data (2014)

It is worth noting that the number of female teachers 24.1% was far less than the number of male teachers. The majority of teachers had less than one year of teaching experience. With regard to academic qualifications, the secondary schools were mainly staffed by Diploma and Bachelor Degree holders (Table 4.2).

## 4.2.3 Questionnaires Returning Rate and Demographic Information

Out of the 176 questionnaires (i.e. 144 for students and 32 for teachers) sent to the eight selected secondary schools, 165 questionnaires (93.7%) were returned. These include 136 questionnaires for students and 29 questionnaires for teachers. All returned questionnaires were completely filled (Table 4.3).

#### Table 4.3: The Distribution of Teachers and Students Involved in the Study

| Name of schools | Teachers respondents | | | | | | Student respondents | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Questionnaire | | | Interview | | | Questionnaire | | | Focus group Discussion | | |
| M | F | T | M | F | T | M | F | T | M | F | T |
| Murad Sadiq | 04 | 00 | 04 | 01 | 00 | 01 | 08 | 07 | 15 | 03 | 03 | 06 |
| Sungaji | 03 | 00 | 03 | 01 | 00 | 01 | 09 | 08 | 17 | 03 | 03 | 06 |
| Hembeti | 03 | 01 | 04 | 01 | 00 | 01 | 09 | 09 | 18 | 03 | 03 | 06 |
| Mvomero | 03 | 01 | 04 | 01 | 00 | 01 | 09 | 09 | 18 | 03 | 03 | 06 |
| Lusanga | 02 | 02 | 04 | 00 | 00 | 00 | 09 | 09 | 18 | 03 | 03 | 06 |
| Diongoya | 02 | 02 | 04 | 01 | 00 | 01 | 10 | 07 | 17 | 03 | 03 | 06 |
| Nassoro Seif | 03 | 01 | 04 | 01 | 00 | 01 | 09 | 08 | 17 | 03 | 03 | 06 |
| Wami | 02 | 02 | 04 | 00 | 01 | 01 | 10 | 07 | 17 | 03 | 03 | 06 |
| **Total** | 22 | 07 | 29 | 06 | 01 | 07 | 73 | 63 | 136 | 24 | 24 | 48 |

**Source**: Field data (2014)

Out of 29 teachers included in this study, 07 were female and 22 were male. The participants included 16 graduates who had Bachelor degree (Education); and 13 had Diploma in Secondary Education (Table 4.3).The majority (48.2 %) of the participants in the study started teaching at their respective schools in the year 2013, therefore they had less than 1 years of service in those schools. Of the remaining participants, eleven (11) had 1-5 years of service, three (03) had 6-10 years, and one (01) had worked at a certain secondary school for than 10 years.

## 4.3 The Students’ Perception and Attitude toward Learning Science Subjects

The first objective of the study was to identify perception and attitude of students toward learning science subjects, in order to capture data; Interview, questionnaire and focus group discussion were administered to teachers and students.

## 4.3.1 The Perception of Students Toward Learning Science Subjects

The respondents were required to show what they think are the perceptions of students toward learning science subjects in secondary schools. The study revealed that majority of students had negative attitude with science subjects. Where 66.2% had negative and 33.8% had positive attitude toward leaning science subjects. For example those with negative said the following; one teacher said:

Most of the students in this school are affected by inferiority complex especially girls as they think that science subjects are only for boys.

Moreover, during the interview process, one teacher who had been teaching for long time in secondary schools had the following to say:

For a long time secondary school students had poor mentality that science subjects are difficult because they contain many Latin words like those in biology.

However, other respondents had different views on student’s perception toward learning science subjects:

In recent years, the number of students taking science subjects in my school has increased drastically compared to five years back. They now regard science subjects just like other subjects.

## 4.3.2 How Students’ Perception Affects Learning of Science Subjects in Secondary Schools

During the interview, teachers made the following explanations pertaining to how the students’ perception affects teaching and learning science subjects in secondary schools. On this, one respondent said:

Low number of female students pursuing science subjects, such as Physics and Chemistry discourages other female students interested to study sciences from lower level as they start to perceive that science subjects were only for the male students.

Another teacher had the following to say on how the students’ perception affects teaching and learning science subjects:

Teachers are not devoted to spend enough time for students benefit because students are less interested to pursue science subjects. The government is overlooking us. We are doing a lot of activities even after working hours, but students’ responses are still not good

## 4.3.3 What Makes Science Subjects Less Interesting

Regarding respondents’ view on what makes science subjects less interesting; during focus group discussion respondents had the following to offer in Figure 4.1: Students’ responses.

Less students interest in science subjects

Few students who succeed with higher level of education

Less fringe benefits among Scientists

Limited teaching and learning materials

Lack of library

Difficult language especially Biology which contains some Latin words

Lack of support and encouragement

Poor parents’ attitude

Poor teachers’ attitude

Laboratories equipments for practicals

Limited classroom

### Figure 4.1: Reasons that Contribute to Students Being Less Interested in Science Subjects

**Source:** Field data (2014)

## 4.3.4 Reasons Contributing to Low Number of Students Taking Science Subjects in Secondary Schools

During the focus group discussion with students, respondents had various explanations pertaining to why there were few students taking science subjects in secondary schools. The following were the views:

1. Some students hate science subjects
2. Fear of the unknown
3. Students having negative attitude toward the learning science subjects
4. Lack of incentives to science teachers as it is more involving in terms of preparation and teaching other subjects and therefore those, teacher need some incentives to sustain the willingness and continue to teach the subjects.

The same idea to teachers were asked to respond during interviews pertaining reasons contributing to low number of students taking science subjects in secondary schools, respondents had different explanations. For example one teacher said:

Poor advice from other people especially those who studied sciences claiming that science subjects are difficult.

Another teacher had the following to say as a response to why there are few students taking science subjects in their school:

Students have negative attitudes toward the learning of science subjects.

Moreover, another teacher in secondary school said:

Lack of cooperation between teachers and students and poor understanding among students because of insufficient teaching and learning environment.

Another teacher had the following to say on the subjects at hand:

In fact, as far as teaching, teachers prefer to teach the subjects and classes they are used to, that is the subjects and classes they have been teaching for long time. When it happens that they have to teach the subjects and classes which they are not used to, they are reluctant, complaining that they are not competent to teach subjects they are not used to.

