INSTITUTIONAL FACTORS INFLUENCING ACQUISITION OF EMPLOYABLE SKILLS BY STUDENTS IN PUBLIC TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING INSTITUTIONS IN NAIROBI COUNTY, KENYA.

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DECLARATION

This research project is my original work and has not been presented in any other university for the award of any degree.

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DEDICATION

This Research Project is dedicated to my father Ainea J Eshitashe, my mother Judith Eshitashe and my siblings Joycelyne, Andrew and Roda .

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ABBREVIATIONS AND ACRONYMS

GoK	Government of Kenya
FKE	Federation of Kenya Employers
ICT	Information Communication Technology
TVE	Technical and Vocational Education
TVET	Technical and Vocational Education and Training
UNDP	United Nation Development Program

ABSTRACT

TVET training is an avenue to empower the youth to be self-employable, to have employable skills and to boost economic development. The main purpose of the study was to investigate the institutional factors influencing acquisition of employable skills by students in TVET institutions in Nairobi County ,Kenya. Four objectives guided the study: to establish the establish the influence of academic qualification of TVET teachers on acquisition of employable skills, establish the extent to which availability of training equipment influence acquisition of employable skills, establish the influence of teaching methods on acquisition of employable skills, establish the influence of adequacy of TVET teachers on acquisition of employable skills. The study adopted descriptive survey design. The study targeted three TVET institutions in Nairobi County.The research instruments used were questionnaires' for teachers and students and an interview guide for principals. The data was analyzed using both descriptive and quantitative statistics. Data was presented in frequency tables and percentages. The key study findings were that teachers had prerequisite academic qualification to teach in TVET institutions, the TVET teachers do not have any professional development program or industrial attachment, academic qualification of teachers' influences acquisition of employable skills by students. There is inadequate provision of training equipment, institutions do not have modern equipment that are relevant to those used in the industries, relevance of training equipment influences acquisition of employable skills, workshops were not well equipped , teachers mainly use lecture, demonstration, work-based learning and discussion teaching methods due to large class sizes, inadequate training equipment and their influence on skills acquisition, the institutions have inadequate teaching staff hence are forced to hire part-time teachers or merge classes in order complete syllabuses. The study concluded that the four institutional factors investigated significantly influenced the employable skills acquired by students. It was recommended that industries should support TVET institution by providing industrial attachment programs for teachers, all stakeholders; parents, industries, government and donors should contribute in providing modern adequate training equipment, TVET teachers should use practically-oriented teaching methods like field trip, project work, simulation and work-based teaching often methods in order to achieve the desired result of imparting the employable skills necessary for the world of work and the government should support TVET institutions in hiring of more trained teachers to curb inadequacy of teachers and merging of classes.

CHAPTER ONE

INTRO DUCTION

1.1 Background to the Study

Technical and Vocational Education and Training (TVET) is broadly defined as; education which is mainly aimed at leading participants to acquire the practical skills, know-how and understanding necessary for employment in a particular occupation, trade or group of occupations (Atchoereria, & Delluc, 2001)). Such practical skills or know- how are provided in a wide range of settings by multiple providers both in the public and private sector. Afeti (2006) affirms that TVET are important for their orientation towards the world of work and their curriculum emphasizing on the acquisition of employable skills. TVET delivery systems are therefore well placed to train the skilled and entrepreneurial workforce that Africa needs to create wealth and emerge out of poverty. Nevertheless, the demand for skilled graduates in the labor market is not always matched with acquired skills.

The ultimate aim of TVET education is for the acquisition of knowledge, attitude and employable skills for sustainable development. The acquisition of life-long employable skills calls for effective and efficient teaching methods, utilization of improved and standard instructional equipment, relevant curriculum and good quality of teachers. Skills acquisition by students can be achieved when the TVET institutions are adequately funded, equipped with adequate facilities

and have competent and experienced teachers that adopt effective and efficient teaching methods (Dasmani, 2011).

Globally, developed countries have given more attention to TVET due to its importance to the economic development. For instance, in Germany training involves dual system whereby 80% of instruction is done in industries and 20% of instruction in schools so as to equip learners with relevant employable skills. Training is largely employer driven and emphasis is on action-oriented, practice-oriented and application-oriented modes of teaching and learning (UNDP, 2010). African Union (2007)) notes that in Singapore there is National Manpower Council that ensures training is relevant to the needs of the labour market. The same is noted in Australia where training curriculum is defined by industries and not the government or TVET institutions and it combines both school-based and work place training. This ensures that the training curriculum remains relevant and students are linked to the market needs.

In Africa, most of the TVET institutions are facing by the challenge of producing employable graduates due to various institutional factors. In Ghana, Dasmani (2011) indicates that inadequate supply of instructional materials, large class sizes, inadequate training facilities, weak linkages with local industries for hands-on-experience for both instructors and trainees lead to ineffective and inefficient training of students while emphasizing on passing final examination in

the TVET institutions. This led to inadequacy in preparation of students for the job market and brought workplace challenges to the graduates.

Udofia, Ekpo, Akpan, & Nsa (2012) revealed that there is significant relationship between teacher quality, teaching methods and instructional facilities and acquisition of employable skills by students. Maeko & Makgato (2014) point out that in South Africa, the quality of TVET teachers is poor since they do not have frequent exposure to relevant industries in order to keep abreast with latest technological developments. A teacher of vocational and technical subject must not only teach, but must use methods that will enhance students' acquisition and development of knowledge, skills, interest and self-concept formation.

Teaching methods used during training are very significant in acquisition of skills. In Nigeria, Audu (2014) revealed that work-based learning, field trip, project-based learning, seminar and simulation methods of teaching facilitates acquisition of both technical skills and employable skills by students at the same time. However, these teaching methods are rarely used by most of TVET institutions in Africa due to inadequate funds and poorly equipped instructional facilities. He affirms that generic skills must be emphasized during training since these skills accelerate employability of graduates.

Kenya has a vast network of TVET institutions providing a wide range of programs ranging from craft, artisan certificate and diploma levels. There is

marked expansion in enrolment and number of TVET institutions in Kenya but despite this, the institutions have some marked shortcomings in terms of low allocation of funds in national budget, understaffing in technical subjects due to poor remuneration of staff and use of obsolete equipment and insufficient learning materials (Nyerere, 2009)). In addition, TVET policy by GoK (2012) indicates that the curriculum being offered in TVET institutions is majorly theory-based and not relevant to market needs due to limited link between the institutions and the industries hence there is mismatch of skills taught in the institution and those required by employers.Since TVET graduates are responsible for service delivery and production of goods in all sectors, it is essential therefore to entrench soft skills in TVET curriculum that will enhance the graduates to secure and maintain jobs so that they can be relied upon at work place.

Adequacy of teaching staff is very key in the implementation of curriculum in any institution. Mbugua, Muthea & Sang (2012) revealed that the main challenges are inadequate staffing leading to multi-grade teaching and hiring of part time tutors thus leading to low quality of training. Njoki (2014) reveals that in Nairobi County, TVET institutions are understaffed especially in technical disciplines which lead to ill preparation of students for work. She also indicated that there is limited industrial attachment with little or no supervision which implies that graduates are not exposed to work environment early enough hence they are deemed incompetent when employed. In addition, the executive director of Federation of Kenya Employers (FKE) stated that “Firms incur a lot of upfront

costs when they hire fresh, inexperienced and interns. Besides paying income tax, firms have to invest in their training since most have theoretical knowledge but lack adequate skills required in the job market." This complain from employers implies that institutions are churning out graduates who are not ready for the world of work.

Availability of modern and relevant training equipment affects the relevance of employable skills acquired by students to market skills needed. Mbugua et.al (2012) expressed that there is inadequate training materials and use of inferior equipment in TVET which have compromised the relevance of skills taught to skills needed by industries. In Nairobi region, Njoki (2014) revealed that most of the TVET institutions had adequate teaching and learning resources but teaching facilities were not well equipped. In addition, the TVET curriculum is rooted in a rigid supply- driven system with little or no linkage or relevance to the labour market needs hence graduates lack skills, knowledge and competencies for securing vision 2030 (World Bank Report, 2015).

The emphasis on skill acquisition is due to the high rate of unemployment among graduates due to advancement in technology and challenging economy which forces employers to re-train new graduate employees in their firms and also put more emphasis on work experience when recruiting new employees. Also due to mismatch of skills between the skills taught and those required by the labour market due to limited industrial attachment of students and tutors together with

weak linkage between the TVETs and industries (Nyerere, 2009). GoK (2012) has indicated so many strategies like increasing funding , equipping them with modern equipment and linking training and labour market needs in order to improve training quality of TVET institutions. TVET education is knowledge, skill and technology driven therefore, the community, employers and government must support the TVET institutions to improve its training quality by providing funds, labour market needs information, attachments to trainees and tutors and equipping of instructional facilities.

The focus on TVETs in Nairobi County is that, there is the highest number of both private and public TVET institutions and industries where trainees are likely to get their industrial attachment so that they can have relevant skills. In addition there is a big increase in number of private TVET institutions which are competing with the public ones. In addition, there is diversity in enrollment of students from all over the country since its located in an area with more socio-economic activities that students can engage in during and after training but on the contrary the graduate students who are mainly youth comprise of the largest number of unemployed people in the county due to lack of relevant practical skills and employable skills but have distinct academic qualification (World bank report, 2015).

