THE OPEN UNIVERSITY OF TANZANIA

THE EFFECT OF LABORATORIES IN SECONDARY SCHOOLS ON STUDENTS' PERFORMANCE IN SCIENCE SUBJECTS

A CASE OF COMMUNITY SECONDARY SCHOOLS

MAGU DISTRICT

JACKSON ALEX BUHATWA

buhatwajackson@yahoo.com

0764 819557/0683 064350

A DISSERTATION SUBMITTED IN PARTIAL FULFILLIMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF EDUCATION IN ADMINISTRATION, PLANNING AND POLICY STUDIES OF THE OPEN UNIVERSITY OF TANZANIA

2014

CERTIFICATION

The undersigned certifies that he has read and hereby recommend for acceptance by the Open University of Tanzania a dissertation titled “The Effect of Laboratories in Secondary Schools on Students’ Performance in Science Subjects” submitted to the faculty of Education in partial fulfilment of the requirement for the degree of Masters of Education in Administration, Planning and Policy Studies.

_____

Prof. Emmanuel Babyegeya

(Supervisor)

_____

Date

COPYRIGHT

DECLARATION

I, **JACKSON ALEX BUHATWA** declare that this dissertation is my own original work, and that it has not been submitted for a similar degree in any other University.

_____

Signature

_____

Date

DEDICATION

This work is dedicated to my Mother and my young Brother for their unconditional love and inspiration throughout this task. You have always been and always will be my heroes.

ACKNOWLEDGEMENT

When we set goals for ourselves, there are always obstacles in the way that may deter us from accomplishing those goals, and encourage us and support us to continue regardless of the obstacles. It is now that I can formally thank those people for doing just that for me.

I must first thank God for being at my side during this challenging time, I needed God to continue as, often the desire was sometimes there to quit.

I would next like to thank my supervisors and mentors particularly Prof. Emmanuel Babyegeya who imparted in me both research skill and research methods. Your constructive advice and consistent guidance highly contributed to the quality outcomes of this research project – thanks for your knowledge, expertise and encouragement during this process.

Furthermore, I would like to thank my beloved friend Laurent Paul for his kind, wisdom, and companies he has with me starting with registration of this course up to the accomplishments. Brother your advice, encouragements and help shall never be forgettable.

Moreover, I would like to thank Mr George Herman of St Augustine University Mwanza for editing and correcting grammatical errors in this work.

Special thanks go to my family, who directly or indirectly assisted me in compiling this research project

ABSTRACT

This study aimed to investigate the effect of laboratories in community secondary schools on students' performance in science subjects in Magu district. A mixed approach was employed in connection with survey design and a sample comprised of ninety five (95) respondents. The data was collected using questionnaire, interview and observation. A SPSS programme was used for processing and analysis of data. The findings of the study revealed that, performance of science subject students have been affected by lack of practical lessons, lack of science subject teachers and scarcity of laboratory facilities. The study suggest that, the uses of science subject laboratories in community secondary schools are vital tool to bring positive impact to students performance. The study recommends that, there should be an extensive study on various factors influencing the academic performance of secondary schools in general and deep insight of the necessary interactions for improvements, the need to have a thorough research on the progress of the remaining 10 community secondary schools in Magu district and there is the need for the government authorities (local and central government authorities) through participatory planning and implementation of secondary schools development programmes to build science subject laboratory in every schools in order to have a sustainable and bright future of existing community secondary schools instead of adding more and more secondary schools.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDECIS

LIST OF ABBREVIATIONS AND ACRONYMS

DEO	District Education Officer
DSEO	District Secondary Education Officer
GER	Gross Enrolment Rate
NECTA	National Examination Council of Tanzania
SEDP	Secondary Education Development Plan
SPSS	Statistical Packages for Social Sciences
UNESCO	United Nations Educational, Scientific and Cultural Organization
URT	United Republic of Tanzania.
WB	World Bank

CHAPTER ONE

INTRODUCTION

1.1 Background to the Problem

Education is always an important tool for development and poverty alleviation and also important for social welfare to any community. UNESCO (2008) states that the level of education of a generation can and may reveal the level of poverty existing in a particular society, therefore investment in education yields returns in poverty reduction, improve health outcomes, and economic growth. Also UNESCO (2009) argues that, education is both the foundation and cornerstone of development and Secondary education occupies a pivotal role in the functioning of the economy and the education system itself.

Mabula, (2012) argued that low levels of education can be the cause and outcome of poverty, both at the level of household and the state. Although education provision has a high cost and expected to lead to economic growth in the long term, governments remain with the duty to provide sufficient, equitable and quality schooling to all citizens. Also Mabula states that low educational attainment in the developing world, including Tanzania can be attributed to a combination of factors ranging from households, national to the global level. For example, the majority of children in Sub Saharan Africa do not make it to secondary school because of

poverty from their families. The Gross Enrolment Rate (GER) shows that two thirds of all countries with secondary GER of 40% and below are in Africa, and in some cases only a small minority participates in and finishes secondary schooling. UNESCO (2008) reported that a high proportion of the population has to receive secondary education for economic growth to take place. On the other hand, the attribute of access should also be linked to quality, equitable and acceptable kind of education to enable people to give their contribution to the development process.

World Bank (2004) states that Tanzania is one of the poorest countries in the world and ranked 3rd among the East African countries in access to secondary education, despite its low rate; issues of access are exacerbated with the type of school in which a child is enrolled. Also World Bank continues by stating that accessibility, equability and quality remain a big challenge in secondary education trend not only in urban, but also in peri-urban poor slums and the rural communities. Secondary education is basic and makes an important stage for young people to acquire knowledge, values and skills which equip them for life challenges, and where some students continue with further studies.

The aim of the government of Tanzania especially through the Secondary Education Development Plan (SEDP) was to increase laboratories and laboratory equipments. MOEVT (2007) states that, over the period, Seminary school candidates performed better at (Division I – III) followed by Government and Non – Government schools,

while community schools experienced worst performance due to the increased number of students that did not match with existing infrastructure. Also MOEVT (2007) adding by saying that some of the major causes for this under – performance include lack of basic instructional facilities likes laboratories and laboratory equipment for students who study science subject. Laboratories have a great impact on academic performance of students and lack of laboratories translates the whole school to poor learning. MOEVT (2010) points out that, despite of the efforts taken by the Government of Tanzania to improve secondary school education in the country; there is still a lot to do with improvement of school facilities especially in rural areas. Thus, laboratories and laboratory equipments are much needed in community secondary schools in Magu district so as to help students who are studying science subjects to perform well in their examinations as well to help teachers to perform practical lessons.

Lackney (1999) explains that historically the assumption has been that, as long as the basic physical requirements of the school buildings are met, such as minimum standards for classroom size, acoustics light, heating and air conditioning. The student learning depends in a large part on pedagogical, psychological and social variable. Thus, laboratories are much more than preliminary requirements in the learning process. Corncoran (1988) also argued that where the problems with working conditions are serious enough to impinge on the work of teachers, they result in higher absenteeism, reduced levels of effort, and lower effectiveness in the classroom, low morale and reduced job satisfaction. Therefore where working

conditions are good they result in enthusiasm, high morale, cooperation and acceptance of responsibilities.

MOEVT, (2010) reports that in the year 2008 the government expected to build 11,885 new classrooms, but only 2,239 were built, of which only 19% of the total is expected. The same situation is noticed in building enough laboratories as many community secondary schools in the country have no laboratories and laboratory equipments. The Daily News of November 10, 2012 state that, presently the government plans to improve school facilities for only selected schools countrywide. Two schools in each of the 132 district councils selected will have their facilities improved.

MOEVT, (2014) states that Magu district has 19 community secondary schools among these only 8 schools have one laboratory each. The remaining which is 11 has no laboratories and laboratory equipments. With such situation in the district, there are possibilities of having a student completing Form Four with poor science skills and knowledge. Mosha (2006) argues that specifically an education system must be able to show stakeholders that excellence is being realized at four skill levels: knowledge, social skills, economic self reliance and academic achievement. Therefore, a good system of education vision must emphasize the provision of quality education by providing improved school facilities such as laboratories. Moreover, inadequate of school laboratory equipments in community secondary

schools in Magu district is considered as a major source for mass failure for students who are taking sciences subjects in their Form Four examination. Table 1.1 (a), Table 1.1 (b), Table 1.1 (c) and Table 1.1 (d) presents examinations results of Form Four from eight community secondary school in Magu district.

Table 1.1 (a) Science Subject Results from National Examination 2010

Year – 2010					
Subjects	**Reg. Students**	**Students sat for Exams**	**Students Passed Exams**	**% of Students Passed Exams**	**% of Students Failed Exams**
Physics	506	479	243	51	49
Chemistry	582	564	281	50	50
Biology	1096	1065	449	42	58
Total	**2184**	**2108**	**973**	**46**	**54**

Source: School Examination Records, 2014, Magu District

Table 1.1 (b) Science Subject Results from National Examination 2011

Year – 2011					
Subjects	**Reg. Students**	**Students sat for Exams**	**Students Passed Exams**	**% of Students Passed Exams**	**% of Students Failed Exams**
Physics	554	512	271	53	47
Chemistry	638	603	241	42	58
Biology	1063	1026	609	59	41
Total	**2255**	**2141**	**1121**	**52**	**48**

Source: School Examination Records, 2014, Magu District

Table 1.1 (c) Science Subject Results from National Examination 2012

Year – 2012					
Subjects	**Reg. Students**	**Students sat for Exams**	**Students Passed Exams**	**% of Students Passed Exams**	**% of Students Failed Exams**
Physics	522	475	198	42	58
Chemistry	675	626	308	49	51
Biology	1270	1196	410	34	66
Total	**2467**	**2297**	**916**	**40**	**60**

Source: School Examination Records, 2014, Magu District

Table 1.1 (d) Science Subject Results from National Examination 2013

Year – 2013					
Subjects	**Reg. Students**	**Students sat for Exams**	**Students Passed Exams**	**% of Students Passed Exams**	**% of Students Failed Exams**
Physics	562	516	147	28	72
Chemistry	716	672	262	39	61
Biology	1184	1115	405	36	64
Total	**2462**	**2303**	**815**	**35**	**65**

Source: School Examination Records, 2014, Magu District

Magu District Council (2014) states that the performance of science subjects from eight community secondary schools in Form Four examinations in 2010 and 2013 has experienced a mass failure of students. The statistics show that in 2010 student who sat for science subjects were 2108 and those who pass the examinations were 973 that mean 46% passed the examination while 54% failed the examination. In 2011 the students who sat for science subjects were 2141 and those who pass the examinations were 1121 which means 52% passed the examinations while 48 failed.

Furthermore, Magu District Council (2014) reports that in 2012 and 2013 Magu district experienced mass failure in community secondary schools for students who were taking science subjects. Magu District Council (2014) shows that in 2012 students who sat for science subjects were 2297 and those who pass the examinations were 916 this means 40% passed the examination while 60% failed the examination. Also in 2013 statistics shows that students who sat for science subjects were 2303 and those who pass the examinations were 815, this means that 35% passed the examinations and 65% failed the examination. The above examination results from eight community secondary schools in Magu district shows the mass failure of students in science subjects in their National Examination. The researcher in this study taking a case of community secondary schools in Magu district wants to examine the effect of laboratories in secondary schools on students' performance in science subjects.

