UNIVERSITY OF NAIROBI

FACULTY OF THE BUILT ENVIRONMENT AND DESIGN

DEPARTMENT OF REAL ESTATE, CONSTRUCTION MANAGEMENT AND QUANTITY SURVEYING

AN INVESTIGATION ON THE EXTENT OF AWARENESS OF EXISTING ON-SITE TRAINING AND CERTIFICATION PROGRAMMES BY SEMI-SKILLED CONSTRUCTION WORKFORCE IN KENYA:

(A Case Study of Construction Sites in Nairobi City County)

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DECLARATION

I hereby declare that this research project is my original work, and that it has never been submitted before for an award of degree in another university.

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

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(Supervisor)

Signature..... **Date**.....16TH JUNE 2023.....

Qs. Sally Olivia

(Supervisor)

DEDICATION

I wish to dedicate this research project to The Almighty God and my entire family for their unceasing support and constant inspiration throughout this program. A special dedication to my loving husband, Steven and my children Victoria and the late Aurelia, who have always been my pillar of support and encouragement during challenging times.

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I also wish to express my gratitude to all my respondents for their valuable feedback and also to the following organizations for their priceless input in varied forms;

i. The National Construction Authority, NCA
ii. National Industrial Training Authority, NITA

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ABBREVIATIONS AND ACRONYMS

AJAC	Aerospace Joint Apprenticeship Committee
ADF	African Development Bank
BCA	Building and Construction Authority
CETA	Construction Education and Training Authority
DIT	Directorate of Industrial Training
GOK	Government of Kenya
GDP	Gross Domestic Product
JBCC	Joint Building and Construction Council
KFMB	Kenya Federation of Master Builders
KNBS	Kenya National Bureau of Statistics
KNQA	Kenya National Qualifications Authority
KPDA	Kenya Property Developers Association
NCA	National Construction Authority
NDTS	National Dual Training System
NITA	National Industrial Training Authority
QAI	Qualification Awarding Institution
RPL	Recognition of Prior Learning
SMS	Short Messaging Service
TVET	Technical and Vocational Education and Training
UN-HABITAT	United Nations Human Settlements Programme

ABSTRACT

The construction industry has a chance to close the knowledge and skill gap by offering on-the-job training and certification programs for semi-skilled workers. The government has taken steps to ensure that more semi-skilled workers are trained and certified through NCA, NITA, and a number of contractors. The fundamental issue, however, has been the consistently poor participation of semi-skilled workers in the training and certification programs set up for them. The research proposition suggested that the semi-skilled construction workers' low level of awareness contributed to their low level of uptake.

The main goal of this study was to investigate the extent of awareness of existing on-site training and certification programmes among semi-skilled workers in Kenya's construction industry. The study's specific objectives were to describe the training needs of the semi-skilled workers; identify the existing on-site training and certification programmes offered for the semi-skilled workers and investigate the communication and awareness tools used, in order to propose how greater awareness of existing programmes could be achieved among semi-skilled workers.

The study employed a qualitative research methodology and underpinned the research using behavioral learning theory, social learning theory, sensory stimulation theory and self-determination theory. The study adopted descriptive research design and the target population comprised of semi-skilled workers, site managers, officials from NITA and NCA and an expert from academia. The study used the snowball sampling technique to generate a sample of semi-skilled workers from the active construction sites. Officials responding to the interviews were selected using the purposive sampling technique. Data was obtained using questionnaires and interviews. The findings indicated that there existed on-site training and certification programmes for the semi-skilled workers with majority of the semi-skilled workers moderately to poorly aware. Coaching was the main training technique and majority of the semi-skilled workers were interested in masonry training and certification.

The study recommended that the Government of Kenya should increase financial resource allocation to on-site training programmes and should engage more contractors to improve communication on the existing on-site training and certification programmes and the modalities of training delivery. Governmental and non-governmental stakeholders on site training and certification should increase the frequency of conducting awareness raising campaigns and diversify the tools used in communication and awareness raising. The study proposed further studies on the effectiveness of existing on-site training and certification programmes offered by governmental bodies in Kenya and the factors affecting the implementation of on-site training programmes among the semi-skilled workers.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter introduces the layout of the study, which includes a study background that highlights the shortage of skilled workers in the rapidly growing construction industry in Kenya and how different agencies are trying to reduce that shortage through on-site training and certification of semi-skilled construction workers. Consequently, it introduces the purpose of this study which is to investigate the extent of awareness of existing on-site training and certification programmes by semi-skilled construction workforce in Kenya.

The chapter also presents; a background of the study, the problem statement, research proposition, objectives, research questions, study justification, significance, scope, assumptions of the study, limitations, delimitations and exclusions, definition of terms used and the organization of the study.

1.2 Background

The Construction sector is a key pillar to the economy of Kenya. It provides commercial and residential developments, engineering infrastructure and associated trade services that accommodate other key pillars of economic growth. According to the Kenya National Bureau of Statistics (KNBS) (2020), the sector contributed a minimum of 5.5% to the Gross Domestic Product (GDP) of Kenya in 2019. In the Vision 2030 development blueprint, the Government of Kenya aims to increase this contribution by at least 10% every year (Kenya Vision 2030 Delivery Secretariat, 2018). The National Construction Authority of Kenya (2017) estimated the number of people who worked in the construction industry in 2016 to be over 500,000. Being a labor-intensive industry, the sector forms an important link between production and employment.

The National Construction Authority (2022) conducted a study to assess the training needs of construction workers in Kenya. The study identified the existence of skills and knowledge gaps in the construction industry which can be solved by training the workers. In the report, the authority recommended the need for basic training for those who enter construction informally or via programmes such as 'kazi kwa vijana'. William Mwanza, Director for National Industrial Training Authority, verified the presence of a skills gap between the present boom seen in the industry and the availability of qualified skilled personnel during a Dual Apprenticeship Launch event held in Kenya (Swisscontact, 2021). The gap was identified after a feasibility study was conducted and majority of the construction companies attested to facing the challenge of skilled labour (Swisscontact, 2021)

According to Muiruri (2019), one of the major drawbacks to the projected growth, is inadequate qualified labour force in the local construction industry. He explains that this shortage leads to the utilization of unqualified labour, which in turn results in substandard work and excessive delays. The gap in skills and knowledge needed in the dynamic industry is evident even though there are governmental and non-governmental organizations that provide training of artisans and technicians in Kenya. Muiruri (2019), further explains that the shortage of skilled construction workers can be attributed to the low enrolment in the country's technical and vocational training institutes.

The Construction Industry Policy draft by the National Construction Authority (NCA) states that only 18% of workers in the sector are formally trained, while 81% were qualified through on-site experience by end of 2018 (Muiruri, 2019). The Authority aims at upskilling the workforce by training and accreditation of technicians and artisans to maintain a skilled, competitive and adequate workforce.

In the NCA training needs assessment report (2022), many respondents to a survey undertaken earlier by the authority indicated preference for on-site training programmes. The training method appealed to many respondents because it allowed trainees to be trained from wherever they are located. This was practical, economical, and avoided language barrier problems. The authorities tried to place trainers in areas that were very familiar to

them, particularly in terms of language. That was aimed at lowering and then getting rid of linguistic obstacles in training. Apprenticeship programmes and coaching among others, are forms of on-the-job training that provide the semi-skilled workforce in construction sites with the required technical skills and certification. At the end of the apprenticeship program, the trainee is expected to have acquired the skills to practice a trade and may then be certified (Daniel *et al*., 2019).

In order to attract construction workers with less than two years of experience and no technical certifications, the NCA created an apprenticeship program in 2016. An apprentice learns on the job while working for at least a year under a certified site supervisor, and he keeps track of his training activities in a logbook. Before the trainee is fully accredited after qualification, a competency assessment test is given to them (NCA, 2021). According to Mwitari (2018), other governmental and non-governmental stakeholders in the industry, in partnership with the NCA and NITA, have also adopted this form of training as a way of bridging the skill gap and empowering the trainees. A trainee can take this training on an ongoing construction site or an assembly workshop where related off-site activities take place. In December 2017, Athi River based Savannah cement in partnership with the National Construction Authority (NCA), trained and accredited 100 masons (Mwitari, 2018).

Many emerging economies including Philippines, South Africa and Namibia have incorporated on-the-job training programs in training and certifying their semi-skilled workforce. They have adopted on-the job training methods and varied them to match the needs of the trainees and their cultural and economic environments (Ogbeifun, 2011). In Singapore, the Building and Construction Authority (BCA) (2015) introduced an apprenticeship program to upgrade their workforce and promote growth of the construction industry. It is a two-year development program combining employment and classroom based vocational training. The workers learn and work concurrently and at the end of the two-year development program, they are certified. According to Ogbeifun (2011), it is imperative to harness the potential in this sector along with the medium size construction stakeholders for the development of skilled artisans.

1.3 Problem statement

In 2017, the Kenya Federation of Master Builders (KFMB) estimated the number of trained plumbers, painters and masons at less than 2,000 in the entire country indicating a general shortage of skilled artisans in the construction industry (Swisscontact, 2021). With a large youthful population of approximately 60% aged between 18 and 35 years, major stakeholders in the industry have embarked on training as a way of bridging the existing shortage in the country. The NCA (2022) estimated the demand for training to be at a million training man-days in a year. The authority forecasts a steady rise in this demand of up to twice this number in the next five years.

Majority of construction workers in Kenya do not possess formal qualifications and the necessary certification (Shelter, 2017). They obtain their training and skills through on-the-job training which relies on "learning by doing" with systematic briefings from the trainer (Ogbeifun, 2011). Workers trained through this method are therefore limited when it comes to licensing by the relevant oversight authorities as well as in their employability. In 2020, the Government through the Kenya National Qualifications Authority (KNQA) developed Recognition of Prior Learning (RPL) Policy Framework in Kenya (NITA, 2022). In the Presidential Directive on RPL issued on 1st June 2021, Qualification Awarding Institutions (QAI's) were required to roll out RPL to ensure the assessment and certification of uncertified workers. NITA in partnership with Kenya National Qualifications Authority took part in the development of the 1st draft policy of Recognition of prior learning. This move was aimed at bridging the existing skill gap in the construction sector (Okongo, 2021). Recognition of Prior learning is used as a tool internationally for lifelong learning, access to higher education and credit towards a qualification. Learning that has taken place outside formal learning institutes, is acknowledged, assessed and certified (Mukhwana, 2021).

According to Swisscontact (2021), there exists a substantial skills gap in plumbing, welding and electrical installations in Kenya. However, in the NCA report (2022), beyond these technical skills, semi-skilled workers in construction sites expressed interest in knowledge and skills in emerging global trends relating to innovation and technology,

communication, construction materials and onsite safety. According to Gitaka (2013), it is important to evaluate the needs of the workers, continually, and subject them to skill upgrading and technological learning within their areas of employment. Identification of the training needs of the workers enable the design of effective training programmes (Buckley & Caple, 1995).

The NCA training needs assessment report indicated that the semi-skilled workforce had the least attendance to the training events organized by the authority within a year. This is in comparison to contractors and construction site supervisors (NCA, 2022). According to the NCA report (2022), in spite of the substantial effort by government and non-governmental stakeholders in organizing and conducting on-site construction training programmes, there has been consistent low turnout by the semiskilled workers. Only 55% of 120 workers had attended a training offered by NCA in the past one year (NCA, 2022). Therefore, the main focus of this study was to assess the extent of awareness of existing on-site training and certification programmes available among semi-skilled personnel working in construction sites in Kenya. According to Buckley & Caple (1995), the training needs of the semi-skilled workers form the backbone of developing the training programmes in a systematic approach to training. The study therefore described the training needs of the semi-skilled workers and investigated the communication and awareness tools used in raising awareness of the existing training programmes. Guidelines through which greater awareness of the existing on-site training and certification programmes can be achieved among the semi-skilled workers were proposed.

1.4 Research Proposition

The low level of awareness of the existing training and certification programmes offered at the construction sites in Kenya has resulted in low level of uptake by the semi-skilled construction workers.

1.5 Objectives of the Study

The main objective of the study was to investigate the extent of awareness of existing on-site training and certification programmes by semi-skilled construction workforce in Kenya.

The specific objectives of this study included:

1. To describe the training needs of semi-skilled workers in construction site in Kenya
2. To identify the existing on-site training and certification programmes offered at the construction sites in Kenya
3. To investigate the existing communication and awareness tools utilized in awareness-raising of existing on-site training and certification programmes in Kenya

   To present guidelines through which greater awareness of existing on-site training and certification programmes by semi-skilled workers can be achieved in Kenya.

1.6 Research Question

The Main Research Question of the study was:

To what extent are the semi-skilled construction workers aware of the existing training and certification programmes offered at the construction sites in Kenya?

Specifically, the study aimed to answer the following questions:

1. What are the training needs of the semi-skilled workers in construction site in Kenya?

2. What are the existing on-site training and certification programmes offered at the construction sites in Kenya?

3. What communication and awareness tools are utilized in awareness-raising of the existing on-site training and certification programmes in Kenya?

4. What guidelines can achieve greater awareness of existing on-site training and certification programmes by semi-skilled workforce in Kenya?

1.7 Study Justification

In the social pillar of the Kenya Vision 2030 statement, the government aims to train a high number of artisans in order to meet the high demand especially in the construction industry (GOK, 2022). The findings of this study purposed to bring into light the existing on-site training programmes targeting semi-skilled workers on construction sites and to recommend ways through which greater awareness of the programmes can be achieved among the workers. It is hoped that these measures will lead to greater uptake of on-site training programmes by semiskilled workers to ensure sufficient availability of competent artisans within the construction industry in Kenya.

1.8 Research Significance

The research will be significant to the semi-skilled workers in the construction industry, building contractors, statutory bodies such as NCA and NITA, training institutions and the government at large. An investigation on the extent of awareness of the existing on-site training and certification programmes by the semi-skilled construction workforce in Kenya will provide findings that will enable statutory bodies such as NCA, NITA and the government, address the issues revolving around awareness of on-site training and certification programmes for the semi-skilled workers.

The study will provide a clear understanding of the key training needs of the semi-skilled construction workers enabling the statutory bodies involved in training such as NITA and NCA to plan effective on-site training programmes that meet the training needs of the workers. Also, the information will assist statutory bodies such as NCA and NITA plan their awareness campaigns better using the appropriate channels, thus improving the attendance of the semi-skilled workers to the on-site training and certification sessions.

According to Gupta (2007), training needs assessment is a critical stage in designing and improving existing training programmes to bridge the existing knowledge and skill gap. The contractor will appreciate the need to train their semi-skilled workforce to meet their needs. This will also improve the existing skill gap in the construction industry. Moreover, the research will reveal information which when disseminated to the semi-skilled workforce on the existing training programmes offered at the construction sites in Kenya, they could easily utilize the opportunity to enhance their skills.

Training is cyclic in nature and is continuously improving. This study will provide a glimpse of the current dynamics relating to on-site training of the semi-skilled workers in the construction industry and understand their training needs. The information can be utilized by training institutions working in partnership with NITA as training centers, in improving the quality of content of the current on-site training programmes as well as in developing more effective programmes for the semi-skilled workers.

The construction industry strongly links with other sectors of the Kenyan economy. Therefore, if on-site training of the semi-skilled workforce is effectively implemented and sensitized, the technical skills of the semi-skilled workers will improve greatly. Improved technical skills of the semi-skilled workforce mean that productivity in construction sites will improve and there will be a significant improvement in the economy enabling the country to make strides towards achieving its social economic goals and the Kenyan vision 2030 at large.

1.9 Scope of the Study

1.9.1 Geographical scope

The physical coverage of the research was Nairobi City County. There are many construction projects undertaken in Nairobi that vary in terms of scope and technology. The projects are handled by different contractors registered by the National Construction Authority (NCA) under different categories, spanning from NCA 1- NCA 8. All classes of contractors are represented in Nairobi and therefore construction work in Nairobi

represents what is being undertaken in the rest of the country (NCA, 2020). This made it a better scope geographically because of the diversity it presents.

1.9.2 Theoretical scope

The theories used to underpin the research included behavioral learning theory, social learning theory, sensory stimulation theory and self-determination theory. According to Conklin & Oyarzun (2021), the behavioral learning theory proposes that all behavior is learnt through interaction with the environment and that behavior is a result of environmental stimuli. Since on-site training involves trainees interacting with their training environment, behavioral learning theory proposes that the trainees' experiences during training are likely to influence their future behavior in their actual practice.

The social learning theory suggests that learning is dependent upon observation and imitation of the behavior, attitudes and emotional reactions of other people. Therefore, trainees are more likely to acquire certain attitudes and reactions from interacting with particular trainers and fellow trainees (Muro & Jeffrey, 2008).

According to Laird (1985), the sensory learning theory suggests that trainees are more likely to retain the skills learnt if the training involved majority of the human senses. As such, as trainees interact with equipment and tools of varied complexity as well as experts from different fields, they are more likely to retain the skills learnt.

The self-determination theory proposes that the will to train is driven by the desire to be competent by the trainee. The training needs of the workers act as sufficient motivation to propel personal growth through training and acquisition of mastery and competence in their trades (Ryan, 1985).

1.9.3 Methodological scope

The nature of the study was qualitative and comprised of a research sample of 371 respondents. A total of 92 active construction sites were randomly selected in the different sub-counties in Nairobi City County. The sub-counties in Nairobi selected for the study included: Westlands, Langata, Dagoretti North, Kasarani and Kamukunji. A total of 92 site managers and 276 semi-skilled workers, working under registered contractors, were selected from the active construction sites.

Predesigned questionnaires were administered to the semi-skilled workers to investigate their extent of awareness of the existing on-site training and certification programmes, the awareness and communication tools used to create awareness and their training needs. A second questionnaire was administered to the site managers to understand their perspective on the existing on-site training. Also, interviews with experts from NCA, NITA and academia were conducted to obtain authoritative information that enhanced the quality of research instruments and provided information on guidelines that would improve training up-take by the semi-skilled workers.

1.10 Assumptions of the study

The study assumed that:

1. A systematic approach of training semi-skilled workers, would result in improved technical skills. Also, improved awareness of the existing on-site training and certification programmes would result in improved attendance of the semi-skilled workers to the training sessions. This would in turn improve their productivity contributing to an improved economy.
2. The study selected Nairobi City County as the physical coverage of the research. The assumption was that since Nairobi is the most urbanized county, with cultural, technological and educational diversity, it best represented all the other counties in Kenya.
3. The study also assumed that during data collection, the respondents would understand what is required when filling the questionnaire and offer appropriate information.

1.11 Limitations of the Study

The study was descriptive and provided the following as the key expected limitations:

Limited time and resources: The distance from one site to another required a lot of movement which was expensive and time consuming. The study therefore narrowed down

the geographical scope to Nairobi City County and further sub-divided the county into sub-counties as a way to mitigate this limitation. Construction sites in Nairobi City County offered a good representation of the NCA registered construction sites across the country since all classes of contractors were represented (NCA, 2020). The study also utilized research assistants during data collection to save on time.

Language fluency. The study concentrated on semi-skilled construction workers who were not all highly proficient in speaking English and Kiswahili, the two official languages of Kenya. In order to overcome this constraint, the researcher and research assistants helped the semi-skilled workers by explaining the questionnaire to them in a language they could understand.

1.12 Delimitations and Exclusions of the study

The study focused on on-the-job training and certification for those working in the construction industry as semi-skilled workforce. It excluded the skilled construction workers. This is because of the existence of a skill and knowledge gap in the construction industry and the semi-skilled workers who do not have certification formed the best target for on-site training and certification programmes. The sector also depends majorly on the semi-skilled workforce who account for 42% of the employed labor force (NCA, 2014).

The study did not also focus on NCA categorization of contractors. According to Mndeme, (2011), implementation of a training program depends heavily on funding. Training is badly impacted by a company's inability to invest in its human resources. It was obvious that NCA 1 – NCA 3 which handled construction sites with large capital outlays had greater capacity for training semi-skilled construction workers compared to NCA 7 - NCA 8 with much lower capital outlays. Therefore, it was not necessary to conduct research into what was obvious and already in the public domain. Instead, the study chose to focus on semi-skilled construction workers irrespective of the NCA categorization of their affiliated contractors.

1.13 Definition of Terms as used in this study

Semi-skilled workforce refers to construction workers who do physical labor and have limited skill sets, lack special training, or have no prior experience (NCA, 2014).

Skilled Construction worker refers to a tradesperson who has completed official training in the necessary technical areas or who has undergone formal training and has a substantial amount of working experience in his or her area of specialization (NCA, 2014).

Skills shortage can be described as an inadequate supply of suitably qualified workers that may be willing to work under existing market conditions, particularly at prevailing wages (Windapo, 2016).

Certification is defined as an evaluation procedure that seeks to identify a person's capability to satisfy legal criteria through a competency test. The certification offers confirmation that the construction worker possesses the necessary knowledge and is capable of producing goods that adhere to the defined quality standards (Hidayat *et al.*, 2019).

Apprentice implies a person who has signed a written contract committing them to work for an employer for a set amount of time in order to learn the theory and practice of a trade in which the employer is also obligated to train them. The curriculum combines formal education with on-the-job training and productive employment (Steedman *et al.*, 1998).

Contractor refers to individual or entity listed in the articles of agreement with whom the Employer has entered into a contract, including any approved assignee and legal successors in title. A construction project is awarded to the individual, business, or firm through negotiation or tendering, and they are compensated for the client's services (Joint Building and Construction Council (JBCC), 1999).

Industrial training refers to a program with the objective of provide supervised practical instruction within a set term. Both government and commercial groups are able to provide this training (University of Malaya, 2013).

Construction Site refers to a place or places where the permanent works are to be carried out and to which materials and goods are to be delivered and includes workshops or other places where materials, goods or work are being prepared for incorporation into the Works either by the Contractor, subcontractors or by others (Joint Building and Construction Council (JBCC), 1999).

Awareness refers to 'the state or ability to perceive, to feel, or to be cognizant of events, objects, or sensory patterns' (Gafoor, 2012).

Awareness-raising refers to a process that creates opportunities for information exchange to improve mutual understanding and to develop competencies and skills required to enable changes in social attitude and behavior. The process of creating awareness must satisfy and uphold the shared demands and interests of the actors involved in order to be effective (Sayers, 2006).

1.14 Organization of the study

This study is organized into five chapters. Chapter one presents an introduction, background, problem statement, research preposition, objectives of the research, research questions, justification, significance of the study, scope, assumptions, limitations, delimitations and exclusions and definition of terms as used in the study.

Chapter two comprises of the literature review which gives a critical review of information gathered from sources such as peer-reviewed journals, university theses and dissertations, magazines, internet, newspapers, Government corporate reports, and conference proceedings with regard to training and human resource development in the construction industry in Kenya. The chapter focuses on introduction, theoretical perspectives, the concept of training and development, training needs assessment, training approaches, Qualities of an effective training programme, types of on-site training and certification programmes, importance of training, best practices in training, construction on-site training and certification, tools of raising awareness and presents a conceptual framework to guide the study.

Chapter three outlines the research methodology which entails a description of the research strategy and data collection methods that were employed in the study. The chapter contains: research design, target population, sampling technique, sample size, data collection methods and instruments, validity and reliability of research instruments, Unit of analysis and observation, data analysis and presentation and ethical considerations.

Chapter four outlines the findings of the study and data analysis. The field data was processed, analyzed and presented in the form of tables, bar graphs, pie charts and error bars. A discussion on the findings of the field investigation is presented in line with the study objectives. The fifth chapter contains a summary of the research findings, conclusions, recommendations and suggested areas of further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The methodical locating, analysis, and identification of publications providing data relevant to the research subject under investigation comprise the review of literature for this study. It is a critical study of the literature that offers a summary, classification, comparison, and evaluation of the many sources under consideration. The chapter presents information gathered from secondary sources such as peer-reviewed journals, university theses and dissertations, magazines, internet, newspapers, Government corporate reports, conference proceedings and books

The chapter presents a theoretical underpinning, training and development, training needs assessment, training approaches, qualities of an effective training programme, types of on-site training and certification programmes, importance of training, training best practices, construction on-site training and certification, awareness of existing training programmes, research gaps, conceptual framework and conclusion.