Another narration on the same question was:

Teachers in this school are capable of teaching science subjects at the low level of form one and two. As such they need further training to enhance their level of understanding of academic content especially in science subjects so as to impress many students to study science subjects

Responding to the same question, another teacher said:

*These teachers have low understanding of and possess few strategies for teaching science subjects hence lead to less interested to the students to study science subjects.*

Moreover, another teacher reported the following concerning to low numbers of students in secondary schools taking science subjects*:*

Inadequate knowledge and skills provided to secondary school students on science subjects from primary school to secondary school, it affect the trend in the provision of quality education on particular subjects in higher education.

## 4.3.5 Strategies for Improvement and Motivating Students toward Learning Science Subjects

The teachers were asked about the main things to be done to promote students to opt science subjects as the career. Teachers included the following to be done:

i. To improvise teaching aids in science subjects from lower class of primary education

ii. To put emphasis in counselling and mentorship of students regarding science subjects

iii. To increase efforts in teaching science subjects rather than other subjects

iv. INSET activities and workshops conducted by MoEVT have to be conducted for a long time to enable teachers’ comprehend all of the required materials

v. After training there is a need for classes for teachers to practice what they have learned in the presence of INSET facilitators to assess if they have understood the required knowledge. This can be done by conducting these INSET activities around schools environment where teachers can have an ample time to learn and practice what they have learned.

Under the aspect of improvement of secondary students’ perception and attitude toward learning science subjects, the study sought views of teachers on what need to be done to improve perception and attitude of students toward learning science subjects (Table 4.4).

#### Table 4.4: Strategies for Improvements of Students’ Attitude toward Learning Science Subjects: Teachers Responses

| S/N Strategies | % |
| --- | --- |
| 1. Provision of continuous in-service courses or workshops to the  teachers to clear difficulties topics | 10.3 |
| 2. Provide intensive training in content and methods during their pre-  service and In-services training. | 6.8 |
| 3. Compulsory and regular in-service training of the science teachers  in line with curriculum changes as well as the basis of respective  science subject content and methodology in order to improve their  competence | 10.3 |
| 4. Frequent follow-up on how science teachers are performing so as to  assist them at work places | 13.7 |
| 5. The government should make sure that each school in Tanzania has  well-equipped laboratories for the best delivery of knowledge and skills | 10.3 |
| 6. Use movable laboratories to solve shortage of laboratories in  Schools | 13.7 |
| 7. Provision of grants to students pursuing science subjects in higher education instead of loans to attract more students in science subjects. | 24.1 |
| 8. To increase practical activities by providing more instruments for  practical’s | 10.3 |

**N=29**

**Source**: Field Data (2014)

The study further required the teachers to give their views on how students can be encouraged to study science subjects. The teachers had the following to offer: To ensure sustainability enough salary and fringe benefits to those teachers teaching science subjects in various schools, motivation to those with higher performance in science subjects by providing them study materials and giving experiments individually during practical sessions and in extra hours. Moreover, the schools should conduct scientific exhibitions in order to arouse talents of students in science subjects and there should be a counselling unit in each school to counsel students not to fear science subjects.

## 4.4 Examine the Teaching and Learning Strategies used in Science Subjects

The second objective of the study was to examine the teaching and learning strategies used in science subjects.. In order to capture data; Interview, questionnaire and focus group discussion were administered to teachers and students.

## 4.4.1 Teaching and Learning Methodologies

Teachers were asked about teaching and learning methodologies they frequently use. The responses indicated that they use different teaching and learning methodologies to facilitate the teaching and learning process where questions and answers as well group discussion were the mostly frequently used as methodologies (Table 4.5).

#### Table 4.5: Teaching and Learning Methodologies often used by Teachers: Teachers’ Views

|  |  |  |  |
| --- | --- | --- | --- |
| Responses in % | | | |
| S/N Methodologies | Frequently | Rarely | Never |
| 1. Questions and answers | 69.2 | 30.8 | 00 |
| 2. Lecture | 48 | 40 | 12 |
| 3. Problem solving | 47.6 | 42.9 | 9.5 |
| 4 Group discussion | 66.7 | 33.3 | 00 |
| 5. Project | 20.7 | 45.5 | 33.8 |
| 6. Lab/experimental activity | 42 | 32.4 | 25.6 |
| 7. Journal writing | 27 | 18 | 45 |
| 8. Oral presentation | 53.8 | 46.2 | 00 |

**N=29.**

**Source**: Field data (2014)

The teachers rarely used project as a teaching and learning methodology. This implies that there were some teachers who had never used some of the methodologies to facilitate teaching and learning. It appeared to be new to them and they had rarely used it in their teaching. As a result, most of them continued to rely on few methodologies. Under the aspect of teaching methodologies, the study sought also views from the students on which methodology was most frequently used by their teachers. The findings showed questions and answers were the most frequently used as teaching methodology (Table 4.6)**.**

#### Table 4.6: Teaching and Learning Methodologies Often Used by Teachers: Students’ Views

|  |  |  |  |
| --- | --- | --- | --- |
| S/N Methodologies | Responses in % | | |
| Frequently | Rarely | Never |
| 1. Questions and answers | 77.9 | 22 | 00 |
| 2. Lecture | 49.1 | 42.1 | 8.8 |
| 3. Problem solving | 58.9 | 34.7 | 4 |
| 4. Group discussion | 74.6 | 23 | 2.4 |
| 5. Lab/experimental activity | 33 | 46.8 | 19.8 |
| 6. Project | 20 | 42 | 38 |
| 7. Journal writing | 22.2 | 33.1 | 48.7 |
| 8. Oral presentation | 38.8 | 46.3 | 14.9 |

**N=29.**

**Source:** Field Data (2014

Students ranked questions and answers as a most frequently used teaching methodology by teachers. Group discussion was ranked as second most often used methods. Moreover, ranked project was the less frequently used methodology. The study also sought to know whether the students attended laboratories as conducted according the school timetable. The finding indicated that 54.4% of students said **yes** and 45.6% said **No.** Furthermore, the students were asked whether influenced to opt science subjects. The finding revealed that 51.2% of students said **No** and 48.8% said **yes**.