The focus on TVET sector is that it is the major producer of engineers and technologists that are absorbed in the industries and the informal sector of

employment. Therefore its main objective is to train students acquire knowledge, attitude and employable skills for employment or self-employment which on the contrary it's not being achieved due various institutional factors (GoK, 2012). Therefore it's against this big gap between acquired skills and employable skills among graduates that the researcher seeks to investigate the institutional factors influencing acquisition of employable skills by students in public TVET institutions in Nairobi County.

1.2 Statement of the Problem

TVET training is an avenue to empower the youth to be self-employable, to have employable skills and to boost economic development. Technical skills form the basis for the realization of industrial transformation and meaningful quest for Kenya's Vision 2030. For this country to breakthrough in industrialization and technological development it must begin by ensuring that it has a critical mass of well qualified technologists and engineers. The main objective of TVET is to provide adequate and appropriate skilled artisans, craftsmen, technicians and technologists at all levels of the economy through practical training and work experience but unfortunately the graduates face mismatch of skills when they get to the labour market which forces industries to retrain them upon employment (FKE report, 2015) .

The question to be answered is that do the current TVET institutions have the capacity to produce graduates with employable skills to fill the social need for these type of workforce in order to achieve the aspiration of Kenya Vision 2030 in

Kenya? Little empirical evidence exists on institutional factors influencing acquisition of employable skills and employability of TVET graduates in Kenya and especially Nairobi County as most have concentrated on challenges facing TVET in Kenya it's against this gap that the researcher investigated the institutional factors influencing acquisition of employable skills in TVETs in Nairobi County.

1.3 Purpose of the study

The purpose of the study was to investigate the institutional factors influencing acquisition of employable skills by students in public Technical and Vocational Education and Training institutions in Nairobi County, Kenya.

1.4 Research Objectives

The study sought to achieve the following objectives:

i. To establish the influence of academic qualification of TVET teachers on acquisition of employable skills by students in public technical and vocational education and training institutions.
ii. To establish the extent to which availability of training equipment influence acquisition of employable skills by students in public technical and vocational education and training institutions.
iii. To establish the influence of teaching methods on acquisition of employable skills by students in public technical and vocational education and training institutions.

iv. To establish the influence of adequacy of TVET teachers on acquisition of employable skills by students in public technical and vocational education and training institution.

1.5 Research Questions

The study was guided by the following research questions:

i. What is the influence of academic qualification of TVET teachers on acquisition of employable skills by students in public technical and vocational education and training institutions?
ii. To what extent does the availability of training equipment influence acquisition of employable skills by students in public technical and vocational education and training institutions?
iii. What is the influence of teaching methods on acquisition of employable skills by students in public technical and vocational education and training institutions?
iv. What is the influence of adequacy of TVET teachers on acquisition of employable skills by students in public technical and vocational education and training institutions?

1.6 Significance of the study

The findings of the study may help tutors to develop and embrace effective teaching methods that will facilitate acquisition of employable skills by students in TVET institutions. The findings may also provide information to the TVET stakeholders to provide adequate and relevant instructional equipment that

will help students to acquire the employable skill. The findings may also be used by the industries to be aware of the need to provide labour market knowledge to institutions in order to enhance relevance of training. The findings of this study may also contribute to add knowledge and can be useful to researchers as a source for further studies.

1.7 Limitations of the study

Acquisition of employable skills may be influenced by other factors like students' mental ability, interest, self-concept, efforts and attitude towards the course they are pursuing. Some of the respondents gave responses to cover their weaknesses and safeguard their interests. The researcher encouraged respondents to give honest responses since they were to be used for research purposes only.

1.8 Delimitations of the study

The study was conducted in three public technical training institutions namely; Nairobi, Kabete and PC Kinyanjui technical training institutions. The data was collected from institutional administrators, teachers and 3rd year students. The 3rd year students were considered in order to evaluate their acquisition of employable skills since they were almost graduating to the labour market.

1.9 Assumptions of the study

The TVET administrators and teachers were aware of the employable skills required by employers therefore they were implementing the TVET curriculum effectively in order for the students to acquire the employable skills.

1.10 Definition of Significant terms

Academic qualification refers to the knowledge, skills, attitudes and values acquired from a formal learning institution by being awarded a certificate.

Adequacy of teachers refers to the acceptable number of teaching staff in relation to the number of students in a given course.

Employable skills refer to skills that help an individual in securing, maintaining and performing effectively on a job. They include personal qualities, thinking skills, information skills, interpersonal skills, technical skills and system and technology skills.

Institutional factors refer to aspects within the institutions that influence acquisition of employable skills.

Teaching methods refers to different ways which teachers use to deliver a body of knowledge, skills, attitudes and values in a given discipline of study to students

Training equipment refers to workshops, laboratories, tools and machinery used for training in a given course.

TVET refersTechnical and Vocational Education and Training (TVET) is the education which is mainly aimed at leading participants to acquire the practical

skills, know-how and understanding necessary for employment in a particular occupation, trade or group of occupations.

1.11 Organization of the study

This study report is organized into Five Chapters. Chapter one covers the introduction which consist of the background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study, limitations and delimitations of the study, basic assumptions of the study, definitions of significant terms and organization of thestudy. Chapter Two focuses on review of related literature. It covers literature review basing on the following institutional factors influencing acquisition of employable skills by students: teacher qualification, instructional materials, teaching methods and relevance of curriculum.

Chapter Three consist of research methodology, covering research design, target population, sample size and sampling techniques, data collection instruments, data analysis techniques and ethical considerations. Chapter Four consists of data interpretation and discussion. Chapter Five consists of summary of findings, conclusion, recommendations and suggestions for further study.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter focuses on the context of TVET in the world and the training process in TVET institutions of Kenya. The chapter also looks at historical development of TVET. The chapter is organized in major themes as guided by research questions.It also has the summary of literature review, theoretical framework and conceptual framework.

2.2 Rationale for TVET

Technical and vocational education (TVET) is broadly defined as "Education which is mainly to lead participants to acquire the practical skills, knowhow and understanding, and necessary for employment in a particular occupation, trade or group of occupations (Atchoareria, D & Delluc, A, 2001). Such practical skills or know-how can be provided in a wide range of settings by multiple providers both in the public and private sector. The role of TVET in furnishing skills required to improve productivity, raise income levels and improve access to employment opportunities has been widely recognized (Bennell, 1999). Developments in the last three decades have made the role of TVET more decisive; the globalization process, technological change, and increased competition due to trade liberalization necessitates requirements of higher skills and productivity among workers in both modern sector firms and Micro and Small Enterprises (MSE). Skills development encompasses a broad range of core skills (entrepreneurial, communication, financial and leadership) so

that individuals are equipped for productive activities and employment opportunities (wage employment, self-employment and income generation activities). Several countries; developed and developing, such as Italy, Brazil, China, Sweden and Japan have given more recognition to TVET through adequate funding. As a result, students get exposed to vocational training and to a culture of scientific investigation and application at an early age.

2.3 Situational analysis of TVET in Kenya

The use of Technical, Industrial, Vocational and Entrepreneurship Training (TIVET) in Kenya encompasses technical training institutions, MSE training and demonstration centers, youth polytechnics and national youth service skills development centers. In Kenya there have been deliberate efforts to structure and deliver formal TVET education through establishment of TVET institutions either by the government or the private sector. However Non formal TVET sector just like the informal sector has been neglected by the government particularly in relation to the organization of systems and structures. The Government has policies for the sector but they are not implemented, enabling the private sector to exploit it for cheap labour. The sector has been generally left to civil societies, religious organizations among others to intervene, which is done at program levels hence few target groups reached.

The current TVET curriculum is weak and not flexible enough to meet the technological changes and diverse needs of different clients. Furthermore the

quality of TVET graduates has declined in recent years due to poor teaching methods, out modeled and inadequate training equipment and lack of meaningful work experience and supervision during attachment (Nyerere, 2009). The graduates of TVET have experienced technology shock when they finally enter the job market. Enrolment in the traditional engineering and building course is dwindling very fast while enrolment in applied sciences and business/commerce oriented courses is growing steadily. Technical teachers lack necessary industry-based technological skills updated through industrial attachment. KTTC has shifted from its original mandate as a producer of trainers and is now competing to offer programs similar to national polytechnics. This to a great extent compromises quality of education especially when resources are lacking. It has been observed that teachers in the technical institutions rarely go for refresher courses which put them at the mercy of their students who are more exposed.

2.4 Academic qualification of technical teachers and acquisition of employable skills.

Teachers play a very important role in the implementation of curriculum in any learning institution, hence they require be well preparing, motivating and supporting in order to ensure that they execute their duties effectively. Vision 2030 has placed great stock in the improvement and provision of TVET as an important objective in achieving economic progress. To ensure quality TVET programs the quality of the teacher is critical among other important considerations such as training equipment and learning and teaching materials.

Dasmani (2011) reveals that in Ghana, the TVET teachers do not undergo regular industrial attachment hence lagging behind in new knowledge on technological advancement in industries. This challenge leads to low quality of training which hinders students from acquiring the employable skills. In this study there is no findings on the required level of academic qualification of technical teacher and how it influences acquisition of skills.

In Nigeria, Udofia. et.al (2012) revealed that there is significant relationship between teacher quality with the acquisition of employable skills by students in TVET institutions. However the findings do not articulate the academic level of qualification that the TVET teacher should have in order to impart employable skills to students. But since there is a significant relationship, then the teacher must be well trained and qualified in order to impart the employable skills to his/her learners.