1:2 Statement of the Problem

MOEVT, (2008) states that Tanzania is implementing development vision 2025 which seeks to have a well – educated, knowledgeable and skilled population to compete and cope with political, social, economic and technological development and challenges from grass root to international level. To achieve this objective, Community Secondary Schools have been established as one of the efforts of parents and government in each ward in the country to accommodate standard seven leavers who pass Primary School examination. Hence, it is a government policy that all

pupils who pass standard seven examinations should pursue secondary education. MOEVT, (2008) states that although there has been a significant progress in terms of access to secondary education compared to before, other factors like school laboratories and laboratory equipments have not yet been addressed

The Carnegies Foundation for the Advancement of Teaching (1988) concluded that, quality education could not be accomplished in a negative educational environment. This shows that if schools have no laboratories and laboratory equipments, the situation will lead to negative effect in teaching and learning science subjects. Therefore this study investigates the effect of laboratories in secondary schools on students' performance in science subjects.

1.3 General Objective

The general objective of this study was to investigate the effect of laboratories in secondary schools on students' performance in science subjects.

1.4 Specific Objectives

The specific objectives of the study were:-

i. To find out the availability of laboratories and the associated requirements and equipments in community secondary schools in Magu district

ii. To examine the rate of doing science subject practical in community secondary schools in Magu district.

iii. To analyse students performance rates in science subjects in community secondary schools in Magu district.

1.5 Research Questions

The study was guided by the following research questions.

i. Does the availabilities of science laboratories and the associated requirements and equipments in community secondary schools in Magu district adequacy?

ii. To what extent science subject practical's in community secondary schools are conducted in Magu district?

iii. What are the performance rates of science students in science subjects in community secondary schools in Magu district?

1.6 Significance of the Study

The study will help young academicians in the field of education by finding research gaps by conducting more researches in the field of education. Also the study will benefit the school administrators, Government and policy formulation body as well as a community concern by using it as a reference in dealing with the effect of laboratories in community secondary schools. Finally the study will increase awareness of the magnitudes of the problem by showing suggestions on how to improve teaching and learning of science subjects in community secondary schools.

1.7 Conceptual Framework

The study was about the availability of science laboratories, equipments and the associated requirements; and how science practical is conducted and their effect on students' performance. The model which was used in this study is Context, Input, Process and Product Model (CIPP Model); this model was developed by Stufflebeams in the 1960s. The model was used as the guiding framework for this study.

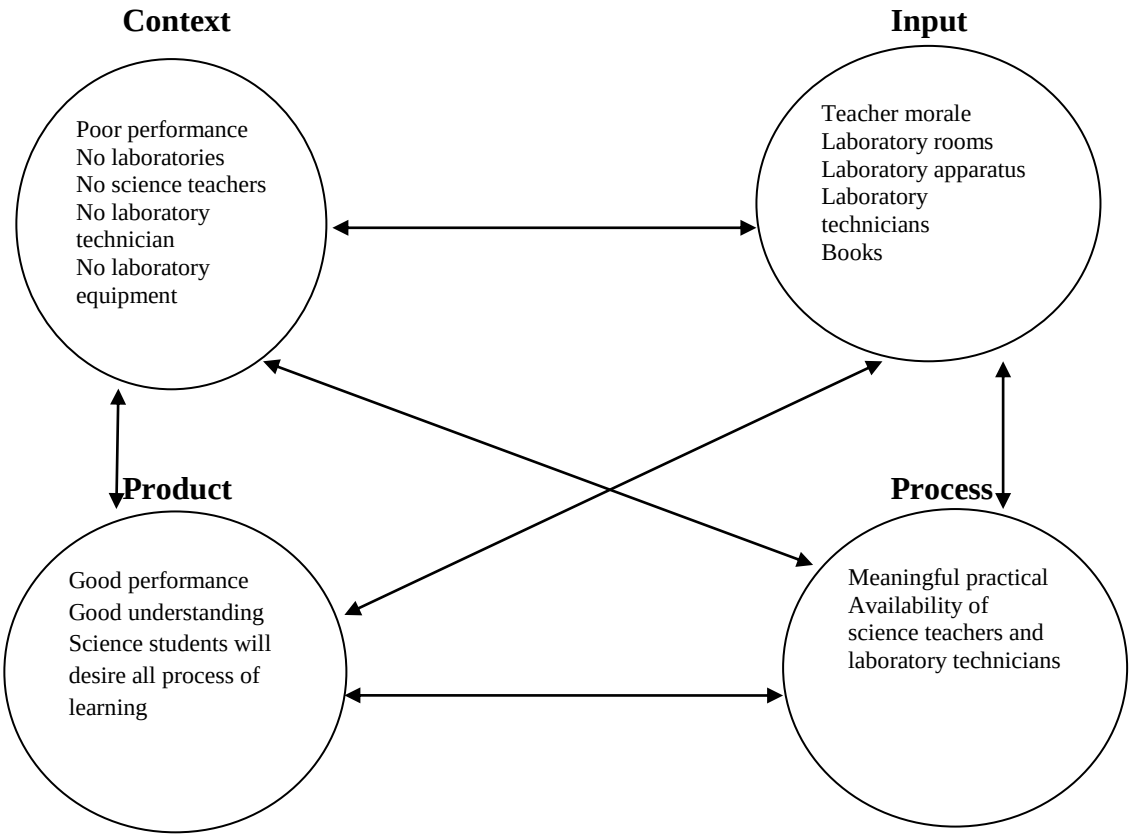

Figure 2.1: The Diagrammatical Exposition of the Conceptual Framework

From the above diagram; context is based on an effect of laboratories in community secondary schools, laboratory equipments, laboratory technicians, poor performance and lack of science teachers thus all these contributing to poor academic performance in science subjects. In the Input stage the resources such as laboratory equipments, books and laboratory room as well as teacher morale in a community secondary school are needed so as to create conducive environment for science student and do they get meaningful learning instead of rote learning. Moreover, in Process stage resources available must be used effectively to students such as conducting meaningful, practical for their experiment under the care of laboratory technicians, employed enough science teachers this will arouse interest to students. Finally, in the Product stage due to the availability of science laboratory in community secondary school the performance of science subject will rise and many students will enjoy taking science subject and accelerate good performance in their final examinations. In the side of teachers, work morale will increase and this will help them to achieve their specific goals effectively. Lastly, after all stages of the model are conducted accordingly and effectively, the academic performance of our students will rise and this will help to achieve the targeted goal effectively.

1.8 Definitions of Key Terms

Science Subject Laboratories: These are special room designed to allow the performance of science subject in schools.

Academic Performance: In this study this term is defined as the grades achieved by students in National Form Four Examinations.

Community secondary schools: These are schools that have been constructed using local resources at ward level.

1.9 Delimitation of the Study

This study was conducted at Magu district, specifically in community secondary schools. The choice of the area was based on the fact that the area was the researcher‘s place of an central origin and that the research was very conversant with the area. There was no doubt because the study will give a relative and reliable picture of this situation in other similar areas of Mwanza region and Tanzania in general

1.10 Limitations of the study

The researcher expected to face the following challenges; first lack of enough time as the researcher attended his working station while doing research. Thus the researcher asked permission for some days from the DEO for conducting research. The second challenge was a shortage of money. Thus the researcher chose nearby schools which were reachable at a low cost. A third challenge was that some targeted respondents showed oppositions, thus the researcher was patient, and try to convince them.

1.11 Organization of the Study

The report was organized in five chapters whereby chapter one was about background to the problem, and chapter two was about review of literature while chapter three was based on methodology of the study also chapter four was about the presentation and analysis of data, finally chapter five was based on discussion, interpretation and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provided an account of the literature review on the effect of laboratories in community secondary school on students' performance in science subjects. The purpose of the literature review was to examine the effect of school laboratories versus performance for students who were taking science subjects in community secondary schools in Magu district. The review of literature was based on the characteristics of a good science subject laboratory in secondary schools, the uses of science subject laboratories for science students in secondary schools, Teaching and Learning of Science Subjects in community secondary Schools as well as Drop Rates and Pass rates in Science Subjects for Community Secondary School Students.

2.2 Characteristics of a Good Science Subject Laboratory in Secondary Schools

The laboratory has been conceptualized as a room or a building specially built for teaching by demonstration of the theoretical phenomenon into practical terms. Farombi (1998) argued by saying that "seeing is believing" as the effect of using laboratories in teaching and learning of science and other science related disciplines as students tend to understand and recall what they see than what they hear or were

told. Laboratory is essential to the teaching of sciences and the success of any science course is much dependent on the laboratory provision made for it. Affirming this, Ogunniyi (1983) said there is a general consensus among science educators that the laboratory occupies a central position in science instruction. It could be described as a place where theoretical work is practicalized whereas practices in any learning experience involves students in activities such as observing, counting, measuring, experimenting, recording, observation and carrying out fieldwork. These activities are totally different from the theoretical work which involves listening to talks and taking down notes from such talks.

According to Ango (1986) any science subjects, laboratory should characterize on stimulating learners' interests as they are made to personally engage in useful scientific activities and experimentation, promotes that science is not only products or process, affords the learner the basic skills and scientific method of problem solving and knowledge obtained through laboratory work promotes long term memory. Laboratory helps to provide a forum wherein the learner is given the exercise to subjects, his beliefs, ideas, statements and theoretical propositions to some forms of experimental test (Soyibo, 1990). To maintain and arouse the interests of students in subjects involving laboratory work, the teacher should be effectively involved in order to transfer knowledge and facts to learners for a good performance in any examinations. Odulaja and Ogunwemimo (1989) highlighted that the teacher assumes a position of dispenser of knowledge with the laboratory serving the function of drill or verification. They further explained that at the other extreme, the

teacher assumes the position of guide to learning and laboratory as a place where knowledge is discovered. However, there are growing evidences that teachers do not exhibit behaviours which are complementary to achieving the stated objectives. They include methods of teaching practical work; inadequacy or absence of well-equipped laboratories; high enrollment of students; inadequacy of resources for teaching and learning practical work; quantity and quality of teachers. Nwachukwu (1984) discovered in her survey of the resources for the teaching and learning of Biology in some of the new secondary schools in Lagos that there was a general inadequacy of resources. She also found out, among other things, that (a) out of 80 per cent of the old schools that accepted as having laboratories, none had a well-equipped laboratory and (b) 40 per cent of the schools had no laboratory at all, while the remaining 60 per cent had rooms labelled "laboratory" without adequate apparatus, she concluded that teaching of Biology practical by teachers would be difficult and that students learning experiences would be limited. In his contribution, Balogun (2010) submitted that no effective science education programme can exist without equipment for teaching. Writing on the situation of our secondary schools today, Okoli (1995) reported that laboratories have become shelves of empty bottles of chemicals. In terms of academic achievement, Soyibo and Nyong (1984) have shown that schools with well-equipped laboratories have better results in the school certificate science examinations than those that are ill-equipped. Corroborating this, Gana (1997) reiterated that students instructed entirely by the laboratory methods had higher attitude's scores, but lower achievement scores than students instructed entirely by the traditional lecture or textbook mode. Yadar (2007) opines that no course in

science and mathematics can be considered as complete without including some practical work. The practical work ought to be carried out by individuals either in science laboratories or in classes. At school level, practical work is even more important because of the fact that we learn by doing. Scientific practices and applications are thus rendered more meaningful. It is an established truth that an object handled impresses itself more firmly on the mind than the object merely seen from a distance or in an illustration. Thus the practical work forms an important feature in any science and mathematics course (UNESCO, 2008). In view of these differences and conflicting findings, the study found the relationship between teachers' quality and students' academic achievement.