## 4.4.2 Challenges to Overcome in order to Improve Teaching and Learning of Science Subjects

Interviews of the teachers revealed that the following challenges need to be overcome in order to improve the teaching and learning of science subjects: Insufficient training for science teachers, lack of motivation among science teachers, shortage of laboratory technicians responsible for preparation of practical’s in the laboratory, heavy load among science teachers, insufficient fund and truancy among students. For example, teachers in one of the school had this to say:

In this school the students studying science subjects failed due to lack of teachers and materials such as chemicals for practical’s, therefore, science students performed poorly.

Another teacher had the following to say with regard to the challenges that need to be overcome in order to improve the teaching of science subjects.

Regular in-service training among science teachers in line with curriculum changes as well as the basis of respective science subjects content and methodology in order to improve competence.

## 4.5. The Role of Teachers in Influencing Students in Learning Science Subjects

The third objective of the study was the role of teachers in influencing students in learning science subjects learning science subjects. In order to capture data; Interview, questionnaire and focus group discussion were administered to teachers and students.

## 4.5.1The Role of Teachers toward Students Learning of Science Subjects

The third research question was meant to examine the perceived role of teachers on encouraging students toward learning science subjects. Teachers were asked to indicate their level of agreement with some variables related to this aspect. They were also free to add other roles that teachers could play in encouraging students to pursue science subjects (Table 4.7).

#### Table 4.7: The Role of Teachers in Encouraging Students: Teachers’ Responses

|  |  |  |  |
| --- | --- | --- | --- |
| S/N Role played by teachers | Responses in % | | |
| Agree | Undecided | Disagree |
| 1. Encourage students’ participation in learning  science subjects | 91.2 | 8.7 | 00 |
| 2. Provide helpful feedback | 53.6 | 46.4 | 00 |
| 3. Increase students motivation to learn science  Subjects | 89.3 | 10.7 | 00 |
| 4. Develop students awareness in learning science  Subjects | 69.4 | 29.6 | 00 |
| 5. Identify students learning needs and difficulties | 69 | 31 | 00 |
| 6. Inform government and parents of students  Achievements | 59 | 41 | 00 |
| 7. Create cooperation among students | 72.4 | 27.6 | 00 |
| 8. Motivate students to conduct experiments | 76.9 | 23.1 | 00 |
| 9. Helps students to gain deep insight into what  students understand in order to plan and guide  instructions | 59.3 | 40.7 | 00 |

**N=29. Source:** Field data (2014)

Findings in Table 4.7 revealed that 91.2% of teachers agreed with teachers' role of encouraging students to participate in learning science subjects in secondary schools. The second most important role of teachers was to increase students' motivation to learn science subjects. Students also were asked to examine the perceived role of teachers inencouraging students toward learning science subjects. Students were asked to indicate their level of agreement with variables listed in Table 4.8. Also, they were free to add other role of teachers in encouraging students to pursue science subjects.

#### Table 4.8: The Role Played by Teachers: Responses from Students

|  |  |  |  |
| --- | --- | --- | --- |
|  | Responses in % | | |
| S/N Role played by teachers | Agree | Undecided | Disagree |
| 1. Encouraging students’ participation in learning  science subjects | 91.8 | 2.5 | 5.8 |
| 2. Motivating students to learn science subjects | 52.2 | 3.1 | 10.1 |
| 3. Identify students’ learning needs and  difficulties in science subjects | 80.9 | 8.4 | 10.7 |
| 4. Inform the government, parents and teachers of  students achievements in science subjects | 78.1 | 12.2 | 10.7 |
| 5. Inform the government, parents and teachers of  students achievements in science subjects | 77.6 | 7.4 | 14.4 |
| 6. Create cooperation among students toward  learning science subjects | 85.1 | 7.4 | 6.6 |
| 7. Motivate students to conduct experiment  Independently | 84.8 | 9.1 | 6 |
| 8. Help students to gain deep insight in  understanding science concepts | 81.1 | 11.5 | 6.8 |

**N=136. Source**: Field data (2014)

Table 4.8revealed that 91.8% of students agreed that encouraging students' participation in learning science subjects was the most important role played by the teachers. The students added that teacher’s encouragement of encouraging students' participation in learning increased the level of students’ interaction, facilitated students’ creativity and motivated students to learn more. Also, students' argued that through this encouragement they found more information about the essentials of science subjects in order to get new ideas that could facilitate learning science subjects.

The second role of teachers is students’ motivation to learn science subjects where students agreed that teachers had a role in creating cooperation among students toward learning science subjects toward learning science subjects. The study revealed that the teacher had greater role toward creating cooperation among students to learn science subjects and opt to proceed to higher levels.Moreover, the motivation of students to conduct experiments independently was also reported to be one of the most frequently played roles of teachers in learning science subjects. It involved theory and laboratory activities where the students motivated conducted experiments independently.

#### Table 4.9: Students’ Responses on What Influences them to opt for Science Subjects

|  |  |  |
| --- | --- | --- |
| S/N | Reasons for studying science subjects | **%** |
| 1 | Priority given to the students who study science subjects in joining  higher level of education in colleges or universities | **20.2** |
| 2 | Easier to be employed nowadays compared to those studying  other subjects | **16.0** |
| 3 | The great demand of scientists in the country and in the world | **15.0** |
| 4 | Participate in the advancement of science and technology | **14.5** |
| 5 | High salaries to those who pursue science career | **13.5** |
| 6 | The influence of academic performance in science subjects from  former schoolmates | **10.3** |
| 7 | Ambitions to be employed as a doctor or civil engineer | **10.2** |

**N=136. Source**: Field data (2014)

Other roles added by students apart from those listed in Table 4.8 included: teachers were working very closely with students in order to make them learn more about what teachers had. They support students to attend school most frequently and to encourage student to study hard in order to reach their ambitions. Moreover, students were asked what influenced to opt science subjects and their responses were as listed in Table 4.8;

## 4.5.2 In-Service Education Training (INSET) or Workshops in Influencing in Teaching and Learning Science Subjects

It was asked whether teachers had been exposed to any INSET activities or workshops pertaining to science subjects, which if known could facilitate to determine and influence perception and attitude of secondary school teachers in teaching science subjects. Responses revealed that 51.7 % of teachers had attended INSET or workshops. The time of training for those who had attended workshops ranged from 5-10 days. Some of them said that they spent 14 days of training. They complained that days were not enough for them to be effectively trained in comparison to the predetermined objective of INSET or workshops. For example, one teacher during the interview said:

I have been a teacher for five years; but I have never attended any INSET programmes in my teaching career, but I always teach biology. There are some teachers who attend these workshops several times when there are new innovations in science education but they are very few compared to the number of teachers present in our schools.