2.2 Theoretical perspective

Milhem *et al*., (2014) describes training and development as a continuous process aimed at improving the skills of the employees in an organization. The whole process should be up to date with the current trends in the market to face the dynamic changes in the workplace. Training theories are an important aspect in choosing and implementing a training process approach in a professional way. According to Goel (2017), training design should be based on learning theories to enable the trainer make informed decisions regarding the learning intervention prescribed within the training design. Learning should align with the needs of the trainees to enable them achieve their goals. According to Conklin & Oyarzun (2021), the key to obtaining desired learning outcomes is to understand how individuals retain and recall knowledge as well as how to keep them motivated and

engaged throughout the learning process. The study will focus on behavioral learning theory, social learning theory, Sensory stimulation theory and self-determination theory.

2.2.1 Behavioral learning theory

The behavioral learning theory also known as behaviorism is a concept that developed as a result of the work of psychologists such as Watson, Thorndike and Skinner in the early 20th century. The concept stems from the idea that all behavior is learned through interaction with the environment. This means that behavior is as a result of environmental stimuli. The learners react and behave based on the association between stimuli and responses (Conklin & Oyarzun, 2021).

Avenilo (2021) explains that a training environment that rewards and recognizes excellent learning outcomes encourages the trainees to have a positive association with the training and continues to display the right behavior throughout the training process. Positive and negative reinforcement is utilized as motivation to the trainee. Repetition is also a key element in behavioral learning theory. Practical demonstration of tasks and reviews give the trainee the reinforcement and behavior demonstration they should follow to enable them retain information.

This theory is significant in the study since on-site training for the semi-skilled construction workers involves their interaction with the environment and the experiences of the semi-skilled workers in construction sites during the training will inform their behavior. Reward systems such as competency certification at the end of the training programme act as positive reinforcement encouraging the trainees to exert more effort into their learning.

2.2.2 Social-Learning Theory

The behavioral learning theory, first forth by Albert Bandura (1997), has been developed into the social-learning theory. Because it takes into account attention, memory, and motivation, the theory serves as a link between cognitive learning theories and behaviorist learning theories motivation (Muro & Jeffrey, 2008). The hypothesis is based on the notion

that learning occurs as a result of our interactions with others. It recognizes the value of observing, modeling, and copying the actions, attitudes, and emotional responses of others.

According to McLeod (2006), the theory does not only focus on the environmental factors contributing to human learning and behavior but also on the cognitive factor. Behavior is leaned through observation from the environment and before response to the stimuli can be made, mediating takes place. The trainee observes the behavior of the trainer and does not automatically imitate it. Prior to imitation, a mediation process occurs. The Figure 2.1 below indicates the mediational process:

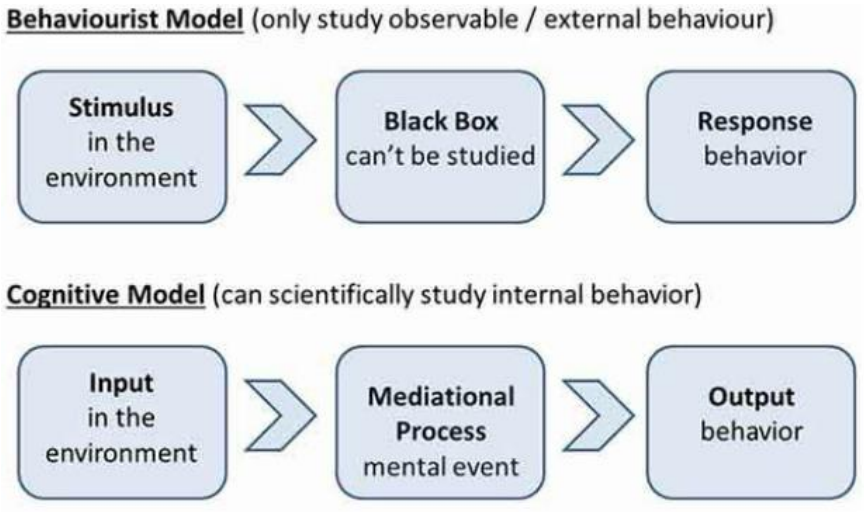

Figure 2.1: Mediational Processes

Source: Bandura (1986)

Bandura (1986) proposed four mediational processes:

Attention; the trainee pays attention to the behavior of the trainer for imitation to take place.

Retention; the trainee has to retain the information after observing. The behavior is remembered for imitation to take place.

Reproduction; the trainee should then be able to perform the behavior that was demonstrated by the trainer.

Motivation; the trainee gauges the reward of performing the behavior versus the perceived cost, if any, then decides whether to imitate or not.

This theory is significant in the study since on-site training programmes for the semi-skilled workers involve acquiring knowledge and skills through observation and imitation. The competency certification obtained at the end of the training programme acts as motivation to encourage the semi-skilled construction workers to imitate the behavior in order to better their skills. Training equips the trainee with knowledge, skills and attitudes required to perform specific tasks (Buckley & Caple, 1995).

2.2.3 Sensory Stimulation Theory

According to Laird (1985), sensory experience is critical for learning to take place. The more the senses involved during the learning process, the more lasting the response. The senses include sight, hearing, touch, smell and taste. He further explains that according to a research conducted, 75 percent of adult's expertise was gained through sight, 13 percent through hearing and 12 percent through touch, smell and taste.

A survey conducted showed that trainees retained only a tenth of what they heard, 72 hours after hearing it. The same trainees retained around 30 percent of what they had seen. Multisensory training techniques enhance learning by engaging the trainees on many levels (Veronica, 2021). The Figure 2.2 below illustrates the multisensory training techniques:

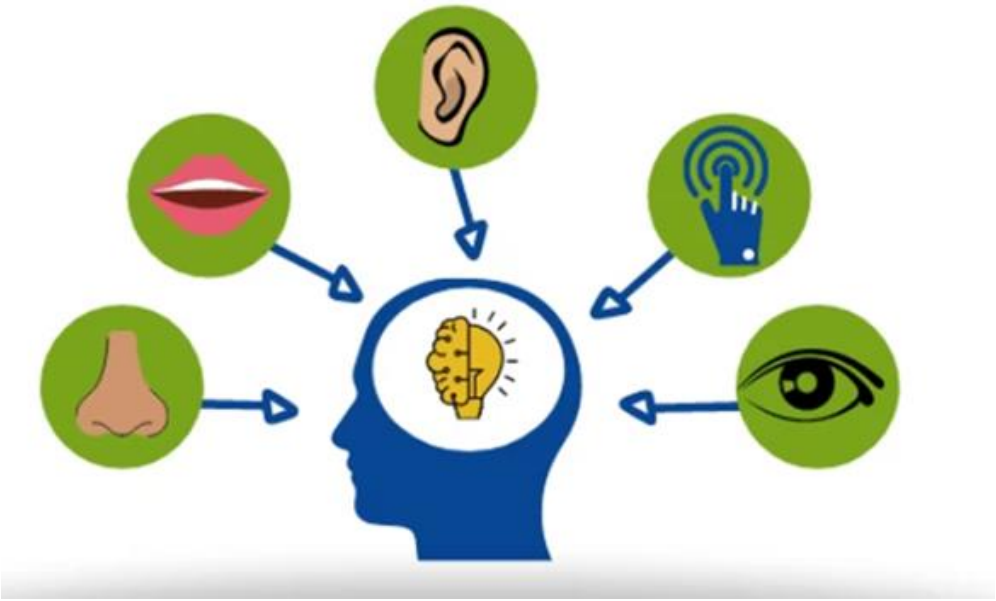

Figure 2.2: Multisensory training techniques.

Source: Veronica, *(2021)*

The sector relies heavily on semi-skilled workforce that works hand in hand with the skilled workforce. These employees also interact with equipment of various sophistication that depends on the nature and complexity of the projects. This way, training happens through apprenticeship, as they are able to learn new skills through visual and verbal interaction with their skilled counterparts.

2.2.4 Self- determination Theory

According to Cherry (2021), self-determination refers to the capacity of every person to make choices and have control over their own life. The motivation theory by Deci & Ryan (1985) suggests that "people are able to become self-determined when their needs for competence, connection, and autonomy are fulfilled." The theory assumes that the behavior of the trainee is driven by the desire for growth and the source of motivation is intrinsic. In this theory, people require to feel in control of their own actions and goals, people need to be competent and master a certain skill and experience a sense of belonging to other people.

According to Deci and Ryan (1985), connection leads to social support that is crucial for a person to become self-determined. A person may become passive or proactive depending on the social environment in which they were raised.

The theory is significant in the study since effective on-site training programmes organized for the semi-skilled workers are based on the training needs of the semi-skilled workers. The training needs of the semi-skilled workers can be considered as the motivation for their growth. The training needs drive them into training with the desire to master a certain skill and become competent.

2.3 Training and Development

Training, as defined by Bass & Vaughan (1966), is a process of organizational improvement that seeks to bring about positive changes by altering the skills and attitudes of employees. This definition encompasses activities ranging from the development and modification of complex socio-emotional attitudes to the acquisition of simpler motor skills. Despite the fact that skills are improved, training aims to also improve on the attitudes of the workers towards the job. Training is therefore considered as an investment in human resource development since it improves the human asset in the organization.

Although at times the concepts "training" and "development" are used synonymously, they are different. According to Mumford (1988), development improves the managerial effectiveness through a learning process. Development process is well planned and deliberate targeting the managerial personnel in most cases. It aims at developing the conceptual skills. On the other hand, "training" is short term with an aim of imparting the technical and mechanical knowledge. Training is therefore vocationally or on the job oriented.

Some organizations prefer to recruit staff who are already trained while others have a policy that allows training and development as a measure to maintain key skills. Whichever option an organization desires to adapt, it should result in the desired effect. Buckley & Caple (1995) indicate that training should follow a systematic approach. The approach consists

of stages that ensure the training achieves its desired intentions. The Figure 2.3 below illustrates the systematic training cycle:

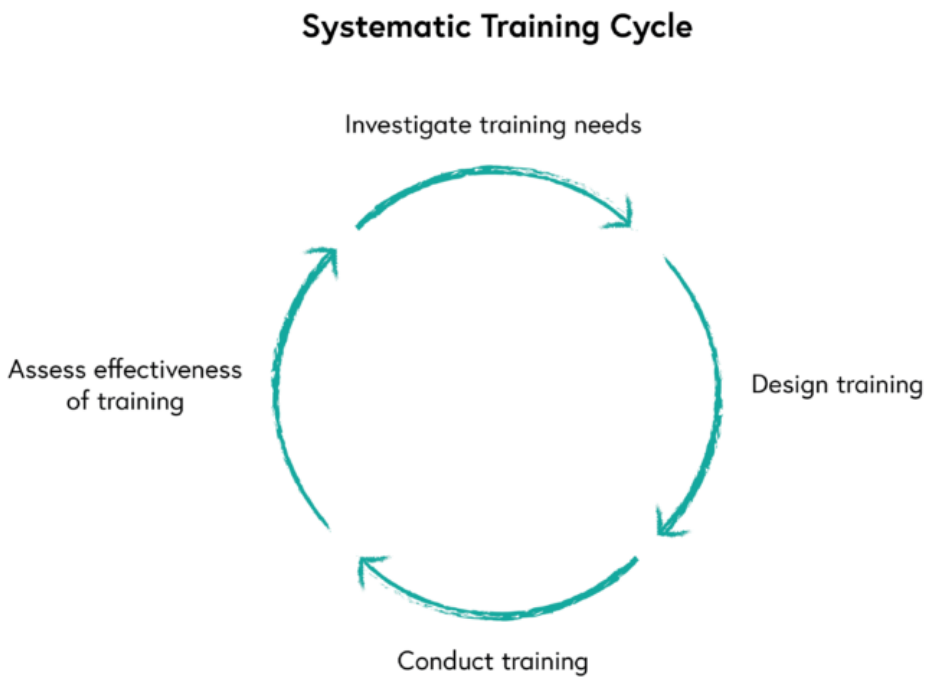

Figure 2.3: A basic model of a systematic approach to training

Source: Buckley & Caple, (1995)

The approach begins by identifying the training needs of the workers. Their training needs enable an appropriate training plan to be developed after which the training is carried out. The effectiveness is evaluated and if the desired intentions are not met, the training needs are identified again. The model is only a basic one and has been further developed by the authors, Buckley & Caple, (1995) to accommodate the complex organizational environment.

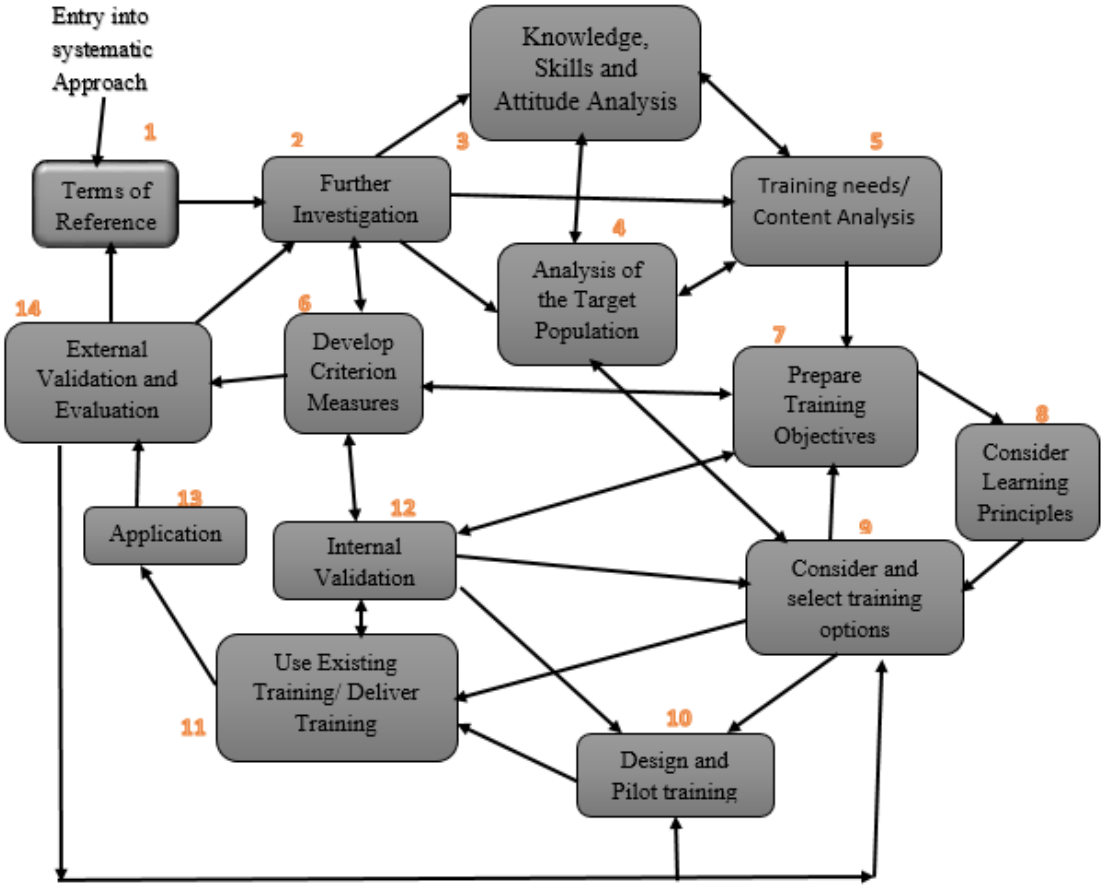

Figure 2.4: A systematic approach to training

Source: Buckley & Caple, (1995)

Buckley & Caple, (1995) use the model illustrated in Figure 2.4, to show the complexities of training. The process involved for effective training to be accomplished include:

Stage 1: Establishing the terms of reference between the client and the trainer. The goals of the training programme are laid down including the specific aspects on how the training is to be conducted. It is at this level where time, manpower resources, cost of the training and physical constraints are spelled out.

Stage 2: Conducting further investigation to establish the training requirements. A detailed analysis of information on the job or position being examined is carried out.

Stage 3: Analysis of the knowledge, skills and attitude related to each task in a job. This gives the trainer the ability to choose the kind and level of training that could be needed.

Stage 4: Analysis of the intended audience is conducted to determine their capabilities and other features to enable an appropriate training programme to be developed.

Stage 5: Analysis of the training needs and content using the data collected about the job, tasks and target population. The information gathered indicates a 'gap' that is used to determine the training requirements for the trainees and the training material.

Stage 6: Developing criterion measures to ensure the training programme designed enables the trainee achieve a certain standard or level of performance.

Stage 7: Developing training objectives that indicate clearly the expectations that trainees should meet during their training. Objectives help in designing and assessing a good training programme.

Stage 8: Examining principles of learning and motivation that need to be made part of the training environment to ensure training objectives are met.

Stage 9: Considering and selecting the appropriate training methods depending on the limits, target audience, goals, and occasionally political ramifications.

Stage 10: Design and pilot training where both diagnostic and pre-training exams are done to make sure the trainees have a common foundation before training.

Stage 11: Delivering training through a variety of instructional methods.

Stage 12: Conducting internal validation to determine if the performance of the trainees has achieved the training objectives.

Stage 13 and 14: Following the students' ability to apply what they learned throughout the training into practice, there will be application and external training monitoring.

2.4 Training Needs Assessment

Training needs assessment is crucial in designing and improving the existing training programmes. Needs assessment is defined as the process establishing whether training is necessary and identifying the training required to fill the existing skill gap (Noe, 2017). According to Gupta, (2007), the difference between the desired status and the current status may point to a problem that calls for additional training. By giving the trainees the necessary knowledge and abilities, training closes the gap or even eliminates it. Five stages can be taken to undertake a training needs assessment, including:

The identification of needs and problems is the initial stage. Establishing organizational aspects in respect to policy, objectives, goals, roles, and responsibilities is the initial step. Then, comparing the employees' actual job performance to the desired performance. This aids in describing the performance or knowledge gap. A training program's goals are established with the intention of bridging the gap.

The next step is to decide on the needs analysis design. In order to identify the target population that will get training in accordance with the established objectives, a needs assessment is carried out. A decision is made on the training's methodologies, resources, and procedures. Performance gap analysis, feasibility analysis, objectives analysis, job/task analysis, target group analysis, contextual analysis, and need versus wants analysis are just a few of the techniques used in needs analysis.

Collecting information is the third step. People are observed at work, structured interviews are conducted, questionnaires are given out, and records of previous training are reviewed to collect data, which is then analyzed. To assess the data, both quantitative and qualitative analysis is used. In regard to the training content, a report is submitted with the findings, conclusions, and recommendations. Finally, Feedback is then given to the concerned officials who determine the next step for training preparation.

The National Construction Authority (2022), conducted a training needs assessment and presented a report during a research dissemination workshop held on 15th March 2022. The report states that as technology advances, so do the training requirements for construction employees. As a result, the Authority (NCA) must regularly analyze the needs for training

in order to close the skill and knowledge gap by setting up effective training programs that address the demands.

A total of 432 respondents were interviewed during the survey and out of that, 28% were workers in the construction industry. The main knowledge and skills gaps for the construction workers identified during the survey included: Innovation and Technology, technical related skills such as plumbing, electrical, carpentry, tiling, painting, water supply, waste management and masonry. Other competencies included safety on-site, fundamental building techniques, and recognition of various building materials and their characteristics (NCA, 2022).

2.5 Training Approaches

According to a report by Hayton *et al*., (1996), some of the factors that very slightly to somewhat influenced whether or not training was conducted include workplace modifications; terms relating to training in industrial awards; coverage of employees by such awards; business plans that address training; the percentage of managers and professionals in the workforce; quality control and new product and technology innovation.

These factors were the drivers of training in most workplaces. They trigger training activities within an enterprise. Work place change had the greatest influence according to the survey conducted. Hayton *et al*., (1996) further indicated that training can take different arrangements, where it can either be internal or external, formal or informal training. The drivers of the training will in most cases inform the training approach employed. Once the need for training is identified, a structure on how the training is to be conducted is designed. A formal internal training utilizes the resources of the enterprise in conducting the training. The training is well planned, structured and documented while an informal training is unplanned, unstructured and undocumented. According to the report, the cost of conducting an informal training is relatively low as compared to a formal training.

Training can take various approaches as discussed by Middlemist *et al*., (1983). According to Figure 2.5 below, the approaches are divided into on-the-job and off-the-job categories:

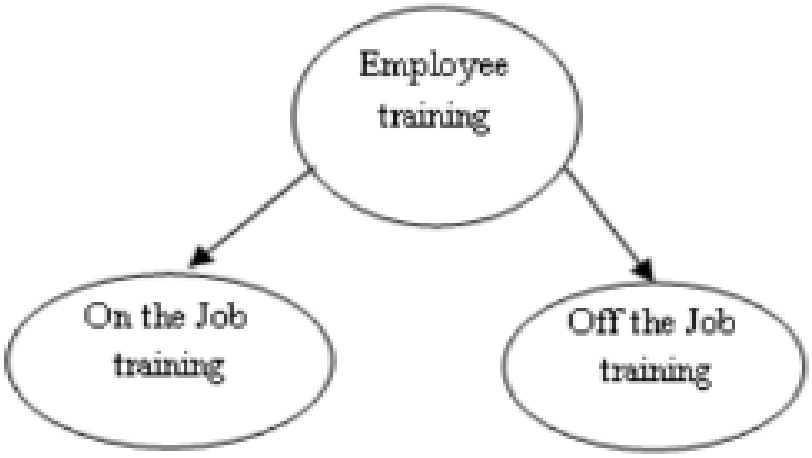

Figure 2.5: Types of training

Source: Basariya & Sree, (2019)

2.5.1 On-the-job training approach

Learning is done while doing the job in an on-the-job training strategy. The workers are able to carry out the tasks assigned to them as they improve their skills by doing them practically. According to Indeed editorial team (2021), On-the-job training also referred to as on-site training takes a practical approach. Workers are trained in the actual working conditions. Therefore, it makes it a cost effective method of training workers since it does not require any special equipment apart from that which is being used for production of work. On-site training also allows continuous feedback between the trainer and the trainee during the session. This makes the construction site an ideal place for training the semi-skilled workers (Sree, 2019). Different methods are used to make it more effective:

Coaching

Where coaching is utilized, a specific person is assigned the role of an instructor or a resource person during the training period. The resource person is more experienced and acts as a guide to the rest of the team. The coach is tasked with the role of answering questions and guiding the trainees to enable them understand the content better. This method may not be as effective when employed alone and therefore is used in conjunction with other methods to make it more effective (Sree, 2019).

This method is suitable for training semi-skilled workers in construction sites since the coach offers constant guidance throughout the session. This provides an excellent opportunity for the trainees to obtain first-hand information and learn quickly (Naorem, 2022).

Apprenticeship

In this case, the trainee works for the organization and is given a salary for the work done. However, the salary is below the scale of that which is offered to a qualified employee as they are still learning. The approach utilizes on-the-job training where skilled personnel coaches a semi-skilled worker on technique and craft involved in actualizing a particular trade (Sree, 2019).

According to (Naorem, 2022), the training method is suitable for training semi-skilled workers in construction sites since it gives an in-depth and detailed practice of the skill. The trainee is able to combine theoretical knowledge and practical skills improving their understanding of key concepts. The stipend obtained during the training period acts as positive reinforcement, increasing the morale of the trainee and providing financial support.

Job Rotation

The workers rotate through a series of related tasks to gain knowledge from different aspects. The trainees are able to carry out different task operations while coaching is still carried out. The trainees do not specialize on a specific task and therefore it becomes a suitable method for training employees for general management positions, transfers, promotions and replacements. The method is also used in organizations for ergonomics purposes (Sree, 2019).

According to an article by (Naorem, 2022), this method of training is not suitable for training semi-skilled workers in construction sites since the trainees may not get enough time to learn and explore a particular technical skill to the level of expertise.

Job Instruction Training

A set of coordinated procedure is utilized in conducting the training. The method takes into consideration the knowledge of the trainee before instructions are issued by the coach. A training schedule is prepared and followed. Usually, the job on which the training is to be conducted, is analyzed (Sree, 2019).