Ferej, Kitainge & Ooko (2012) revealed that majority of TVET teachers are diploma holders it raises question on the kind of training offered to students since the same teachers were trained in the same institutions with the same level of academic qualifications. This poses a challenge on the students since most of the teachers who are their role models have limited industrial attachment hence have limited knowledge on labour markets needs making it difficult for the teachers to transfer the employable skills. This also agrees with Githinji & Kigwilu (2015), who

revealed that teacher qualifications, teaching experience and teacher motivation have a high influence on the implementation of Artisan and Craft curriculum. Therefore this implies that the TVET institutions should employ more qualified teachers in order to enhance teacher competence in order to spur and sustain students' interest in technical courses. Mbugua, Muthea & Sang (2012) affirms that the TVET institutions were poorly staffed with qualified teachers especially in technical subjects which force the institutions to hire part-time teachers. However the study does not show how this influences the acquisition of employable skills. This is a critical condition for the training process since the academic qualification of the hired teachers is not highly considered since there is weak monitoring and evaluation procedures carried out in TVETs and hence low quality of training leading to poor acquisition of employable skills. Karemu & Gongera (2014) affirms that teachers in Kiambu County lack exposure to newest technology and therefore teachers need more learning (re-training) because they lack the necessary skills. Both the teachers and students have poor technology awareness and the graduating students lack marketable skills.

As TVET programs are industry-based and industry-competence oriented, it is necessary for TVET teachers to have the right set of competencies and right work environment when delivering technical and vocationally-oriented programs so that the students are provided with the right set of skills and knowledge required by industries. In addition to have regular in-service capacity building

courses on new technological advancement in the industries. It is also important to have national standards for TVET teachers since they can only impart employable skills that they have acquired in their training.

2.5 Availability of training equipment and acquisition of employable skills.

Institutional workshops offer opportunities for practical training of students in skill acquisition in their technical trade areas for future development of the key sectors of the economy in order to meet the basic needs of electricity, roads and machinery, among others. Student's practical projects are an important part of the curriculum in TVET, but a supportive school environment is a fundamental requirement for the successful implementation of curriculum (Bybee & Loucks-Horsely, 2000). This aspect of the curriculum can only be implemented where workshop facilities, tools, equipment and machines are adequate and relevant. Availability of appropriate workshop facilities enhances student learning by allowing them to be involved in demonstrations, and practice which will help them to continue to build their skills.

In Nigeria, Audu (2013) affirms that one of the issues of great controversy among TVET educators is the issue of the poor state of workshop tools and equipment in TVE institutions in Nigeria (Umunadi, 2011). Umar & Ma'aji (2010) stated that most of the TVE institutions in Nigeria have been forced to perform below standard due to non -availability, poor management or utter neglect of the required facilities in the workshops for effective skills acquisition.

Therefore, provision of adequate workshop tools, equipment and machines is a prerequisite for effective implementation of TVET programs in any country. Udofia et.al. (2012) confirms this by stating that there is significant relationship between workshop equipment for training and acquisition of employable skills.

According to Dasmani (2011), TVETs in Ghana suffer from inadequacy in the provision of instructional materials and training equipment which leads to focusing more on theoretical teaching leading to trainees lacking proficiency in their chosen field of specialization. Since TVETs mostly rely on training, their short supply will negatively affect practical skills acquisition.

In Kenya, Muthaa.et.al. (2012) revealed that most TVETs operate with inadequate workshop facilities, which do not have adequate training equipment. The lack of training facilities compromises the relevance of taught skills to market skill needs in industries and business organizations. Most of the training equipment found in TVETs are not technologically in tandem with equipment found in industries and business organizations. The training equipment are inferior to the equipment used in industries and business organizations. This state of training equipment erodes the relevance of taught skills to market skill needs. There is urgent need to modernize equipment and provided adequate facilities to ensure that graduates coming out of TVETs acquire skills relevant to the employment market skill needs in industries and business organizations. In agreement with this the TVET policy in Kenya affirms that one challenge facing

TVETs in their curriculum implementation is obsolete training equipment that leads to poor training quality and acquisition of skills leading to mismatch of skills among graduates (GoK, 2012; Nyerere, 2009).

2.6 Teaching methods and acquisition of employable skills

TVET education is knowledge, skill and technology driven. It empowers students with skills and job creation potentials leading to poverty reduction. The acquisition of practical employable skills empowers the students with competence to practice, create, develop and establish self in the work place. Skills acquisition by students can only be achieved where the training institutions have competent and experienced teachers that adopt effective and efficient teaching methods (Audu.et.al., 2014).

In Ghana, Dasmani (2011) revealed that most TVET graduates attributed their unemployment to a number of factors including outdated and irrelevance in some parts of the curriculum, non-exposure to entrepreneurship education, practical subjects not well taught due to the absence of laboratory and inadequate practical demonstrations, obsolete equipment and materials in short supply. These short falls leads to too much theory-oriented training and little practice hence inadequate skills acquisition. The results of this study triggered more research in Ghana on the best way to carry out training in TVET. Therefore, Competency Based Training (CBT) which is an industry and demand driven education and training program, its products have a high demand on the job market have been adopted in order to produce employable graduates from TVET (Anane, 2013). She

continues to state that the CBT have been adopted by many countries like USA, Japan, Australia, China, Netherlands, South Africa, Asia and many more. This implies that CBT approach is the way to go for TVETs across the world for them to remain relevant in the economy since it has many hopes because it is an outcome based approach and a major driver, incentive and motivator of learning where the students are rated higher than teachers (Dadi, 2014).

Audu (2014), it revealed that the most effective and efficient teaching methods to be used in order to enable students to acquire skills include: demonstration, work based learning (attachment), simulation, fieldtrip, context based learning, discussion and Problem based learning (project work). He further reveals that these teaching methods should be used together with teacher-centered and learner-centered approaches of teaching and learning.

In Kenya, the most teaching method used is lecture method which is majorly theory based and teacher-centered (Mbugua.et.al. 2012). Karemu & Gongera (2014) affirms that in Kiambu county TVET has lost its relevance and the TVET institutions face challenges like lack of sufficient government funding, lack of modern facilities, outdated technology and lack of training materials for both teachers and students which impacts negatively on the teaching methods used by teachers which is mainly lecture method which can neither equip the youth with employable skills nor empower them to be self-reliant because they lack essential facilities and technology to carry out practical and demonstrations.

In contrary with the above findings, Mwaura & Mwangi (2015) revealed that the teachers teaching automotive diploma course mostly used demonstration, project work and phase testing as the least used method. However, in most cases the teachers combined all the above methods and the trainers varied the use of these methods which is a good practice of quality training delivery. Despite the teachers using these methods in enhancing skill acquisition, the teachers are sometimes incapacitated since the institutions did not have well balanced adequate training facilities to implement the curriculum effectively. Teaching aids such automotive training models are very critical in the provision of quality skills training of which were not available.

Therefore, it's quite important that TVET teachers be encouraged to use different teaching method like demonstration, work based learning (attachment), simulation, fieldtrip, context based learning, discussion and Problem based learning (project work) as significant determinants of the teaching methods that influence the acquisition of practical, so that the students can acquire the skills for gainful employment in the labor market or be able to establish on their own and become self-reliant.

2.7Adequacy of TVET teachers and acquisition of employable skills

The teacher–pupil ratio greatly influences performance. Chelimo (2005) notes that, Schools with low teacher–pupil ratio greatly give individual attention to the pupils and there is increased interaction which enables the learners to be

motivated. According to Mbugua.et.al. (2012) in Kenya most TVETs operate with inadequate teaching staff which compromises the quality of teaching and learning since the short fall in the number of teachers is addressed through hiring part-time teachers, multi-grade teaching, and the students individualized learning engagements. Multi-grade teaching refers to a situation where students at different levels of learning are taught in the same workshops, laboratories or classrooms. This affects the interactive capacity between the students and the teachers' hence poor quality of training and acquisition of skills. Githinji & Kigwilu (2015), who revealed that teacher qualifications, teaching experience and teacher motivation have a high influence on the implementation of Artisan and Craft curriculum. Therefore this implies that the TVET institutions should employ more qualified teachers in order to enhance teacher competence in order to spur and sustain students' interest in technical courses. Mbugua, Muthea & Sang (2012) affirms that the TVET institutions were poorly staffed with qualified teachers especially in technical subjects which force the institutions to hire part-time teachers. However the study does not show how this influences the acquisition of employable skills.

2.8 Summary of literature review.

The institutional factors are very key in determining the nature of training and employability of the graduates of a given institution. As noted by Ferej, Kitainge & Ooko (2012), the academic qualification of teachers is very key in the delivery of TVET curriculum since the practical training and industrial attachment teachers go through their training affects how the will deliver the relevant skills to

students. As noted by various scholars is that most of TVET teachers have diploma qualifications which puts them at the mercy of their students who are more exposed and are training for the same level.

Dasmani (2011) affirms that TVET institutions have inadequate training equipment which are outdate and inferior to those used in industries hence leading to irrelevance of skills acquired by students. Due to inadequate training equipment, most of the TVET teachers opt to use lecture teaching method with limited practical training. TVET policy in Kenya also affirms that one challenge facing TVETs in their curriculum implementation is obsolete training equipment that leads to poor training quality and acquisition of skills leading to mismatch of skills among graduates (GoK, 2012).

Inadequacy of teachers in TVETs has also been noted that it leads to multi-grade teaching and hiring part-time teachers who may not be qualified to deliver the technical subjects hence the teachers tend to teach theoretically and not practically. However, Competency Based Training (CBT) which is an industry and demand driven education and training program and its products have a high demand on the job market should be adopted in order to produce employable graduates from TVET (Anane, 2013).