The responses from teachers indicated that, some teachers including those who had attended INSET revealed that they were not capable and confident. Moreover, during interview, one of the teachers had the following to say on how the in-service courses or workshops influenced teaching and learning science subjects:

Sometimes the implementation of curriculum interrupted by teaching and learning environment. This was because of current advances in the globalized worldand home-based factors whereby at home students are busy doing activities so they failed to get enough time or self studies.

## 4.5.3 Teachers’ Barrier that Influence Students’ Interest to Pursue Science Subjects

Under the students’ interest arena, study sought to knows the views of the respondents on teachers’ barriers that may influence students interested to pursue science subjects. Teachers and students reported in Figure 4.1

### 

Poor influence from Peer groups

Reduced students’ interest to pursue science subjects

Students’ discouragement

Low salary to teachers

Dissatisfaction of teachers

Low support from parents

Inadequate Fringe benefits

Negative attitude of teachers

Lack of in-service training for teachers to cope with curriculum changes even the topic perceived to be difficult

Students having negative mentality toward learning science subjects

Inadequate of teaching and learning materials

Teaching not done effectively

Low capability of science teachers

### Figure 4.2: Factors Contributing to the Declining Interest of Students in Studying Science Subjects

### Source: Field Data (2014)

# CHAPTER FIVE

# 5.0 DISCUSION

## 5.1 Introduction

This chapter presents discussion of the research findings. Findings are presented and discussed in line with research objectives and questions that guided the study. The findings were discussed in conjunction with a reflection on the literatures and other studies that relate to the problem under investigation.

## 5.2 The Attitude of Secondary School Students toward Learning Science Subjects

## 5.2.1 The Attitude of Students Toward Learning Science Subjects

The finding from respondents revealing that majority of the students had negative attitude toward learning science subjects. The study indicated that some of the students had poor mentality that science subjects are difficult because they contain many difficult words as is the case in biology with Latin words. Moreover, most of female students were influenced by the inferiority complex which made them think science subjects are only for boys. The findings are supported by observation of HakiElimu (2008) reported that students developing negative attitude to science subjects over the years in secondary schools. In a similar finding, URT (2008) reported that the performances of secondary school students have been attributed to poor attitude toward science subjects.

## 5.2.2 How Students’ Perception Affect the Learning of Science Subjects in Secondary Schools

It was learnt from the study that several interpretations can be made on how the perceptions of students affect the learning of science subjects. First, low number of female students pursuing science subjects, such as physics and chemistry discourages other female students interested to study sciences from lower level of education and thereby making them perceive that science students are only for the male students. The second interpretation was based on teachers themselves as they are not devoted to spend a lot of time for students’ benefit because they are less interested to encourage them to pursue science subjects. The government was overlooking them. They are doing a lot of activities even after working hours, but students’ responses still are not good. Students need to be highly motivated because science subjects are time consuming and difficult.

Papanastasiou (2004) carried out a study in developing countries to examine the major influence on attitude toward science career. The researcher noted that the attitude was learned and therefore it influence of other people. This strongly affects student’s attitudes toward science, level of aspiration exerted by the students, their families and their peers. Similar results were revealed for home level of aspiration by Simpson and Oliver (1990) who found this factor to have direct as well as indirect effect on attitude among peers and individual attitudes toward sciences.

The involvement of parents in the form of interest taken by parents to discuss with their children and school experience influences attitude of students toward science. Parental involvement and peers have direct and indirect effects on students studying science. Attitude is mediated through science teaching activities. Weinburg and Englehard (1994) noted that attitudes are important factors that can influence a student’s achievement.

## 5.2.3 What Makes Science Subjects Less Interesting

It was learnt from the findings that, there are several views on what makes science subjects less interesting. Several views made from students, first, few students who succeed with higher level of education. Second, the claims that lack of support and encouragement associated with poor attitude from both teachers and parents. The third noted the difficult language especially biology which contain some Latin words. The fourth one claim noted was limited teaching and learning materials which include library, classroom and laboratories equipment for practical. Lastly less fringe benefits among scientists. There are general claims that, some of the students face hardships in interpreting study materials in science subjects as a result continued frustration boil into students into students’ minds triggered the less interesting in pursuing science subjects.

Pierrakeas, xenos, Panagiotakopoulos and Vergids (2004) concur with above findings. These authors jointly established that students in Greece were dropping from studies due to academic reasons. Students dropped from studies to inability to sufficiently understand the course learning materials in order to satisfy minimum academic obligation. Moreover, Kilato (1997) adopted a gender perspective to examine study in science subject. The study identified among other things lack of support from various education stakeholders, while some study materials were uncontextualized to Tanzania learners as a result interest in science subjects diminishing among students.

Inline with the above discussion , the current researcher argues that; it is true that the knowledge from other countries is similar as that of Tanzania, which implies that the study materials for science subjects adapted abroad to be similar as those which developed in Tanzania. However, the way the study materials are presented can create a big barrier for students’ learning. For instance, a difficulty language in the study materials is a barrier to the majority of students especially whose English language competency is low. These perception and interpretations are passed over to new students and tend to affect students’ learning significantly.

## 5.2.4 Reasons Contributing to Low Number of Students Taking Science Subjects in Secondary Schools

The research findings from both students and teachers showed that most of students claimed that science subjects are the difficult which means they thought they needed extraordinary efforts for the students to perform better. Also, teachers asserted that many female students and other people had inferiority complex that only male students can pursue science subjects. They added that some jobs like engineering were for males only and therefore the subjects related with those jobs should be left to male students only. These findings support the argument of Mabula (2012) that science subjects were considered as too difficult to understand because they contain many concepts. These findings also relate to the argument made by Osaki (2007) who noted that science books are lacking, limited science facilities and many of science teachers are too fast in teaching process.