According to Alipour *et al.,* (2009), in this method of training, the instructor prepares a job breakdown, presents the steps to the trainee and while under supervision, the trainee performs each step of the job. The method is suitable for training semi-skilled workers in construction sites since it is conducted in the practical work station and is real time. The trainee is also able to get timely feedback on performance. The method is suitable for task oriented duties such as operating an equipment. The trainee observes the trainer doing the job and gains the experience of doing the job under supervision. It is appropriate in learning manual skills and procedures for doing things (Pfau, 2007).

2.5.2 Off-the-job training approach

This mode of training is conducted away from the workplace either in a special place set aside by the organization but within the organization or in a non-organization environment such as a school or university.

Off-the-job training approaches include:

Vestibule training

This type of training occurs within the premises of the organization but in a designated place away from the work station. However, the resources used at the work setting for carrying out the training are similar. This method is suitable in cases where the number of workers to be trained is large and the work methods to be taught are many. The training is conducted by special instructors inside the factory premises but away from the shop floor (Sree, 2019).

This training approach may be suitable for training semi-skilled workers in construction sites since they can focus on acquiring the new skill rather than performing the actual job. Also, production is not interrupted since the training is carried out in a separate room or area. However, the duplication of materials, equipment and conditions found in the real workplace make this method of training expensive as opposed to using the real workplace (Naorem, 2022).

Programmed instructions

According to Sree (2019), the materials to be used for training are categorized in a particular sequence such that the trainee show cases understanding of one set before proceeding to the next. Books and manuals are used together with electronic teaching machines. In this case, the trainee has to respond to the questions in one set correctly before proceeding to the next. The approach offers minimal interaction with a coach and may therefore not be suitable for training semi-skilled workers in construction sites.

Classroom instructions

This method of learning contributes widely to cognitive skills as opposed to physical. The approach is suitable for low level employees who would want to build their technical skills, professionals who would like to stay updated on the technological developments and managers who would like to build a broader perspective of societal relationships. This method violates the principle of learning by doing. Therefore, the semi-skilled workers

may not benefit as much from it unless it is used in conjunction with a more practical oriented approach (Sree, 2019).

Sensitivity training

In this case, several individuals work together for several days to build self-awareness, understand group processes and understand interpersonal relationships. The approach utilizes comprehensive group discussions and exchange to increase sensitivity to others as well as an individual's own prejudices (Hernandez, 2021).

According to Hernandez (2021), this training approach is suitable for construction workers at all levels including the semi-skilled workers. It enables all employees gain more sensitivity and learn how to accept their differences. This improves the overall wellbeing of an organization.

The Table 2.1 below gives a comparison between on-the-job training and off-the-job training methods. The features of each method have been summarized in the table.

Table 2.1: Comparison of on-the-job training vs off-the-job training

ON-THE-JOB TRAINING METHOD	OFF-THE-JOB TRAINING METHOD
Employees receive training while operating in genuine working environments on a daily basis.	Training is conducted away from the actual work environment, either at a special site in the organization or non-organization location.
Practical approach	Theoretical approach
It is a cost effective method of training as it does not require any special equipment except that used in the job.	It requires expenses like separate training rooms, specialists and training resources like projectors.
The knowledgeable staff members conduct the training.	Training is provided by the experts
Feedback on the training will be given immediately so that the trainees can improve their skills.	Feedback on the training is not given immediately.
The workers develop their skills by performing the tasks.	Learning takes place by acquiring knowledge.
The level of learning disturbance is high since learning takes place at the actual workplace.	There is minimal learning disturbance since learning takes place away from the actual working environment.
The organization obtains some production while the employee is learning	The organization does not obtain some production during the learning process.

Source: Indeed Editorial Team (2021)

2.6 Qualities of an Effective Training Programme

A training program is an organized method for developing human resources that uses knowledge, education, supervision, and practice to raise a worker's degree of proficiency in a particular skill (Bhasin, 2020). An effective training program must have the following characteristics, according to Trainer Hangout (2017): relevancy, assurance of professional growth, learner attention, efficacy of communication, integration of new technologies, and an effective evaluation system.

Apart from the values of the organization being in line with training, a training programme should be relevant to the workers. This means that the training should meet the needs of the workers, solve a business problem or contribute to certain business operations. After conducting a training needs assessment, the gap as a result of current performance and the desired performance should be addressed (Gupta, 2007).

According to Trainer Hangout (2017), The training programme should meet the objectives of the training and at the same time lead to professional advancement of the workers. A good plan outline is therefore critical. The workers become more focused and eager to learn once there is a positive impact on their skills. Also, the training programme should not only solve or address critical issues affecting employees but also have a reward system that targets all the workers who accomplish a specific goal/milestone. The trainers also need to give regular feedback to the trainees while practicing their new skills.

When leading the course, instructors should communicate well both verbally and nonverbally. It is important that the terminology used is appropriate for both the trainer and the learner. When new technologies are used, the training program should include them to appeal to the workforce while also enhancing their technical proficiency. The technical abilities of the workforce are enhanced when practical experience is prioritized. (Gupta, 2007). Finally, according to Trainer Hangout (2017), the program should provide employees a voice in planning, making decisions, and carrying them out. The examination aids in locating the areas that require additional improvement or modification

2.7 Types of On-site Training and Certification Programmes

2.7.1 Technical or Technology Training

According to Darwinbox (2022), technical training equips the trainee with technological aspects of the work. Technical skills enable employees to perform tasks in an effective way. In the construction sector, semi-skilled workers receive technical training enriching their skill set thus making them eligible for promotions as well as better payment packages. Barker (2021), argues that technology becomes obsolete very quickly and the semi-skilled worker need to reskill themselves with the latest tools and technologies to remain competitive.

2.7.2 Quality Training

The training enables the trainee to prevent, detect and correct work that is not of the required quality (University of Minnesota, 2011). Quality training can be applied in the construction sector whereby the semi-skilled workers can be trained on how to identify mistakes in their work, learn and streamline their workflow (Topliff, 2020). According to University of Minnesota (2011), quality training reduces the cost of production and gives employees a competitive advantage.

2.7.3 Skills training

Gives the trainee the knowledge and abilities needed to do assignments with expertise. In most cases skills training is offered on-the-job with the help of a mentor (University of Minnesota, 2011). In the construction sector, on-site skills training enables the semi-skilled workers perform their work better and at the same time improve their confidence. The existing skills gap can be improved by incorporating skills training in the construction sector (DePauw, 2019).

2.7.4 Safety training

According to University of Minnesota (2011)**,** safety training programmes are designed to ensure the workers are protected from injuries as a result of work-related accidents. Employees are the most valuable asset in any firm, thus guaranteeing their safety minimizes downtime and costs. The semi-skilled personnel in the construction industry receive health and safety training that gives them the knowledge and abilities to identify

and solve job site dangers before they can result in an accident or illness. (Occupational Safety and Health Administration, 2016) .

2.8 Importance of training

Training becomes essential where the current productivity of the workers does not match the expected performance. The knowledge, skills and expertise of the workers need to be improved to reflect on better performance at the work station. Training is supposed to prepare the trainee for any tasks assigned in the future. The workers are provided with as much information as possible to be able to perform their jobs efficiently. This in turn motivates them and this improves the overall productivity of the organization (McNamara, 1998).

The following are a few benefits of training and development, according to McNamara (1998): increases a worker's morale and sense of purpose at work, increases employees' motivation, results in financial benefit as a result of tasks being completed effectively, increases the innovation of products and reduces employee turnover. The gain is felt by both the employer and the employee/worker. However, training may not always result in gain to both parties if it does not address a deficiency. It must target a need or a problem for maximum benefits as it is an expensive undertaking. Training requires resources of the organization and the effort and time of the workers (McNamara, 1998).

2.9 Training Best practices

UN-HABITAT, (2017) defines best practices as initiatives that contribute remarkably to better quality of life in cities and communities around the world. According to a manual shared by Aerospace Joint Apprenticeship Committee (AJAC), (2008), best practices are methods that can be embraced, tailored and standardized since these techniques have continuously proven to be most effective in producing a desired outcome in most business environments.

According to Burke & Hutchins, (2008), in the literature on training and human resource development, there is no theoretical framework for the phrase "best practice approach." Best practice reports in transfer of training contain data that is limited and predominantly rely on the opinion of the author. Burke & Hutchins (2008), further indicate that there is no 'magic weapon' in 'best practices' approach that can solve problems in all firms and therefore advocate for a contingency model.

Hassan *et al*., (2006) thinks that it's crucial for workforce training to be built on a framework that accepts various methods under various conditions while keeping an emphasis on learning. A framework that includes the stages of (i) Training Needs Analysis, (ii) Training Design, (iii) Training Implementation, and (iv) Training Evaluation is the foundation of training "best practice."

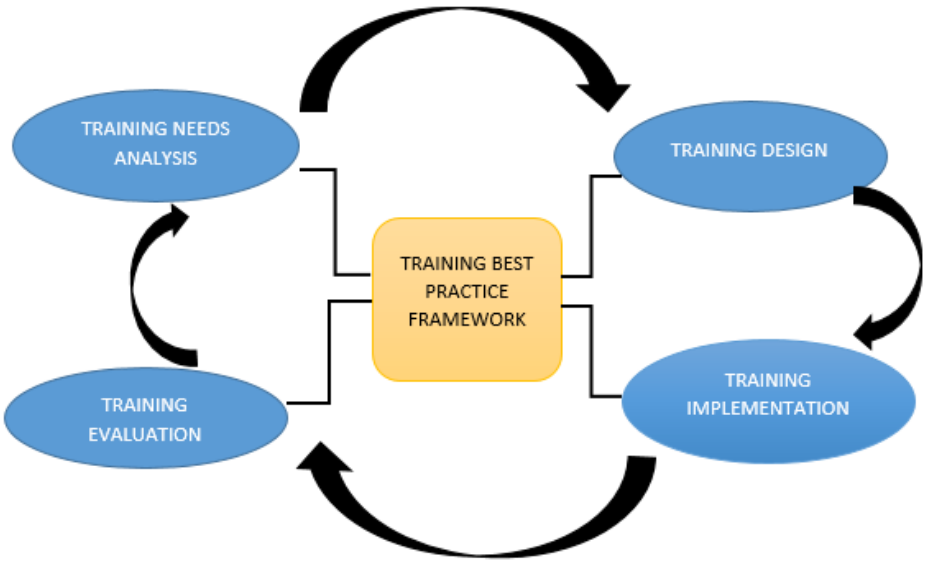

Figure 2.6: Training 'best practice' framework

Source: Hassan *et al*., (2006)

Royal (2014), explains that a training session should accommodate trainees and provide a friendly environment for students who have been out of classroom for long and those who

continue with education as a regular part of their professional life. The author advocates seven general principles that serve as best practices for employee training:

Preparation of a training agenda and sticking to it ensures that all critical information is covered; understanding the trainees learning styles and their level of skill in relation to the subject matter aids in creating training plans that consider the employees' training requirements; checking the trainees' retention of the course content during the training sessions and allowing question-and-answer sessions (Royal, 2014).

He advocates for the Use of visual aids to enhance delivery of content, Combining various training techniques to help the trainees not lag behind the overall learning curve, Use of real life scenarios during training sessions and Use of positive reinforcement such as rewards to enhance knowledge acquisition and retention (Royal, 2014).

A research conducted by Aerospace Joint Apprenticeship Committee, (2008) was used to develop a list of best practices for an on-the-job training programme. The best practices manual was created as a guide during the training process and can be customized to make it applicable across many trades and sectors. The best practices for training recommended in the manual include:

Company's commitment to the structured on-the-job training programme. The commitment spans from resource allocation, developing and committing to a training plan and identification of mentors and apprentices; identification of the training needs of the workers versus the existing skill gaps. This enables the company identify the particular areas and positions within the company that the workers need to be trained; development of a rotational training schedule to help diversify employees through cross training; identifying and selecting experienced mentors from the current employee list. The mentor is trained to gain tools for effective mentoring; selection of apprentices that shows interest in the training programme. Giving apprentices feedback during the training programme creates room for improvement and ensures an effective training programme and ensuring a uniform system for feedback for problem solving (Aerospace Joint Apprenticeship Committee, 2008).

2.10 Construction on-site training and certification

According to Alipour *et al.,* (2009), Training has been used throughout the world as a way of building capacity in the construction sector, as well as improving work productivity. Training and development enables an organization to effectively manage and maintain a skilled workforce. Training is further described as a situational process, meaning that no specific training method is correct for every situation.

In the twenty first century, on-the job training, also known as on-site training has been used in construction sites to provide task specific knowledge and skills to the semi-skilled workers (Alipour *et al.*, 2009). The workers are able to carry out their work as they earn. Certification is done at the end of the onsite training as proof that the trainee is competent. The testing and certification process enable the trainer to assess the competency of the trainee. The certificate on the other hand improves the employability of the trainee, placing them at a better position to demand a better wage (Makena, 2016).

According to Ogbeifun (2011), many countries have opted to actively engage in on-the-job form of training as a way of bridging the skill gap in the construction industry. The traditional apprenticeship model, in which a semi-skilled worker spent years tethered to a tradesperson, has evolved into a new training method called onsite training. However, the mode of operation, length of time, and intensity vary from one nation to another.

2.10.1 Global perspective

Malaysia

Malaysia has been experiencing a shortage of skilled construction workers for a long time. The skilled workers produced from vocational training are not enough to meet the needs in the construction sector and therefore for a long period, the country has been depending on foreign skilled labour (Zaki *et al.*, 2012).

According to Zaki (2012), the country introduced a two year apprenticeship training programme in the year 2005 known as National Dual Training System (NDTS) as a measure to improve the shortage of skilled workers. The apprenticeship programme was

aimed at producing a knowledge worker (K-Worker) with the appropriate technical competence, human and social competence, learining and methodology competence. The apprenticeship training programme combines 20-30% classroom based vocational training at training institutions and 70-80% training at the workplace. Day release and block release are the two delivery methods. In the day release program, learners receive training at the workplace for roughly 4-5 days per week and at the training facilities for the remaining 1-2 days. Trainees in the block release receive training for 4-5 months at their places of employment and 1-2 months at training facilities. At the conclusion of the training time, the trainee subsequently receives a competency certificate. (Zaki *et al.*, 2012).

Singapore

A two-year apprenticeship program was introduced by Singapore's Building and Construction Authority in 2012. The program was designed to raise the level of expertise of construction employees so they could command higher wages. The apprenticeship program combined work experience and academic vocational instruction. An incentive for upgrading was offered to the learners, which helped them financially while they were in training. Following certification, their earnings increased by 10% to 20% percent (BCA, 2015).

According to BCA (2015), the apprenticeship programme had attracted more than 70 apprentices by the year 2015 and 80 percent were young people below the age of 35 years. The apprentices received their trade diploma certificates in the year 2014 after completion. The authority provided financial incentives to the participating construction companies by enabling them meet up to 80 percent of the training cost.

South Africa

The Construction Education and Training Authority (CETA) is involved in providing skills development services to the construction sector in South Africa. The authority carries out research to determine the construction employees' current training needs and arranges suitable skill-development programs. The authority funds a number of programmes including certification of learners (CETA, 2019).

The authority is involved in apprenticeship programmes which are a form of on-site training. The main aim is to produce 30,000 artisans per year by the year 2020. The authority has partnered with small and medium sized companies and public funded vocational schools in implementing the apprenticeship programme. The programme adopts the dual vocational training system where the apprentices combine classroom based vocational training and practical training in the companies (CETA, 2019).

According to an annual report by CETA (2021), training of artisans is a national priority in South Africa. Recognition of Prior Learning is one of the flagship projects by CETA where informal artisans are taken through a trade test to assess and evaluate their knowledge and work and thereafter issued with a certificate to improve their employability.

2.10.2 Local Scenario (Kenya)

According to Kenya Property Developers Association (2018), the increase in demand for housing has led to a boom in the construction industry. Urbanization rate has increased by 4.4% between 2015 and 2018, increasing the housing demand to 200,000 units annually. Approximately 50,000 houses are built leaving a deficit of 150,000 houses annually.

According to a research conducted by the National Construction Authority (2015) on construction workers, 18% of construction workers have been formally trained while around 81% are qualified through on site experience. Therefore, many people who lack the technical skills and certification can benefit from the training programmes offered in construction sites in Kenya. The construction industry forms a favorable point to empower the semi-skilled, who may be interested in gaining better skills, to improve their livelihoods. According to a report by the African Development Bank, the skill gap was at 75 per cent by the year 2016 and this pushed statutory bodies like the National Construction Authority to focus on training of construction workers (GOK, 2018) .

Skilled construction workers including site supervisors are accredited and certified by National Construction Authority (NCA). This is to ensure they have the skills required to practice their trade hence streamlining the industry. The trades covered include masonry, plumbing, electrical, wiring, tiling and roofing (Kagai, 2019).

The benefits of accreditation and certification by the NCA to the construction workers include: Proof that the individual has undergone the necessary training needed to carry out the work and better job market since most contractors want accredited construction workers to foster high professional standards of work, thus better workmanship. Full accreditation is usually granted to all the skilled workers who have attained formal technical training from an accredited training institution. Provisional accreditation is granted based on industrial experience and referrals (Kagai, 2019).

The National Construction Authority rolled out an apprenticeship program in 2020 that allows semi-skilled construction workers to work under an accredited site supervisor to gain experience. The semi-skilled workers who wish to join the program are supposed to fill a downloadable form from the National Construction Authority's website. The details required include: The workers name and trade area, Accreditation number of their assigned site supervisor, the registered project they would be working on, Passport photograph and the registration number of the contractor they would be working under (National Construction Authority, 2017).

According to NCA (2017), semi-skilled workers are issued with an apprenticeship card and a log book which they are required to log in 288 hours during the program. The worker is then supposed to undergo a trade test with the National Industrial Training Authority to establish their competency. Most of the workers however find the trade tests expensive which hinders them from taking them. This explains why, despite the fact that these training and mentorship programmes are being carried out, only 34,295 artisans had been registered with NCA as at 2019.

According to Kagai (2019), the National Construction Authority (NCA) offices and Huduma center are both locations where you can submit your application in person. You can also do it online through the NCA portal. In either situation, the following paperwork must be provided: Technical certifications from an approved training facility, a passport-size photo, a Grade 3 or higher NITA trade test, and a copy of a national identification card are required. A Kshs. 1000 application fee is required for qualified construction workers,

and a Kshs. 2000 application fee is required for construction site supervisors. Applications are valid for three years before being renewed.

The National Construction Authority set up training and mentorship programmes whereby the semi-skilled construction workers were trained and accredited. The training was held by the Authority at Kolping Vocational Centre in Kilimambogo, Kiambu County on 12th to 13th of January 2017. The training focused on construction workers and site supervisors and was themed: Be SAFE (Smart, Alert, Focused and Educated). The construction workers were trained on construction industry basics, construction safety, health and disaster response, work ethic, entrepreneurship and best practices for the industry. The benefit is that these training are offered at no cost to the workers (NCA, 2017).

The National Construction Authority set up another training and accreditation program in 2017 themed '*Jenga smart'* that targeted artisans and site supervisors. The training was free and meant to sharpen the skills of the artisans, train them on the importance of using Personal Protective Equipment (PPE) and sensitize them on industrial rights. The training sessions were conducted on construction sites. The National Construction Authority partnered with Technical and Vocational Education and Training (TVET) institutions and managed to train 15,000 skilled workers (Mwitari, 2018).

The Authority also partnered with Toolkit Skill Ltd, which is registered by the National Industrial Training Authority (NITA), as a trainer. It managed to train and certify 70 students under the Safaricom Foundation Scholarship Program in Masonry, Welding and plumbing, making them legally recognized as construction workers (Mwitari, 2018).

According to (Makena, 2016), a number of construction firms in Kenya have also dedicated their time and money to train and certify the semi-skilled workers as a way to make them competent improving their employability. The move is also meant to bridge the skill gap that is existing in the construction industry. Some of these firms are registered with NCA and NITA as trainers and work in partnership with other non-profit organizations.

Eurofix Industries Limited, a Turkish Company, rolled out a training program in partnership with the Laikipia's National Government Affirmative Action Fund (NGAAF),

that saw at least 300 hundred youths from Laikipia County trained at no cost. The one-week training was held at Laikipia Woman Representative, office themed *'Fanikisha Ndoto'.* It was meant to upgrade their skills in a way that conforms to the changing technology in the construction industry enabling them to take advantage and benefit from local contracts (Munyi, 2021).

HF Development and Investments Limited (HFDI) in partnership with other organizations such as National Construction Authority, building materials retailer Alibhai Shariff and HF Foundation rolled out an on-site training program at the Komarock Heights site in Komarock estate, Nairobi. The program was aimed to train and accredit artisans as a way of addressing the shortage of skilled construction workers. Organizations such as Arc skills have also trained more than 1000 construction workers in a blended learning model themed: TVET ON SITE. The programmes were aimed to train masons, electricians, plumbers, tiling specialists, plasters and painters. (Mwitari, 2018).

According to NITA (2021), a list of valid training providers is released annually. There are construction companies such as Norken International Ltd, offering training to the semi-skilled workers and are registered by NITA and NCA as training providers. The construction companies enhance competencies through practical training seminars and events. NITA regulates and facilitates industrial training with an aim of improving productivity. The authority is currently upgrading its industrial training centers to improve the delivery of services to the construction sector. The Republic of South Korea, contributed to the upgrade of the training facilities in Mombasa by supplying modern training equipment and refurbishment of the facilities. This was done under the project: Capacity development by NITA (Okongo, 2021).

The authority is engaged in regulating trainers and accrediting institutions engaged in training. The training centers that have been accredited by NITA offer training to the skilled and semi-skilled. After completion of training, the trainees undergo a trade test with evidence of attendance from the training centers, before they can be certified. The authority is engaged in trade testing and issuing of certificates. Candidates who have undergone

training in the various training centers, book a trade test in the various grades, namely; grade I, II and III.

2.11 Awareness of Existing On-site Training Programmes

Awareness can be defined as knowledge of something's existence or the condition or power to sense or feel things or sensory patterns (Gafoor, 2012). According to Sayers (2006), awareness-raising is the process of informing and educating people on a subject or issue with the aim of influencing their attitude, behavior, and beliefs in order to realize a specific objective or goal. The procedure creates communication channels, which fosters improved understanding between parties and the development of competencies and abilities that are essential for enabling changes in social attitude and conduct. Awareness raising helps to overcome two major barriers: 1) Lack of knowledge and 2) Attitude and perceptions (Zero waste Scotland, 2012). According to Mndeme (2011) , lack of clarity of communication concerning training in an organization, affects its growth. In cases where the employees do not understand the benefits of training and there are no clear training systems, procedures or training policies, training suffers.

According to Waziri and Stephen (2013), the key aspects impacting the implementation of training programs are: the availability of funding, the employees' dedication and ability to attend training, as well as their awareness of the program's existence. Other elements that affect the implementation of training, besides awareness of the training programs already available, include:

Funding

According to Mndeme (2011), funding is critical in the implementation of a training programme**.** Lack of money to invest in human resource development in any organization affects training negatively.

Commitment

According to Mndeme (2011), the level of commitment to training that employees have in any firm can have an impact on training.

Time

According to Sambrook (2002), Training inside an organization is impacted by a shortage of time resulting from work organization and workplace pressures. Even if the trainees are aware of the training programs already in place, they may not have the time to participate. Employees struggle to find the time to learn their daily work routine because of work pressures. As a result, the chances they have to learn more and develop their talents are either completely eliminated or put off until an unspecified future time.

According to Waziri and Stephen (2013) , awareness and implementation of the training programme showed a significant relationship. Public awareness can be enhanced through the use of certain approaches and techniques (Sayers, 2006). The main communication and awareness tools used during on-site training include:

Direct communication through the use of word of mouth, meetings, workshops and seminars and informal social events; mass communication via printed materials including flyers, billboards, and posters, emails, websites, and web logs (blogs), broadcast SMS to mobile phones, mass media interviews, news stories, and articles and structured education and training programmes in schools, colleges and adult learning centers (Sayers, 2006). The study sought to understand the relationship between the extent of awareness of the existing on-site training and certification programme among the semi-skilled workers and the knowledge and attitude they possessed about the on-site training programmes.