The major reason why students join TVET institutions is to secure employable skills for employment or self-employment. Given the reasons training institutions should endeavor to produce graduates who are marketable to industries and

business organizations. This will be feasible when the internal efficiency and the external efficiency of TVETs are achievable. Whereas the government of Kenya has made many recommendations in policy documents on how to address these institutional variables, they have not been implemented and there is no documented evidence to show progress. Previous scholars of TVET have recommended various strategies for which there is no tangible evidence of implementation. The proposed study will investigate the institutional factors influencing acquisition of employable skills.

2.9 Theoretical framework

The study was based on functional context theory by Thomas Sticht (1975). The theory suggests that the learning of new information is facilitated by making it possible for the learner to relate it to knowledge already possessed and transform old knowledge into new knowledge. By using materials that the learner will use after training, transfer of learning from the classroom to the "real world" will be enhanced. Functional Context theory is based on four principles. First, the instructions must reach the goals of the lesson and help the student to use his/her prior information. Second, the educators have to use tools and materials that match what the students are learning. Third, educators can improve literacy by: good content knowledge, information processing skills, or design of the learning tools. Finally, new assessment of learning that requires context measurement. Therefore the TVET institutions must provide an environment of learning that is more similar to the industrial environment so that the skills acquired by students will be relevant to skills required by industries. TVET teachers should

use teaching method and tools that will enhance skills acquisition by students so that they can function well in the work environment .

2.10 Conceptual Framework

The conceptual framework shows the relationships that exist between the dependent and independent variables under study. Also shown are the moderating variables and intervening variables. The conceptual framework is as shown in Figure 2.1

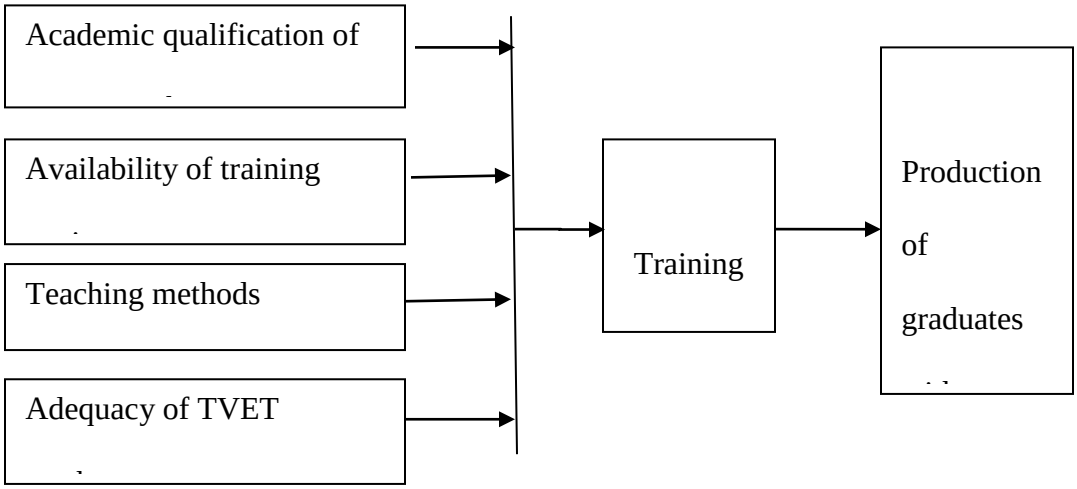

Figure 2.1: Conceptual framework on interaction of variables.

The conceptual framework above diagrammatically shows the relationships that exist between the dependent and independent variables under study. The dependent variable is production of TVET graduates with employable skills whose main indicator is the number of graduates from the TVET institutions who secure employment in industries or have self-employment. The independent variables that will be investigated to establish their level of influence on the

dependent variable are: academic qualification of TVET teachers, availability of training equipment, teaching methods and adequacy of TVET teachers.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter contains the methodology for data gathering and analysis that was used in the study. The chapter is organized along the following sub sections: research design, target population, sample size and sampling procedure, data collection instrument, instrument reliability, data collection procedure ,data analysis and presentation and ethical considerations that will be considered in the study.

3.2 Research design

The research design used in this study was descriptive survey research design. Mugenda and Mugenda (2003) states that the descriptive study is a method, which enables the researcher to summarize and organize data in an effective and meaningful way. The study adopted descriptive survey research design to obtain information by asking questions relating to individual view on how institutional factors influence acquisition of employable skills by students. This enabled the researcher to ascertain and be able to describe characteristics of the variables of interest in the institutional factors. The major purpose for adopting descriptive research design is that it gives a description of state of affairs as it exists at present. Kothari (2005), notes that the design is suitable for this study since the researcher wants to describe how TVET institutional factors

influence the acquisition of employable skills by students. The researcher was not able to manipulate any variables.

3.3 Target population

Population refers to the entire group of people, events or things of interest that the researcher wishes to investigate (Kombo, 2006). The population of the study consisted of all the three (3) public TVET institutions in Nairobi County. The target population of the study comprised of all the 3 principals, 250 teachers and 1200 third year students from the 3 institutions.

3.4 Sampling design and sampling procedure

Sampling is the process of selecting a number of individuals for a study in such a way that the individuals selected represent a large group from which they are drawn (Mugenda and Mugenda, 2003). The suitable sampling method used was stratified random sampling method. This involved dividing the population into strata so that the units within each stratum areas are homogeneous. The elements from each stratum were selected by random sampling procedures to ensure there is no bias among respondents as all respondents had equal chances of being selected to participate in the study. This improved representativeness by reducing sampling error. This sampling method is suitable for this study since the population is heterogeneous.

Table 3.1 Sampling framework

Profession	Target population	Sample size	Percentage
Principals	3	3	100.0
Teachers	250	75	30.0
Students	1200	120	10.0
Total	**1453**	**198**	**14.0**

The data indicates 14% representation. This will be considered appropriate as affirmed by Mugenda and Mugenda (2003) who opined that the sample must be large enough to represent the salient characteristics of the accessible population.

3.5 Data collection instruments

Primary data was collected using questionnaires and an interview guide. This is because they collect information that is not directly observable. There were 2 questionnaires, one for the teachers and the other for the students. The reason for choosing questionnaire is its potentials in reaching out to a large number of respondents within a short time; able to give the respondents adequate time to respond to the items, and offer a sense of confidentiality to the respondent. The questionnaires were organized according to the research objectives. In addition they had open ended items and Likert scale to allow the respondents give their opinion and suggestions. An interview guide was used with the Principals.

3.6 Validity of the instrument

According to Mugenda and Mugenda (2003), Validity is the accuracy and meaningfulness of inferences, which are based on the research results. It is the degree to which results obtained from the analysis of the data actually represent the variables of the study. To ensure validity of the study, the instruments were subjected to a criterion of measuring both face and content validity. A pilot test was carried out to evaluate the validity, clarity of test items and suitability of language used in the instrument and the feasibility of the study. The responses to the instrument were used to determine whether the items are clear, valid and whether they draw consistent. The researcher consulted with the supervisors' to get expert opinion to approve the content of the instruments. Items not found suitable werediscarded so as to improve the quality of the instrument.

3.7 Instrument reliability

Reliability refers to precision, consistency and accuracy of the research instrument. It is the degree of consistency that the instrument demonstrates (Best and Khan, 2003).The test-retest method was used to determine the reliability of instruments. The questionnaire was subjected to a pilot test before the actual administration to the respondents. The questionnaires designed by the researcher based on the research questions were pre-tested to ascertain the suitability of the tool before the actual administration. A pilot study was conducted to find the instruments reliability and the procedures of administration as described in 3.6.

The instruments were administered twice to the same group of subjects at an interval of two weeks. The scores of the first and the second were correlated using

Pearson product moment correlation coefficient formula. The responses obtained were analyzed and compared. A Pearson product coefficient of 0.6 was obtained which qualified the instruments as reliable since the coefficient obtained from the pretesting data was above 0.6 (Mugenda & Mugenda, 2003).

$$r_{xy} = \frac{n \sum x y - \sum x \sum y}{(n\sum x^2 - (\sum x)^2)(n \sum y^2 - \sum y^2)}$$

$\sum x$ is the sum of even scores

$\sum y$ is the sum of odd scores

Qualitative data generated from interview schedules was organized into themes, categories and patterns pertinent to the study. In addition, the qualitative data in this study was analyzed thematically through discussion, comparing of possible relationships or significant differences between various variables as well as substantiating the possible causes of some research findings. The Pearson product correlation formula was.

3.8 Data collection procedures

A research permit to conduct the study was sought from National Council of Science Technology and Innovation (NACOSTI). Then permission was sought from the Nairobi County Office. Later appointments with principals of respective institutions were booked to make arrangements on when to collect data. The filled questionnaires were collected immediately after they were filled for purpose of analysis.

3.9 Data analysis and presentation

The raw data collected was sorted, coded and arranged serially according to the type of data whether quantitative or qualitative. Quantitative data was analyzed through descriptive statistics while qualitative data was analyzed by arranging them according to the research questions and objectives. Qualitative data was categorized into themes and patterns in relation to the objective of the study. Then the data was coded into descriptive codes and analyzed using non-numeric techniques Borg and Gall (2004) argue, the most used and understood standard proportion is the percentage. The findings will then presented in tables and figures.

3.10 Ethical considerations

The requisite approval and permission was sought from the relevant authorities before carrying out the research. The researcher also explained the purpose of the study to the respondents and assured them of confidentiality of their responses and identities. The researcher adhered to appropriate behavior in relation to the rights of principals, teachers and students who were the respondents.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter presents the findings from the analysis of the data collection. The chapter also presents the interpretation of the results of analysis in relation to institutional factors that influence acquisition of employable skills by students in public TVET in Nairobi County. The analysis was done in respect to the study objectives that aimed to establish the establish the influence of academic qualification of TVET teachers on acquisition of employable skills by students in public TVET institutions, establish the extent to which availability of training equipment influence acquisition of employable skills by students in public TVET institutions, establish the influence of teaching methods on acquisition of employable skills by students in public TVET institutions, establish the influence of adequacy of TVET teachers on acquisition of employable skills by students in public TVET institutions.