The above findings concur with Munro and Elson (2000) who noted a small number of secondary school students taking science subjects. These authors jointly conducted a study in developing countries that showed that that, only 30% of students studied physics and 32% studied chemistry and mathematics in secondary schools in 1994. These percentages decreased to 25% and 26% respectively in 2005 as pointed out by research by Lyons (2005). The finding also from students showed that, respondents had different explanation to why there were few students taking science subjects in secondary schools. For instance, a form four student indicated that, students had negative attitude toward science subjects. While another students had different explanation where noted that some student hate science subjects and lack of incentives to science teachers as it is more involving in terms of preparation and teaching science subjects.

The findings concur with HakiElimu (2008) noted that students developing negative attitude to science subjects over the years in secondary schools. These findings also relate to the argument made by Munro and Elson (2000) who noted a small number of secondary school students taking science subjects. These authors jointly conducted a study in developing countries that showed that that, only 30% of students studied physics and 32% studied chemistry and mathematics in secondary schools in 1994. These percentages decreased to 25% and 26% respectively in 2005 as pointed out by research by Lyons (2005).

Similar trend can be seen in France, Germany and other developed countries where for instance, the students’ enrolment in science subjects has been decreasing in different rates. For example, the trend in some of the countries were as follows, Norway experienced decrease at the rate of 40% as from 1994 to 2003, Denmark is 20% as from 1994 to 2002, Germany 20% as from 1994 to 2001 and the Netherlands was 6% as from 1994 to 2001 (OECD, 2007).

## 5.2.5 Strategies for Improvement and Motivating Students toward Science Subjects

The finding showed several strategies regarding on strategies for motivating students to opt for science subjects. There are those who mentioned that the government prepare In-services Training and workshops under MOEVT for a long time to enable teachers’ comprehend all the required materials. They, also insited that there is a need for classes for teachers to practice what they have learned in presence of INSET facilitators to assess if they have understood the required knowledge. This to be done by conducting these INSET activities around schools environment where teachers can have an ample time to learn and practice what they have learned.

There were those based on teachers themselves where they indicated that have more duties of improvising teaching aids in science subjects from lower class of primary education, putting emphasis in counselling and mentorship of students regarding science subjects and increase effort in teaching science subjects. Training teachers in new strategies is very important to be done before implementing the Tanzania Education Training Policy of 1995. Grover (2009) asserts that training is key to transform teachers who are not capable into the best teachers who are capable.

The findings are supported by of observation by Bennel, (2004) that motivation influences individual behaviour with respect to the attainment of goals and tasks. Also, teachers argued that helps students to find more information about the topic so that during classroom discussion they can fully participate and bring new ideas to facilitate learning, finally develop positive attitude toward learning science subjects.

## 5.2.6 Conclusion on Research Question One

The research question of this section was intended to assess the secondary school students’ perception and attitudes’ of students toward learning science subjects. In the discussion it was shown that some students had bad perception toward learning science subjects while other not, students’ perception noted and observed on how it affects the learning of science subjects and unfriendly environment to students in learning science subjects,. There is also a need of having strategies for sustainable improvement and motivating students toward for Science Subjects.

## 5.3 Examine the Teaching and Learning Strategies used in Science Subjects

## 5.3.1 Teaching and Learning Methodologies

The study revealed that questions and answers as well group discussionsseveral times used in the process of teaching and learning science subjects as teaching methodologies. Moreover, the majority of teachers very rarely employed project and journal writing as teaching methodologies. The methodologies appeared to be new to them and they had rarely been used in their teaching. As a result, most of them continued to rely on few methodologies.

The statements above imply that some of the teachers were not aware of use of several teaching methodologies. They believed that group discussion and questions and answers are commonly preferable, while the curriculum emphasizes the use many teaching methodologies as you can in the whole process of teaching. Insufficient time for implementing several teaching methodologies, also included teachers’ comments such as; they are time consuming, time factor, difficult to implement; “if I use combination of methodologies I will never complete the syllabus”. Teachers contended that some methodologies require a significant amount of teachers’ time; this is because some require teachers to give sufficient attention and care to every student to accomplish the task and provide formative feedback.

The above findings on teaching and learning methodologies concur with reports of Chonjo *et al*. (1996) and Mafumiko, (1998). They noted that secondary schools in Tanzania face a lot of challenges. Teaching is still traditional and teachers do not emphasize on learning by doing different activities. Tilya (2003) pointed out that science subjects are usually presented as a rigid body of facts, theories and rules to be memorized and practised, rather than a way of thinking about and understanding of natural phenomena. Dasu (2001) showed that, apart from various methods mentioned in the syllabus only chalk and talk method are used. As a result, most of the school leavers are unable to put into practice knowledge learnt. This implies that teachers’ knowledge has become routinized and become mechanical; teachers lack the rich and flexible subject matter and knowledge for teaching. Therefore, in fact what they teaches the students is what has been rehearsed for long time. Nevertheless is not static, it is ever changing, what was relevant last year may not be relevant today.

## 5.3.2 Challenges to Overcome in order to Improve Teaching and Learning of Science Subjects

The study showed that respondents had many challenges that needed to be overcome in order to improve the teaching and learning of science subjects. The challenges included insufficient training to science teachers, lack of motivation among science teachers, shortage of laboratory technicians responsible for preparation of practical in the laboratories, heavy workload to science teachers, insufficient fund and students’ truancy. Data on lack of teaching and learning materials such as chemicals for practical and experimental activities indicated that teachers were assigned to teach many hours without using teaching and learning materials. Students cover a lot of concepts and information within a given time frame theoretically with limited teaching and learning materials for science subjects. These findings concur with observation made by Banda (2005) who said that the school curriculum needs teachers to teach and each student is required to comprehend the whole materials taught.

## 5.3.3 Conclusion on Research Question Two

The second research question intended to examine the teaching and learning strategies used in science subjects .The study revealed that questions and answers as well group discussionsseveral times used often. The statements above imply that some of the teachers were not aware with other methodologies. The study also revealed that there are fewer laboratories, inadequate teaching and learning facilities in schools and Poor quality of science classroom noted as a barrier which affect students toward learning science subjects. The notable challenges prevailing in teaching and learning like excessive teaching load, included insufficient training to science teachers, lack of motivation among science teachers were found out to be of significant challenge causing students dropout from learning science subjects.