2.12 Research Gaps

Studies and literature on on-the-job training and certification point out only a few aspects of on-the-job training practice; they don't go into great detail on the degree to which semi-skilled workers are aware of the on-the-job training that is already in place. The knowledge and skill gap that currently exists in the construction industry was the main focus of the most recent training study NCA conducted. The survey focused on general training requirements in construction (NCA, 2022). It did not take into account how well-informed semi-skilled workers were about the availability of on-site training and certification programs. The gaps as indicated above encouraged the researcher to carry out a detailed

investigation on the extent of awareness of existing on-site training and certification programme among semi-skilled workers.

2.13 Conceptual Framework

The literature has dealt with the concept of training and development, specifically onsite skills training for the semi-skilled workforce. According to Swaen (2015), a conceptual framework exemplifies the goals of the study. It specifies the study's variables and their relationships. The dependent variable in this study is the extent to which the semi-skilled workers in the construction sector are aware of existing on-site training programs. The independent variable in this study is the existing on-the-job training programs for semi-skilled workers.

According to Zero waste Scotland (2012), attitude and perceptions as well as lack of knowledge can only be surmounted through raising awareness. Therefore, to understand the relationship between the variables in the study, it is important to identify the level of knowledge, prevailing attitudes and perceptions about the programmes among the workers.

Given the two variables operate in a natural environment and the target group being human beings with other needs, some secondary factors (moderating variables), are bound to affect the relationship either by strengthening it or weakening the degree of relationship. The conceptual framework is captured in the figure 2.7 below:

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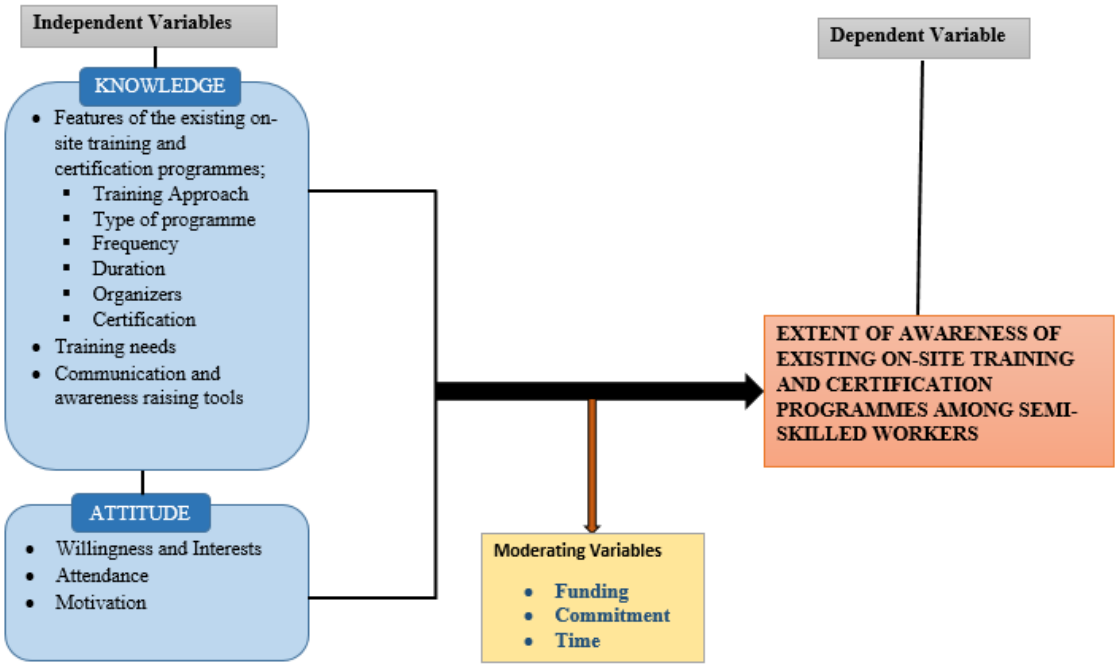

Figure 2.7: conceptual framework of the study

Source: Author, (2022)

2.14 Conclusion

This chapter reviews on onsite training for semi-skilled workforce in the construction industry. The present-day aspects around on-site skills training globally and locally, have been addressed including the benefits it accrues to the employer and the semi-skilled workforce. The focus has been majorly in Kenya and how the onsite skills training for semi-skilled workers is being conducted.

The major statutory bodies involved have been addressed with a bias on how they conduct the training programmes. The study has developed a conceptual framework to give direction to the study by demonstrating the researcher's position and the key variables in the study. This opens up the discussion into assessing the extent of awareness of the existing training programmes for the semi-skilled construction workforce in Kenya

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the steps and phases that were observed during the study's execution. The primary goal was to guarantee that accurate and trustworthy results were produced in a manner that best addressed the study objectives.

The study used a qualitative technique with the goal of determining the relationship between the on-site training and certification programs already in place and extent of awareness among semi-skilled workers in the construction industry. The chapter covers the following topics: the research design, target population, sampling frame and techniques, data collection techniques, data recording instruments, data processing and analysis, and lastly ethical considerations.

3.2 Research Design

Research design can be defined as "the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure" (Kothari, 1990). This means that it defines the conceptual structure in which the research is to be done. The study was cross-sectional by nature. According to Zangirolami-Raimundo *et al*, (2018) a cross-sectional study makes observation of the variables at a single point in time. This means that it does not follow individuals up over time. This type of study is relatively quick and inexpensive to conduct than other types of research.

Descriptive research was used in the study as the research design. A descriptive research describes the attributes of a particular individual; group or phenomenon being studied. The research questions in this study focused on understanding 'what' happens rather than 'why' it happens, making a descriptive research, the most suitable research design. The traits of a particular group were described including the frequencies in which they occurred

(Kothari, 1990). The study's main objective was to determine the degree of semi-skilled workers' knowledge of existing on-site training and certification programs by distributing questionnaires to determine whether or not the respondents were aware of such programs. Targeted interviews with key stakeholder leaders provided further information about the programs.

3.3 Target population

The target population is the particular group from which data was gathered and conclusions were formed (Kothari, 1990). According to Frankfort-Nachmias *et al*., (2015), population refers to a collection of all the units from which the researcher intends to draw conclusions. The first set of the target population for the study were semi-skilled construction workforce working in active construction sites under registered contractors in Nairobi. The information obtained was used to investigate the extent of awareness of the existing on-site training and certification programmes.

The second set of the target population were site managers, working under registered contractors, in charge of the selected active construction sites. The second set of the target population gave their perspective in relation to the on-site training and certification programmes. The third set of the target population were; an NCA official from the department of Training and Capacity Building, training expert in academia from one of the government technical institutions in Kenya and a NITA official from the department of Industrial Training and Skills Development. They were used to obtain authoritative information with regards to on-site training and certification for the semi-skilled construction workers.

A subset of the target population, the accessible population designates the group to which the researcher has actual practical access. The population is constrained to a specific area, city, county, state, or organization. (Mugenda & Mugenda, 2003). The population in this study was obtained from ongoing multiple active construction sites within Nairobi City County. Nairobi County was the most accessible to the researcher due to the limitation of time and funding. The county is the most urbanized with cultural, educational and

technological diversity and best represents all the other counties in the country. Also, all classes of contractors were best represented in Nairobi City County (Refer to *Table 3.1)* and therefore the construction sites served as a good representation of NCA registered construction sites in all the other counties.

3.3.1 Construction sites under Registered Contractors

In the selection of construction sites under registered contractors in Nairobi City County, the stratified sampling technique was used. According to Cochran (1977), the population is divided into non-overlapping subpopulations using the stratified sampling approach, and these subpopulations collectively make up the entire population. In this case, due to the expansiveness of Nairobi City County, the county was divided into sub-counties and in each sub-county, active construction sites under registered contractors in the different categories were selected to form part of the total population.

All construction projects undertaken in the country are required to be registered by the NCA. The authority keeps a register of all the active construction sites in the country (Baraza, 2022). Additionally, NCA divides contractors into eight groups, with NCA 1 being the top group and NCA 8 being the lowest, (NCA, 2020). Each category is based on project financial value limits that the contractors are not to exceed, resource holdings and track record (Refer to *Table 3.1).* Each active construction site is registered under a contractor in any of the eight categories. The population distribution of NCA registered building contractors under different categories, with physical addresses of and operating in Nairobi City County, is captured in the Table 3.1 below:

Table 3.1: Total population distribution of contractors under different categories in Nairobi City County

CATEGORY	Project Value Limits (Kshs.)	POPULATION (N)
NCA 1	Unlimited	184
NCA 2	Up to 500,000,000	118
NCA 3	Up to 300,000,000	143
NCA 4	Up to 200,000,000	534
NCA 5	Up to 100,000,000	580
NCA 6	Up to 50,000,000	843
NCA 7	Up to 20,000,000	559
NCA 8	Up to 10,000,000	836
TOTAL		**3797**

Source: NCA *(2020)*

The criteria used to select construction sites for the study was:

Active construction sites under a registered contractor and in good standing with NCA. According to the data in Table 3.2, A total of 2984 active construction sites were registered by NCA in Nairobi City County during the financial year 2021-2022. Stratified sampling technique was used to split Nairobi City County. Nairobi county was subdivided into 17 sub-counties and out of the 17, the study focused on 5 sub-counties due to time and financial constraints. Simple random sampling technique was used to select the five sub-counties.

According to Taherdoost, (2016), a sample for a study is taken from a larger group using the simple random sampling approach, and each participant is chosen at random. Each individual has an equal probability of being a sample in the method. The selected sub-counties included: Westlands, Langata, Kasarani, Dagoretti North and Kamukunji.

Table 3.2: Total population distribution of active construction sites in Nairobi City County for 2021-2022

Sub-Counties in Nairobi	Population distribution of active construction sites under registered contractors (N)
Westlands	579
Langata	511
Dagoretti North	249
Dagoretti South	148
Kibra	37
Roysambu	193
Kasarani	240
Ruaraka	55
Embakasi South	97
Embakasi North	35
Embakasi East	194
Embakasi West	69
Embakasi Central	58
Makadara	102
Kamukunji	199
Starehe	194
Mathare	24
TOTAL	**2984**

Source: NCA (2022)

Table 3.3: Total Population Distribution of active construction sites in the selected sub-counties for 2021-2022

Sub-Counties in Nairobi	Population distribution of active construction sites under registered contractors (N)
Westlands	579
Langata	511
Dagoretti North	249
Kasarani	240
Kamukunji	199
TOTAL	**1778**

Source: NCA (2022)

3.3.2 Target population of Semi-skilled workers

The criteria used for selecting semi-skilled workers for the study was:

Snowball sampling technique was used in selecting the semi-skilled workers in the active construction sites. According to Taherdoost, (2016), a non-probability sampling method called snowball sampling is best used when the population is small and challenging to reach due to its closed character. The approach solely relies on recommendations, with current subjects offering recommendations to find samples.

In the case of semi-skilled workers in a construction site, they are employees of the contractor and under the supervision of the site manager. The site manager selected the semi-skilled workers under different trades, for the study. At least 3 semi-skilled construction workers were selected from different trades in every active construction site in the selected sub-counties in Nairobi City County (Westlands, Langata, Kasarani, Dagoretti North and Kamukunji). Construction projects that were under investigation were at different stages of construction. These trades were not in operation concurrently at the

construction sites. Therefore, the trades chosen were unique to each site depending upon the stage of construction at which each project was at.

3.3.3 Target population of NCA official, NITA official and Expert in Academia

The criteria used for selecting the officials for the study was:

Purposive sampling technique was used to select official respondents from NCA, NITA and an institution of training. According to Tongco, (2007), the purposeful selection of an informant based on the informant's personal characteristics is known as the judgment sampling or purposive sampling technique .In this case, the researcher determines what information is required and then searches for sources who can and are willing to supply it based on their expertise or experience.

Official communication was made to the institutions by the researcher which responded by recommending specific respondents drawn from the relevant departments within the institutions. An NCA official from the department of training and capacity building, NITA official from the department of industrial training and skills development and a trainer from a technical training institutions within Nairobi City County, were referred to the researcher. The respondents were to provide authoritative information for the study.

3.4 Sampling Technique

Sampling is a fundamental part of the research design and can be defined as the process of obtaining a smaller set of data from a population that is large (Frankfort-Nachmias *et al*, 2015). Sampling is done because the researcher cannot be able to collect data from all the individuals. Collecting data from all of them would be impractical in terms of time, cost and other factors.

A sampling frame refers to a listing of all the population units (Kombo & Tromp, 2009). It is from this list that a sample is selected. The study utilized the stratified random sampling technique in selecting the active construction sites in Nairobi City County. According to (Hayes, 2021) , stratified random sampling sub-divides the entire population into sub-groups known as strata. Stratified random sampling technique prevented the concentration

of active construction sites under registered contractors in only one part of the geographical area of study. Each site manager in charge of a construction site selected, formed part of the target population. The study utilized a combination of snowball sampling and random sampling in selecting the semi-skilled workers in every construction site. The officials for the interviews were selected using the purposive sampling technique.

3.5 Sample Size

The size of a sample is estimated from the target population. According to Cooper & P.Schindler (2009), a sample of approximately 10% of the population can in most cases provide good reliability. There are several misconceptions on the most appropriate size of sample required for a study. The most appropriate method takes into consideration the level of accuracy expected, that is the size of the standard error (Frankfort-Nachmias *et al*., 2015).

Sample estimates have random variations known as sampling errors. The measurement of this error is referred to as 'precision of the sampling plan'. The error decreases with increase in the size of the sample (Kothari, 1990). The sample size was determined using the formula shown below (Miller & Brewer, 2003)

$$n = \frac{z^2 \, x \, p \, x \, q \, x \, N}{e^2 \, (N-1) + z^2 \, x \, p \, x \, q}$$

Where:

n = Sample size

N = Size of the population

p = Sample proportion estimated to have a characteristic being measured (95% confidence level of target population)

q = significance level (1-p)

e = Acceptable error at 5% (0.05), calculated at 95% confidence level

z = Standard normal variable required at 95% confidence level (1.96)

The sample size applied in the formula is as follows:

$$n = \frac{z^2 \, x \, p \, x \, q \, x \, N}{e^2 \, (N-1) + z^2 \, x \, p \, x \, q}$$

Z =1.96, p =0.95, q =0.05, N=1778, e =0.05,

$$n = \frac{1.96^2 \, x \, 0.95 \, x \, 0.05 \, x \, 1778}{0.05^2 \, (1778-1) + 1.96^2 \, x \, 0.95 \, x \, 0.05}$$

$n = 70.1 \approx$ **71 total active construction sites** in the 5 selected sub-counties in Nairobi

There were **71 active sites** to be considered and in each construction site, the site manager in charge of the day to day operations was considered.

According to Israel (1992), to compensate for non-response, 30% is usually increased to the sample size and 10% to compensate for respondents that the researcher is unable to contact. In the study, the sample size was adjusted by 30% as compensation for non-response and respondents that were difficult to contact. The adjustment was distributed to the sample size in different sub-counties.

Sample size (with compensation for non-response) = sample size x 1.3 = **92 respondents**

The sample sizes for the active construction sites in each sub-county was determined as follows:

$$n_r = \{N_r | N\}\text{n}$$

Where:

$n_r = sample\ size\ for\ the\ stratum\ r$

$N_r = Population\ size\ for\ stratum\ r$

$N = Total\ population\ size\ for\ active\ construction\ sites\ in\ all\ the\ selected\ sub - counties$

$n = Total\ sample\ size\ for\ actives\ construction\ sites$

Westlands,

$n_r = \{N_r|N\}\text{n} = \{579|1778\}\ 92$ = **30 active construction sites**

Langata,

$n_r = \{N_r|N\}\text{n} = \{511|1778\}\ 92$ = **26 active construction sites**

Dagoretti North,

$n_r = \{N_r|N\}\text{n} = \{249|1778\}\ 92$ = **13 active construction sites**

Kasarani,

$n_r = \{N_r|N\}\text{n} = \{240|1778\}\ 92$ = **12 active construction sites**

Kamukunji,

$n_r = \{N_r|N\}\text{n} = \{199|1778\}\ 92$ = **11 active construction sites**

Table 3.4: Distribution of calculated sample size of active construction sites in Nairobi City County

Sub-Counties in Nairobi City County	Population distribution of active construction sites under registered contractors (N)	Sample size
Westlands	579	30
Langata	511	26
Dagoretti North	249	13
Kasarani	240	12
Kamukunji	199	11
TOTAL	**1778**	**92**

Source: Author's Construct, (2022)

Table 3.5: Distribution of semi-skilled workers in active construction sites in Nairobi City County

Sub-Counties in Nairobi City County	Population distribution of active construction sites under registered contractors (N)	Sample size of active construction sites	Number of semi-skilled workers in every selected sub-county (3 workers per active site)
Westlands	579	30	90
Langata	511	26	78
Dagoretti North	249	13	39
Kasarani	240	12	36
Kamukunji	199	11	33
TOTAL	**1778**	**92**	**276**

Source: Author's Construct, (2022)

Table 3.6: Breakdown of target respondents in Nairobi City County

Respondent Category	Targeted Number
Contractors/site supervisors in active construction sites in the selected sub-counties of Nairobi City County	92
Total Semi-skilled workers in active construction sites	276
NCA official	1
NITA official	1
Expert in Academia	1
Total target population	**371**

Source: Author's Construct, (2022)

3.6 Data Collection Method

Through the use of questionnaires and interviews, data on respondents' awareness of the programs for on-site training and certification, as well as the level of that awareness, were gathered. Data was collected by administering the questionnaires to semi-skilled workforce working under registered contractors, site managers in-charge, in active construction sites in different sub-counties of Nairobi City County. The researcher selected the use of questionnaires as the method of data collection due to the limitation of time and financial resources. The method is less expensive in terms of time and finances and can be used to collect large amounts of data from a large sample size within a short time (Young, 2015).

Depending on the respondents' accessibility, the researcher distributed questionnaires in both electronic and paper form. The hard copy questionnaires were physically distributed to the active building sites by a team of two research assistants, and the soft versions were sent through email or as Google forms. The assistants received training in comprehending the research topics, correctly approaching respondents, translating questions into Kiswahili when necessary, and gathering data in accordance with the study's goals. A questionnaire should translate the study objectives into specific questions, which when answered should provide the data for analysis (Frankfort-Nachmias *et al*, 2015).

Recorded interviews were conducted with an expert in academia, a NITA official and an NCA official to obtain authoritative information and their perspective on on-site training and certification for the semi-skilled workers. According to Kothari (1990), structured interviews involve the use of predetermined questions following a rigid procedure. Structured interviews enabled the researcher obtain authoritative information in depth and in case the questions were misunderstood, clarification can be sought.

The review of pertinent literature was used to gather secondary data for the study. The literature review included a thorough discussion of the theoretical perspective on training, concepts of training and development, an assessment of training needs, importance of training, training approaches, training best practices, on-site skill training and certification in Kenya and other nations, as well as a conceptual framework. Books, peer-reviewed

journals, university theses and dissertations, newspaper articles, and other published materials, as well as conference proceedings, were used to gather the literature.

3.7 Data Collection Instruments

The open-ended and closed-ended questions on the questionnaires given to the semi-skilled workers and site managers were designed to gather data that was pertinent to the study's goals. While close-ended questions only required brief responses to keep the respondent on task, open-ended questions were designed to elicit detailed responses.

The questionnaire to the semi-skilled workers began with a screening question aimed at obtaining eligible respondents for the survey. The main objective of the research was to investigate the extent of awareness of the existing on-site training and certification programmes by the semi-skilled workers. Therefore, the screening question was intended to categorize all the semi-skilled workers that are aware and not aware of the existing training programmes. After screening, part A of the questionnaire aimed at assessing the extent of awareness and existing on-site training and certification programmes. The extent of awareness was measured using a Likert scale and the following parameters were used: A response of 'yes' on 6-8 statements = highly aware (4), 3-5 statements = moderately aware (3), 1-2 statements = poorly aware (2) and a response of 'no' on all the statements = not aware (1).

Information about the communication and awareness tools used in raising awareness and features of the existing on-site programmes such as training techniques used was obtained in this section. The respondents were required to rate their awareness based on what they knew about the programmes on an ordinal scale. A series of questions that used the binary scale were used in this section as a guide to enable them rate their awareness on the ordinal scale. This section aimed at achieving the main objective of the study. Part B of this questionnaire described the training needs of the semi-skilled workers and gauged their attitude towards the existing on-site training and certification programmes. The respondents were required to give their opinion on some of the measures that could be put in place to improve the awareness levels.

The questionnaire to the site managers began with a screening question aimed at obtaining the right respondent for the survey. The respondent should have conducted on-site training for the semi-skilled workers in their construction sites before, to be able to proceed with the survey. Part A of the questionnaire aimed at assessing the extent of awareness and existing communication and awareness tools for on-site training and certification programmes. This part required the respondents to rate the attendance of the semi-skilled workers to the training and certification programmes and give information about the communication and awareness tools used in raising awareness. Part B of the questionnaire was aimed at obtaining information on the existing on-site training and certification programmes being offered at the construction sites in Kenya. Information about the frequency of the training, types of training programmes being offered, the techniques used, the duration of the programme(s) and the organizers was obtained in this section. Part C of the questionnaire described the training areas captured during the training sessions. The respondents rated the degree to which the training affected the semi-skilled workers' performance at work. A Likert scale was used based on the following parameters: To a very large extent= (5), To a great extent= (4), Somewhat= (3), Little= (2) and Not at all = (1).

Drivers of training were captured with responses presented in a five-point Likert scale with the following parameters: Extremely Influential= (5), Very Influential= (4), Moderately Influential= (3), Slightly Influential= (2) and Not at all Influential= (1). The section was aimed at describing the motivation behind the need for training by the semi-skilled workers. The respondents were also asked for their thoughts on how to raise awareness of the current on-site and certification programs.

In order to validate the information gathered from the semi-skilled workers and site managers, interview schedules for officials at NITA, NCA, and an academic expert were developed based on the study's objectives. The purpose of the interview schedules was to determine the semi-skilled workers' training requirements as well as the existing on-the-job training and certification programs that are available to them. The interview also aimed to comprehend some of the progress achieved by the authorities in increasing public

knowledge of the on-site training programs already in place, as well as the difficulties they have encountered and the steps they have taken to overcome them.

3.8 Pilot Study

A pilot study was conducted during the study to check the validity and reliability of the study. The data collection instruments were put to test to ensure they could be understood clearly by the respondents, obtained the required information and were free from major bias. According to In, (2017), a pilot study is crucial for enhancing the main study's effectiveness and quality. It can be characterized as a more compact study that helps with the design and adjustment of the larger investigation.

After conducting the pilot study, the data obtained was used to measure internal consistency using Cronbach's alpha (α). According to Tavakol (2011), Cronbach alpha is used to gauge how consistently a test or scale measures a given idea across all of its elements. The permissible values for the metric, which has a scale from 0 to 1, fall between 0.7 and 0.95.

During the study, 5 active construction sites were selected randomly within the area of study and 15 questionnaires administered to semi-skilled workers working in different trade areas, in the selected construction sites. Another set of questionnaires were administered to the site managers in charge of each of the 5 construction sites. The coefficient of 0.82 was calculated using Cronbach's alpha (α). Since the information was regarded as reliable, the questionnaires did not need to be changed.

3.9 Validity of Research Instruments

Validity is described as how thorough the data that has been collected covers the actual area that is being investigated in the study. The main focus is what an instrument measures and how exhaustively it does (Ghauri & Gronhaug, 2005). According to Kothari (2004) , content validity refers the degree of sufficient coverage a measuring instrument provides over the topic being studied. The study used questionnaires and interview schedules as the

measuring instruments to obtain data. Kothari (2004) further urges that content validity can be determined by a group of experts who evaluate the effectiveness of the instrument in meeting the acceptable standards. The content validity of the questionnaire and interview schedules was established through reviews by the research supervisors to ensure they were in-line with the subject of the study.