4.2 Instrument response rate

The target population of this study comprised of all the 3 principals, 250 teachers and 1200 third year students from the TVET institutions. Out of the sampled population there were 3 responses from all the principals, out of 75 teacher questionnaires given out 40 from the teachers were returned and out of 120 student questionnaires given out100 from the students were returned.

The response rate is presented as in Table 4.1

Table 4.1 Instrument response rate

Respondents	Sampled	Response	Change
Principals	3	3	100.0
Teachers	75	40	53.3
Students	120	100	83.3
Total	**198**	**143**	**100.0**

From the values in Table 4.1, it can be observed that the response rate of each respondent was above 50.0% respondent turn out. According to Mugenda and Mugenda (2003) a response rate above 50.0% can adequately be used in establishing the research objectives and answering research questions. The researcher faced a challenge in accessing teachers respondent because the research carried out during examination period in the institutions hence they were not readily available which led to low teacher response rate.

4.3 Demographic information of respondents

Demographic information was sought from the respondents in order to understand their characteristics. The responses from respondents are presented below.

4.3.1 Gender of principals.

A total of 2 male and 1 female principals participated in the study translating to a response rate of 66.7% male and 33.3% female participation. The data is recorded in the Table 4.2.

Table 4.2 Gender of principals.

Gender	Frequency	Percentage
Male	2	67.7
Female	1	33.3
Total	**3**	**100.0**

The findings in the Table 4.2 shows that the majority of respondents were male. (67.7%). This shows that many of the institutions are led by male gender.

4.3.2 Gender of students

A total of 100 students, 75 male and 25 female students participated in the study translating to 75.0% male response rate and 25.0% female participation rate. The data is recorded in the Table 4.3.

Table 4.3 Gender of students

Gender	Frequency	Percentage
Male	75	75.0
Female	25	25.0
Total	**100**	**100.0**

The findings in Table 4.3 show that majority (75.0%) of the students who participated in the study were of male gender. This shows that there is a great gender disparity among the student body. The gap in the gender distribution could be attributed to the fact that TVETs in the study offered a lot of engineering courses which are not favorites for the female population.

4.3.3 Gender of teachers.

A total of 40 teachers, 27 male and 13 female teachers participated in the study translating to 68% response rate with 32% female participation. The data is shown in the Table 4.4.

Table 4.4 Gender of teachers.

Gender	Frequency	Percentage
Male	27	68.0
Female	13	32.0
Total	**40**	**100.0**

The findings in the Table 4.4 show that the majority of teacher respondents were male (68%).

4.3.4 Age of teachers

The age of teachers was sought. The response data is recorded in the Table 4.5.

Table 4.5 Age of teachers

Age	Frequency	Percentage
Below 30	8	20.0
31-40	20	50.0
41-50	15	37.5
51 and above	7	17.5
Total	**40**	**100.0**

The findings in the Table 4.5 shows that majority of the TVET teachers aged between 41-50 and 51 and above years (55%) which indicates that they are experienced enough to develop their careers.

4.3.5 Age of students

The age of students was sought in order to identify their maturity level.The data is recorded in the Table 4.6.

Table 4.6 Age of students

Age	Frequency	Percentage
Below 20	10	10.0
21-25	55	55.0
26 and above	45	45.0
Total	**120**	**100.0**

Findings in table 4.6 show that majority (55.0%) of the students in the study were aged between 21-25 years. This shows that the bulk of enrolled students for TVET were young. Although TVETs accept students of all ages above 18 years, the majority of entrants to these institutions are students who have just finished secondary school education. These findings are in agreement with GoK (2012) who indicated that subsidized secondary education results to a large number of KCSE graduates who could not get vacancies in the formal tertiary institutions.

4.3.6 Teachers teaching experience

The teachers were asked to state the number of years they have spent teaching in TVET institutions. The teachers had spent varying number of years in the institutions as shown in Table 4.7

Table 4.7 Teachers teaching experience

Period	Frequency	Percentage
0-5	10	25.0
6-10	8	20.0
11-15	10	25.0
16-20	8	20.0
21 and above	4	10.0
Total	**40**	**100.0**

The values in Table 4.7 depict the period the teachers had spent in the institutions. The data shows that among the teachers who participated in thestudy, a total of 75.0% had spent 6 years and above in the institution. This implies that they were conversant with the institutions' operations and were able to respond to the questionnaires effectively.

The principals were also asked to state how long they had served as principal in their respective institutions. All the Principals more than 5 years of experience as principals hence were conversant with TVET curriculum and the needs of the industries.

4.3.7 Students level of study

A total of 100 students, 55 of them pursue diploma courses while 45 pursue craft courses which translates to55.0% and 45.0% respectively .The data is recorded in the Table 4.8

Table 4.8 Students level of study

Level of study	Frequency	Percentage
Diploma	55	55.0
Certificate	45	45.0
Total	**100**	**100.0**

Findings in table 4.8 reveal that most (55.0%) of the students in the study were pursuing diploma courses in the TVETs.

4.3.8 Courses pursued by students

The study sought to find out the popular courses pursued by students in TVETs where the respondents were drawn from. This was achieved by asking the students what courses they were pursuing in the TVET institutions.

Table 4.9 Courses pursued by students

Course	Number of students	Percentage
Engineering	56	56.0
Applied sciences	15	15.0
ICT	12	12 .0
Business related	17	17.0

N=100

Findings in Table 4.9 reveal that most (56.0%) of the students in the study were pursuing Engineering courses in the TVETs. The students were asked to give a reason why they pursued their respective courses, majority of the students indicated that they pursued their courses due to passion.

4.4 Academic qualification of teachers and acquisition of employable skills.

The first objective of the study sought to find out the influence teachers academic qualification on acquisition of employable skills. The respondents were teachers and principals.

4.4.1 Academic qualification of teachers

The study sought to find out the academic qualification of teachers in order to find out how it affects acquisition of employable skills. The teachers' responses are recorded in Table 4.10.

Table 4.10 Academic qualification of teachers

Level of education	Frequency	Percentage
Diploma in certificate education	12	30.0
Bachelors degree	20	50.0
Masters degree	8	20.0
Total	**40**	**100.0**

As presented in Table 4.10, the findings show that out of the 40 teachers, 28 had attained qualifications above a first degree whichrepresents 70.0% of the teachers. The data reveals that majority of the teachershave the prerequisite academic qualifications to train students. The findings in Table 4.10 corroborates previous studies that revealed that TVET teachers had the requisite minimum qualifications and were qualified to teach TVET courses.However the findings contradicts with the findings of Ferej, Kitainge & Ooko (2012) who indicated that the majority of teachers were diploma holders. This contradiction can be sufficed by increase in demand in university education by many people in the current trends of education whereby many people are pursuing degree courses. Given the concurrence in findings with the more recent studies, it is clear that the challenge of non-qualified trained teachers for TVET courses is not a concern for TVET

institutions. Majority (70.0%) of the respondents who were mainly teachers agreed that the academic qualification of teachers influence skill acquisition since it influences how the teacher delivers the course content to students.

The study also sought to find out whether the teachers had undertaken industrial attachment during their pre-service training, all the respondents agreed that they had partook in industrial attachment and it has enabled them to be to train students especially in technical courses. In addition, the study sought to find out if the teachers had industrial attachment since they left their training. Majority of teachers (90.0%) indicated that they had never attended any industrial attachment since they left their training. This implies that the teachers are exposed to new technologies in the market that the students need to acquire. This adversely affects them in keeping abreast with the new technologies in the market in relation to their field of specialization. These findings agree with Karemu & Gongera (2014) who revealed that TVET teachers lacked exposure to new technology. This influences negatively on the students acquisition of relevant employable skills to the market skills needs. Majority of teachers (85.0%) further believed that their academicqualifications had a high influence on the teaching of TVET courses and students'acquisition of employable skills since it helps them in understanding the course content and effective content delivery to students.

4.4.2 Principals education level.

The principals' academic qualification was sought in order to find out whether they had requisite qualification to head the TVET institutions. The data is recorded in the Table 4.11.

Table 4.11 Principals education level.

Level of education	Frequency	Percentage
Bachelor's degree	2	67.7
Masters	1	33.3
Total	**3**	**100.0**

The findings from Table 4.11 reveal that the TVET principals have requisite academic qualification to lead these institutions. In addition they are qualified to impart the employable skills to students by providing the right leadership and planning for students achievement in their training.

The study sought to find out the principals opinion on how the academic qualification of teachers influence acquisition of employable skills. All the principals of the TVET institutions under study confirmed that all the hired teachers by the government were academically qualified to teach the TVET courses. Further the principals stated that academic qualification of teachers is very significant in the training process which influences the acquisition of employable skills.

4.5 Availability of training equipment and acquisition of employable skills.

The second objective of the study was tofind out the extent to which availability of training equipment influence acquisition of employable skills by students. The teachers were asked to rate the adequacy, quality and relevance of the training equipment.

The study sought teachers to rate the availability, relevance and adequacy of training equipment and their influence on acquisition of employable skills. The responses were recorded in the Table 4.12.