2.3 The Uses of Science Subjects Laboratories for Science Students in Secondary Schools

Ojera, (2012) states that in today's age of science and technology when scientific knowledge has grown exponentially, technological innovations have progressed at a rapid pace, and the effects of science and technology are clearly witnessed in all aspects of our lives, it is obvious that science and technology education plays a key role in the futures of societies. Because of its importance, all societies and particularly developed countries have continuously sought to improve the quality of science and technology education.

Ojera, (2012) continues by saying that in the present age, new information is constantly added to the existing information in science education. Therefore, the

main objective of school laboratories at secondary level should be to equip students with the skills of accessing information, rather than trying to transfer information to students. Instead of learning by rote, students should be equipped with problem solving skills for new situations and transferred accumulated knowledge properly. Furthermore, their skills of accessing and producing information should also be improved.

Laboratories play a significant role in effective science subjects. Laboratory classes are supplementary to science students and make up a crucial part of academic performance. Şahin-Pekmez (2000) inquired why science teachers felt they need to carry out experiments in their classes. The teachers' responses included; helping students understand and learn better, enhancing their interest in classes, improving their manual skills, helping them discover knowledge on their own, improving their observation skills, enhancing their problem-solving skills and ensuring students learn through experience.

Hofstein and Naaman (2007) reviewed and reported several studies conducted in various countries about laboratory applications. In their evaluation, they stated that laboratory applications aimed to enhance students' science process and problem-solving skills and their interest in and attitudes toward scientific approaches in accordance with the objectives of basic science education. Burak (2009) argued that laboratories will contribute to improving students' conceptual understanding, application skills and techniques, and ability to analyze inter-variable relationships

and chemical analyses-syntheses. This study aimed to examine the effect of school laboratories on performance for science students

Burak (2009) states that besides offering scientific knowledge, laboratory classes also contribute to improving student skills, including, scientific thinking, observation, creative thinking, interpretation of events, data collection and analysis, and problem solving. Therefore, due to the importance of school laboratory students should be attached to laboratory classes for science subjects achieve their goal. Burak (2009) argues that in order to construct knowledge on their own and to acquire problem-solving skills, students need to study in a laboratory environment that brings science process skills in prominence. Science process skills form the basis of the ability to conduct scientific research. These skills constitute a general definition of the logical and rational thought that an individual uses throughout his/her lifetime

.

Sahin (2000) states that an effective laboratory environment requires the following conditions: teachers should be prepared and planned for classes and have previous experience for the experiment to be carried out in the class; students should have conceptual pre-knowledge about the experiment; students should be provided an environment to use and reinforce such knowledge; basic and higher-level science process skills should be used; links should be established between the subjects taught in classroom and laboratory and their daily lives; and the laboratory environment should introduce innovations. Furthermore, laboratory safety should be effectively maintained and safety awareness should be raised among students. Therefore, this

study wants to examine the effect of laboratories in secondary school on students' academic performance in science subjects in community secondary schools. Table 2.1 indicates that among 6 selected districts Magu district needs 132 laboratories and available laboratories are 11 and worse enough there is a short of 121 science laboratories. This situation makes the difficulty for students who are taking science subjects to perform well in their final examinations.

Table 2.1: Infrastructural Requirements (Laboratories) In Six Selected Districts

	Science Laboratories		
District	**Required**	**Available**	**Short**
Dodoma Municipal	108	9	99
Nyamagana	90	15	75
Magu	132	11	121
Masasi	102	11	91
Kasulu	195	8	187
Mtwara – Urban	67	6	61
Total	**694**	**60**	**634**

Source: UNESCO 2010

2.4 Teaching and Learning of Science Subjects in Community Secondary Schools in Tanzania

URT, (2009) argues that Tanzania has been reviewing its education curriculum on various occasions in order to bring meaningful learning at different levels. The changes took place in different years and in various phrases. Example in 1976, 1995 [Unified science which was just piloted in some schools for one year and abandoned], 1997, 2005 and lately in 2007. Osaki, (2007) report that in an effort to improve science teaching and learning in secondary schools the government of

Tanzania introduced several projects including School Science Project and School Mathematics Project. 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 the experimental approach to teaching and learning. These programs also focused on laboratory activities and a great deal of outdoor activities

However, the School Science Projects and School Mathematics Projects were later abolished after the pilot study due to the massive failure of students who were in those projects. The failure as advanced by Osaki (2007) was because the implementation and examination did not focus on what the student were actually learning in their science classes. By considering the results observed from this project, it can be argued that the school teaching and learning environment is influencing the results for students who opt to take science subjects, hence, contributing to the mass failure of students' academic performance in science subjects. This observation is in line with what Nkuba, (2012) who emphasized that, school climate is the social learning setting for learning environment in which students have different experiences, depending upon the protocols set up by the teachers and administrators.

Hakielimu, (2010) argues that in fact all scholars agree that the school climate can create a fabric of support that enables all members of the school community to teach and learn at optimum levels. The study by Nkuba (2012) revealed that negative

attitudes towards a course of study would always affect performance, which in turn might discourage further engagement in the course. UNESCO, (2009) reports normally students are to be motivated to arouse the interests to the field of study, i.e. the science studies, by instilling to them with positive evaluative affection towards performing the best in opting and learning of science subjects The observation pointed out by Nkuba (2012) give predictive reasons for the situation in secondary schools in Tanzania due to decrease in the number of students taking science subjects and the high failure rate in science subjects observed in secondary schools.

With respect to the capacity of the educational system to meet Tanzania's national development goals, findings of the study by UNESCO (2009) reveal acute shortages of science teachers and other resources such as textbooks, teaching aids and school laboratories in secondary schools across the country. The need is particularly acute in science, mathematics and technology education. For example, whereas the figures for secondary-school mathematics teachers for the Masasi District in Mtwara Region and Dodoma Municipal show that urban areas may fare somewhat better than rural ones, the difference is minor when considering the depth of the need in case of science teaching facilities and qualified teachers in mathematics and science.

Chonjo, (1996) reports that speaking at the Conference for Science and technology in 2010, the president of the United Republic of Tanzania emphasized that, "Dealing with the shortage of science teachers alone is not enough for quality science education. There is need of providing teaching aids, text books and laboratory

equipments The existing shortage of 9,486 science laboratories and 35,840 housing units for teachers, demands a staggering USD 1.2 billion budget over the next five years. To this cost, adds the requirement of 13.5 million additional science text books". This serious statement from the Head of the state implies the presence of difficulty learning environment, especially for science subjects in community secondary schools. Hence that is why this study focuses on examining the effect of laboratories in community secondary school on students' performance in science subjects

2.5 Drop Rates and Pass rates in Science Subjects for Community Secondary School Students'

Mabebe, (2013) argues that different studies indicate that drop out from science subjects and the lack of teachers as well as teaching facilities are the most cited reasons. According to the URT, (2010), the failure in National Examination results which has been reported in different sources is only a single door for explaining the situation. This recorded evidence goes hand in hand with the serious dropout from science subjects as indicated in table 1. The trend in the drop out from science subjects is more serious in Physics and chemistry subjects as compared to mathematics and biology the subjects which are compulsory for all students.

Table 2.2: Trend of Science Subjects Drop Rate and Pass Rate in 2010 Form Four National Examination Results

Subjects	Year	Students Registered	Students Dropped Science Subjects	Students Set for Final Exams	% of Students Dropped Science	Students Passed Exams	% of Students Passed final Exams
Mathematics	2010	350,904	0	350,904	0	56,467	16.1
Biology	2010	350,904	1910	348,994	0.54	106,393	30.5
Chemistry	2010	350,904	212,104	138,800	60.4	60,908	43.9
Physics	2010	350,904	257,785	93,119	73.5	41,559	44.6

Source: MOEVT (2010)

UNESCO (2009) reports that school climate is one of the major factors that influence students' interest in science subjects in many countries. This has been evidenced through the dramatic decrease of the number of students studying science subjects in secondary schools. Also a UNESCO (2009) continuing by reporting that there is a serious concern on the reason why many students who do core science subjects in secondary schools opt not to take science programs and science related specializations in their higher learning. As if that is not enough, many graduates who graduate in science fields choose not to pursue science related occupations regardless of their good qualifications in science courses.

Research conducted in some developing countries by Munro and Elson (2000) indicates that, only 30% of students studied physics and 32% studied chemistry and mathematics at their higher learning in 1994. These percentages decreased to 25% and 26% respectively in 2005 as pointed out by research by Lyons (2005). The

similar trend can be seen in France, Germany and other Developed countries where, for instance, the student enrolment number has been decreasing in different rates. 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).

The reasons for the decrease in the number of students taking science subjects in developed countries vary for the reasons for students in developing countries, that is why this study sought to examine the effect of laboratories in secondary schools on students' performance in science subjects. According to UNESCO (2009) it was revealed that the reason as to why youth in schools are currently not interested in taking science subjects are complex, however, there is a firm evidence that indicates a connection between attitudes towards science subjects and the way in which science subjects are taught. Similarly, the studies by Lyon (2005) acknowledged that the decline of interest among young learners in science subjects in Tanzania is a result of how science is taught and learnt.