3.10 Reliability of Research Instruments

The capacity of research instruments, in this case questionnaires and interview schedules, to yield results that are consistent in nature after being put through multiple trials under the same circumstances is known as reliability (Kothari, 1990). Also, to improve reliability during the collection of data, the time to administer the questionnaire was important to minimize the influence of external factors. In this case, the questionnaires were administered to the semi-skilled workers and site managers during morning hours (before noon) when concentration was high, by the researcher and a team of research assistants. The use of research assistants was used as a measure to mitigate the limitation of time. The assistants were trained on; understanding the research questions, approaching the respondents properly, translating the questions to Kiswahili where necessary and how to gather data in accordance with the study's goals.

3.11 Unit of Analysis and Unit of Observation

According to Dolma (2010), The term "entity being analyzed in a study" is used to describe the unit of analysis, while "entity on which measurements are taken" is used to describe the unit of observation. According to Trochim (2006), deciding on the unit of analysis is the first step in data analysis for a study. In the study, the unit of analysis was the semi-skilled construction workers. The unit of observation in the study and the unit of analysis are the same. The NCA official, NITA official, site managers and academic expert provided the researcher with information on on-site training and certification for the semi-skilled workers. They were therefore not units of observation.

3.12 Data Analysis and Presentation

Data analysis is the process of calculating specific metrics and looking for patterns in the interactions between sets of data. (Kothari, 1990). According to Calzon (2022), data that is collected during a study is modelled and analyzed in a manner that provides meaningful insights to assist in decision making. Data in the study was analyzed using the spreadsheet software programme, Microsoft Office Excel 2010. For the collected and recorded data to be meaningful at a glance, and make ease of reference, data presentation techniques were used.

After conducting the pilot study, Cronbach's Alpha coefficient was determined to check for reliability and consistency. After collecting the actual data, ordinal data collected using the five-point Likert scale was used to measure the extent of awareness of the existing on-site training programmes by the semi-skilled workers, the attendance of the semi-skilled workers to the training sessions, the extent to which the existing training and certification program(s) met the training needs of the semi-skilled workers, frequency of conducting the on-site training and certification programmes and training drivers. The analysis of the data on the five-point Likert scale was done using frequency distribution in percentages. After that, for convenience of reference, the data was displayed as bar graphs and pie charts. In order to rank the training's motivators and the information presented using error bars, mean and standard deviation were obtained.

3.13 Ethical Considerations

The subject fits within the social sciences category since it aims to comprehend human behavior. Therefore, it was important to follow ethical criteria when gathering data to make sure the study's goals were met as efficiently as feasible. Ethics are well-founded principles of right and wrong that outline what people should do. These principles are typically expressed in terms of rights, obligations, benefits to society, justice, or particular virtues (Velasquez *et al*.,2010)

The research problem, the study's context, the protocols required by the study, the data gathering method, the types of people participating in the study, and the data type obtained are some of the aspects that might cause ethical difficulties to arise (Frankfort-Nachmias *et al.,* 2015). The following considerations were put in place during the study as a measure to mitigate the ethical issues.

The respondents were requested to participate voluntarily in the study without being compelled. The participants of the research were fully aware of the steps and hazards involved and guaranteed their acquiescence. Thus, informed consent was ensured for each participant. The research was conducted with utmost integrity. The participation and information of the respondents was held with confidentiality. Their participation did not subject them to a position where they were endangered physically or psychologically. The researcher assured the respondents of anonymity and utmost confidentiality. Consultations with the respondents was done prior to conducting the interviews and appointments booked. The interview questions were also sent to the respondents in advance to enable them prepare.

3.14 Summary

The study's goal was to determine the relationship between the on-site training and certification programs now in place and the level of awareness among semi-skilled workers in the construction sector. A qualitative technique was used in the study to achieve this goal. The chapter focused on the research design, target population, sampling frame and tactics, data collection methods, data recording tools, data processing and analysis, and lastly ethical considerations that were applied when carrying out the study. The semi-skilled employees and site supervisors were given questionnaires, and Microsoft Excel was used to analyze the research findings. Interviews were held with a representative from the NCA's department of training and capacity building, a representative from NITA's department of industrial training and skills development, and a training specialist from one of the technical training institutes.

CHAPTER FOUR

DATA ANALYSIS, FINDINGS AND DISCUSSION

4.1 Introduction

The main objective of the study was to investigate the extent of awareness of existing on-site training and certification programmes by the semi-skilled construction workforce in Kenya. The specific objectives focused on describing the training needs of the semi-skilled workers, identifying the existing on-site training and certification programmes to meet these needs, investigating the existing communication and awareness tools utilized in raising awareness and proposing guidelines through which greater awareness can be achieved.

Questionnaires were administered to the semi-skilled workers and site managers and the research findings analyzed using Microsoft excel. Interviews were conducted with; an NCA official from the department of training and capacity building, NITA official from the department of industrial training and skills development and a training experts in one of the technical training institutions in Kenya. This chapter entails a presentation of the research findings. The data from the field investigation has been analyzed, presented in tables, pie charts and bar graphs and briefly interpreted with an aim of answering the research questions.

4.2 Response Rate and Distribution

The research questionnaires were administered to 92 active construction sites in 5 sub-counties in Nairobi City County. Depending on the preference of administration by the site manager, the questionnaires were in hardcopy and also available in Google Forms. The semi-skilled workers were assisted in some cases, in translating the questions in the questionnaire to Kiswahili by either the research assistants or the researcher. Out of a total of 368 questionnaires administered to the site managers and semi-skilled workers, only 267 questionnaires were returned duly filled giving a total response rate of 73%. The results are as presented in the Table 4.1, Figure 4.1 and Figure 4.2

Table 4.1: Response rate and distribution of questionnaires in Nairobi City County.

Sub-Counties in Nairobi City County	No. of questionnaires administered	No. of questionnaires returned duly filled	Response Rate
Westlands	120	93	**78%**
Langata	104	74	**71%**
Dagoretti North	52	39	**75%**
Kasarani	48	30	**63%**
Kamukunji	44	31	**71%**
TOTAL	**368**	**267**	**73%**

Source: Field Data, (2022)

Figures 4.1 and 4.2, respectively, provide two different ways to visualize the data in Table 4.1 above: as a bar chart and a pie chart.

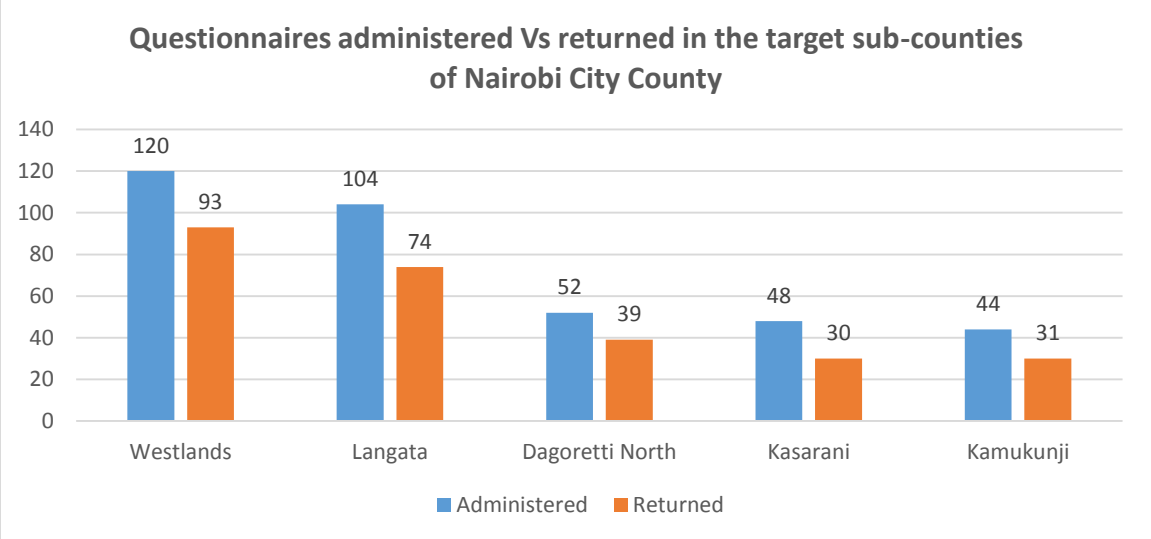

Figure 4.1: Questionnaire Administered Versus Returned in Nairobi City County

Source: Field Data, (2022)

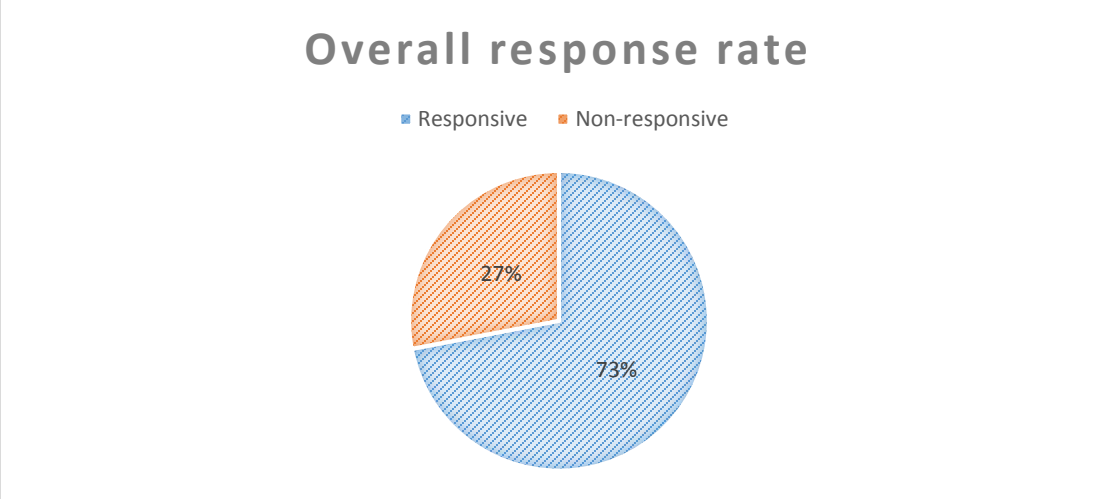

Figure 4.2: Overall Response Rate

Source: Field Data, (2022)

Out of the 92 questionnaires administered to the site managers in all the selected sub-counties, only 72 questionnaires were returned duly filled to satisfaction. This gave a response rate of 78% and a non-response rate of 22%. The results are as presented in the Table 4.2, Figure 4.3 and Figure 4.4

Table 4.2: Site managers' response rate to questionnaires in Nairobi City County.

Sub-Counties in Nairobi City County	No. of questionnaires administered to Site Managers	No. of questionnaires returned duly filled	Response Rate
Westlands	30	26	**87%**
Langata	26	19	**73%**
Dagoretti North	13	11	**85%**
Kasarani	12	9	**75%**
Kamukunji	11	7	**64%**
TOTAL	**92**	**72**	**78%**

Source: Field Data, (2022)

Figures 4.3 and 4.4, respectively, provide two different ways to visualize the data in Table 4.2 above: as a bar chart and a pie chart.

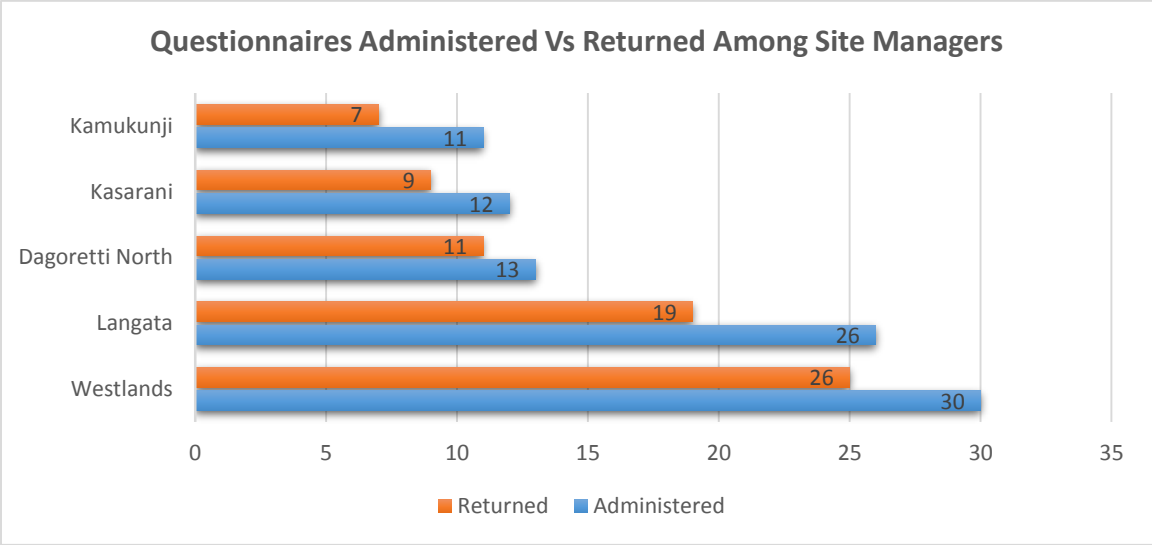

Figure 4.3: Questionnaire Administered Versus Returned Among Site Managers

Source: Field Data, (2022)

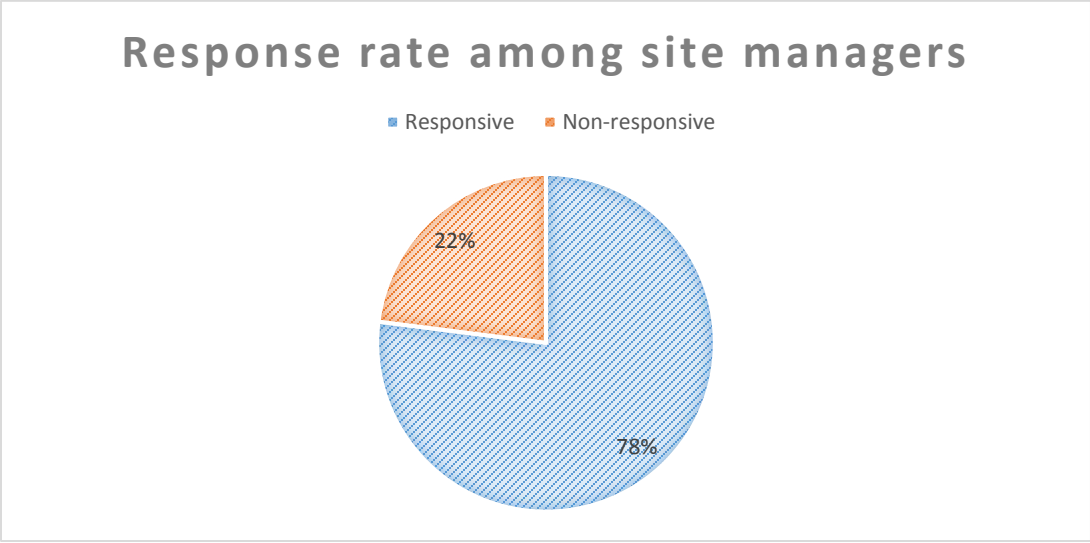

Figure 4.4: Overall Response Rate Among Site Managers

Source: Field Data, (2022)

Out of the 276 questionnaires administered to the semi-skilled workers, only 195 questionnaires were returned duly filled to satisfaction. This gave a response rate of 71% and a non-response rate of 29%. The results are as presented in the table 4.3, Figure 4.5 and Figure 4.6

Table 4.3: Response rate and distribution of questionnaires among semi-skilled workers in Nairobi City County

Sub-Counties in Nairobi City County	No. of questionnaires administered to Semi-Skilled Workers	No. of questionnaires returned duly filled	Response Rate
Westlands	90	68	**76%**
Langata	78	55	**71%**
Dagoretti North	39	28	**72%**
Kasarani	36	21	**58%**
Kamukunji	33	23	**70%**
TOTAL	**276**	**195**	**71%**

Source: Field Data, (2022)

Figures 4.5 and 4.6, respectively, provide a bar chart and a pie chart that illustrate the data in Table 4.3 above.

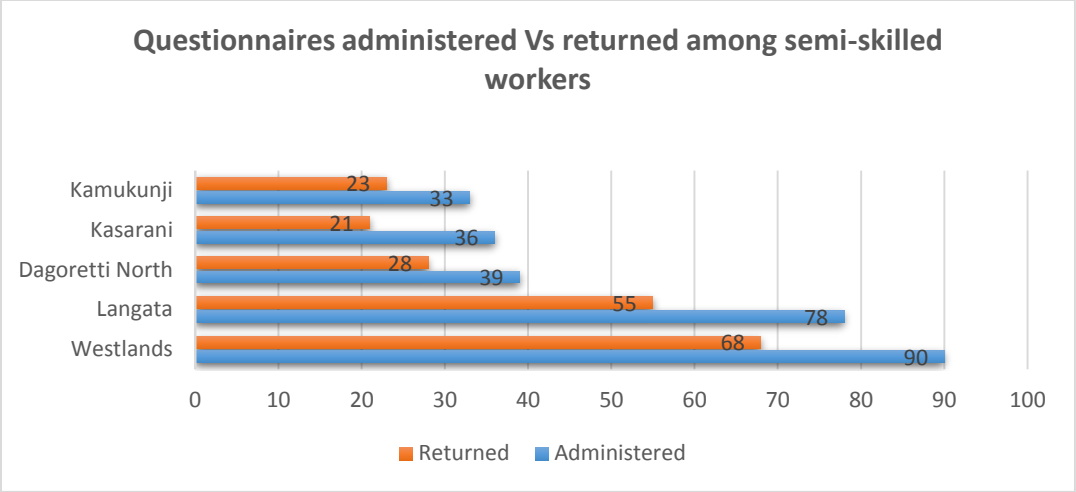

Figure 4.5: Questionnaires Administered Vs Returned Among Semi-Skilled Workers

Source: Field Data, (2022)

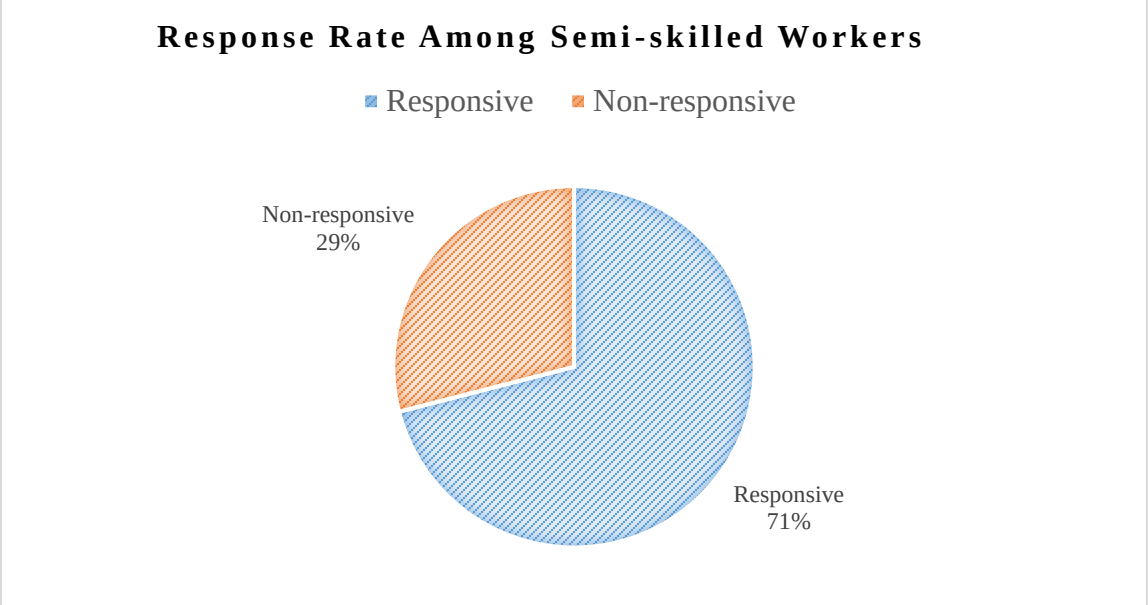

Figure 4.6: Overall Response Rate Among Semi-Skilled Workers

Source: Field Data, (2022)

According to Mugenda & Mugenda (2003), a response rate of 70% and above is regarded as very good response for analysis to be conducted. A response rate of 50% is enough for analysis to be carried out. In the case of this study, the overall response rate was 73%, thus very good and sufficient for analysis.

4.3 Awareness of Existing On-Site Training and Certification Programmes

The main objective of the study was to determine the extent of awareness of existing on-site training and certification programmes by semi-skilled construction workers. In response to the objective, the respondents, who were the semi-skilled workers, were required to indicate their awareness of existing on-site training and certification programmes as a screening question during the survey. The aim of the screening question was to obtain the right respondents to proceed with the survey. The data on Table 4.4 and Figure 4.7 summarizes the findings.

Table 4.4: Awareness of Existing On-Site Training and Certification Programmes for Semi-Skilled Workers

Semi-skilled workers awareness of the existing on-site training and certification programmes	**Frequency**	**Percentage (%)**	**Cumulative percentage (%)**
Yes	123	63	63
No	72	37	100
Total	**195**	**100**	

Source: Field Data, (2022)

Figure 4.7 illustrates a pie chart that can be used to visualize the data from Table 4.4 above.

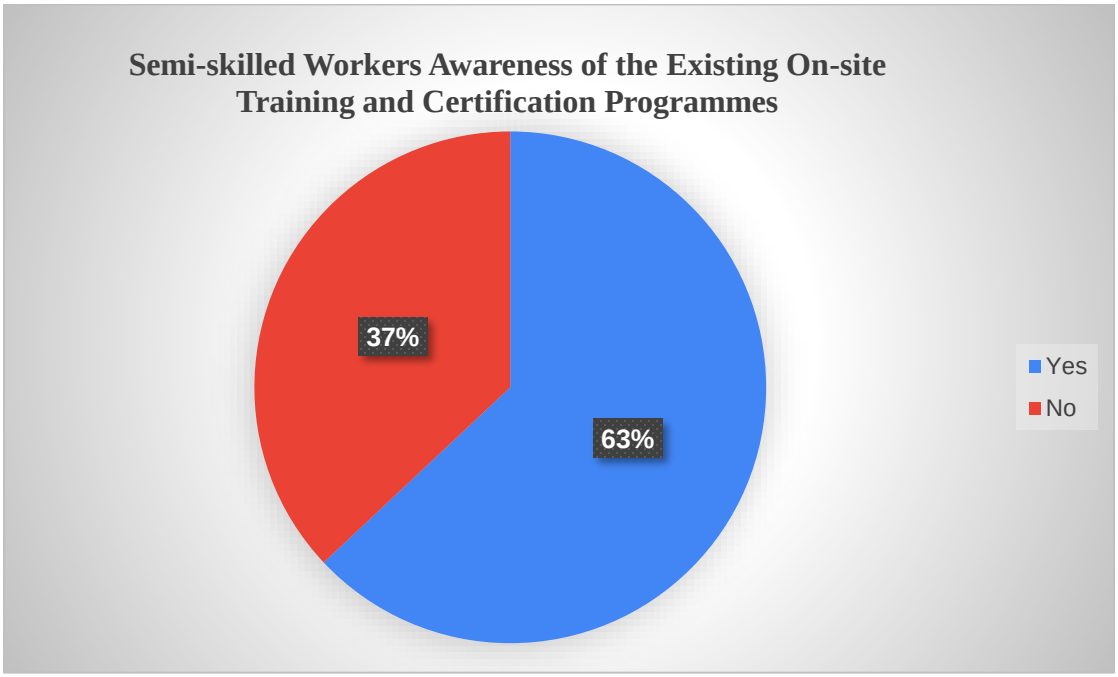

Figure 4.7: Awareness of Existing On-Site Training and Certification Programmes for Semi-Skilled Workers

Source: Field Data, (2022)

Majority of the semi-skilled workers, 63%, were aware of the existing on-site training and certification programmes while 37% were not aware. This translated to 123 respondents who were aware and 72 who were not aware. Therefore, only the 123 respondents, continued with the survey to gauge their extent of awareness. The possible reason for awareness among majority of the semi-skilled workers could be attributed to the awareness campaigns conducted by NCA and NITA.