Table 4.12 Teachers response on availability of training equipment and acquisition of employable skills. (SD=1, D=2, A=3, SA=4) (Values in %)

Item	SD	D	A	SA
There is inadequate provision of training equipment	0.0	37.5	62.5	0.0
There is well equipped workshop equipment	0.0	75.0	25.0	0.0
The training equipment are upto date/relevant to the industrial equipment	0.0	67.5	32.5	0.0
The training equipment are technologically modern	0.0	77.5	22.5	0.0
The nature and availability of training equipment influence acquisition of relevant employable skills	0.0	37.5	62.5	0.0

N=40

The findings in the Table 4.12 show that majority of the teacher respondents (62.5%) indicated that training equipment were not adequate compared to only 37.5% of respondents who indicated that the training equipment were adequate. This implies that the teachers felt that TVETs operated with

inadequate training equipment. G.O.K (2005) observes that training facilities are critical if education in Kenya is to meet the technological market skill needs and move the country to the vision 2030. The availability of training facilities is critical to quality teaching and training. These findings agrees with findings of Nyerere (2012) who indicated that majority of TVET institutions operated with inadequate and obsolete training equipment. This implies that the TVET curriculum being offered is mainly theory-based hence hindering practical skill acquisition.

The study also sought information on the influence of the nature and availability of training equipment on acquisition of relevant employable skills by students. Majority of respondents (75.0%) agreed that the nature and availability of training equipment had influence on the acquisition of relevant employable skills by students whereas 25.0% felt that the nature and availability of training equipment had no effect on acquisition of relevant employable skills.

The study therefore sought information on the relevance of the training equipment to equipment used in industries. Respondents were asked to rate the training equipment in term of relevance to those used in industries. The teacher respondents (67.5%) indicated that the training equipment were not relevant to the equipment used in the industries whereas 32.5% of the respondents felt that the equipment were relevant. A few of the respondents who agreed that the training equipment were adequate and technologically modern to the ones used in

industries. This can be possible especially in business courses that do not use a lot of machinery. The study established that certain courses used facilities that were completely out of tune with facilities used in industries.

The study sought information on whether the workshops are well equipped with equipment that are technologically modern. The teachers (76.5%) disagreed that the workshops were well equipped with technologically modern equipment while 24.5% agreed the workshops were well equipped.

The study sought information on the effects of availability of training equipment on acquisition of employable skills by students. Majority of teacher respondents (90.0%) indicated that the availability of training equipment especially in technical subjects influenced students acquisition of employable skills especially technical practical skills hence due to its inadequacy erodes the relevance of training to market skill needs whereas 10.0% of respondents indicated that the availability of the training equipment did not have effect on the acquisition of employable skills to market skill needs.. This data reveals that availability of training equipment compromised the acquisition of employable skills to skill needs in industries.

The principals' opinion was sought on the extent to which availability, relevance and effect of training equipment on acquisition of employable skills. All the principals indicated that inadequacy of training equipment was one of the

main challenges facing public TVET institutions. One of the main reasons given was inadequate of funds from the government, limited support from the industries and donors in providing relevant training equipment to the institutions. These findings concur with findings of previous studies hence compromising the relevance of the skills acquired to the skills required in the market. All the respondents indicated that the training equipment were not technologically modern to the ones used in industries especially in the engineering, applied science and ICT courses. The findings agrees with other studies findings (Dasmani, 2011) which noted that most of the TVET institutions had inadequate training equipment and were not technologically in tandem with the ones used in industries and business organization. The principals affirmed that there is high need for the stakeholders to support the institutions in provision technologically modern training equipment.

Students' opinion was sought out to find out how availability of training equipment influenced their acquisition of employable skills.The students were asked to rate the adequacy, relevance and availability of training equipment. Their responses were recorded in Table 4.13.

Table 4.13 Students response on availability of training equipment and acquisition of employable skills. (SD=1, D=2, A=3, SA=4) (Values in %)

Item	SD	D	A	SA
There is inadequate provision of training equipment	10.0	20.0	60.0	10.0
There is well equipped workshop equipment	15.0	50.0	35.0	0.0
The training equipment are upto date/relevant to the industrial equipment	5.0	67.0	33.0	5.0
The training equipment are technologically modern	7.0	55.0	45.0	13.0
The nature and availability of training equipment influence acquisition of relevant employable skills	10.0	20.0	60.0	10.0

N=100

The students' opinion was sought in reference to the adequacy of the training equipment. Majority of the students respondents (70.0%) indicated that the training equipment in TVETs were inadequate while 30.0% indicated that the training equipment were adequate. This implies that majority of the students felt

that they are being trained using inadequate training equipment which makes the teachers to mainly use lecture method of teaching.

The study also sought information on the relevance of the training equipment to equipment used in industries.The students opinion on the relevance of training equipment used in TVETs compared to those used in industries and was sought. Majority of students (67.0%) felt that the training equipment used were not relevant to those used in the industries while 33.0% rated the facilities were relevant. The study established that certain courses used facilities that were completely out of tune with facilities used in industries especially the technical subjects.

The study sought information on whether the workshops are well equipped with equipment that are technologically modern.The students' respondents (53.0%) disagreed that the workshops werewell equipped with technologically modern equipment whereas 40% agreed. Few of the students (11.0%) felt that the workshops were not well equipped with technologically modern equipment.

The students were asked to explain the effect of availability of training equipment on their acquisition of employable skills. Majority of the students (70.0%) agreed that the inadequate provision of training equipment affected them negatively in acquiring practical skills and they were not very confident enough to handle machinery used in the industries. A few of the respondents (30.0%) agreed that the training equipment were adequate and technologically modern to the ones

used in industries hence this can be possible especially in business courses that do not use a lot of machinery.

4.6 Teaching methods and acquisition of employable skills.

The third objective of the study was to investigate the influence of teaching methods on acquisition of employable skills. All the respondents were asked to identify the teaching methods used during training.

The teachers were asked to rate how often they use various methods of teaching and how they influence acquisition of employable skills. The teachers' response is recorded in Table 4.14:

Table 4.14 Teachers response on teaching methods and acquisition of employable skills. (Never=1, Rarely=2, Often=3,Always=4) (Values in %)

Teaching method	Never	Rarely	Often	Always
Lecture	0.0	0.0	12.5	86.5
Demonstration	12.5	62.5	25.0	0.0
Work-based learning	12.5	25.5	62.5	0.0
Simulation	75.0	25.0	0.0	0.0
Field trip	77.7	15.5	7.7	0.0
Context-based learning	62.5	15.5	22.5	0.0
Discussion	0.0	0.0	55.0	45.0
Problem-based learning	80.0	10.0	10.0	0.0
Project work	67.5	25.0	7.5	0.0

N=40

From the findings in Table 4.14 shows that majority of the teachers use lecture, demonstrationand discussion methods of teaching always in their training process. Work-based learning was often used since it involves industrial attachment of students. The other methods were rarely or never used due large class sizes and inadequate provisionof training equipment. This implies that since these methods that are really used are practically oriented, compromise acquisition of employable skills by students. These findings agrees with Audu (2014) who revealed that the most effective and efficient teaching methods to be used in order to enable students to acquire skills are work-based learning, simulation, fieldtrip, project work and context –based learning. Thefindings further concur with Mbugua et.al.(2012) who revealed that the most teaching method used in Kenyan TVETs is lecture method which is majorly theory based and teacher based which gives learners limited space for interaction. These findings requires that the TVET teachers need to embrace learner- centered teaching methods. When the teachers were asked to give suggestions of what will help them improve their teaching methods, a majority suggested that the TVET curriculum should focus summative evaluation of each skill to be acquired than the current summative evaluation of the whole course that is focused on passing examination than skills acquisition.

The principals were asked to highlight the most common teaching methods used by their teachers.The principals revealed that the teachers mainly used lecture, demonstration and discussion methods due to large size of classes, the need to compete the syllabus, nature of the area of specialization and

availability of training equipment based learning(industrial attachment) teaching method is mainly used when students are going for their internship program in industries and business organizations. Further the principals stated that the methods used in teaching greatly influences acquisition of employable skills.Majority of the students do not acquire the required employable skills by industries since the teaching methods used are mainly teacher-centered and theory based. However they suggested that that the curriculum should change and start using Competency Based Training approach that is being used by countries like Ethiopia, Ghana, Australia, China, Asia(Anane, 2013) so that the Kenyan TVET graduates can be marketable even in other countries.

Table 4.15 Students response on teaching methods and acquisition of employable skills.

The study sought information from the students on which methods their teachers were using during training and how they influenced their acquisition of employable skills.Responses were recorded in Table 4.15.

Table 4.15 Students response on teaching methods and acquisition of employable skills. (Never=1, Rarely=2, Often=3,Always=4).(Values in %).

Teaching method	Never	Rarely	Often	Always
Lecture	0.0	0.0	15.0	85.0
Demonstration	0.0	15.0	75.0	10.0
Work-based learning	55.0	17.0	28.0	0.0
Simulation	87.0	13.0	0.0	0.0
Field trip	57.0	24.0	19.0	0.0
Context-based learning	82.0	15.0	3.0	0.0
Discussion	0.0	5.0	77.0	28.0

N=100

The findings of the study revealed that majority of teachers (85.0%) used lecture, (75.0%) demonstration and (77.0%) discussion in their teaching due to large classes of learners and inadequate training equipment and their enhancing

on skill acquisition. Majority of the students indicated that the current teaching methods used hinder their acquisition of employable skills especially in engineering, ICT and applied science courses. The students felt that they were not able to acquire critical thinking skills, problem solving skills and creativity and innovative skills due the teaching methods used like lecture methods. These findings agree with GoK (2012) report that indicated the training is mainly theory-based hence leading to mismatch of skills among TVET graduates. When the students were asked to suggest methods which will enhance their skills acquisition, majority of them indicated that discussion, field trip, project work, work-based learning and demonstration were the methods that will help them acquire practical employable skills.