Mabebe, (2013) also reports that speaking in the Parliament session in 2008, the then minister for Education and Vocational Training Prof. Jummanne Magembe noted that, there was a drop in science subject choice for students in secondary schools, especially for those going for Advanced Secondary Education in Tanzania. This was specifically in mathematics, biology, physics and chemistry whereby the decrease

was said to range from 30% in 2005 to 25% in the year 2009 (NECTA, 2005; 2009). Speering & Rennie, (1996).in their studies reveal that the teaching and learning of science is more theoretical than observational, experience and experiment based, this situation affects the interest of students to take these subjects in their higher studies. Tytler, (2010) states that to rectify the mass failure of students taking science subjects, the science teaching should focus on the contemporary needs and experiences of the learners and that it should be a constantly changing and developing discipline so as to localize the content to the learners' context

2.6 Summary of Knowledge Gap

The review above, generally indicated that the importance of using laboratories for science students have been revealed, how teaching and learning of science subjects in Tanzania are being implemented and shows drop rate and pass rate in science subjects for secondary school students but the effect of laboratories on secondary school performance in science subjects at Magu district are still unrevealed. In addition to that, some studies were conducted in other countries like that of (Burak,2009) on the relationship between science process skills with efficient laboratory use and science achievement in chemistry education in Turkey, the relationship between availability of teaching and learning resources and performance in secondary school science subject in Eldoret Municipality in Kenya (Ambogo, 2012), also the research conducted by (Olufunke, 2012) on the Effect of Availability and Utilization of Physics Laboratory Equipment on Students' Academic Achievement in Senior Secondary School Physics. Furthermore, most of them did

not point out directly the effect of laboratories on secondary school students' performance in science subjects, but the information on how science subjects are taught and drop out as well as pass rate may be used to examine the effect of laboratories on students' performance. Moreover, this study focused on examining the effect of laboratories in secondary schools on students' performance in science subjects especially in community secondary schools. For that matter, this study intended to fill that gap.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section discusses research methods and procedures, which was used in gathering data for this study. According to Kothari (2004) research methodology is a way to systematically describe and solve the research problem. In other words the research methodology set out the procedure to be used to conduct the study with the aim of providing essential information that a reader needs to understand how the data will be collected and analysed.

3.2 Research Approach

The researcher used mixed approach, although the quantitative approach was mainly employed. Quantitative approach is a numerical method of describing observations of materials or characteristics (Best and Kahn, 1989). Quantitative approach enabled the researcher to analyse data using descriptive and inferential statistics whereas qualitative approach enabled the researcher to assess the perceptions and understanding of the society about the problem under study. The aim was to examine the effect of laboratories in secondary schools on students' performance in science

subjects. The data obtained from the field helped the researcher to determine the efficiency and usefulness of the study if in any way benefited secondary school students, teachers, parents and other educational stakeholders.

3.3 Research Design

The study adopted descriptive survey research design. The purpose of this research design was to obtain pertinent and precise information concerning the current status of a phenomenon and whenever possible to draw valid general conclusions from facts discovered. Gall, (2007) argues that descriptive survey is the means through which opinion, attitude and suggestions for improvement of educational practices and instructions and other data can be obtained. The descriptive survey research design was suitable for this study because the descriptive study determines and reports the way things are. The researcher adopted this descriptive research design to be able to describe the phenomenon as it is on the ground.

3.4 Description of the Study Area

Magu district is one of the seven districts of Mwanza region, other districts are Kwimba, Misungwi, Nyamagana, Ilemela and Sengerema. It is about 64 km (Magu centre) from the capital city of the Mwanza region. Mwanza is geographically located between latitude 1^0 30' and 3^0 south of the Equator and between longitude 31^0 45' and 34^0 10' East of Greenwich. South it is boarded by Kwimba district and

the South Mwanza city council. Also Misungwi district to the West while Ukerewe and Busega districts for the North and Bariadi in the East as well as to the North is boarded by Lake Victoria

Magu district has 299,759 populations. Main economic activities are fishing, agriculture, and livestock keeping and trading. Farmers produce both food crops and cash crops such major cash crops are cotton. Politically the district has 17 administrative wards where every ward has one community secondary schools; there are 19 community secondary schools. A temperature ranges between 17^0c to 33^0c. During rainy seasons the district is cool and hot during dry seasons. However, there is a natural regulator of the rising temperature, which is Lake Victoria.

3.5. Population

The aim of this study was to obtain data that would enable the researcher to examine the effect of laboratories in secondary schools on students' performance in science subjects. Therefore the target population of this study were Teachers, Students, Former Form Four, Heads of School and District Secondary Education Officer in Magu district.

3.6. Sampling Techniques and Sample Size

In order to make sure that the selected sampling frame was accurate, complete and have no bias, both simple random sampling and systematic sampling were used. Simple random sampling was employed in selecting 6 community secondary schools by preparing labelled cards and put them in a box. Thus researcher picked 6 labelled cards to represent the entire group. Therefore, this technique helped the researcher to avoid biases in selecting the sample size and also served time. Also the researcher selected randomly 10 students from each secondary school whereby students asked to pick from the box cards, those who picked labelled cards were included in the study, while those who picked unlabelled cards were not included. From there a purposive sampling procedure was employed in the selection of 10 Former Form Four Leavers from Vocational Training Centres and Boda boda Camps because of their importance to the study. Furthermore the study selected 3 Science Teachers, 1 Head of school from each secondary school and 1 District Secondary Education Officer from Magu district who by virtual of their responsibilities were thought to be aware of the problem such that they could bring more accurate result. Thus the sample size was expected to be 95 respondents.

3.7 Research Instruments

In this research the researcher used three research instruments, namely; Interview, Questionnaires and Observations.

Interview

This technique was used in the opinion that most of the respondents were not used to questionnaires filling. The interview was semi - structured, in such a way that it could help the researcher to obtain accurate information from the respondents and it was expected to be time conscious. The views that were provided were used for drawing a reasonable conclusion.

Questionnaires

Both open ended and close ended questions were used. Open ended questions were employed so as to impress the respondents in expressing their views and opinions on related matters. Closed questionnaires were used to some questions that demand the respondents to select an answer from the list provided below each question in the questionnaire. Before embarking on data collection process, the questionnaires were tested so that important considerations could be taken into account in refining some questions and make it more users' friends.

Observation

The researcher used non participatory observation. The observation guide was used to collect data such as the number and condition of laboratories as well as adequacy of the laboratory equipments. Orodho (2004) asserts that the status of phenomenon is determined not by interviewing respondents but observing what is there currently.

The observation guide therefore allowed for more objectivity in the research study (see Appendix H).

3.8 Reliability and Validity of the Research Instruments

The principle of reliability and validity remains the fundamental part of research instruments of this study. The study took into consideration these as the cornerstones of the study.

3.8.1 Reliability of the Research Instruments

Reliability is the measure of the degree to which a research instrument yields consistent results when administered at different times (Kothari, 2011). In order to maintain the reliability of the research instruments the following were considered. Standard questionnaires were used with scaling instrument; they were pre- tested to determine their relevance and easy understanding. All returned questionnaires were checked to ensure whether they are all properly filled. The semi-structured interview questions were re-stated in a slightly different form at a later time during the interview sessions so as to evaluate the consistency of the responses as the interview goes on.

3.8.2 Validity of the Research Instruments

The validity of the research instruments means its effectiveness in measuring the specific behaviour that it intends to measure (Kothari, 2011). In order to maintain the accuracy of the data from interview, the interview based upon a carefully designed semi structured interview questions were used so as to elicit significant information for getting greater content validity of the instrument (Best and Kahn, 1989). Furthermore, the interviewee's responses were compared to other sources of data. To have strong external validity a purposive sample of respondents was used by using chance methods from the population.

3.9 Data Processing and Analysis Plan

Processing of data implies editing, coding, classification and tabulation where as analysis refers to computation of certain measures along with searching for patterns of relationship that exists among data group (Kothari, 2011). The researcher, processed data by carrying out manual editing, coding, classifying and tabulating data obtained from documentation and interview. The data that were obtained using questionnaires from the respondents were processed using computer packages known as Statistical Packages for Social Science (SPSS) where statistical tables produced as the output of the input information. Statistical analysis was done and the outputs were thereafter being used to prepare frequency and percentage tables showing the number of participants basing on each research objectives and question.

3.10 Ethical Considerations Issues

Patton, (1990), defined ethical considerations as the way a researcher should describe how will ensure that ethical issues of requirements are upheld in the study. During data collection the informed consent was first being sought from respondents after explaining the dignity, privacy and well fare of the respondents. The researcher also maintained confidentiality by not mentioning the names because it could make clear to them that the information given could be treated with great confidentiality.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1 Introduction

Chapter four presents findings of this study. The findings are presented, interpreted and discussed in connection with the effect of laboratories in secondary schools on students' performance in science subjects in Magu district. The findings are presented in sub-sections as guided by the objectives of the study and that mainly answer the research questions. The study sought information from Science Subject Teachers, Form Four students and Former Form Four students using questionnaires as well as Heads of school and District education Officer using interview and observation schedule for observing laboratory facilities and materials.

The findings are presented and discussed in the light of the reviewed literature related and according to the research objectives which are:-

i. To find out the availability of laboratories and the associated requirements and equipments in community secondary schools in Magu district
ii. To examine the rate of doing science subject practical in community secondary schools in Magu district.
iii. To analyse students performance rates in science subjects in community secondary schools in Magu district.

4.2 The Availability of Laboratories and the Associated Requirements and Equipments in Community Secondary Schools

This objective have two themes which sought to find out the number of science subject laboratories available in community secondary schools and the associate requirements as well as equipments. The researcher use observational schedule and Interview to find data on the objective number one. Their responses are presented and analysed. The following are the results:-

4.2.1 The Availability of School Science Laboratory and Materials

To understand better the school science laboratory and materials, the current study formulates an observation schedule to capture the availability of these facilities. This information is presented in Table 4.1.

Table 4.1 School Science Laboratory Facilities and Materials

Facilities/ Equipments	Available		Not Available		Adequacy		Inadequacy	
	No.	%	No.	%	No	%	No	%
Laboratory room (s)	1	16.7	5	83.3	-	-	1	83.3
Apparatus	2	33.3	4	66.7	-	-	2	66.7
Furniture	1	16.7	5	83.3	-	-	1	83.3
Chemicals & Specimens	1	16.7	5	83.3	-	-	1	83.3
Text Books	6	49	6	51	-	-	6	51
Teaching Charts	2	33.3	4	66.7		-	2	66.7
Functional Prep room	-	-	6	100	-		-	-
Piped water	-	-	6	100	-	-	-	-
Heating means ie Gas	-	-	6	100	-	-	-	-
Gas/ fumes chamber	-	-	6	100	-	-	-	-
Proper Lighting i.e. electricity, natural	1	16.7	5	83.3	-	-	1	83.3

Information from the observation schedule shows that there are some schools without certain essential science subject laboratory materials and facilities. Table 4.1 indicates these as; functional preparation room (100%), piped water (100%), heating means e.g. gas (100%), Gas/fumes chamber (100%), laboratory room (83.3%), apparatus (66.7%), furniture (83.3%), chemical and specimen (83.3), teaching charts (66.7%). There are some facilities though available are not adequate in all the schools sampled for the study these are; laboratory room, furniture, chemical & specimens and proper lighting i.e. electricity, natural. These facilities are available in only one community secondary school out of six sampled schools. Also among six sampled schools only two schools have laboratory apparatus and teaching charts. Teachers cannot work adequately and efficiently without adequate facilities. This is especially so in science subjects where frequent exposure of the student to practical is expected. Inadequate facilities lead to poor performance by students.