The lack of awareness among the 37% could be attributed to the fact that NCA and NITA use direct communication and bulk SMS as the main tool of raising awareness. Direct communication may not have been as fast in reaching a wide range of semi-skilled workers and some of the workers do not have access to the digital awareness raising tools used by the authority such as social media and bulk SMS. The authorities were adopting other

means of raising awareness such as sharing materials after physical training to spread more accurate information about trainings and their frequencies. They were also planning on increasing the frequency and geographical coverage of the trainings.

4.3.1 Extent of Awareness of Existing On-Site Training and Certification Programmes by Semi-skilled workers

This section aimed at investigating the extent of awareness of the existing on-site training and certification programmes by the Semi-skilled workers. 63% of the semi-skilled respondents, who were aware of the existing on-site training and certification programmes, were required to further rate their extent of awareness by responding to a number of statements. The statements were focused on their awareness of existing on-site training and certification programmes offered by NCA, NITA and other training institutions. Table 4.5 and figure 4.8 below summarize the replies of the semi-skilled workers.

Table 4.5: Extent of awareness of existing on-site training and certification programmes by semi-skilled workers

	Statements on existing on-site training and certification programmes for the semi-skilled workers	**Response Frequency**		**Total Respondents**	**Response percentage (%)**	
Statement 1	Awareness of the existing on-site training and certification programme(s) offered by NCA or NITA for the semi-skilled workers	**Yes**	81	123	**Yes**	66
		No	42		**No**	34
Statement 2	Awareness of the application process for the programme(s)	**Yes**	50	123	**Yes**	41
		No	73		**No**	59
Statement 3	Awareness of the downloadable form on the NCA website for application of the apprenticeship programme	**Yes**	23	123	**Yes**	19
		No	100		**No**	81
Statement 4	Awareness of the duration of the NCA apprenticeship programme	**Yes**	20	123	**Yes**	16
		No	103		**No**	84
Statement 5	Awareness of the trade tests offered by NITA	**Yes**	54	123	**Yes**	44
		No	69		**No**	56
Statement 6	Awareness of Competency certificate offered after completion of trade tests offered by NITA	**Yes**	54	123	**Yes**	44
		No	69		**No**	56
Statement 7	Awareness of any on-site training and Mentorship programme set up by NCA and NITA in partnership with other training centers	**Yes**	34	123	**Yes**	28
		No	89		**No**	72
Statement 8	Awareness of construction companies accredited by NITA offering training to the semi-skilled workers	**Yes**	13	123	**Yes**	11
		No	110		**No**	89

Source: Field Data, (2022)

Figure 4.8 illustrates how the data in Table 4.5 above can be shown as a bar chart.

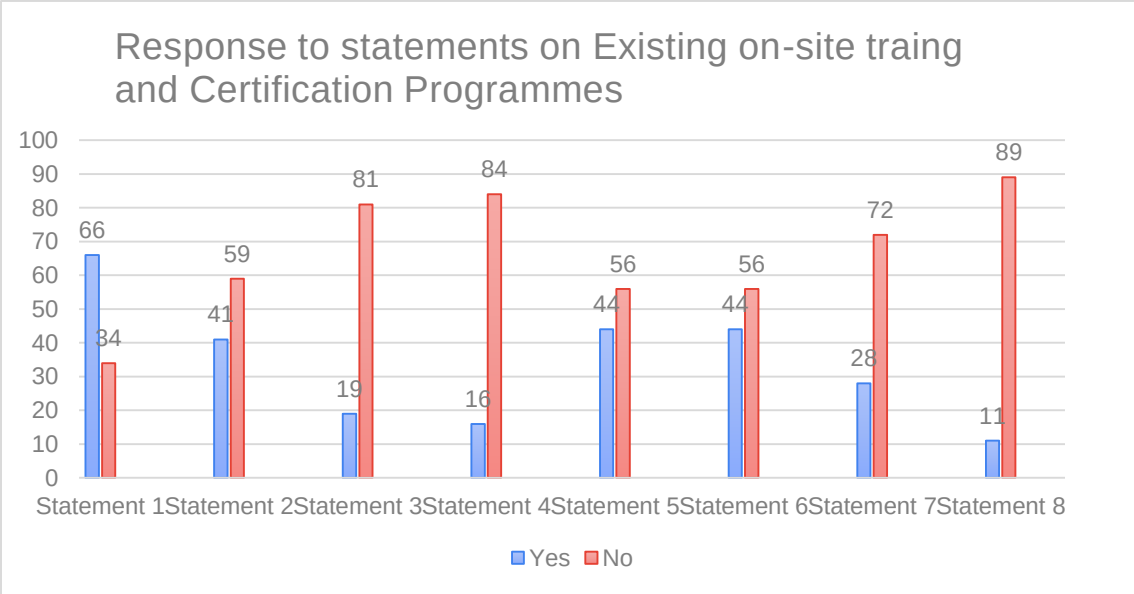

Figure 4.8: Extent of Awareness of the existing on-site training and certification programmes by Semi-skilled workers

Source: Field Survey, (2022)

In gauging the extent of awareness, majority of the semi-skilled workers,66%, were aware of statement 1 while 34% were not aware. The lack of awareness among the 34% could be attributed to the fact that, the statement gauged awareness of on-site training offered by governmental bodies while some of the workers had trained under non-governmental organizations. These findings suggest that the governmental bodies involved in training, need to improve on the frequency of their awareness raising campaigns and the tools used, to reach more semi-skilled workers.

Majority of the workers, 59%, were not aware of statement 2. Also, majority of the semi-skilled workers, 81% were not aware of statement 3. The lack of awareness of statement 2 and 3 among the 59% and 81% respectively could be attributed to the fact that the information about the application process for the training and the downloadable form, was available on the website of the respective authorities and majority of the semi-skilled workers had limited access to the online content. The findings suggest that the authorities

need to device more channels of communication with the semi-skilled workers. Majority of the semi-skilled respondents, 84%, were not aware of statement 4 while 16% were aware. The lack of awareness among the 84%, on statement 4 could be attributed to the fact that NCA apprenticeship programme had recently been rolled out in the year 2020 by NCA and they were still in the process of increasing awareness. Majority of the semi-skilled workers, 56%, were aware of statement 5 and 6, while only 44% were not aware. The lack of awareness among the 44% could be attributed to the fact that attending a trade test to receive a competency certificate was not compulsory among the semi-skilled workers. They could easily get provisional accreditation from NCA, enabling them work for a period of 3 years before the provisional accreditation expired. Therefore, they may not have been keen on the certification and the procedure involved in acquiring.

The findings suggest that the government, through bodies such as NCA and NITA, need to insist on the importance of the certification as a way of also improving the existing skill gaps. Majority of the semi-skilled workers, 72%, were not aware of statement 7 while only 28% were aware. Also, only 11% were aware of statement 8 while 89% were not aware. The lack of awareness could be attributed to the fact that NCA and NITA were still partnering with more training centers and construction companies to improve on-site training and the information may have not been readily available to the semi-skilled workers. The findings suggest that both governmental and non-governmental organizations involved in training need to improve and increase their communication platforms to the semi-skilled workers.

4.3.2 Rating Extent of Awareness of Existing On-Site Training and Certification Programmes by Semi-skilled workers

The 123 respondents were further required to rate their awareness based on their responses in the statements in 4.2.1 above. The results are as presented in the Table 4.6 and Figure 4.9

Table 4.6: Rating of Awareness of Existing On-Site Training and Certification Programmes by Semi-Skilled Workers

Rating of awareness by Semi-skilled Workers	Frequency	Percentage (%)	Cumulative percentage (%)
Not aware	0	0	0
Poorly aware	55	45	45
Moderately Aware	58	47	92
Highly Aware	10	8	100
Total	**123**	**100**	

Source: Field Data, (2022)

The information in the Table 4.6 above can be represented as a bar chart as shown in Figure 4.9

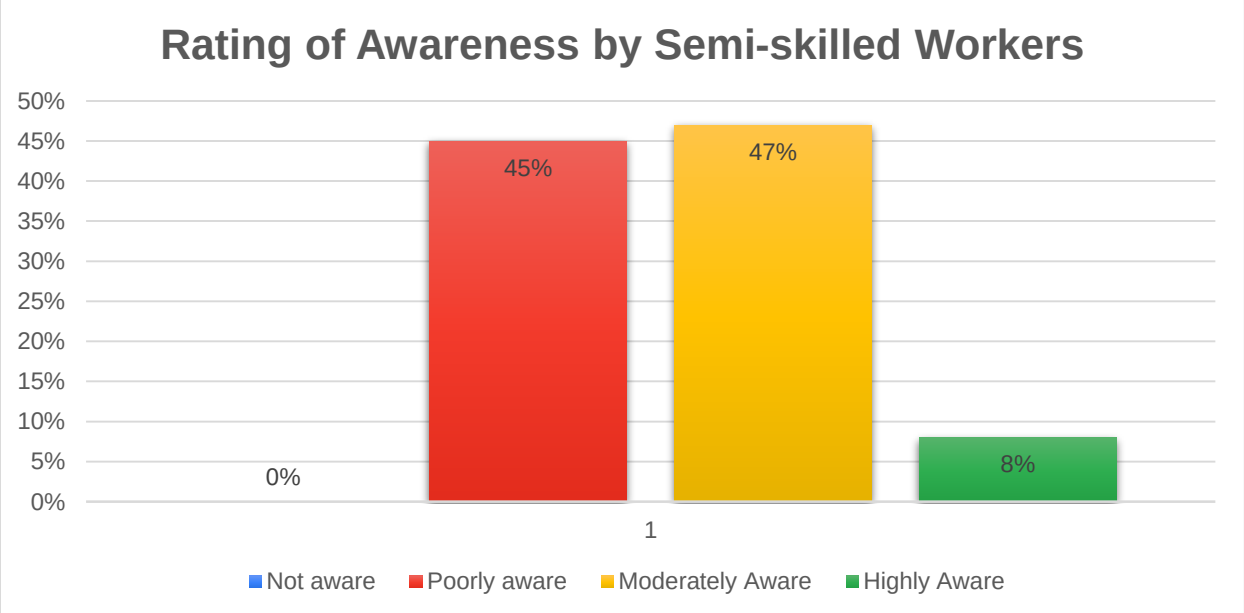

Figure 4.9: Rating of Awareness of Existing On-Site Training and Certification Programmes by Semi-Skilled Workers

Source: Field data, (2022)

47% of the total 123 respondents, were moderately aware of the existing on-site training and certification programmes whereas 45% of the respondents were poorly aware. Only 8% were found to be highly aware. These results show that the majority of semi-skilled workers in Kenya's construction sector lack adequate knowledge of the country's current on-site training and certification programs. In this instance, the semi-skilled workers' level of knowledge would be regarded sufficient if they were aware of the entire training procedure, whether with governmental or non-governmental groups, and how they would proceed to receive a competency certificate from NITA. Therefore, these findings suggest that the governmental and non-governmental bodies involved in training and certification still have a role to play in increasing awareness through diversifying their communication and awareness raising tools with an aim of reaching more semi-skilled construction workers.

4.4 Training Needs of Semi-Skilled Workers

One of the specific objectives of the survey was to describe the training needs of the semi-skilled workers. This section aimed at describing their training needs and also understanding, from the site manager's perspective, the training areas captured during their recent on-site training session. It was expected that the training needs of the workers were taken into consideration as a measure of reducing the existing skill gaps.

4.4.1 Training Areas that Appeal to Semi-Skilled Worker in a Construction Site

The respondents were required to indicate a single training area that appealed to them the most with a view of establishing their most pressing training needs. The Table 4.7 shows the summary of their responses.

Table 4.7: Training Areas that Appeal to the Semi-Skilled Worker in a Construction Site

Training Area	Frequency	Percentage (%)
Masonry	22	18
Plumbing	15	12
Electrical (Wiring)	12	10
Carpentry	9	7
Site health and safety	9	7
Drawings interpretation	8	7
Welding and fabrication	7	6
Water supply/ waste management	7	6
Types of Construction materials	5	4
Roofing	5	4
Tiling	5	4
Steel fixing	4	3
New construction technology and innovations	4	3
Basic building construction process	3	2
Painting	3	2
Inspection of construction materials	2	2
Basic measurement and cost estimation in building construction	2	2
Communication skills	1	1
TOTAL	**123**	100

Source: Field Data, (2022)

The highest percentage of semi-skilled workers, at 18%, were interested in training and certification in masonry. This was followed by 12% in plumbing, 10% in electrical (wiring) and the lowest, 1% in communication skills. Among other needs, these findings indicate greater interest for masonry, plumbing and electrical training among semi-skilled workers. The interest could be accredited to the fact that the top three trades offer work that takes longer to complete in construction sites as compared to other trades hence the worker is assured of employment for a longer time.

In addition, compared to masonry, other training fields like electrical (wiring) demand hi gher levels of analytical and mathematical skills from applicants. This could explain why masonry appeals more to the semi-skilled workers as compared to electrical (wiring). These findings suggest a priority area of focus for training and certification bodies such as NCA and NITA. The bodies could focus more on the trade areas and formulate a framework that promotes quicker accreditation on the trade areas that appeal the most to the semi-skilled construction workers.

4.4.2 Training Areas Captured During On-Site Training Sessions

The aim of this section was to understand from the site manager, the training areas captured during the training sessions in the selected active construction sites in Nairobi City County. The responses of the site Managers were summarized as shown on Table 4.8

Table 4.8: Training Areas Captured During On-site Training Sessions

Training Area	Contractor	Percentage (%)
Site health and safety	14	27
Masonry	8	15
Plumbing	5	10
Steel Fixing	4	7
Painting	4	7
Welding and fabrication	3	6
Electrical (Wiring)	3	6
Carpentry	2	4
Tiling	2	4
New construction technology and innovations	2	4
Basic building construction process	2	4
Types of Construction materials	1	2
Roofing	1	2
Inspection of construction materials	1	2
TOTAL	**52**	100

Source: Field Data, (2022)

Majority of the selected construction sites, 27%, offered health and safety training to the semi-skilled workers. The findings could be due to the measures taken by the contractors and NCA to help reduce the number of accidents and risk of injury on construction sites. Also, construction sites risk closure or penalties from the county public health officials for non-compliance particularly with regard to health and safety.

Masonry and plumbing contributed 10% and 9% respectively, which was noted to be in accordance with the training needs of the majority of semi-skilled workers. Roofing works which was offered by sub-contractors, contributed the least at 1%. The relationship between the data in Table 4.7 and that in Table 4.8 indicate that there are measures being taken to enable training on site that is in tandem with the needs of the workers, albeit minimal.

4.5 Existing On-Site Training and Certification Programmes

One of the specific objectives of the study was to identify the existing on-site training and certification programmes offered at the construction sites in Kenya. The aim of this section was to identify the existing on-site training and certification programmes and their features that included: training techniques used, type of programmes, Frequency of on-site trainings, Duration, Organizers of the training and certification. The respondents, who were in this case the site managers, were also asked to give their perspective on the drivers of training by ranking them on a 5-point Likert scale.

As a way of screening the respondents who would continue with the survey, the site managers were categorized into two; those who had at some point conducted on-site training and certification at the construction site made the first category whereas those who had never conducted on-site training and certification at the construction site made the second category. Table 4.9 and Figure 4.10 below summarizes the respondent's responses.

Table 4.9: Active Construction Sites in Nairobi City County conducting On-Site Training and Certification.

Active construction sites that are Conducting or have conducted on-site training and certification before	Frequency	Percentage (%)	Cumulative percentage (%)
Yes	52	72	72
No	20	28	100
Total	**72**	**100**	

Source: Field Data, (2022)

The information in the Table 4.9 above can be represented as a pie chart as shown in Figure 4.10

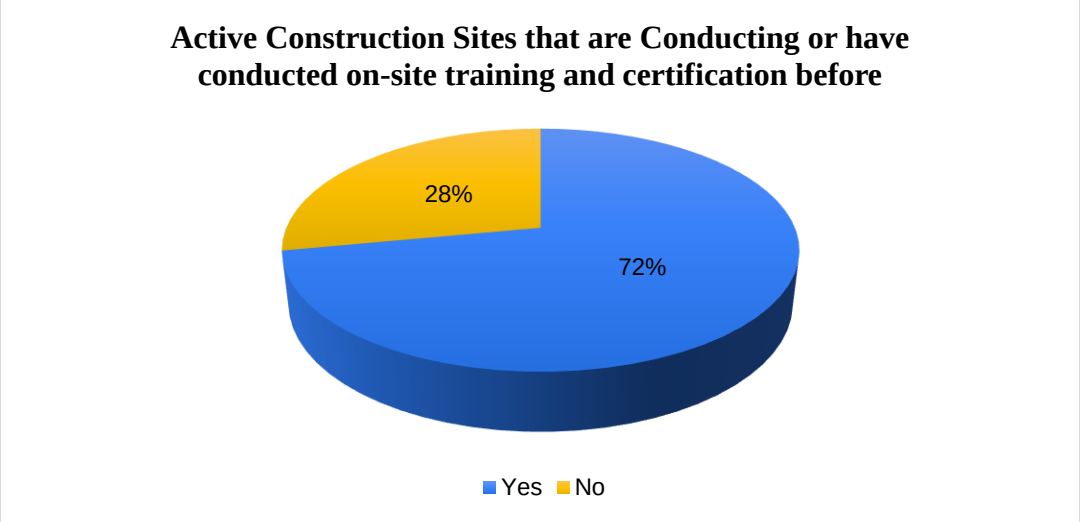

Figure 4.10: Active Construction Sites in Nairobi City County conducting On-Site Training and Certification.

Source: Field Data, (2022)

4.5.1 Training Technique

This section aimed at identifying the training techniques used to train the semi-skilled workers on active construction sites that reported to have conducted on-site training. The data was obtained from site managers. Each category of respondents was required to give one response, based on the latest training session conducted. The data on Table 4.10 and Figure 4.11 summarizes the responses of the site managers

Table 4.10: On-Site Training Techniques Used According to Site Managers

Training techniques according to Site Mangers	**Response Frequency**	**Percentage (%)**	**Cumulative percentage (%)**
Coaching	14	27	27
Mentoring	13	25	52
Apprenticeship	8	16	68
Sensitivity	8	16	84
Job Instruction Training	4	8	92
Vestibule	3	5	97
Job rotation	2	3	100
TOTAL	52	100	

Source: Field Data, (2022)

The information in the Table 4.10 above can be represented as a bar chart as shown in Figure 4.11

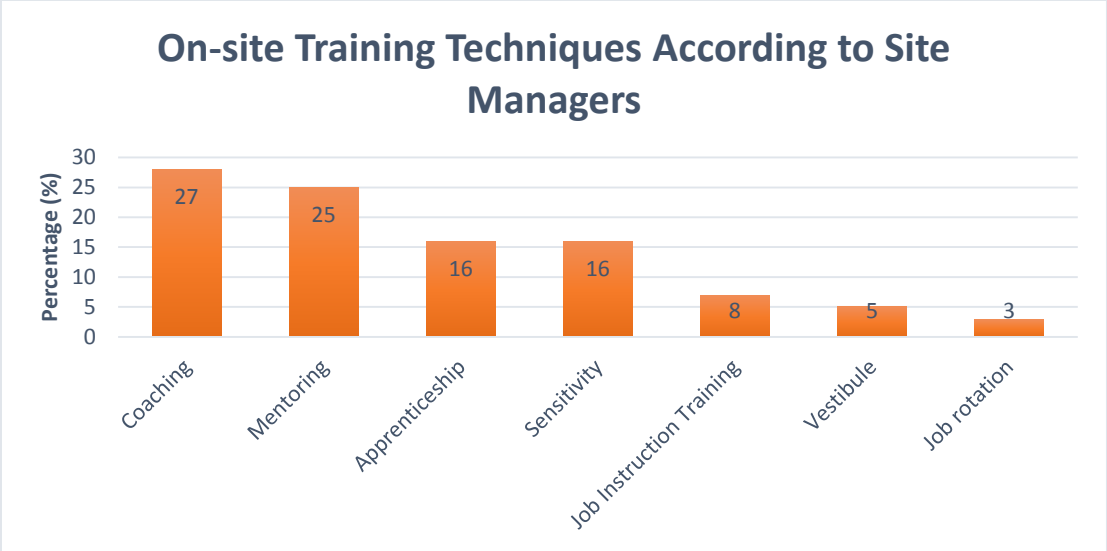

Figure 4.11: On-Site Training Techniques Used According to Site Managers

Source: Field Data, (2022)

The most common on-site training technique reported was coaching, at 27% closely followed by mentoring at 25%. The reason for this finding could be accredited to the fact that on-site training takes a practical approach and it is more effective when an expert or an experienced employee demonstrates the task and share experiences for the semi-skilled workers to learn from. Also, feedback can be given immediately to the semi-skilled worker and is tailored based on the work done at that particular time. Vestibule and job rotation recorded the lowest prevalence at 5% and 3% respectively.

Semi-skilled workers also mentioned the training methods that were applied during the on-site training where this was possible. This is because some semi-skilled employees might have gone to a training elsewhere. Since some semi-skilled respondents hadn't followed up on the training's specifics, they were unaware of the details. Majority of the semi-skilled respondents, 97% were able to describe the techniques that had been used during on-site trainings. The data on Table 4.11 and Figure 4.12 summarizes the responses of the semi-skilled workers.

Table 4.11: On-Site Training Techniques used according to Semi-Skilled Workers

Training techniques according to semi-skilled workers	Response Frequency	Percentage (%)	Cumulative percentage (%)
Coaching	59	48	48
Apprenticeship	27	22	70
Mentoring	21	17	87
Vestibule	8	7	94
Job Instruction Training	4	3	97
Not Aware	4	3	100
TOTAL	**123**	**100**	

Source: Field Data, (2022)

The information in the Table 4.11 above can be represented as a bar chart as shown in Figure 4.12

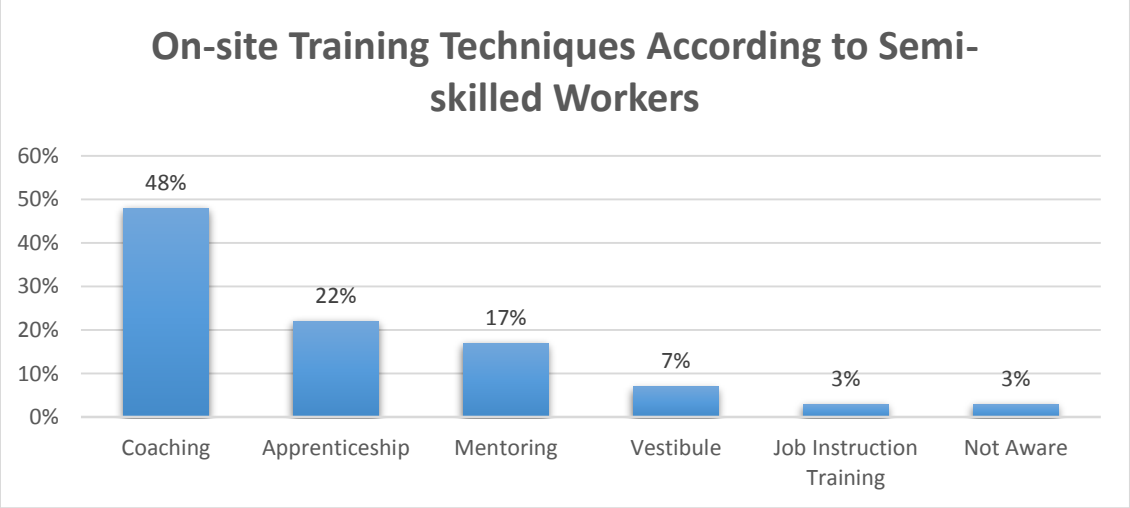

Figure 4.12: On-Site Training Techniques used according to Semi-Skilled Workers

Source: Field Data, (2022)

According to majority of semi-skilled respondents, the most common training technique used was coaching at 48% followed by apprenticeship at 22% and mentoring at 17%. Vestibule and Job instruction training techniques reported 7% and 3% respectively indicating minimal preference by trainers.