## 5.4 The Role of Teachers in Influencing Students in Learning Science Subjects

## 5.4.1 The Role of Teachers Toward Students Learning of Science Subjects

The study indicated that teachers played a great role in encouraging students' participation in learning science subjects. Students' motivation to learn science subjects made them conduct experiments independently and made them develop the habit to attend laboratory sessions regularly. Kajinga (2011) insists that, when demonstration is done by a teacher in the classroom, students understand well, but this understanding is supplemented when each student performs on his or her own, but when no real practical is done, students remain with narrow knowledge.

Moreover, most of the teachers rarely played their role of informing the government, parents and other teachers of the student’s achievement in science subjects. Also other role played rarely by teachers were the identifying students learning need and difficulties in science subjects, helping students to gain deep insight into what they understand in order to plan and guide instructions to provide helpful feedback. Teachers claimed to have limited role due lack of enough time for students staying in schools for studying. Most of the teachers said that they had insufficient time to play multiplicity of roles due to the fact that students had a variety of learning needs. Only a few of them were confident that they had to use limited time on encouraging attitude of secondary school students toward learning science subjects. These findings concur with Banda (2005) who revealed that, when the school curriculum is very huge, it needs teachers to teach and assist each student to comprehend the whole materials taught by teachers. The situation is due to the limited number of Science teachers in many secondary schools. As a result, teachers’ ability to apply other roles which are beneficial to students was hindered.

Some students claimed that teachers were encouraging them to participate actively both in science and art subjects and the students’ participation was more vibrant especially during experiments. The level of participation is also reported to be very high during lessons where learners are required to demonstrate practical knowledge; they socialize and strengthen social groupings, support each other and in so doing, build confidence. The findings were supported by Mucheru ( 2003) who argued that teachers’ are required to ensure that learners are assessed regularly using different methods which cover the cognitive, affective and psychomotor domain, so that the results of assessment can provide information on changes that should be made to improve curriculum delivery.

Teachers added that it increase the level of students’ interaction, facilitate students’ creativity and motivate students to learn more. The findings are supported by of observation by Bennel, (2004) that motivation influences individual behavior with respect to the attainment of goals and tasks. In a similar finding, Kibani (2008) and Yara (2009) noted that the teachers should develop positive relationship with students and stress classroom activities which involved active teaching and learning process and students’ participation in class.

## 5.4.2 In-Service Education Training (INSET) or Workshops in Influencing in Teaching and Learning Science Subjects

The research study revealed that some teachers had never attended any INSET programs in their teaching career. There are some teachers who attend these workshops every time when there are new innovations in science education but they are very few compared to the number of teachers present in particular schools. Furthermore, research findings showed that teachers had attended few days during the INSET activities or workshops due to inadequate time, little chemicals and essential equipment in their respective school laboratories. Such trainings were theoretical as there were no sample classes for them to practise what had been learned on the presence of their facilitators. When they came back from workshops, they found it difficult to implement what had been learned. Also, sometimes the implementation of curriculum influenced by learning environment. This was because of current advances and globalized world where students were found engaging themselves in facebook and WhatsApp for chatting matters that are not at all related to school activities. So, when given home based work, students failed. They also failed to get enough time for self studies.

These findings support argument of Mosha (2004) that there are teachers who completed a lifelong career in teaching without benefiting from any form of in-service education programmes. These findings are contrary with Education and Training Policy (1995) which states that in-service education training and re-training shall be compulsory in order to ensure teachers’ quality and professionalism has not been achieved.

## 5.4.3 Teacher’s Barriers that Influence of Students’ Interest to Pursue Science Subjects

The study revealed that some students were willing to study science subjects but teaching and learning facilities and other requirements needed in science were reported to be a problem for them. These observations are supported by observation of Osaki (2007) that the critical challenges hindering the promotion of science subjects in Tanzania secondary schools were; Inadequate teaching and learning facilities in schools and Poor quality of science classroom practice which reduce the enjoyment and effective learning of science subjects by students. Mabula (2012) also noted a serious shortage of competent and qualified science teachers in many schools in Tanzania and currently the provision of quality education in Tanzania. A similar situation was reported by Chonjo *et al.* (1996) who reported that the school teaching and learning environment influence the results for students who opt to take science subjects, hence contributes to the drop of students’ interest in science subjects.

Mvungi (2009) examined schools based factors that influence students’ choice of science subjects as their career in Tanzania. The researcher noted that most of science teachers were dissatisfied with their job as well as teaching and learning conditions. The researcher contends that many secondary school students lack career guidance and counselling services in their study schools. Teachers and parents in some schools had negative attitude toward science career that was attributed to the students not choosing science as their career.

The study also revealed that there are fewer laboratories in secondary schools compared to recommended ratio, and as a result most of them complained and reported that they assign students to engage in theory only. Sometimes students were assigned to conduct experiments in groups. Also, it was noted by teachers that lack of laboratories complicate their ability to complete the syllabus which consists of theory and practical parts. Sometimes it takes a long time to cover the syllabus. These findings concur with observation made by Tilya (2003) who reported that science subjects are presented as a rigid body of facts, theories and rules to be memorized and practised, rather than a way of thinking about understanding of natural phenomena.

## 5.4.4 Conclusion on Research Question Three

The third research question intended to investigate the role of teachers in influencing their students in learning science subjects. The study revealed that the main role played by teachers was motivating students to learn science subjects and encouragement to participate in conduct of experiments. The study also revealed that some teachers had never attended any INSET programs in their teaching career while some of them attended these workshops every time when there are new innovations. There is need of having invitation to INSET and workshops to all teachers so as to enable teachers to comprehend all required teaching and learning materials.

**CHAPTER SIX**

# 6.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

## 6.1 Introduction

This chapter deal with the presentation of summary of the study, the summary of the major findings, the chapter also include the conclusion and recommendations of the study.