Moreover during the interview sessions, one of the District Secondary Education Officer (DSEO) states that lack of science subject laboratories is one of the factors which led to poor performance among many students who opt science subjects when he said;

> *"Magu district has 6 science subject laboratories which are in use in six secondary schools, while 13 laboratories are still in the construction stage and when these laboratories will be completing performance in science subject will improve"*

Also during the interview sessions, one of the Head of school point out that the availability of laboratories affects secondary school on students' performance in science subjects in different ways when he states that;

> *"Availability of laboratories enables the students to learn actual practical of subjects rather than theoretical learning"*

This is in agreement with Ogunniyi (1983) who argue that there is a general consensus among science educators that the laboratory occupies a central position in science instruction. It could be described as a place where theoretical work is practicalized whereas practices in any learning experience involves students in activities such as observing, counting, measuring, experimenting, recording, observation and carrying out fieldwork. These activities are totally different from the theoretical work which involves listening to talks and taking down notes from such talks.

4.2.2 Number of Teachers in Community Secondary Schools

This subsection presents the view of the respondents on the number of science subject teachers in six selected community secondary schools in Magu district. Data collections are done through questionnaire and interviews. Through a questionnaire the respondents were asked to mention the number of science teachers in their respective schools. The following are the results:-

Table 4.2 (a) Number of Physics Teachers

Number of Teachers	Frequency	Percent	Valid Percent	Cumulative Percent
One	4	66.7	66.7	66.7
More than three	2	33.3	33.3	100.0
Total	**6**	**100.0**	**100.0**	

Table 4.2 (b) Number of Chemistry Teachers

Number of Teachers	Frequency	Percent	Valid Percent	Cumulative Percent
One	4	66.7	66.7	66.7
More than three	2	33.3	33.3	100.0
Total	**6**	**100.0**	**100.0**	

Table 4.2 (c) Number of Biology Teachers

Number of Teachers	Frequency	Percent	Valid Percent	Cumulative Percent
One	4	66.7	66.7	66.7
More than three	2	33.3	33.3	100.0
Total	**6**	**100.0**	**100.0**	

Table 4.2 (a), Table 4.3 (b) and Table 4.4 (c) indicate that among of 6 selected community secondary school, 4 schools have one physics, chemistry and biology teacher, which is equivalent to 66.7% and only 2 remains schools have more than three science subject teachers specialised in physics, chemistry and biology which is 33.3%. This means that science subject teachers have huge workload compare to other subject teachers, this situation makes them fail to teach students well and end up with mass failure of science students. This is in line with Chonjo, (1996) who reports that speaking at the Conference for Science and technology in 2010, the

president of the United Republic of Tanzania emphasized that, "Dealing with the shortage of science teachers alone is not enough for quality science education. There is need of providing teaching aids, textbooks and laboratory equipments.

Moreover, during the interview sessions with DSEO in Magu district about the number of science subject teachers, he states that;

> *"Magu district has 75 science teachers in all her secondary schools and within those science teachers every school has been allocated one teacher among three science subjects. Due to this problem of scarcity of science teachers in our district, we have the problem of poor performance especially for science students"*

This is in line with the study conducted by UNESCO (2009) which reveals acute shortages of science teachers and other resources such as textbooks, teaching aids and school laboratories in secondary schools across the country. The study state that the need is particularly acute in science, mathematics and technology education, therefore the government should put much effort to invest in training many teachers especially science teachers.

4.3 The Rates of Doing Science Subject Practical's in Community Secondary Schools

In this subsection the respondents with respect to objective number two were asking to assess the rates of doing science practical in community secondary schools in Magu district. Through questionnaire Form Four students and Former Form Four students were asking to put a tick against the correspondent number of practical in each science subject and science subject teachers were asking to circle appropriate the correspondent answer.

4.3.1 Monthly Rates of Doing Science Subject Practical's

This subsection presents the data through questionnaire that were administered to 18 science subject teachers from six sampled schools. The respondents were asking to select and circle appropriate the correspondent answer from the questionnaire. The results are presented in Table 4.3

Table 4.3 (a) Monthly Rates of Doing Physics Practical's

Response	Frequency	Percent	Valid Percent	Cumulative Percent
One	1	16.7	16.7	16.7
Two	1	16.7	16.7	33.3
None	4	66.7	66.7	100.0
Total	**6**	**100.0**	**100.0**	

Table 4.3 (a) presents responses of six (6) Physics teachers who have participated in this study. The results shows that one physics teacher has managed to conduct one practical lesson in a month and in another school one Physics teacher has conducted

two practical in a month while the remaining teachers from four secondary schools they have failed to conduct Physics practical in a month.

Table 4.3 (b) Monthly Rates of Doing Chemistry Practical's

Response	Frequency	Percent	Valid Percent	Cumulative Percent
One	3	50.0	50.0	50.0
Two	1	16.7	16.7	66.7
None	2	33.3	33.3	100.0
Total	**6**	**100.0**	**100.0**	

Table 4.3 (b) presents responses of six (6) Chemistry teachers who have participated in this research. The results shows that three (3) teachers have managed to conduct one Chemistry practical lesson in their schools in a month and one (1) Physics teachers has conducted two Chemistry practical lesson in a month while the remaining two teachers from two secondary school have failed to conduct Chemistry practical lesson in a month.

Table 4.3 (c) Monthly Rates of Doing Biology Practical's

Response	Frequency	Percent	Valid Percent	Cumulative Percent
One	2	33.3	33.3	33.3
Two	1	16.7	16.7	50.0
None	3	50.0	50.0	100.0
Total	**6**	**100.0**	**100.0**	

Table 4.3 (c) present responses of six (6) Biology teachers who have participated in this research. The results shows that two (2) Biology teachers from two secondary schools equals to 33.3% have managed to conduct one practical lesson in a month and only one teacher from one secondary school equals to 16.7% has managed to conduct two practical lesson in a month while the remaining three (3) Biology teachers have failed to conduct a practical lesson in a month which is equals to 50%.

4.3.2 Number of Practical's conducted by Form Four Students

This part presents the data obtained through questionnaire that were administered to 60 Form Four students from six selected community secondary schools. The respondents were asking to tick the number of practical that they have conducted since they inter Form Four in their respective schools. Also 10 Former Form Four students were administered through questionnaire and they were asking to indicate number of science subject practical which they did when they were Form Four. The results are presented in Table 4.4 (a) up to 4.4 (d)

Table 4.4 (a) Number of Physics Practical conducted by Form Four

Number of Practical	Frequency	Percent	Valid Percent	Cumulative Percent
One	30	50.0	50.0	50.0
Three	10	16.7	16.7	66.7
None	20	33.3	33.3	100.0
Total	**60**	**100.0**	**100.0**	

Table 4.4 (a) presents responses of 60 students who were asking to indicate the number of Physics practical conducted since they inter Form Four. The results shows that 30 student's equals to 50% have conducted one (1) Physics practical and 10 students equals to 16.7% have conducted three (3) practical's while the remains 20 students have not yet done any Physics practical's since they inter form four.

Table 4.4 (b) Number of Chemistry Practical conducted by Form Four

Number of practical	Frequency	Percent	Valid Percent	Cumulative Percent
One	20	33.3	33.3	33.3
Three	10	16.7	16.7	50.0
None	30	50.0	50.0	100.0
Total	**60**	**100.0**	**100.0**	

Table 4.4 (b) presents responses of 60 students who were asking to indicate the number of Chemistry practical conducted since they inter form for. The results shows that 20 student's equals to 33.3% have conducted one (1) Chemistry practical and 10 students equals to 16.7% have conducted three (3) practical's while the remains 30 students have not yet done any Chemistry practical's since they inter Form Four.

Table 4.4 (c) Number of Biology Practical conducted by Form Four

Number of Practical	Frequency	Percent	Valid Percent	Cumulative Percent
One	20	33.3	33.3	33.3
Two	10	16.7	16.7	50.0
None	30	50.0	50.0	100.0
Total	**60**	**100.0**	**100.0**	

Table 4.4 (c) presents responses of 60 students who were asking to indicate the number of Biology practical conducted since they inter Form Four. The results shows that 20 student's equals to 33.3% have conducted one (1) Biology practical and 10 students equals to 16.7% have conducted two (2) practical's while the remains 30 students have not yet done any Biology practical's since they inter Form Four.

Table 4.4 (d) Number of Practical Conducted by Former Form Four

Number of Practical	Frequency	Percent	Valid Percent	Cumulative Percent
One	4	40.0	40.0	40.0
More than four	2	20.0	20.0	60.0
None	4	40.0	40.0	100.0
Total	**10**	**100.0**	**100.0**	

Table 4.4 (d) present responses of 10 Former Form Four students who were asking to indicate number of science subject practical conducted when they were in Form Four. The results shows that 4 student's equals to 40% have conducted one (1) science subject practical and 2 students equals to 20% have conducted two (2) science subject practical's while the remains 4 students did not do any science subject practical's in their schools. This implies that, students from community secondary schools in Magu district are taught science subject by their teachers theoretically rather than practically and this could results poor understanding of science subject student's hence mass failure in examinations. This is supported by Burak (2009) who argued that laboratories will contribute to improving students'

conceptual understanding, applying skills and techniques, and ability to analyse inter-variable relationships and chemical analyses-syntheses.

Furthermore, during the interview sessions, one of the Head of school pointed out that due to lack of enough science subject laboratories, students does not get the chance to familiarize themselves with the laboratories apparatus and specimen, hence they lack the knowledge in practical work leading to poor performance in the subject when he states that;

> *"Teachers handling the subject have a hard time teaching some science subject topics that need to be done practically. This discourages some teachers since students perform poorly in these topics as they fail to understand well"*

This is in agreement with the study conducted by UNESCO (2008) which argues that at school level, practical work is even more important because of the fact that we learn by doing. Scientific practices and applications are thus rendered more meaningful. It is an established truth that an object handled impresses itself more firmly on the mind than the object merely seen from a distance or in an illustration. Thus the practical work forms an important feature in any science and mathematics course.

4.4 Analysis of Students Passing Rate in Science Subjects

In this subsection the respondents with respect to objective number three were asking to show the performance rates of science students in science subjects in six selected community secondary schools in Magu district. Science subject teachers were asking to show how science subject laboratory influence the performance rates of science students as well as to indicate the performance of science subjects in the National Examinations by putting a tick against the options given. The results from science subject teachers are presented in Table 4.5 (a), Table 4.5 (b) and Table 4.5 (c) as well as the results from form four students are presented in Table 4.5 (d) and Table 4.5 (e) is the results for former form four students.

4.4.1 The Influence of Science Subject Laboratory on Students' Performance

In this subsection the respondents were asking to show the influence of science subject laboratory on students' performance in their respective schools. Questionnaires were used to collect information from science teachers. The findings are presented in Table 4.5 (a) up to 4.5 (i).