4.5.2 Type of Training Programme

The respondents, in this case the site managers, were required to indicate the type of training programme that had taken place in the constructions sites. They were required to provide a single response, based on the latest training session conducted. The data on Table 4.12 and Figure 4.13 summarizes the responses of the site managers

Table 4.12: Type of Training Programme offered According to Site Managers

Type of on-site training programme offered According to Site Managers	**Response Frequency**	**Percentage (%)**	**Cumulative percentage (%)**
Safety training	23	45	45
Skills training	11	22	67
Quality training	8	13	80
Technical or technology training	10	20	100
Total	**52**	**100**	

Source: Field Data, (2022)

The information in the Table 4.12 above can be represented as a bar chart as shown in Figure 4.13

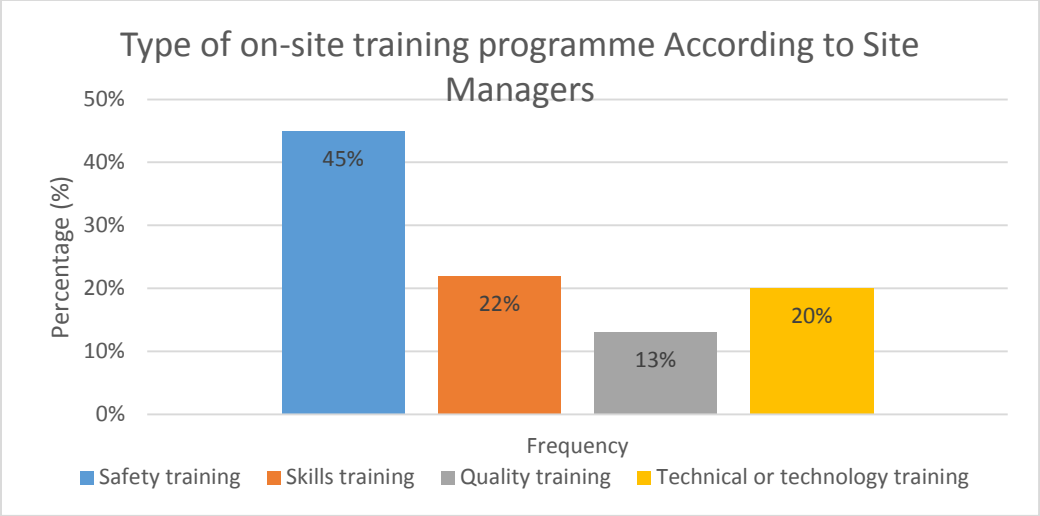

Figure 4.13: Type of Training Programme offered According to Site Managers

Source: Field Data, (2022)

At 45%, Safety training was the most prevalent training programme in active construction sites in Nairobi County. Distantly, behind were skills and technical training programmes at 22% and 20 % respectively. The least was quality training with a percentage of 13%. This was attributed to the fact that the first three programmes could be executed with the minimum available resources on site. Also, safety training was conducted to reduce the number of accidents on site, hence, risks related to loss of lives.

4.5.3 Frequency of On-site Training

The objective of this section was to establish the frequency of conducting training in the selected active construction sites in Nairobi City County. The site managers provided insight on the frequency of training in their respective construction sites as shown in Table 4.13 and Figure 4.14 below;

Table 4.13: Frequency of Conducting On-Site training

Frequency of Conducting On-site training	Frequency	Percentage (%)	Cumulative percentage (%)
Weekly	4	8	8
Monthly	20	38	46
Quarterly	13	25	71
Yearly	12	24	95
Rarely	3	5	100
Total	**52**	**100**	

Source: Field Data, (2022)

The information in the Table 4.13 above can be represented as a bar chart as shown in Figure 4.14

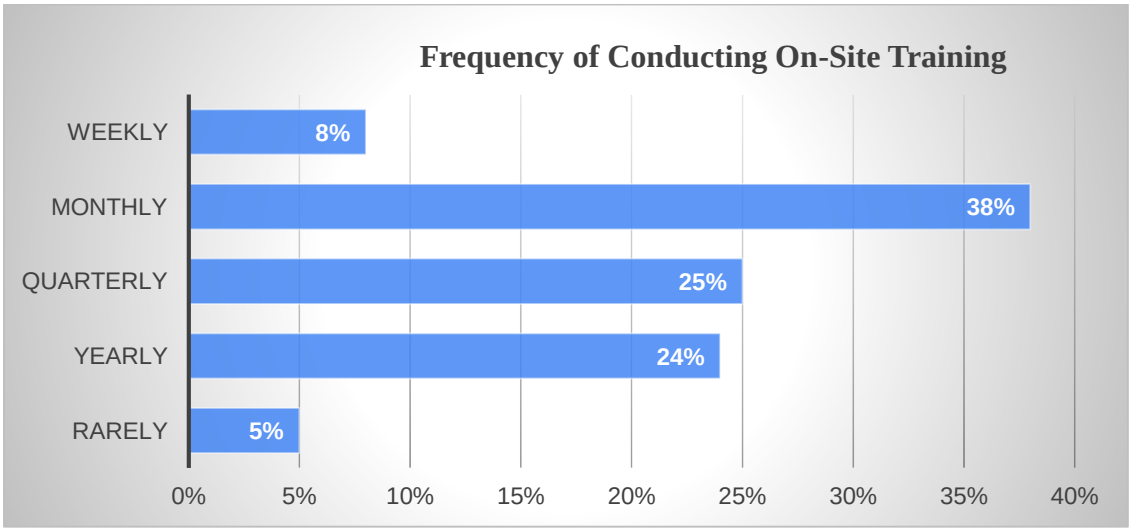

Figure 4.14: Frequency of Conducting On-Site training

Source: Field Data, (2022)

Majority of the selected active construction sites conducted on-site training programmes on a monthly basis accounting for 38%. Some chose to have the trainings quarterly and yearly which represented a frequency of 25% and 24% respectively. Those who conducted training at intervals of more than one year, accounted for 5% which implied rare occurrence. Weekly trainings on the other hand stood at 8% indicating less prevalence. This could be attributed to the difficulty of organizing and conducting training on weekly basis given most tasks on construction sites take more than a single week. Also, other factors such as cost and availability of expert trainers could have accounted to the frequency distribution.

4.5.4 Duration of On-site Training and Certification Programme

The aim of this section was to determine the duration of the on-site training and certification programmes undertaken in the selected active sites that reported to have conducted training. The site managers were required to indicate the duration of the most recent training session held at their construction sites. Their responses were analyzed and are presented in Table 4.14 and Figure 4.15 as shown below;

Table 4.14: Duration of On-Site training

Duration of the On-site training programme	Frequency	Percentage (%)	Cumulative percentage (%)
0-7 days	42	81	81
7-14 days	2	4	85
14-21 days	4	7	92
21-28 days	1	3	95
Over 28 days	3	5	100
Total	**52**	**100**	

Source: Field Data, (2022)

The information in the Table 4.14 above can be represented as a bar chart as shown in Figure 4.15

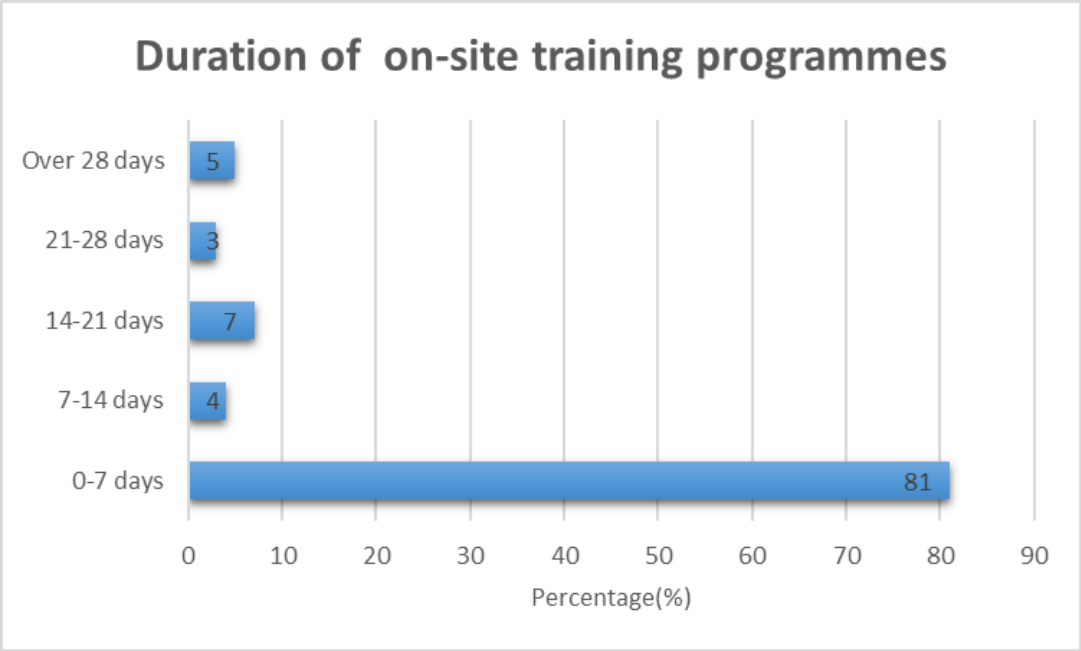

Figure 4.15: Duration of On-Site training

Source: Field Data, (2022)

The largest percentage of site supervisors reported to have held training in their sites for durations not longer than seven days accounting for 81%. This may be due to the pressure that contractors are subject to in their bid to try and deliver within strict deadlines and budgets. A few supervisors indicated durations longer than seven days which accounted for less than 10% in each category as shown in Table 4.14 above. Such occurrences were recorded mostly by supervisors who reported to have had apprenticeship training programmes within their sites.

4.5.5 Organizers of On-site Training and Certification Programme

In this section, the respondents who were the site managers were required to indicate the organizers of the on-site training programme. The respondents were required to select between government, non-governmental bodies and in some other cases, both. The results are as presented in the bar chart shown in the Figure 4.16 below

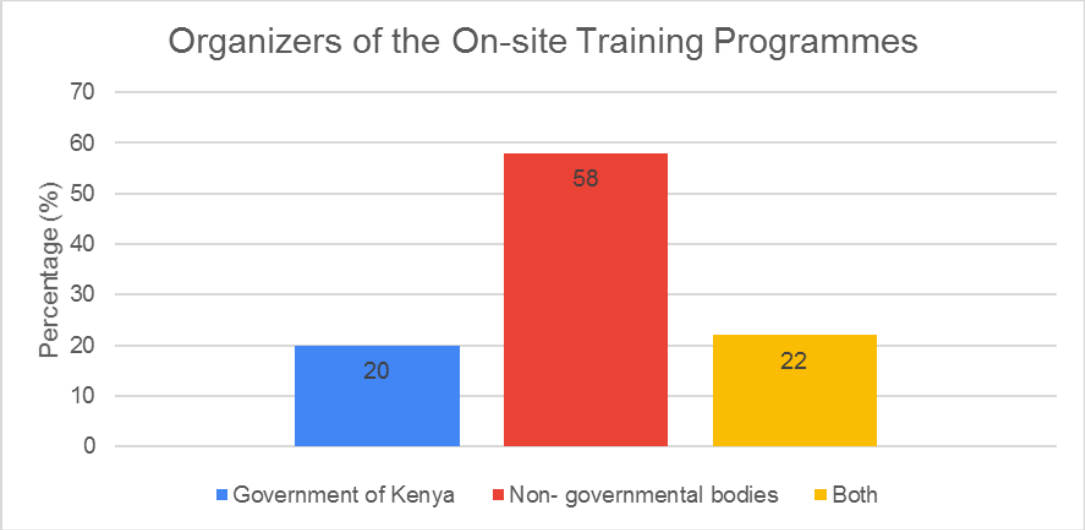

Figure 4.16: Organizers of On-site Training Programme

Source: Field Data, (2022)

Most of the on-site training programmes reported by site supervisors were organized by non-governmental bodies which made up 58%. Governmental bodies and partnerships between the governmental and non-governmental bodies accounted for 20% and 22% respectively. Most contractors, who were part of the non-governmental bodies, were undertaking training by themselves hence the high percentage recorded for non-governmental bodies. Even so, government bodies were also working hard to bridge that gap either by undertaking training directly or through partnerships with non-governmental stakeholders.

4.5.6 Certification

This section aimed at establishing the percentage of on-site training programmes that resulted into a form of certification to the semi-skilled workers. The site managers were required to indicate whether or not the semi-skilled workers were awarded certificates or any other form of recognition at the end of the most recent training conducted, within their sites. The data on Table 4.15 and Figure 4.17 below summarizes the findings;

Table 4.15: Certification received by Semi-Skilled Workers

Certification received	Frequency	Percentage (%)	Cumulative percentage (%)
Yes	26	50	50
No	26	50	100
Total	**52**	**100**	

Source: Field Data, (2022)

The information in the Table 4.15 above can be represented as a pie chart as shown in Figure 4.17

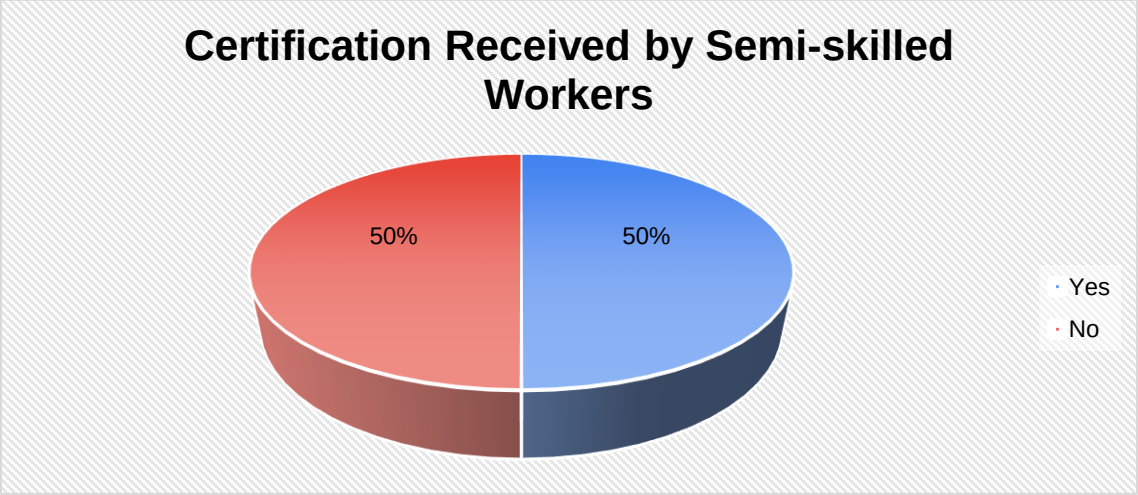

Figure 4.17: Certification received by Semi-Skilled Workers

Source: Field Data, (2022)

The findings presented a tie between semi-skilled workers who were awarded for their attendance of training and those who were not. Some workers reported that they had received certificates of participation or attendance from trainings organized by non-governmental organizations. Those who attended NCA sponsored programmes received provisional accreditation cards by the Authority as evidence of their attendance.

In contrast, an equal number of semi-skilled workers in the construction industry in Kenya did not receive any form of certification or accreditation even after they attended training events. Most of such workers are those who attended in-house trainings carried out by contractors themselves as part of sensitization and mentoring. Since the future of the construction industry seems to be anchored on such certification, workers who don't receive recognition represent a wasted opportunity. Lack of competency certification could result in duplication of trainings and this could kill the morale of workers.

4.5.7 Rating Effect of On-site Training and Certification Programme on Job Performance

In this section, the site managers were requested to rate the impact of training on job performance in relation to those workers who had trained on site. Their responses are as presented on Table 4.16

Table 4.16: Rating Effect of On-Site Training on Job Performance

Rating Effect of On-Site Training on Job Performance	Frequency	Percentage (%)	Cumulative percentage (%)
Not at all	0	0	0
Little	0	0	0
Somewhat	3	6	6
To a great Extent	26	49	55
To a very large extent	23	45	100
Total	**52**	**100**	

Source: Field Data, (2022)

Majority of site supervisors, 49%, indicated that the on-site training programmes held on their construction sites had positive impact on the semi-skilled workers to a great extent and almost an equal percentage, 45%, indicating a very large extent. The supervisors who had an average opinion, 6% explained that they could not exactly affirm the improvement

in the semi-skilled workers because most of the workers kept shifting from site to site making it difficult to assess improvement satisfactorily.

4.5.8 Drivers of Training

The respondents, who were the site managers, were required to rank the drivers of training. Mean scores of the items and standard deviations were computed to facilitate in the ranking of the findings. These findings were to offer understanding on the drivers that had the most influence on training at the construction sites. The results are as shown on Table 4.17 and Figure 4.18 below

Table 4.17: Ranking of the Drivers of Training at the Construction Sites

	Response Frequencies					Mean and Standard Deviation	
	1	**2**	**3**	**4**	**5**	**Mean**	**Standard Deviation**
Quality Management	0	0	13	18	41	**4.39**	**3.93**
New Technology and Product Innovation	0	5	11	13	43	**4.31**	**3.89**
Workplace Change	2	5	36	21	8	**3.39**	**2.98**
Business Plans which include Training	6	11	34	11	10	**3.11**	**2.78**
Proportions of Managers and Professionals in the Workforce	5	18	24	15	10	**3.10**	**2.79**
Industrial Awards with Training Clauses	7	22	17	18	8	**2.97**	**2.69**
Coverage of Employee by Industrial Awards	7	23	18	14	10	**2.96**	**2.69**

Source: Field Data, (2022)

The information in the Table 4.17 above can be represented using an error bar as shown in Figure 4.18

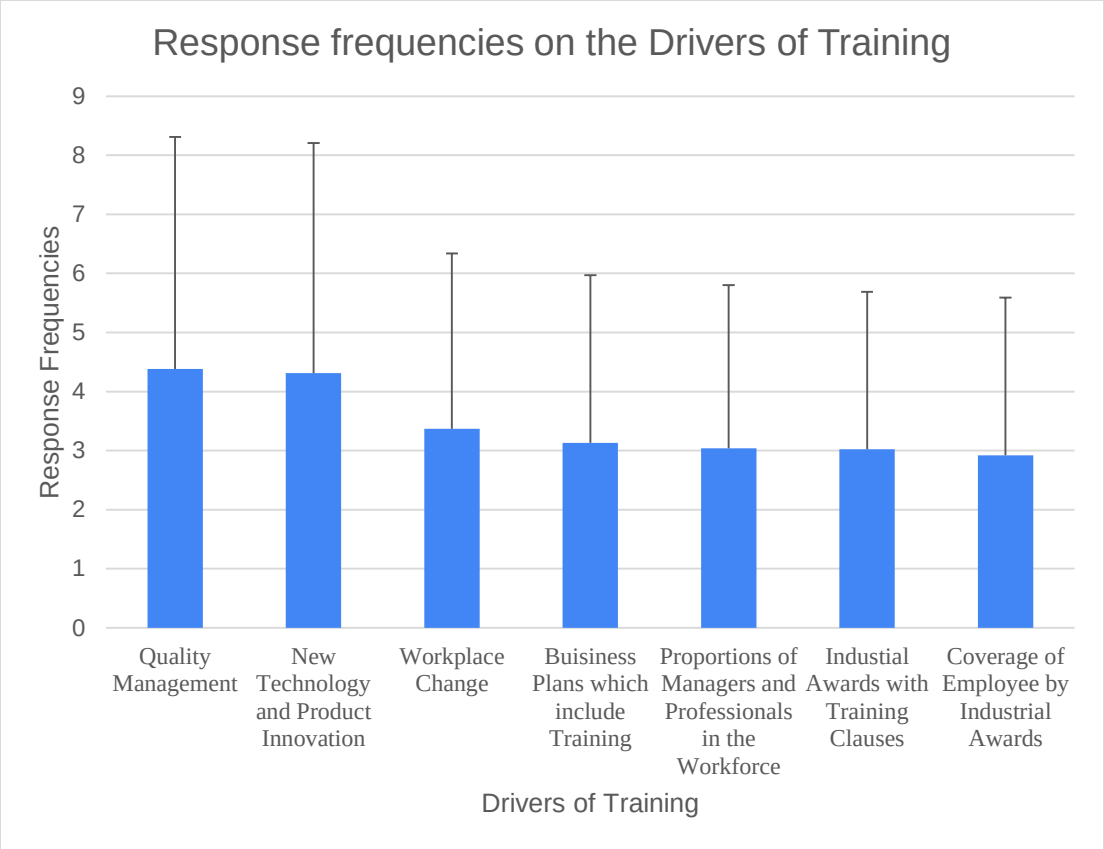

Figure 4.18: Ranking of the Drivers of Training at Construction Sites

Source: Field Data, (2022)

In reference to Table 4.17, quality management scored the highest level with a mean of 4.39 (standard deviation=3.93). New technology and product innovation ranked second on the drivers of training with a mean of 4.31 (standard deviation= 3.89). Work place change ranked third with a mean score of 3.39 (standard deviation= 2.98). Industrial awards with training clauses and coverage of employee by industrial awards ranked six and seven with mean scores of 2.97 (standard deviation=2.69) and 2.96 (standard deviation=2.69) respectively.

4.6 Existing Communication and Awareness Tools Utilized in Awareness-Raising of Existing On-Site Training and Certification Programmes

This section was to examine the communication and awareness tools utilized in raising awareness to the semi-skilled workers, of existing on-site training and certification programmes. The respondents, in this case both semi-skilled workers and site managers were required to indicate the communication and awareness raising tools used The Table 4.18 and Figure 4.19 summarizes their responses

Table 4.18: Communication and awareness tool used by site managers

Awareness tool used by Site Managers	**Frequency**	**Percentage (%)**	**Cumulative percentage (%)**
Direct Communication	48	92	92
Advertising	4	8	100
Publications	0	0	
Press release	0	0	
Total	**52**	**100**	

Source: Field Data, (2022)

The information in the Table 4.18 above can be represented using a bar chart as shown in Figure 4.19

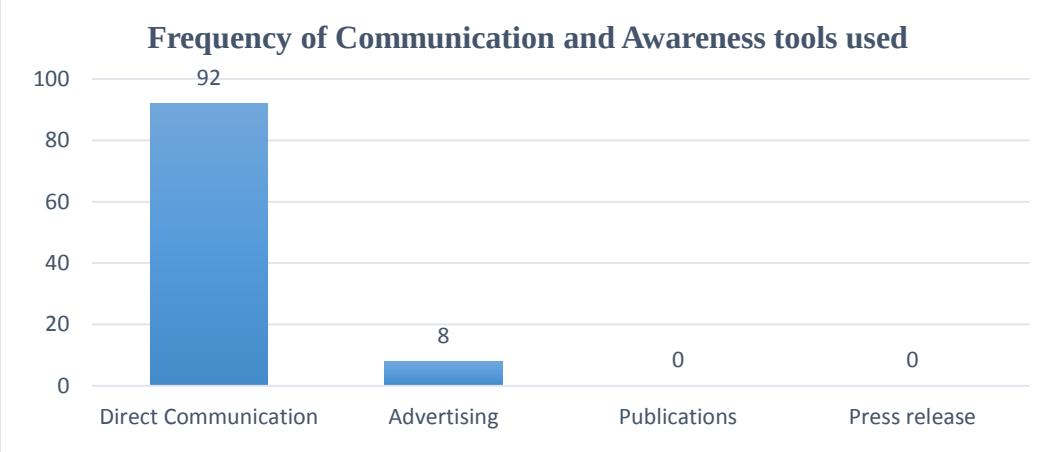

Figure 4.19: Communication and Awareness tool used by Site Managers

Source: Field Data, (2022)

92% of Site managers reported direct communication to be the most common tool used to create awareness about on-site training for semi-skilled workers. The preference for direct communication was based on the fact that they were in constant contact with semi-skilled workers on their site. This made direct communication the easiest and most convenient tool of communicating and raising awareness levels on any planned training events relating to the workers. Most on-site trainings organized by governmental bodies used direct mode of communication. Very few site managers, 8%, had employed advertising through mass communication media to communicate to semi-skilled workers about training activities. Such cases were few on the account that advertising training sessions was expensive.