4.7 Adequacy of TVET teachers and acquisition of employable skills.

The fourth objective of the study was to find out the extent to which the adequacy of TVET teachers influence acquisition of employable skills by TVET students. The respondents were the teachers and principals.

The teachers were asked to agree or disagree on whether the teachers in their departments were adequate.The teachers' response was recorded in Table 4.16.

Table 4.16 Teachers response on adequacy of TVET teachers

Adequate Teachers	Frequency	Percentage
Yes	12	30
No	28	70
Total	**40**	**100**

Majority (70%) of the respondents indicated that the teachers were inadequate especially in technical courses which compromised the quality of teaching and learning process. This leads to poor syllabus coverage, merging of classes and hiring of part-time teachers. These affects skills acquisition in that teachers are forced to use lecture method of teaching always due overstretched training equipment and large teacher-student ratio. These findings concurs with the findings of Mbugua.et.al.(2012) who also noted that the impact of the inadequacy of teachers is that most students end up having more theoretical knowledge with limited acquisition of practical skills and interpersonal skills.

The study sought to find out he principals opinion on whether they had adequate teaching staff and how it influences the acquisition of employable skills. The principals revealed that the teachers deployed by the government were not adequate in each department of specialization. Therefore they were forced to hire part-time teachers who either are not trained to be teachers but have technical skills in a given area of specialization. This implies that the quality of the training

process is poor hence poor acquisition of employable skills. Thesefindings concurs with Mbugua.et.al (2012) findings that most of the TVETs operate with inadequate teaching staff.

4.8 Challenges facing the TVET institutions in producing graduates with employable skills.

The study sought the principals' opinion through interview on whether they were aware of the employable skills required by the current employers. All the principals confirmed that they were aware of the employable skills required by current employers. Apart from the technical skills and interpersonal skills, each graduate should also acquire ICT skills, creativity and innovative skills, management skills, team work skills and communication skills that will enable them to secure a job. The principals were asked to explain the major challenges facing the institutions in producing graduates with employable skills. The summary of challenges are shown in Table 4.17

Table 4.17 Challenges facing the TVET institutions in producing graduates with employable skills.

Challenge	Frequency	Percentage
Inadequate trained teaching staff	3	100.0
Rigid and exam-oriented curriculum	3	100.3
Inadequate modern training equipment	2	67.7
Limited industrial attachment for teachers	3	100.0
Limited support from the industries	2	67.7

N=3

The respondents (100.0%) revealed that the institutions faced several challenges which include: inadequate trained teaching staff, rigid and exam-oriented curriculum that do not allow new changes in the market and limited industrial attachment for teachers. Majority of respondents (67.7%) indicated that they faced inadequate modern training equipment and limited support from the industries in terms of funds, market skills information and provision of training equipment challenge. All these challenges have adversely affected the quality and the relevance of the skills acquired by the TVET graduates hence leading to mismatch of skills among graduates.

4.9 Suggestions to improve acquisition of employable skills by students.

The researcher sought suggestions from the respondents on how to improve skills training and acquisition of employable skills among students. Majority of the respondents both teachers and principals suggested that: technology should be embedded in TVET curriculum, teachers and students should be exposed to regular industrial attachment in order to enhance career and academic development of both teachers and students respectively. On adequacy of teachers, it was suggested that the government should hire more trained teacher to solve understaffing of teachers in order to increase the teacher-student ratio. On availability of training equipment both teachers and principals suggested that, more technologically modern training equipment to be provided so that the workshops can be well equipped with relevant training equipment. On teaching

methods, the teachers suggested that teachers should embrace the use work-based learning, problem-solving in addition to the lecture, discussion and demonstration methods often used.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the findings from the discussions in Chapter four and also gives conclusions and recommendations based on the objectives of the study and the research questions. The chapter ends with suggestions for further study**.**

5.2 Summary of the study

The main purpose of the study was to investigate the institutional factors influencing acquisition of employable skills by students in TVET institutions in Nairobi County,Kenya. Four objectives guided the study: to establish the establish the influence of academic qualification of TVET teachers on acquisition of employable skills by students in public TVET institutions, establish the extent to which availability of training equipment influence acquisition of employable skills by students in public TVET institutions, establish the influence of teaching methods on acquisition of employable skills by students in public TVET institutions, establish the influence of adequacy of TVET teachers on acquisition of employable skills by students in public TVET institutions. The study adopted descriptive survey design. The study targeted three TVET institutions in Nairobi County.

The research instruments used were questionnaires' for teachers and students and an interview guide for principals. The raw data was coded into

themes and concepts and analyzed using both descriptive and quantitative statistics. Both Excel and Statistical package for social scientists (SPSS) were used for data analysis. Data was presented in charts, frequency tables and percentages. The findings enabled the researcher to establish the recommendations of the study. The findings are summarized in the subsequent subsections.

5.2.1 Academic qualification of teachers and acquisition of employable skills.

Study findings revealed that (100.0%) of teachers employed by the TVETs had prerequisite academic qualification to teach in TVET institutions. The TVET teachers (90.0%) have not attended any professional development program or industrial attachment to expose them to new technologies in the market since they left their training. Majority of the teachers (85.0%) agreed that the academic qualification of teachers significantly influences acquisition of employable skills by students.

5.2.2 Availability of training equipment and acquisition of employable skills

The study findings revealed that majority of the respondents (70.0%) revealed that the TVETs had inadequate provision of training equipment especially in technical courses. In addition, the institutions do not have modern equipment that are relevant to those used in the industries. Relevance of training equipment influences acquisition of employable skills. However, the study also noted that workshops were well equipped.

5.2.3 Teaching methods and acquisition of employable skills.

Study findings indicated that teachers (86.5%) often use lecture, (62.5%) demonstration and (55.0%) discussion teaching methods due to large class sizes, inadequate training equipment and their influence on skills acquisition. These methods do not enhance full acquisition of employable skills by students. The study noted that the appropriate teaching methods that enhance skills acquisition are field trip, discussion, demonstration, project work and work-based learning.

5.2.4 Adequacy of teachers and acquisition of employable skills.

The studyrevealedthat (70.0%) of the institutions have inadequate teaching staff hence are forced to hire part-time teachers or merge classes in order complete syllabuses. In addition, institutions were not able to cope with the changes in departments involving fast changing technologies. The Principals also averred shortage of staff and identified the main courses affected as engineering, applied science and ICT courses noting that TVET curriculum was mainly focused on passing examinations and limited use of ICT in the teaching learning process.

5.3 Conclusion

Institutional factors play a big role in influencing skills acquisition by students for it's in the institutions that students are prepared for the world of work.In conclusion, the TVET institutions have academically qualified teachers who are trained to implement the curriculum of various fields of

specialization,majority of the TVET teachers have never had the opportunity for industrial attachment or in-service training since they left their training colleges. This implies that majority of TVET teachers are not privy to technology and information used in industries and business organizations which were perceived to be superior to those used in the TVETs.

On adequacy of teachers,TVETs operates with inadequate teachers. This compromises the quality of teaching and learning since the short fall in the number of trainers is addressed through hiring part-time teachers and merging of classes which affects the interactive capacity between the students and the teachers. It therefore concluded that there is need to hire more trained teachers to curb the shortage of teachers.

The findings on availability of training equipment in TVET show that the institutions operate with inadequate training equipmentwhichcompromises the relevance of taught skills to market skill needs in industries and business organizations. Most of the training equipment found in TVETs are not technologically in tandem with equipment found in industries and business organizations which eroded the relevance of taught skills to market skill needs. It is therefore concluded that there is urgent need to modernize equipment and provided adequate training equipment to ensure that graduates coming out of TVETs acquire employable skills relevant to the employment market skill needs in industries and business organizations.

The teaching methods used during training significantly influence acquisition of skills by students. Majority ofteachers mainly use lecture, demonstration, work-based learning and discussion teaching methods due to large class sizes, inadequate training equipment and their influence on skills acquisition. However the appropriate teaching methods that enhance skills acquisition are field trip, discussion, demonstration, project work and work-based learning. Therefore the institutional factors investigated in the study can concluded to be one of the main reasons why TVET students do not acquire the employable skills required by the current employer.

5.4 Recommendations

Based on the findings of the study, the following were recommended:

(i) Industries should support TVET institutions by providing industrial attachment programs and linkages for teachers in order to enhance the professional development of teachers and gaining knowledge on new technologies and market skills needs.

(ii) All stakeholders; parents, industries, government and donors should contribute providing adequate training equipment that are technologically modern in order to adequately equip the training workshops.

(iii) TheTVET teachersshould use practically-oriented teaching methods like field trip, project work, simulation and work-based teaching often in order to

achieve the desired result of imparting the employable skills necessary for the world of work.

(iv) The government should support TVET institutions in hiring of more trained teachers to curb inadequacy of teachers and merging of classes.

5.5 Suggestions for further study

Given the findings and conclusions drawn from the undertaken research project, it is apparent that there are institutional factors influencing acquisition of employable skills by students in public TVET institutions in Nairobi County.

(i) A study to be undertaken in both public and private TVET institutions in other counties to determine the institutional factors influencing acquisition of employable skills by students in TVET institutions.

(ii) A study to be carried out to determine factors that influence use of ICT in TVET curriculum.

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APPENDICES

Appendix I: Introduction Letter

University of Nairobi,

Department of Educational Administration and Planning,

P.O. Box 92,

KIKUYU.