Table 4.5 (a) Status of Physics Laboratory Influence Performance Rates of Science Students

Responses	Frequency	Percent	Valid Percent	Cumulative Percent
Too little	1	16.7	100.0	100.0
Missing System	5	83.3		
Total	**6**	**100.0**		

Table 4.5 (b) Status of Biology Laboratory Influence Performance Rates of Science Students

Responses	Frequency	Percent	Valid Percent	Cumulative Percent
Too little	1	16.7	100.0	100.0
Missing System	5	83.3		
Total	**6**	**100.0**		

Table 4.5 (c) Status of Chemistry Laboratory Influence Performance Rates of Science Students

Responses	Frequency	Percent	Valid Percent	Cumulative Percent
Too little	1	16.7	100.0	100.0
Missing System	5	83.3		
Total	**6**	**100.0**		

Table 4.5 (a), Table 4.5 (b) and Table 4.5 (c) shows that one (1) Physics teacher, one (1) Biology teacher and one (1) Chemistry teacher from one secondary school which is equal to 16.7% out of six (6) teachers in each science subjects responding by circled “Too little” this means that the status of Physics, Biology and Chemistry laboratory in their school influence the performance rates of science students too little. The remaining five (5) science teachers in each science subjects who are equal to 83.3% did not answer this question because in their schools have no Physics, Biology and Chemistry laboratory. This implies that, there is a big challenge of science subject laboratory in community secondary schools in Magu district because among six sampled schools in this study only one school had Physics, Biology and Chemistry laboratory which are in use while the remaining five community secondary schools had no science subject laboratory.

Table 4.5 (d) Responses on Positive Influence of Physics Laboratory

Responses	Frequency	Percent	Valid Percent	Cumulative Percent
Agree	1	16.7	16.7	16.7
Strong disagree	5	83.3	83.3	100.0
Total	**6**	**100.0**	**100.0**	

Table 4.5 (e) Responses on Positive Influence of Biology Laboratory

Responses	Frequency	Percent	Valid Percent	Cumulative Percent
Agree	1	16.7	16.7	16.7
Strong disagree	5	83.3	83.3	100.0
Total	**6**	**100.0**	**100.0**	

Table 4.5 (f) Responses on Positive Influence of Chemistry Laboratory

Responses	Frequency	Percent	Valid Percent	Cumulative Percent
Agree	1	16.7	16.7	16.7
Strong disagree	5	83.3	83.3	100.0
Total	**6**	**100.0**	**100.0**	

Table 4.5 (d), Table 4.5 (e) and Table 4.5 (e) indicate that, 16.7% Physics teacher, Biology teacher and Chemistry teacher agree and 83.3% indicates science subject teachers who strong disagree that the performance of the students in Form Four Examinations is positively influenced by the status of school Physics laboratory. This implies that, performance of science subject students in community secondary schools do not depend much on laboratory found in their schools because most of schools do not have science subject laboratory.

Table 4.5 (g) Responses on Negative Influence of Physics Laboratory

Responses	Frequency	Percent	Valid Percent	Cumulative Percent
Strong agree	1	16.7	100.0	100.0
Missing System	5	83.3		
Total	**6**	**100.0**		

Table 4.5 (h) Responses on Negative Influence of Biology Laboratory

Responses	Frequency	Percent	Valid Percent	Cumulative Percent
Strong agree	1	16.7	100.0	100.0
Missing System	5	83.3		
Total	**6**	**100.0**		

Table 4.5 (i) Responses on Negative Influence of Chemistry Laboratory

Responses	Frequency	Percent	Valid Percent	Cumulative Percent
Strong agree	1	16.7	100.0	100.0
Missing System	5	83.3		
Total	**6**	**100.0**		

Table 4.5 (g) indicates that, 16.7% strong agree that the performance of Physics, Biology and Chemistry students in Form Four Examinations is negatively influenced by the status of school science laboratory and 83.3% did not answer the question because in their schools have no Physics, Biology and Chemistry laboratory. This implies that most of the performances of science subject students are negatively influenced by their schools science laboratories which are not fully equipped with laboratory facilities hence poor performance in national examinations.

4.4.2 Form Four Examination Results in Science Subjects

This part presents the data obtained through questionnaire that were administered to science subject teachers, Form Four students and Former Form Four Students. The respondents were asking to indicate the performance of science subjects from the National Examination Results by putting a tick against the option given. The data from science subject teachers are presented in Table 4.6 (a), Table 4.6 (b) and Table 4.6 (c) as well as the data from form four students are presented in Table 4.6 (d) and Table 4.6 (e) presents the data from former form four students.

Table 4.6 (a) Results of Chemistry Students in Form Four National Examinations

Response	Frequency	Percent	Valid Percent	Cumulative Percent
Good pass	1	16.7	16.7	16.7
Marginal fail	5	83.3	83.3	100.0
Total	**6**	**100.0**	**100.0**	

Table 4.6 (a) presents responses of six (6) Chemistry teachers who were selected to participate in this research. The results shows that 1 (one) teacher equals to 16.7% has obtained good pass from her students who sat for Chemistry examinations in Form Four while the remaining 5 (five) Chemistry teachers equals to 83.3% have obtained marginal fail from their students who sat for final examinations. This implies that, there is a big problem concerning chemistry subject because number of performances in community secondary schools is very low compared to other subjects such as Arts. Thus much effort is needed to improve the situation from different angles.

Table 4.6 (b) Results of Physics Students in Form Four National Examinations

Response	Frequency	Percent	Valid Percent	Cumulative Percent
Good pass	1	16.7	16.7	16.7
Marginal fail	5	83.3	83.3	100.0
Total	**6**	**100.0**	**100.0**	

Table 4.6 (b) presents responses of six (6) Physics teachers who have been selected to participate in this research. The results shows that only 1 (one) teacher equals to 16.7% in her school has obtained a good pass from her students who sat for Physics examinations in Form Four while the remaining 5 (five) Physics teachers equals to 83.3% have obtained marginal fail from their students who sat for final examinations. This implies that, there is a big problem concerning Physics subject because number of performances in community secondary schools is very low compared to other subjects such as Arts. Thus much effort is needed to improve the situation from different angles.

Table 4.6 (c) Results of Biology Students in Form Four National Examinations

Response	Frequency	Percent	Valid Percent	Cumulative Percent
Good pass	1	16.7	16.7	16.7
Marginal fail	5	83.3	83.3	100.0
Total	**6**	**100.0**	**100.0**	

Table 4.6 (a) presents responses of six (6) Biology teachers who have been selected to participate in this research. The results shows that 1 (one) teacher equals to 16.7%

has obtained a good pass from her students who sat for Biology examinations in Form Four while the remaining 5 (five) Biology teachers equals to 83.3% have obtained marginal fail from their students who sat for final examinations. This implies that, there is a big problem concerning the Biology subject because number of performances in community secondary schools is very low compared to other subjects such as Arts. Thus much effort is needed to improve the situation from different angles.

Table 4.6 (d) Response from Form Four Students on performance of Science Subjects in National Examinations Results

Response	Frequency	Percent	Valid Percent	Cumulative Percent
Good Pass	4	6.7	6.7	6.7
Marginal Fail	44	73.3	73.3	80.0
Fail	12	20.0	20.0	100.0
Total	**60**	**100.0**	**100.0**	

Table 4.6 (d) presents the responses of sixty (60) Form Four students who have been selected to participate in this study from community secondary schools. The results shows that, 4 students' equals to 6.7% have responded to good pass, 44 students equals to 73.3% each have responded to marginal fail while the remaining 12 students responded to fail. This means that, most of students who study science subject perform poorly and this makes many students not to opt science subjects during their study.

Table 4.6 (e) Response from Former Form Four on performance of Science Subjects in National Examinations Results

Response	Frequency	Percent	Valid Percent	Cumulative Percent
Good pass	2	20.0	20.0	20.0
Marginal fail	8	80.0	80.0	100.0
Total	**10**	**100.0**	**100.0**	

Table 4.6 (e) presents responses of ten (10) Former Form Four students who have been selected to participate in this study from Magu district. The results shows that, 2 students' equals to 20% have responded to good pass while the remains 8 students responded to marginal fail. This means that, most of students who study science subject perform poorly and this makes many students not to opt science subjects during their study.

Furthermore, through this subsection a researcher presents the findings that show performance on science subject from six selected community secondary schools from 2010 – 2013. The information was collected through documentary reviews. The findings are presented in Table 4.7 (a), Table 4.7 (b), Table 4.7 (c) and Table 4.7 (d)

Table 4.7 (a) Performance of Science Subject in 2010

Year – 2010					
Subjects	**Reg. Students**	**Students sat for Exams**	**Students Passed Exams**	**% of Students Passed Exams**	**% of Students Failed Exams**
Physics	506	479	243	51	49
Chemistry	582	564	281	50	50
Biology	1096	1065	449	42	58
Total	**2184**	**2108**	**973**	**46**	**54**

Table 4.7 (a) indicate that, in the year 2010 there were 2184 Form Four students registered for Physic, Chemistry and Biology examinations, in that year 2108 students sat for final examinations and 973 passed the examinations. This means that, 46% of students passed the examinations while 54% students failed the examinations. Moreover, Table 4.6 (a) shows that in 2010 students who sat for Biology examination experienced mass failure in which 1065 students who sat for that examination only 449 passed the examination, which is equals to 46% while 1135 students failed the examination which is equal to 54%.

Table 4.7 (b) Performance of Science Subjects in 2011

Year – 2011					
Subjects	**Reg. Students**	**Students sat for Exams**	**Students Passed Exams**	**% of Students Passed Exams**	**% of Students Failed Exams**
Physics	554	512	271	53	47
Chemistry	638	603	241	42	58
Biology	1063	1026	609	59	41
Total	**2255**	**2141**	**1121**	**52**	**48**

Table 4.7 (b) indicates that, in the year 2011 there were 2255 Form Four students registered for Physic, Chemistry and Biology examinations, in that year 2141 students sat for final examinations and 1121 passed the examinations. This means that, 52% of students passed the examinations while 48% students failed the examinations. Moreover, Table 4.6 (b) shows that in 2011 students who sat for Chemistry examination experienced mass failure in which 603 students who sat for that examination only 241 passed the examination, which is equal to 42% while 362 students failed the examination which is equal to 58%.

Table 4.7 (c) Performance of Science Subjects 2012

Year – 2012					
Subjects	**Reg. Students**	**Students sat for Exams**	**Students Passed Exams**	**% of Students Passed Exams**	**% of Students Failed Exams**
Physics	522	475	198	42	58
Chemistry	675	626	308	49	51
Biology	1270	1196	410	34	66
Total	**2467**	**2297**	**916**	**40**	**60**

Table 4.7 (c) indicates that, in the year 2012 there were 2467 Form Four students registered for Physic, Chemistry and Biology examinations, in that year 2467 students sat for final examinations and 916 passed the examinations. This means that, 40% of students passed the examinations while 60% students failed the examinations. Moreover, Table 4.6 (c) shows that in 2012 students who sat for the Biology examination experienced mass failure in which 1196 students who sat for

that examination only 410 passed the examination, which is equal to 34% while 786 students failed the examination which is equal to 66%.

Table 4.7 (d) Performance of Science Subject in 2013

Year – 2013					
Subjects	**Reg. Students**	**Students sat for Exams**	**Students Passed Exams**	**% of Students Passed Exams**	**% of Students Failed Exams**
Physics	562	516	147	28	72
Chemistry	716	672	262	39	61
Biology	1184	1115	405	36	64
Total	**2462**	**2303**	**815**	**35**	**65**

Table 4.7 (d) indicates that, in the year 2013 there were 2462 Form Four students registered for Physic, Chemistry and Biology examinations, in that year 2303 students sat for final examinations and 815 passed the examinations. This means that, 35% of students passed the examinations while 65% students failed the examinations. Moreover, Table 4.6 (d) shows that in 2013 students who sat for Biology and Physics examinations experienced mass failure, for example the students who sat for Biology examination were 1115 and only 405 passed the examination which is equals to 36% while 710 students failed the examination which is equal to 64%. In Physics examination, students who sat were 516 and 147 students passed the examination, which is equal to 28% of students while 369 students failed the examination which is equal to 72%.