## 6.2 Summary of the Research

The study was guided by three research objectives; the first was assessing secondary school students' perception and attitude toward learning science subjects. The second objective was examining the teaching and learning strategies used in science subjects and the last was examining the role played by teachers in influencing their students to learn science subjects. The study was confined to science teachers and students from form two to four in secondary schools.

The review of literature suggested that studies on assessment of secondary school students’ perception and attitude toward learning subjects have been conducted in other countries beside Tanzania such as UK, US, Kenya, Germany, France, Norway, Denmark, Netherlands, South Africa, Malawi and Turkey. Most of these studies focused on the current perception and attitude of secondary school students toward learning science subjects. In Tanzania, no comprehensive study had been done on the assessment on perception and attitude of secondary school students toward learning science subjects, whereas few studies had been conducted on some science subjects. The study adopted a cross sectional survey research design which employed interview, questionnaire and focus group discussion in data collection.

## 6.3 Summary of the Major Research Findings

## 6.3.1 The Attitude of Students toward Learning Science Subjects

The study has shown that majority of students had negative attitude in learning science subjects. As a result, most of them choose other fields like arts. Students claimed that, to a large extent influenced by the following: Teachers’ influence, poor support of government to provide basic necessities needed for learning science subjects, teaching and learning environments, poor mentality and inferiority complex toward where they believed that science subjects meant only for male students.

## 6.3.2 To Examine the Teaching and Learning Strategies Used in Science Subjects

The study indicated that teachers were using questions and answers as well as group discussion as teaching methodologies more often. Most of the teachers rarely used methodologies such as lab experimental, projects and journal writing. Teachers claimed to have limited time to use multiplicity of methodologies. Only a few of them were confident to use different methodologies.

## 6.3.3 Role of Teachers to Students in Learning Science Subjects

The study indicated that teachers had a role to play toward students in learning science subjects by encouraging students' participation in learning the science subjects, motivating students to learn science, motivating students to conduct experiments independently and develop students to attend laboratory sessions regularly. Most of the teachers rarely played the role of informing the government, parents and teachers of the students’ achievement in science subjects, identifying students learning needs and difficulties in science subjects, they helped students to gain deep insight into what students understand in order to plan and guide instructions and provide helpful feedback.

The general findings reveal that some of the teachers had not attended any in-service training or workshops since inception in their teaching career although some of them attend several times as it appears. Those who were trained had received incomplete training and it reduced their confidence both theoretically and practically. Sometimes those teachers were not comfortable with the knowledge due to the fact that was not implementing what they had learnt effectively because of environmental constraints. This was because some of the teachers have never attended any INSET activities regarding science subjects and those who attended INSET claimed to have received incomplete trainings.

## 6.4 Recommendations

To students, the morale of teachers is an important factor to ensure that teachers give out their best at all times so that students receive the best possible education. Young minds are easily influenced and affected by what they see and learn (Magendri, 2011). Raising the morale of teachers will create a positive attitude toward learning science subjects and this will help schools to focus on providing a well-rounded educational programme in which teachers and students are willing to do.

In Service Education Training (INSET) activities and workshops recommended by MoEVT have to be conducted to enable teachers’ comprehend all of the required materials. After training there is a need for classroom practice for teachers to practise what they have learned in the workshops. This can be done by conducting these INSET activities around school environment where teachers can have enough time to learn and practise what they have learned. Finally, teachers need to be provided with sufficient environment by reducing the teaching load to help them practise effectively their role of assisting students as curriculum developers. They have to consider the evaluating scope indicated in the curriculum in each subject.

## 6.5 Conclusions

In the view of the outlined research findings, the following conclusions are made: Firstly, majority of students have negative attitude toward learning science subjects. Secondly, teachers used few teaching and learning strategies in the process of teaching and learning science subjects. Lastly, teachers had a role to play toward students in learning science. There are limited opportunities for INSET activities and workshops to teachers.

## 6.6 Recommendations for Further Research

This study had the intention of assessing perception and attitude of secondary school students’ toward learning science subjects. Another study is recommended to extensively study students’ attitude from the grassroots (primary school level) in learning science subjects.

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# APPENDICES

**Appendix 1: Interview guide for science teachers**

This conversation aims at collecting data on **Assessment of secondary students’ attitude toward learning science subjects in Mvomero district.** The information to be collected will be for academic purposes only. The following questions guide the conversation.

1. Why are there few students taking science subjects in this school?
2. What are the major challenges that you need to overcome in order to improve the teaching of science subjects?
3. What do you think are the perception of students toward learning science subjects?
4. How does the perception affect the learning of science subjects in secondary schools?
5. How are the in-service courses or workshop influences teaching and learning science subjects?
6. What are the teachers’ barriers that may influence those students interested to pursue science subjects as their career?
7. What do you think should be done to promote the students to opt science subjects as the career?

**THANK YOU**

**Appendix 2: Science teachers’ questionnaire**

This questionnaire aims at collecting data on **assessment of secondary students’ attitude toward learning science subjects in Mvomero district.** The information to be collected from science teachers will be used for academic purposes only. I therefore, kindly request your cooperation to fill in the questionnaire (science teachers only).

**Part A**

Personal particulars (please tick)

1. Sex; Male ( ) Female ( )

2. What is your highest education qualification?

Diploma ( )

First degree (Bachelor) ( )

Second degree (Masters) ( )

Others (specify).......................................................................

3. For how long have you been in the teaching career?

Less than one year ( )

1. to 5 years ( )
2. to 10 years ( )

More than ten years ( )

**Part B**

Please tick one response or fill in your appropriate answer

4. In teaching and learning which methodologies do you often use?

|  |  |  |  |
| --- | --- | --- | --- |
| Methodologies | Responses | | |
| Frequently | Rarely | Never |
| Questions and answers |  |  |  |
| Lecture |  |  |  |
| Problem solving |  |  |  |
| Group discussion |  |  |  |
| Lab/experimental activity |  |  |  |
| Projects |  |  |  |
| Journal writing |  |  |  |
| Oral presentations |  |  |  |

Others (if any) (please explain what you do and how often)

...............................................................................................................................