April/ May 2013.

Dear respondent,

I am a student at the University of Nairobi undertaking an educational research study in TVET institutions in Nairobi County. The study is designed to gather information on the **Institutional factors influencing acquisition of employable skills by students in public TVET institutions**. You have been chosen to participate in this study, kindly respond to all items inthe questionnaires. Do not write your name or that of your institution anywhere.

The information provided will be used for purposes of academic research only and your identity will remain confidential.

Thank you for your cooperation.

Yours faithfully,

Josephine Anindo.

Post graduate student; University of Nairobi.

Appendix II: Teachers questionnaire

This questionnaire is intended to gather information on institutional factors influencing acquisition of employable skills by students in Public TVET Institutes in Nairobi Region. Please answer the following questions by putting a tick [√] in the appropriate box or by writing in the space provided.

Section A: General Information

1. Gender: (a) Male [ ] (b) Female [ ]

2. Age (in years): Below 30[ ] 31-40[ ] 41-50 [ ] 51 and above [ ]

3.Name of your institution……

4. Name of your department……

SECTION B: Influence of academic qualification of TVET teachers and acquisition of employable skills.

5. What is your highest level of education qualification?

a) Certificate in Technical education [ ] **b)** Diploma in Technical education [ ]

c) Bachelor's degree [ ] **d)** Masters [ ] **e)** PhD [ ] **f)** Others (specify)……

6. Teaching experience **a)** 0-5 [ ] **b)** 6-10 [ ] **c)** 11-15 [ ] **d)** 16-20 [ ] **e)** 21 and above [ ]

7. Did you carry out industrial attachment during your training? **a.** YES [ ]

b.NO [ ]

If yes, how does it affect you in imparting employable skills to your students?

……

……

8. Have you ever gone for industrial attachment after your training? **a.** YES [ ]

b. NO [ ]

9. Does your academic qualification influence your skill training to students?

a.YES [ ] **b.** NO [ ]

Explain your answer

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Section B: Influence of availability of training equipment and acquisition of employable skills

5. To what extent do you agree with the following statements? Use a scale of 1-4 where: 1(***strongly disagree-SD)***,2 (**d*isagree-D)***, 3 **(*agree-A*)** 4 (***strongly agreeSA)***

S/NO	Item	SD	D	A	SA
1	There is inadequate provision of training equipment				
2	There is well equipped workshop equipment				
3	The training equipment are upto date/relevant to the industrial equipment				
4	The training equipment are technologically modern				
5	The nature and availability of training equipment influence acquisition of relevant employable skills				

In your own opinion, how does the availability of training equipment influence acquisition of employable skills by students in your institution?

……

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…….

Section c: Influence of teaching methods and acquisition of employable skills

6.How often do you use the following methods of teaching? Use a scale where: **1(Never) 2(Rarely) 3(often) 4(always)**

S/NO	Teaching method	Never	Rarely	Often	Always
1	Lecture				
2	Demonstration/experimentation				
3	Work-based learning				
4	Simulation				
5	Field trip				
6	Context-based learning				
7	Discussion				
8	Problem-based learning				
9	Project work				

a.What factor(s) influences your choice and use of a given teaching method? Tick appropriately (√)

a.Availability of training equipment [ ] **b.** Small class size [ ] **c.** Large class size [ ] **d.** The method enhances acquisition of employable skills [ ]

Section D: Influence of adequacy of TVET teachers and acquisition of employable skills

7. The teachers in my department are adequate. a. YES [ ] b. NO [ ] If no,

(i) How do you manage inadequacy of teachers in your department?

a.Multi-grade teaching [ ] b. Peer teaching [ ] c. Hiring part-time teachers [ ]

(ii)How does inadequacy of teachers in your department influence skill acquisition by your students?

……

……

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.....

8. What do you think can be done to improve on development of skills amongtrainees?

……

……

……

……

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……..

Appendix III: Interview guide for principals

PART 1: General Information

1. How long have you served as a principal in this institution?

2. Are you aware of the employable skills required by current employers? If yes, which ones?

3. In your opinion, what are the major challenges you are facing the institution in producing graduates with employable skills?

PART 2: Influence of institutional factors and acquisition of employable skills.

4. To what extent does your institution support the professional development of teachers? What challenges do you face in doing this as an institution?

5. In your opinion, how does the academic qualification of your teachers influence the acquisition of employable skills by students?

6. To what extent is adequate modern training equipment available for training? How does the availability and nature of training equipment influence acquisition of employable skills by your students?

7. What are the most commonly used teaching methods in delivery of the curriculum by the teachers? How do these methods influence acquisition of employable skills by the students?

8. Given that this is a public institution, you are provided teachers by the government, are they adequately deployed in every specialization? How does adequacy of teachers influence the training process?

9. What do you think can be done to improve the skill acquisition by students in TVET institutions?

Appendix IV: Students' questionnaire

This questionnaire is intended to gather information on institutional factors influencing acquisition of employable skills by students in Public TVET Institutes in Nairobi County. Please do not write your name on anywhere on this questionnaire. Please answer the following questions by putting a tick [√] in the appropriate box or by writing in the space provided.

Section A: General Information

1) Gender: a) Male [ ] b) Female [ ]

2) Age (in years): a) Below 20 [ ] b) 21-25 [ ] c) 26- and above [ ]

3) Level of study a) Higher Diploma [ ] b) Diploma [ ] c) Craft [ ] d) Artisan [ ]

4) Course …….

Give a reason for pursuing this particular course

……

……

Section B: Influence of availability of training equipment and acquisition of employable skills.

5. To what extent do you agree with the following statements? Use a scale of 1-5 where: 1 (**Strongly Disagree -SD**), 2 (**Disagree-D**), 3 **(Agree-A**) 4(**Strongly Agree-SA**)

S/NO	Item	SD	D	A	SA
1	There is adequate training equipment for practical training				
2	The training equipment are relevant to the one used in industries				
3	The workshop, classes and laboratories are well equipped with modern training equipment				
4	Inadequate training equipment negatively affect acquisition of skills				
5	Relevance of training equipment influence acquisition of employable skills				

In your own opinion, explain how availability of training equipment influences your acquisition of employable skills.

……

……

……

Section c: Influence of teaching methods and acquisition of employable skills

6. Indicate rate at which the teachers use the following teaching methods. Use a scale where: **1(Never) 2(Rarely) 3(often) 4(always)**

S/NO	Teaching method	Never	Rarely	Often	Always
1	Lecture				
2	Demonstration/experimentation				
3	Work-based learning				
4	Simulation				
5	Field trip				
6	Context-based learning				
7	Discussion				
8	Problem-based learning				
9	Project work				

Which of the above teaching methods influences your acquisition of employable skills?

.....

.....

.....

7. Which of the following employable skills have you acquired since you started your training? ***Put (√) for Yes and (×) for No.*** **a.** Personal qualities [ ] **b**. Interpersonal skills [ ] **c.**ICT skills [ ] **d.** Technical skills [ ] **e.** Management skills [ ] **f.** Creativity and innovative skills [ ] **g.** Problem-solving skills [ ] **h.** Critical

analysis skills [ ] **i.** Written and spoken communication skills [ ] **j.** Numeracy skills [ ] **k.** Commercial awareness [ ] **l.** Entrepreneurship skills [ ]

8. What do you think can be done to improve skills acquisition by students in TVET institution?

……

……

……

……

Appendix V: Research authorization letter

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone:+254-20-2213471, 2241349,3310571,2219420
Fax:+254-20-318245,318249
Email:dg@nacosti.go.ke
Website: www.nacosti.go.ke
when replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. NACOSTI/P/16/66200/11861

Date: 29th June, 2016

Josephine Anindo
University of Nairobi
P.O. Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Institutional factors influencing acquisition of employable skills by students in public technical and vocational education and training institutions in Nairobi County, Kenya,"*** I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **28th June, 2017.**

You are advised to report **the County Commissioner and the County Director of Education, Nairobi County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Nairobi County.

The County Director of Education
Nairobi County.

Appendix VI: Research permit

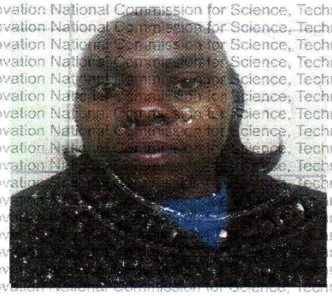
THIS IS TO CERTIFY THAT:
MISS. JOSEPHINE ANINDO
of UNIVERSITY OF NAIROBI, 0-100 NAIROBI,has been permitted to conduct research in *Nairobi County*

on the topic: *INSTITUTIONAL FACTORS INFLUENCING ACQUISITION OF EMPLOYABLE SKILLS BY STUDENTS IN PUBLIC TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING INSTITUTIONS IN NAIROBI COUNTY, KENYA.*

for the period ending:
28th June,2017

.....
Applicant's Signature

Permit No : NACOSTI/P/16/66200/11861
Date Of Issue : 29th June,2016
Fee Recieved :Ksh 1000



.....
Director General
National Commission for Science, Technology & Innovation

CONDITIONS

1. **You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit**
2. **Government Officers will not be interviewed without prior appointment.**
3. **No questionnaire will be used unless it has been approved.**
4. **Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.**
5. **You are required to submit at least two(2) hard copies and one(1) soft copy of your final report.**
6. **The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice**

REPUBLIC OF KENYA

National Commission for Science, Technology and Innovation

RESEARCH CLEARANCE PERMIT

Serial No.A 9814

CONDITIONS: see back page