Based on the data presented and discussed in subsection 4.4 above, the findings reveal that the performance of students who study science subjects in community secondary schools in Magu district are poor because of lack of essential facilities like science subject laboratory that are important during practical lessons. This is in line with Soyibo and Nyong (1984) who have shown that schools with well-equipped laboratories have better results in the school certificate science examinations than those that are ill-equipped. The government and community at large must put much effort to create a better environment of teaching and learning in community secondary schools.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The core of this chapter is to give the overall implication of the study and the findings already discussed in the prior chapter. The chapter also provides a brief conclusion about the whole study and it suggests some recommendations to the study.

5.2 Summary

The findings of the study are presented in this subsection in accordance with the specific objectives of the study which are:-

i. To find out the availability of laboratories and the associated requirements and equipments in community secondary schools in Magu district
ii. To examine the rates of doing science subject practical in community secondary schools in Magu district.
iii. To analyse students passing rates in science subjects in community secondary schools in Magu district.

5.2.1 The Availability of Laboratories and the Associated Requirements and Equipments in Community Secondary Schools in Magu District

Number of Science Subject Laboratories

The study shows that the majority of community secondary schools found in Magu district have no science subject laboratories and there is only one community secondary school which is Magu secondary school has three laboratory rooms of Physics, Chemistry and Biology. Moreover, two community secondary schools which are Lubugu secondary school and Lugeye secondary school have only one science laboratory room with no apparatus and non functional (not in use). The remaining schools have no any science subject laboratories whereby science teachers and students who participated in this research state that during practical lessons they use normal classroom as laboratory for practical lessons see Table 4.1 or they travel to nearby schools which have science subject laboratory.

Number of Science Subject Teachers

Furthermore, the study shows that, there is scarcity of science subject teachers in community secondary schools in Magu district. Magu district has 75 science teachers and within those science teachers every school has been given approximately one teacher in each science subject. Also the study discovered that only 3 community secondary schools have more than one science subject teacher; this is Magu secondary school, which has 11 science teachers, Itumbili secondary school which

have 8 and Lugeye secondary school which have 7 science teachers see Table 4.2 (a). Table 4.2 (b) and Table 4.2 (c).

Observation Schedule for School Science Laboratory Facilities and Materials

The findings also reveal that, Magu district has a scarcity of laboratory facilities in her community secondary schools. The following facilities were not available in school science subject laboratory; heating means, e.g. gas, piped water, functional preparation room and gas/fumes chamber. All other facilities, though available were not adequate in all the schools sampled for the study.

5.2.2 The Rate Doing Science Subject Practical in Community Secondary Schools

The results of the findings shows that science subject practical have been conducted in a very few schools and a majority of students complete Form Four studies without doing any science subject practical's. For example from six sampled schools the study reveals that approximately 50% of students have not done any science subject practical's since they inter Form Four and 33.3% they have done only one science subject practical's as well as 16.7% they have done three practical's and on the side of science subject teachers the study shows that 33.3% of science teachers have managed to conduct one practical lesson in a month in their classroom, 16.7% teachers have also managed to conduct two practical lesson in a month while the remaining 50% have not conducted any science subject practical due to lack of laboratory facilities and materials. This shows that, the majority of community

secondary schools rely much on theory/lecture method of teaching and learning science subjects rather than practical learning.

5.2.3 Analysis of Students Passing Rate in Science Subjects

The results of the findings show that majority of Form Four students who study science subjects scored marginal fail in their final national examinations and few of them scored good pass. For example the results from National Examination Council of Tanzania in 2013 shows that 35 % of students passed science subject examinations and 65% of students failed examinations. This shows that laboratories have a big impact to students' performance, especially for those who study science subjects.

5.3 Conclusion

The objective of the study was to investigate the effect of laboratories in community secondary schools on students' performance in science subjects in Magu district. The study reveals that, a total of 60 students who participated in this research showed that 50% had not done any science subject practical which is equal to 30 students and 50% had done one to two practical lessons since they inter form four. Also the findings reveal that, from six sampled community secondary schools in this study only one school has three rooms of science subject laboratories which are Physics, Chemistry and Biology while the remaining schools have no science subject laboratories in which some schools conducted their practical lessons in their normal classroom or travel nearby secondary schools which have laboratory. The study also shows that there is the scarcity of laboratory facilities in community secondary

schools which hinder the process of learning and teaching science subject to students and teachers.

Therefore, the uses of science subject laboratories in secondary schools are the vital tool to bring positive effect to students' academic performance. Thus, there is the need to increase much effort on building more science subject laboratories with full facilities so as to increase performance to students and create conducive environment for teachers during teaching and learning process.

5.4 Recommendations for Further Research

Basing on the findings of the study, the following recommendations are made:-

The findings in this study allow an extensive study on various factors influencing the academic performance of Tanzanian community secondary schools in general and deep insight of the necessary interactions for improvements. However, there is a need to collect more information in order to have a good generalization and better understanding of the factors affecting the academic performance of community secondary schools in Tanzania.

The findings have explained that among the total number of 60 students who are Form Four from six surveyed schools, only 30 students had the opportunity to conduct practical lessons and the rest which is 30 students did not get the chance to do practical works. This suggests the need to have a thorough research on the progress of the remaining number of community secondary schools in Magu district,

but, if possible, the government should fund this kind of a survey all over the country so as to come into a conclusion on the socioeconomic impacts of the established community secondary schools.

Also, there is a need for the government authorities (local and central government authorities) through participatory planning and implementation of secondary schools development programmes to build science subject laboratories in every school in order to have a sustainable and bright future of existing community secondary school instead of adding more and more secondary schools.

REFFERENCES

Ango, M. L. and Sila M.D., (1986). Teaching and Learning of Biology Practical; The Experience of some Nigerian Secondary Schools. *Journal of Science Teachers Association of Nigeria*, l24 (1 & 2), 33-47.

Balogun, T.A., (2010)., Improvisation of Science Teaching Equipment. *Journal of the Science Teachers Association,* Vol. 20, No. 2, 72-76.

Best, J.W and Kahn, J.V., (1989)., *Research in Education, 6th Ed.* Prentice – Hall, Inc: Englewood Cliffs.

Burak, F., (2009), *An Investigation of the Relationship between Science Process Skills with Efficient Laboratory Use and Science Achievement in Chemistry Education.* Journal of Turkish Science Education. Retrieved from http// www.tused.org on 28/03/2014

Carnegie Foundation for the Advancement of Teaching., (1988), The Imperiled Generation, New York, Carnegie Foundation for the Advancement of Teaching

Corncoran, T., (1988), Working in Urban Schools, Washington, D.C, Institute for Educational Leardership

Chonjo, P. N., (1996), Improving Science Education in Secondary Schools: A Situational Analysis of Selected Government Secondary Schools in Tanzania Mainland, Dar es Salaam, Tanzania: Ministry of Education and Culture

Farombi, J.G., (1996). Resource Concentration, Utilization and Management as Correlates of Students' Learning outcomes: A study in School Quality in Oyo State. Unpublished Ph.D. Thesis, university of Ibadan.

Gall, K., (2007), Educational Research; An Introduction 8th Edition. New York, USA

Hofstein, A. and Naam, R. M., (2007), The Laboratory in Science Education: The State of the Art. Chemistry Education Research and Practice

Koul, L., (2004), Methodology of Educational Research, 3rd Edition, New Delh: Wishwa Prakashan Publications

Kothari, C. R., (2004). *Research Methodology; Methods and Techniques.* 3rd edition, Wiley, New Delhi.

Kothari, C. R., (2011). *Research Methodology; Methods and Techniques.* 2nd Revised Edition. New age international publishers. New Delhi

Lackney, J.A., (1999), "Assessing School Facilities for Learning/Assessing the Impact of the Physical Environment on the Educational Process", Mississippi State, Miss. Educational Design Institute,

Lyons, T., (2005), Different Countries, Same Science Classes: Student' experiences of School Science in their own words. International Journal of Science Education. Retrieved from http://www. research. acer.edu.au.aer/3 on 1/04/2014

Mabebe, E. N and Emmanuel, G., (2013), *School Droup Out in Community Secondary Schoools: A case of Nyamilama Secondary Schools – Mwanza Tanzania,* International Journal of Science and Technology Volume 2 No. 10

Mabula, N., (2012), *Promoting Science Subjects Choices for Secondary School Students in Tanzania. Challenges and Opportunities*, Dar es Salaam University Collages of Education,Tanzania

Ministry of Education and Vocational Training (MoEVT),. (2007). *The Annual Parliamentary Budget Report presented in the Parliamentary Meeting of the Year* 2007/2008. Tanzania.

Mosha, H. J,. (2006) Planning Education System for Excellence, Dar es Salaam, E & D Limited

Munro, M and Elson, D., (2000), Choosing Science at 16, NICEC Project Report, NICEC, Cambrige

Ngao, F. L,. (2011), *Factors that Define Exclusion in Secondary School Education: A case of Community Secondary Schools in Babati – Manyara Region, Tanzania*

Nkuba, M,. (2012), Promoting Science Subjects Choices for Secondary School Students in Tanzania: Challenges and Opportunity, Dar es Salaam University Colleges of Education

Nwachukwu, G.O,. (1984). A survey of the resources for the teaching and learning of

Biology in some new secondary schools in Lagos. Unpublished Ph.D Thesis, Unversity of Ibadan, Ibadan.

Odulaja, G. and Ogunwemimo, K,. (1989). Teachers Attitude Towards Biology Practical with Particular Reference to School certificate Biology practical Examinations. A case study of Lagos. B.Sc project Report, University of Lagos.

Ogunniyi, M.B,. (1983). Analysis of Laboratory Activities in Selected Nigerian Secondary Schools. *European Journal and Science Education,* Vol. 5, (2).

Ojera, D., (2012), *Perception of Students and Staff on Determinants of Performance in Science laboratory Technology in Institute of Technology in Southern Nyanza Region, Kenya*. International Journal of Academic Research in Progressive Education and Development

Olufunke, B. T., (2012), Effect of Availability and Utilization of Physics Laboratory Equipment on Students' Academic Achievements in Senior Secondary School Physics, Obafemi Awolowo University, Nigeria

Orodho, A. J., (2004). *Techniques of writing research proposals and report in education and social sciences*. Nairobi: Masola Publishers.

Osaki, K.M,. (2007). *The Challenge of Science and Mathematics Education in Tanzania*. Presented at the Workshop to Launch the National Science INSET Programme. Dares Salaam: Ministry of Education and Vocational Training.