5. Have you ever attended any in-service courses or workshops on science subjects?

Yes ( ) No ( )

6. How many trainings did you attend?……………………………………………….

7. When did you attend?.............................................................

8. Please show your level of agreement with the following statements on role of

teachers on secondary school students’ toward learning science

subjects.

|  |  |  |  |
| --- | --- | --- | --- |
| Role played by teachers | Responses | | |
| Agree | Undecided | Disagree |
| Encourage students’ participation in learning science subjects |  |  |  |
| Provide helpful feedback |  |  |  |
| Increase students’ motivation to learn science subjects |  |  |  |
| Develop students awareness in learning science subjects |  |  |  |
| Identify student learning needs and difficulties. |  |  |  |
| Inform the government and parents of student achievements. |  |  |  |
| Create cooperation among students. |  |  |  |
| Motivates students to conduct experiment |  |  |  |
| Helps teachers to gain deep insight into what student understand in order to plan and guide instruction |  |  |  |

Specify any other role of teachers on attitude of secondary school students toward

learning science..............................................................................................................

9. Please, show your level of agreement with the following statements on the barriers that can affect the perception and attitude of secondary school students in learning science subjects

|  |  |  |  |
| --- | --- | --- | --- |
| Factors | Agree | Undecided | Disagree |
| Inadequate teachers |  |  |  |
| Insufficient learning environment |  |  |  |
| Large number of students in the class and laboratories |  |  |  |
| Inadequate teaching time. |  |  |  |
| Influence of performance in examinations ( National exams) |  |  |  |
| Lack of teaching and learning materials such as chemicals for practical assessment. |  |  |  |
| Lack of laboratories |  |  |  |

10. Please add other factors perceived to be the barriers to incorporation of attitude of secondary school students toward learning science subjects...............................

11. Give any other comments on the secondary school student’s perception toward learning science subjects.........................................................................................

12. In your opinion what else can be done to improve attitude of students toward learning science subjects? ..................................................................

13. How can students be encouraged to opt for science subjects? .............................

**THANK YOU**

**Appendix 3: Students’ questionnaire**

This questionnaire aims at collecting data on **Assessment of secondary students’ perception and attitude toward learning science subjects in Mvomero district.** The information to be collected will be for academic purposes only. I therefore, kindly request your cooperation to fill in the questionnaire.

**Part A**

Personal particulars (please tick)

1. Sex; Male ( ) Female ( )

2. Which form are you

Two ( )

Three ( )

Four ( )

**Part B**

Please tick one response or fill in your appropriate answer

3. To determine which methodologies (s) do teacher use in teaching and learning

often?

|  |  |  |  |
| --- | --- | --- | --- |
| Methodologies | Responses | | |
| Frequently | Rarely | Never |
| Questions and answers |  |  |  |
| Lecture |  |  |  |
| Problem solving |  |  |  |
| Group discussion |  |  |  |
| Lab/experimental activity |  |  |  |
| Projects |  |  |  |
| Journal writing |  |  |  |
| Oral presentations |  |  |  |

Others (if any) (please explain what you do and how .........................................

4. Are science subjects offered according to the schedule? Yes ( ) No ( )

5 Are you attended laboratories as conducted? Yes ( ) No ( )

1. Were you influenced to opting science subjects? Yes ( ) No ( )
2. If yes what influenced you to opt for Science Subjects?..........................................
3. Please show your level of agreement with the following statements on the

Role played by teachers toward students in learning science subjects.

|  |  |  |  |
| --- | --- | --- | --- |
| Role | Responses | | |
| Agree | Undecided | Disagree |
| Encouraging students’ participation in learning science subjects |  |  |  |
| Students’ motivation to learn science subjects by teachers |  |  |  |
| Develop students to attend the laboratories sessions regularly |  |  |  |
| Identify student learning needs and difficulties in science subjects |  |  |  |
| Inform the government, parents and teachers of student achievements in science subjects |  |  |  |
| Create cooperation among students toward learning science subjects |  |  |  |
| Motivates students to conduct experiment independently |  |  |  |
| Helps students to gain deep insight into what they understand science concepts |  |  |  |

Specify any other role of teachers in students............................................................

10. Please, show your level of agreement with the following statements on the barriers that influence the attitude of secondary school students in learning science subjects.

|  |  |  |  |
| --- | --- | --- | --- |
| Factors | Agree | Undecided | Disagree |
| Inadequate number of teachers |  |  |  |
| Insufficient of learning materials |  |  |  |
| Large number of students in the class and laboratories |  |  |  |
| Inadequate teaching time in conducting experiment in laboratories. |  |  |  |
| Lack of teaching and learning materials such as chemicals for practical |  |  |  |
| Influence of perception from peer groups |  |  |  |
| Lack of laboratories |  |  |  |

12. Please add other factors perceived to be the barriers to incorporation of attitude of secondary school students toward learning science subjects

........................................................................................................................................

13. What should be done to encourage more students to opt for science subjects?

........................................................................................................................................

14. What difficulties do you face in studying science subjects?

.....................................................................................................................................

**THANK YOU!**

**Appendix 4: Focus group discussion for students**

Thank you for agreeing to participate. I am very interested to hear your opinion of assessment of secondary students’ attitude toward learning science subjects

i/ The information you give is completely confidential, and will not associate your

name with anything you say in the focus group.

ii/ I understand how important it is that this information is kept private and

confidential. I will ask participants to respect each other’s confidentiality.

iii/ The participants should range from 9-12 students

**Guideline for Focus Group Discussion:**

1. Why are there few students taking science subjects?
2. What makes science subjects less interesting subjects?
3. What factors contributed to your are decision to choose science to proceed in
4. higher level of schooling.
5. What things would keep you in studying science subjects as your career in
6. higher education?
7. What suggestions do you have to improve the learning environment here so that you would want to pursue science subjects?

**THANK YOU!**

**Appendix 5: Selected Secondary Schools and Their Respective Divisions**

|  |  |  |
| --- | --- | --- |
| **S/N** | **School** | Division |
| 1 | Wami Secondary School | Mvomero |
| 2 | Mvomero Secondary School | Mvomero |
| 3 | Hembeti Secondary School | Mvomero |
| 4 | Sungaji Secondary School | Mvomero |
| 5 | Murad Saddiq Secondary School | Turiani |
| 6 | Lusanga Secondary School | Turiani  Turiani |
| 7 | Diongoya Secondary School |
| 8 | Nassoro Seif Secondary School | Turiani |