Patton, M.Q., (1990). *Qualitative Evaluation and Research Methods 2nd ed.* Newbury Park.Sage Publications.

Sahin, P. E., (2000), Procedural Understanding Teacher Perception of Conceptual Basis of Practical work, University of Durham, School of Education

Soyibo, K., (1990). Progress and Problems in Nigerian Secondary School Education 1960 – 1984. *Journal of Research in Curriculum* (Special) 1, March, 51 – 61.

Speering, W., and Rennie, L., (1996), Students' Perceptions about Science. The Impact of Transition from Primary to Secondary Schools. Retrieved from http:// www. acer.edu.au.aer/3 on 1/04/2014

UNESCO,. (2008). *Challenges of implementing free day secondary education in Kenya. Experiences from district.* Nairobi: UNESCO

UNESCO., (2009), Needs Assessment Study of Tanzania Science Education. Retrieved from http://www.esrftz.org on 06/04/2014

UNESCO., (2009), The Global Literacy Challenge, Paris, UNESCO

Ministry of Education and Vocational Training., (2009), Basic Education Statistics in Tanzania (BEST) National Data, Dar es Salaam, Ministry of Education and Vocational Training

Ministry of Education and Vocational Training,. (2010*). Basic Education Statistics in* Tanzania (BEST). National Data. Dar es salaam. Ministry of Education and Vocational Training.

Ministry of Education and Vocational Training., (2010), Educational Sector Development Programme: Secondary Education Development Programme II (July 2010 – 2015), Dar es Salaam

National Examination Council of Tanzania., (2014), Form Four National Examination Results

Tytler, R,. (2010), Re – Imaging Science Education Engaging Students in Science for Australia Feature. Retrieved from http://www.research.edu.aer.edu.aer/3 on 02/04/2014

World Bank,. (2004). Program Document for a proposed financing to the United Republic of Tanzania for a Secondary Education Development Program. Washington DC, World Bank, Report No 27613.

APPENDICES

Appendix A: Questionnaire for Chemistry teacher

I am pleased to work with you in this exercise. Please answer the following questions freely and accurately. No answer is wrong because it shows what you honestly feel. Do not write your name or the name of your school on this paper. All information will be kept secret.

The questions are meant just to seek for your opinion about the effect of laboratories in secondary schools on students' performance in science subjects. Indeed, your participation in this study is greatly valued. Thank you very much.

Title/position _____ Date _____

District _____ Region _____

1. To what extent the status of school chemistry laboratory influence the performance rate of science students in your school? (Circle appropriate)

   (a) Too little

   (b) About right

   (c) Too much

2. The performance of your students in form four examinations is positively influenced by the status of your school chemistry laboratory. (Circle appropriate)

   (a) Strongly agree

   (b) Agree

   (c) Disagree

   (d) Strong disagree

3. The performance of your students in form four examinations is negatively influenced by the status of your school chemistry laboratory. (Circle appropriate)

   (a) Strongly agree

   (b) Agree

   (c) Disagree

   (d) Strong disagree

4. What are the monthly rates of doing chemistry practical's in your class? (Circle appropriate)

   (a) One

   (b) Two

   (c) Three

   (d) More than three

   (e) None

5. How many chemistry teachers do you have in your school? (Circle appropriate)

   (a) One

   (b) Two

   (c) Three

   (d) More than three

   (e) None

6. What is the performance rates of Chemistry students in the form four National Examinations? (Circle appropriate)

1	**2**	**3**	**4**	**5**
Excellent	**Very Good**	**Good Pass**	**Marginal Fail**	**Fail**

Appendix B: Questionnaire for Physics teacher

I am pleased to work with you in this exercise. Please answer the following questions freely and accurately. No answer is wrong because it shows what you honestly feel. Do not write your name or the name of your school on this paper. All information will be kept secret.

The questions are meant just to seek for your opinion about the effect of laboratories in secondary schools on students' performance in science subjects. Indeed, your participation in this study is greatly valued. Thank you very much.

Title/position _____ Date _____

District _____ Region _____

1. To what extent the status of school physics laboratory influence the performance rate of science students in your school? (Circle appropriate)
   (a) Too little
   (b) About right
   (c) Too much
2. The performance of your students in form four examinations is positively influenced by the status of your school physics laboratory. (Circle appropriate)
   (a) Strongly agree
   (b) Agree
   (c) Disagree
   (d) Strong disagree

3. The performance of your students in form four examinations is negatively influenced by the status of your school physics laboratory. (Circle appropriate)

   (a) Strongly agree

   (b) Agree

   (c) Disagree

   (d) Strong disagree

4. What are the monthly rates of doing physics practical's in your class? (Circle appropriate)

   (a) One

   (b) Two

   (c) Three

   (d) More than three

   (e) None

5. How many physics teachers do you have in your school? (Circle appropriate)

   (a) One

   (b) Two

   (c) Three

   (d) More than three

   (e) None

6. What is the performance rates of physics students in the form four National Examinations? (Circle appropriate)

1	2	3	4	5
Excellent	**Very Good**	**Good Pass**	**Marginal Fail**	**Fail**

Appendix C: Questionnaire for Biology teacher

I am pleased to work with you in this exercise. Please answer the following questions freely and accurately. No answer is wrong because it shows what you honestly feel. Do not write your name or the name of your school on this paper. All information will be kept secret.

The questions are meant just to seek for your opinion about the effect of laboratories in secondary schools on students' performance in science subjects. Indeed, your participation in this study is greatly valued. Thank you very much.

Title/position _____ Date _____

District _____ Region _____

1. To what extent the status of school Biology laboratory influence the performance rate of science students in your school? (Circle appropriate)
   (a) Too little
   (b) About right
   (c) Too much
2. The performance of your students in form four examinations is positively influenced by the status of your school Biology laboratory. (Circle appropriate)
   (a) Strongly agree
   (b) Agree
   (c) Disagree
   (d) Strong disagree

3. The performance of your students in form four examinations is negatively influenced by the status of your school Biology laboratory. (Circle appropriate)

   (a) Strongly agree

   (b) Agree

   (c) Disagree

   (d) Strong disagree

4. What are the monthly rates of doing Biology practical's in your class? (Circle appropriate)

   (a) One

   (b) Two

   (c) Three

   (d) More than three

   (e) None

5. How many Biology teachers do you have in your school? (Circle appropriate)

   (a) One

   (b) Two

   (c) Three

   (d) More than three

   (e) None

6. What is the performance rates of Biology students in the form four National Examinations? (Circle appropriate)

1	**2**	**3**	**4**	**5**
Excellent	**Very Good**	**Good Pass**	**Marginal Fail**	**Fail**

Appendix D: Semi- Structured Interview for District Secondary Education Officer.

The interview is meant just to seek for your opinion about the effect of laboratories in secondary schools on students' performance in science subjects.

Please be guaranteed that the information you offer will be used for research purposes only and will be treated with high discretion. Indeed, your participation in this study is greatly valued. Thank you very much.

1. How many science teachers do you have in your district?

   Write it _____

2. How many science subject laboratories do you have in your district?

   Write it _____

3. How does the availability of laboratories affect secondary school on students' performance in science subjects in your district?

   _____

   _____

   _____

4. How does the absence of laboratories affect secondary school on students' performance in science subjects in your district?

   _____

   _____

   _____

5. What is the performance rates of science students in the form four National Examinations in your district? (Circle appropriate)

1	2	3	4	5
Excellent	**Very Good**	**Good Pass**	**Marginal Fail**	**Fail**

Appendix E: Semi- Structured Interview for Head of Secondary School.

The interview is meant just to seek for your opinion about the effect of laboratories in secondary schools on students' performance in science subjects.

Please be guaranteed that the information you offer will be used for research purposes only and will be treated with high discretion. Indeed, your participation in this study is greatly valued. Thank you very much.

1. How many science teachers do you have in your school? Write it

   Physics _____ Chemistry _____ Biology _____

2. How many science subject laboratories do you have in your school?

   Write it _____

3. How does the availability of laboratories affect secondary school on students' performance in science subjects in your school?

   _____

   _____

   _____

4. How does the absence of laboratories affect secondary school on students' performance in science subjects in your school?

   _____

   _____

   _____

5. What is the performance rates of science students in form four National Examinations in your district? (Circle appropriate)

Excellent	**Very Good**	**Good Pass**	**Marginal Fail**	**Fail**

Appendix F: Questionnaires for form four students

This questionnaire inquires your opinion about the effect of laboratories in secondary school students' on performance in science subjects.

Please be guaranteed that the information you offer will be used for research purposes only and will be treated with high discretion. Indeed, your participation in this study is greatly valued. Thank you very much.

School ----------Ward ----------District----------Region ----------

Please tick (√) for which is appropriate against each statement provided according to the scales given.

1. How many Physics practical have you done in your class?

Physics		
S/N	Number of practical	Put a tick**(√)**
i	One	
ii	Two	
iii	Three	
iv	More than four	

2. How many Chemistry practical have you done in your class?

Chemistry		
S/N	Number of practical	Put a tick**(√)**
i	One	
ii	Two	
iii	Three	
iv	More than four	

3. How many Biology practical have you done in your class?

S/N	**Biology**	
	Number of practical	Put a tick**(√)**
	One	
	Two	
	Three	
	More than four	

4. What is the performance rates of science students in the form four National Examinations? (Circle appropriate)

1	**2**	**3**	**4**	**5**
Excellent	**Very Good**	**Good Pass**	**Marginal Fail**	**Fail**

Appendix G: Questionnaire for former form four

This short and brief questionnaire seeks to get information about the effect of laboratories in secondary school students' on performance in science subjects.

Please be assured that the information you give will be treated confidentially and no right will be violated. I beg your sincere participation. Thank you very much.

Put a tick (√) where appropriate in the following.

1. The name of secondary school you completed _____
2. Year of completion _____
3. Which subjects did you prefer among Physics, Chemistry and Biology?

   Write it _____
4. What was your performance in the National Examination in Science subjects?

   Please put a tick against the option given (√).

Excellent	**Very Good**	**Good Pass**	**Marginal Fail**	**Fail**

5. Briefly explain what factors made you pass science subjects?

   _____

   _____

   _____

6. Briefly explain what factors made you failed science subjects?

_____

_____

_____

7. How many science subject practical did you do when you were in form four?

S/N	Number of practical	Put a tick **(√)**
I	One	
ii	Two	
iii	Three	
iv	More than four	

Appendix H: **Observation Schedule for the Schools' Science Laboratory and Facilities**

Instructions: The information given in this checklist will be treated as very confidential, please give your opinion as honestly and accurately as possible.

Table 4.1 School Science Laboratory Facilities and Materials

Facilities/ Equipments	**Available**		**Not Available**		**Adequacy**		**Inadequacy**	
	No.	**%**	**No.**	**%**	**No**	**%**	**No**	**%**
Laboratory room (s)								
Apparatus								
Furniture								
Chemicals & Specimens								
Text Books								
Teaching Charts								
Functional Prep room								
Piped water								
Heating means ie Gas								
Gas/ fumes chamber								
Proper Lighting i.e. electricity, natural								