Semi-skilled workers were also required to indicate the communication and awareness tools through which they learnt about the existing on-site training and certification programme. This was either the construction sites they were presently working in or other sites they had previously worked. The summaries of their responses are as indicated in the Table 4.19 and Figure 4.20

Table 4.19: Communication and awareness tool used according to semi-skilled workers

Awareness tool used	Frequency	Percentage (%)	Cumulative percentage (%)
Direct Communication	92	75	75
Advertising	22	18	93
Publications	9	7	100
Press release	0	0	
Total	**123**	**100**	

Source: Field Data, (2022)

The information in the Table 4.19 above can be represented using a bar chart as shown in Figure 4.20

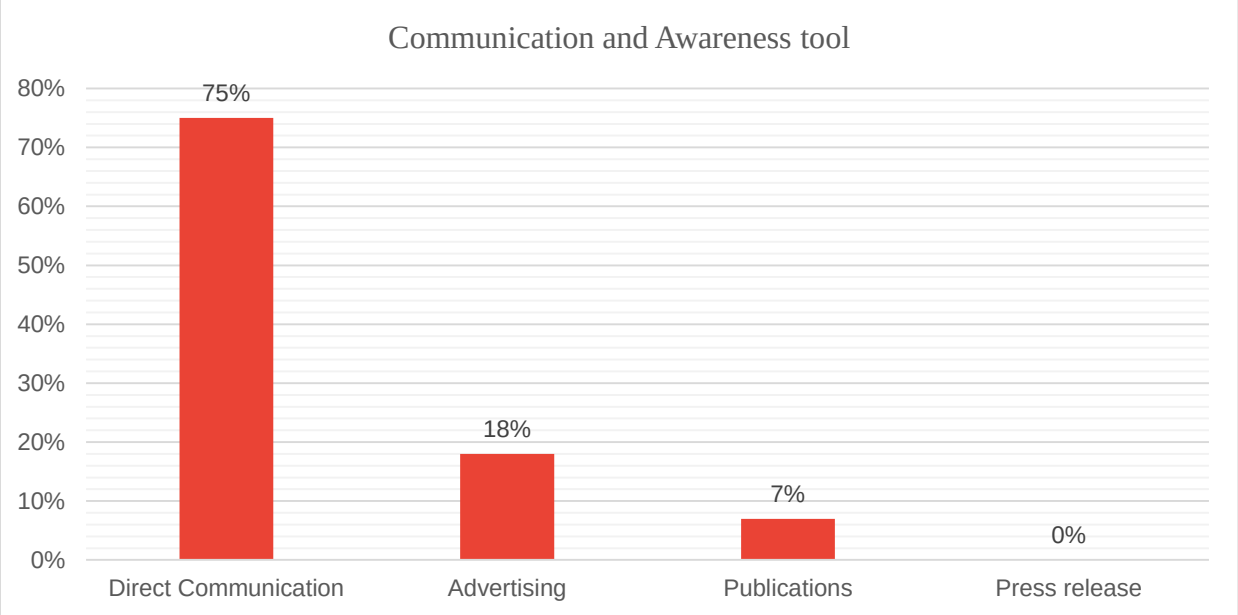

Figure 4.20: Communication and Awareness tool used according to Semi-Skilled Workers

Source: Field Data, (2022)

Direct communication was reported to be the most prevalent awareness communication tool among semi-skilled construction workers at 75%. This depended on word of mouth and direct visits by officials from the organizing bodies. Advertising followed at a distant, 18%, subsequently followed by publications at 7%. No semi-skilled worker reported to have received communication via press releases by any of the training bodies.

4.7 Rating Attendance of On-site Training and Certification programmes by Semi-Skilled Workers

In this section, the site managers were required to rate the attendance of on-site training and certification programmes by the semi-skilled workers. This aimed at gauging the awareness of the semi-skilled based on attendance according to the site managers' perspective. Also, the effectiveness of the communication and awareness tool used in raising awareness. Table 4.20 and Figure 4.21 summarizes the responses of the site managers.

Table 4.20: Attendance of On-Site Training and Certification Programmes by Semi-Skilled Workers.

Rating Attendance of On-Site Training and Certification Programmes by Semi-skilled workers	**Frequency**	**Percentage (%)**	**Cumulative percentage (%)**
Very Poor	0	0	0
Poor	3	6	6
Fair	10	19	25
Good	24	46	71
Excellent	15	29	100
Total	**52**	**100**	

Source: Field Data, (2022)

The information in the Table 4.20 above can be represented as a bar graph as shown in Figure 4.21

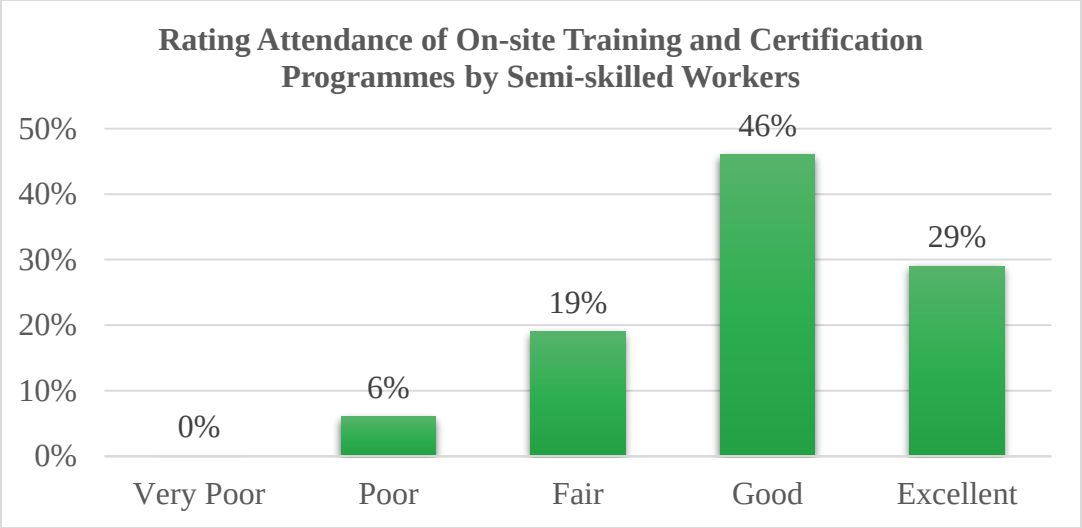

Figure 4.21: Attendance of On-Site Training and Certification Programmes by Semi-Skilled Workers.

Source: Field Data, (2022)

46% of the site supervisors expressed great satisfaction with the attendance by semi-skilled workers whereas 29% expressed overwhelming satisfaction. This represents a cumulative percentage of over 50% of the total number of respondents thus implying a commendable degree of satisfaction in both the attendance and communication tools used. It is worth noting that 19% were fairly impressed by the attendance by semi-skilled workers and that 6% of the respondents felt that the attendance by the workers was poor. The poor attendance could have been attributed to expenses associated with transport and meals especially for the venue-based training. Some semi-skilled workers were also afraid of losing their daily wages especially in cases where training was conducted in a different venue, since remuneration was on a daily basis. These findings suggest that financial support by the organizing bodies especially during the training period could go a long way in improving attendance.

4.8 Willingness to Attend On-site Training and Certification Programmes among Semi-Skilled Workers

The researcher was keen to gauge the willingness to attend on-site training among semi-skilled workers and to identify factors that motivated their decisions. The targeted respondents were semi-skilled workers and their responses are as shown in the Table 4.21 and Figure 4.22

Table 4.21: Willingness to Attend On-site training and certification programmes among Semi-Skilled workers

Willingness to Attend	**Frequency**	**Percentage (%)**	**Cumulative percentage (%)**
Yes	123	100	100
No	0	0	100
Total	**123**	**100**	

Source: Field Data, (2022)

Although the attendance of the semi-skilled workers was not 100%, all respondents expressed willingness to attend on-site training whenever offered. These findings indicate that there exist barriers to such trainings. Such barriers could be financial or limited time. Some semi-skilled workers were afraid of losing their daily wage by attending trainings offered away from the construction site. This means that some had limited time to commit to training due to work demands at the construction site. However, the semi-skilled workers cited the following as their motivating factors in order of importance; more income, more job opportunities, reduced layoffs, improve knowledge and skills and better on-job performance

The information can be represented in an inverted pyramid as shown in Figure 4.22

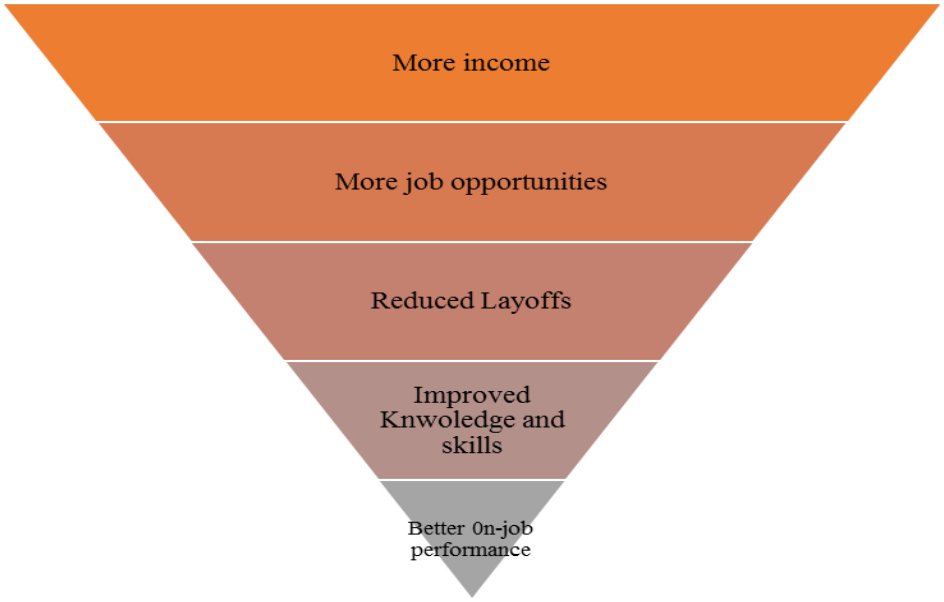

Figure 4.22: Motivating Factors in order of importance

Source: Field Data, (2022)

4.9 Suggested Measures to Raise the Level of Awareness of Existing On-Site Training and Certification Programmes Among Semi-Skilled Workers

This section aimed at establishing some of the measures that can be put in place to improve the level of awareness of the existing on-site training and certification programmes among the semi-skilled workers. To achieve this, the site managers and semi-skilled workers were required to give their suggestions on some of the measures that can be put in place. The measures were as presented below:

Increase the frequency of awareness-raising campaigns; the authorities, NCA and NITA, should diversify the awareness communication tools other than being over reliant on direct communication; NCA and NITA should increase the frequency of field visits and make them more interactive; the authorities, NCA and NITA, should seek more partnerships with contractors to improve communication and delivery of training; government should increase funding towards raising awareness and conducting on-site training; NCA should sensitize contractors on the existing and future incentives aimed at rewarding contractors who go out of their way to enable training of their semi-skilled workers.

4.10 Clarification by NCA, NITA and Expert in Academia, on Matters Relating to Existing On-site Training and Certification Programmes

The researcher reached out to major stakeholders concerned with training and certification of construction workers in Kenya for authoritative insight on the existing on-site training programmes for semi-skilled workers. Using a single interview schedule the researcher was able to interview three officials, each drawn from: a government technical training institution, Department of Training and Capacity Building of the NCA and department of industrial training and skills development of NITA respectively, as respondents. The interviews were conducted separately within the precincts of the respondents' organizations, recorded and summarized into a question and answer format. The transcript of the interview is as shown below;

Literature that has been reviewed in the study indicates that there are existing on-site training and certification programmes for the semi-skilled workers in Kenya. Do you agree with this? What are some of the on-site training programmes being offered currently to the semi-skilled construction workers to improve the existing skill gap?

All respondents agreed that on-site training and certification programmes for semi-skilled construction workers in Kenya did exist.

The respondent from the training institution indicated that several training institutions were in partnership with NITA as training centers to train only. Once the trainees met the stipulated number of training hours, they received certificates of attendance from the institutions before proceeding to take trade tests at NITA. If successful in the tests, the workers would then be certified by NITA.

However, the expert lamented low training uptake by semi-skilled workers. According to him, semi-skilled workers in the construction industry work to earn for survival. Going for training within the institution without earning was deemed a waste of time and a big risk to survival. Given that most of the training institutions charged fees, the financial burden of raising training fees coupled with rather more urgent basic needs, proved difficult for

many of the workers. He however stated that, some institutions were offering training scholarships, fee subsidies and flexible training hours to encourage uptake by prospective trainees.

The respondent from the NCA explained that on-site training programmes for semi-skilled workers offered by the authority fall into two categories; on-site sensitization where workers are sensitized for a maximum of two hours per construction site and on-site apprenticeship programme where a semi-skilled worker works under a skilled worker for six months. The semi-skilled worker is required to keep a daily log of training activities and undergo assessment by experts from the authority on a weekly basis. After the lapse of the six months of training, the trainee is allowed to book and take a trade test by NITA. Upon certification by NITA the worker could be fully accredited by NCA.

On the other hand, on-site sensitization does not offer any certification to the workers. However, it provides a chance to give provisional and full accreditation cards to semi-skilled workers who show competency but do not possess competency certificates. Provisional accreditation cards expire after 3 years and are non-renewable. The workers are then expected to obtain a competency certificate for full accreditation through NITA assessed grade tests or an approved technical training institution.

The respondent from NITA clarified that the authority offers training. The authority is also an examining body which conducts trade tests for trainees that have already acquired the skills elsewhere; either through the various accredited training centers or in accredited construction companies. The authority is open for trainees to take tests three times a year; in April for all grades, August for grades I and II and December for grade III.

Are there any construction sites accredited as training centers by NCA or NITA? How would you rate the attendance of the on-site training by semi-skilled workers? Are there any measures that have been put in place to improve this attendance?

NCA clarified that there were no specific construction sites that had been accredited by the authority as training centers. On-site training is done by the Authority during planned visits

or through an apprenticeship programme and can be carried out within any construction site that is in good standing with NCA.

Attendance by semi-skilled workers to on-site sensitization training offered by the NCA was reported to be ‘impressive’ by the respondent. She rated the attendance at 80% which implied very good attendance. On the contrary, the NCA apprenticeship programme had very low uptake. She attributed this to the fact that the programme had been recently rolled out in the year 2020, and was still picking up in terms of awareness among the target group.

To encourage better attendance, the host contractors are normally given 10 CPD points towards the renewal of their licenses by the authority whereas the workers are given merchandise such as caps and bags or sometimes provided with meals as incentive to attend. Also, the contractor is informed beforehand about the training to enable him or her plan and provide convenient time.

NITA too did not have specific construction sites accredited for training. The respondent clarified that NITA partnered with willing construction companies that paid training levy. Trainees from such companies would then proceed to take grade tests at NITA before certification. Such contractors would then be reimbursed afterwards.

The respondent rated the attendance of the on-site training by semi-skilled construction workers at 70%. He explained that most of the workers that attended were very enthusiastic about the trades they were practicing under. However, if the training was not conducted on the job where the semi-skilled worker was being paid by the contractor, some of them did not attend because of financial constraints.

To improve this, NITA introduced Recognition of Prior Learning (RPL) which aimed at enabling semi-skilled workers to train from wherever they were and only undertake the grade test by NITA before certification. Also, as good will, most training centers accredited by NITA were introducing free training to the semi-skilled workers who cannot afford.

What training areas have the largest skill gap and what are some of the measures put in place by NCA and NITA to ensure that the training needs of the semi-skilled workers are met?

All trades had people training in them, although masonry had the highest number of trainees according to the respondent from the training institution. As for carpentry, he noted that most people who train on site were not able to carry out good joinery works unless they were attached to a skilled carpenter for apprenticeship. Electrical did not have many trainees due to the analytical and mathematical skills required.

According to the NCA respondent, Quality training and safety training were areas with the greatest skill gap. During on-site sensitization programmes by the Authority, the semi-skilled workers were trained on issues of site safety such as use of PPE's while on site, use of proper tools during construction process, inspection and maintenance of equipment, adherence to occupational Health and Safety laws regulations and guidelines and adherence to MOH guidelines on Covid-19 prevention.

She emphasized that NCA through its partnership with NITA was helping improve the quality of work done on site since trainees could easily take grade tests and obtain competency certificates. NCA was using provisional accreditation to rope in more semi-skilled workers who would eventually need proof of competency from a recognized institution or NITA gained within the 3 years of provisional accreditation before being fully accredited.

With the introduction of RPL more semi-workers trained through various informal setups had a chance of taking tests and receiving certification in their trades through NITA. NITA has widespread training centers where workers can acquire all the skills they need before getting certified.

What communication and awareness tools are being used by NCA and NITA to improve the level of awareness of the existing on-site training and certification programmes for the semi-skilled workers? How would you rate the performance of the tools in raising awareness? How frequent are the awareness campaigns?

The respondent from the training institution highlighted that most training institutions relied on word of mouth from previous trainees as the main tool of awareness. Some had working websites and social media pages that could be accessed by semi-skilled workers for information concerning the training programmes.

Other than social media such as Facebook and twitter and adverts and notices on the authority's website, bulk SMS was the most commonly used awareness tool by NCA which maintains a database of a number of construction workers obtained during site visits. The respondent provided an effectiveness rating of 90% for the bulk SMS and 70% for social media in reaching the semi-skilled workers.

During quality assurance visits by the NCA officials, they engage workers and shed light about on-site trainings. The main language used during the training sessions is Kiswahili which most of the workers are conversant with. Sometimes, the Authority carries out awareness campaigns randomly but frequently.

NITA relied mainly on word of mouth and physical site visits. However, at times mobile SMS are used since majority of the workers have access to mobile phones. The researcher also got to understand that NITA allows trade tests to be conducted in vernacular to reach a larger audience with different levels of education.

Are there any challenges that have been experienced in raising awareness of the existing on-site and certification programmes for the semi-skilled workers? Kindly list some of the challenges and how they can be mitigated?

The respondent from NCA noted that they were facing some challenges in raising awareness among the semi-skilled workers. She explained that majority of the semi-skilled workers did not have smart phones which meant that they could not access social media which is an important awareness raising tool. With regards to bulk SMS, some of the workers had blocked promotional messages thereby locking out all messages from the Authority in as much as the Authority had their contacts. To mitigate these challenges, the respondent reported that the authority was increasing the frequency of site visits so as to reach as many semi-workers as possible. It was also trying to maximize the use of social

media to target workers and site supervisors or contactors that had access to the platforms, as they could easily engage the semi-skilled workers directly.

Both NCA and NITA respondents agreed that the greatest challenge had been the fact that most contractors operated on tight schedules to deliver projects and therefore did not consider training as important. They allowed very little time to train or sensitize workers which was not sufficient to ensure competency. Therefore, majority of the workers were left on their own to train and become competent while still working to deliver the project. As a way of trying to convince contractors to allow more time for training, the Authorities were making effort to reach the contractors beforehand. This allowed the host contractors to select a period that was convenient to them thus allowing more training time for the workers. In some cases, the Authorities carried out trainings jointly to maximize on the little time availed by the contractors. They would target high semi-skilled workers' turn-up days for example during concreting and excavation works.

What measures can be put in place to improve on-site training?

All the stakeholders agreed that there was room for improvement with regard to the delivery of on-site training for semi-skilled workers. The following are some of the measures and proposals put forward by different players involved;

a) The NCA through their Training and capacity building department was already making strides towards identifying the training needs of semi-skilled workers by undertaking annual needs assessment surveys among workers. The findings of such surveys assist the Authority to tailor more responsive training programmes to the workers' needs.
b) Both NITA and NCA were aiming at increasing the frequency and geographical coverage of trainings.
c) Both Authorities were focusing on raising the number of personnel charged with training. They felt that more experts would be able to reach more workers in many construction sites.

d) Through partnerships with tertiary institutions and other private stakeholders, the authorities aimed at building capacity of their staff for them to meet the dynamic needs of the workers.
e) If the numbers of trainers allowed, both authorities aimed at assigning trainers to regions that were of great familiarity to them especially when it came to language. That was targeting the reduction and subsequent elimination of language barriers during training.
f) The NCA planned to publish guide books, brochures, handouts and other reference materials targeting semi-skilled works, which would be distributed to them after physical training sessions.

4.11 Challenges Encountered during Field Investigation

During data collection stage of the research project, the researcher encountered various challenges that had an effect on the timelines of delivering the research project. However, the researcher took various measures as a way of mitigating the challenges. Some of the challenges encountered include:

Non-responsiveness of some of the respondents was the main challenge during data collection. The researcher had targeted 92 site managers in five sub-counties in Nairobi City County. Some of the site managers were very busy due to the strict timelines in delivering the projects and did not have time to respond to the researcher. The researcher had to leave an online questionnaire form to be filled at their convenience, which resulted in some not filling the questionnaires at all despite the phone calls and emails follow up. The researcher managed a response rate of 78% which was good for analysis.

The researcher had targeted 276 semi-skilled workers, with an aim of 3 semi-skilled workers in every selected active construction site. Some contractors denied authorization of the semi-skilled workers and the researcher had to leave a few printouts of the questionnaires to be filled by the semi-skilled workers during breaks and collected later.

Delayed response from the interviewees was also a challenge. The researcher had organized interviews with NCA and NITA officials and there was delay in response from the organizations. The organizations required the researcher to request for an interview by

writing a letter and waiting for their response. There was delay in response due to the busy schedules of the organizations and also the country's general elections. The researcher had to follow up by visiting their offices physically and making phone calls. This was a great constraint on time and the budget of the research. The researcher had to extend the timelines of delivering the research project by two weeks.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter consists of a summary of the study findings and conclusions are made based on the findings. The findings and conclusions are made in line with the study objectives. Recommendations have also been made on some of the measures that could be put in place to achieve greater awareness of the existing on-site training and certification programmes by the semi-skilled workers. Also, the chapter has recommended some of the areas that can be researched further in the future in on-site training and certification.

5.2 Summary of Study findings

The study aimed at investigating the extent of awareness of the existing on-site training and certification programmes by the semi-skilled construction workforce in Kenya. The study findings have been made in line with main and specific research objectives as outlined below:

5.2.1 Main Objective: To Investigate the Extent of Awareness of Existing On-Site Training and Certification Programmes by Semi-Skilled Construction Workforce in Kenya.

The objective aimed at establishing the awareness of the existing on-site training and certification programmes by the semi-skilled workers and rating their extent of awareness. The findings of the study showed that majority of the semi-skilled workers were aware of the existing on-site training and certification programmes. However, in terms of the extent of awareness, majority were either moderately aware or poorly aware.

The semi-skilled workers did not have adequate information concerning the on-site training and certification programmes offered by NCA and NITA and how they would go about in the application process of the programmes and the trade tests for certification purposes. Only a few, less than 10% of the respondents, were highly aware. These findings

suggest that governmental and non-governmental organizations involved in training need to increase their frequency and channels of communication and raising awareness of existing on-site training and certification programmes among semi-skilled workers. The study successfully attained the objective.

5.2.2 Objective One: To Describe the Training Needs of Semi-Skilled Workers in Construction Sites in Kenya.

One of the specific objectives of the study was to describe the training needs of the semi-skilled workers. To achieve this objective, the study sought to find out the most pressing training needs of the semi-skilled workers. The findings showed that masonry, plumbing and electrical (wiring), respectively, had the highest number of percentage. Communication skills had the lowest percentage indicating that it did not appeal to most of the workers. In most construction sites, masonry takes longer compared to other trades and therefore a worker is assured of employment for a longer time. This explains why the trade appealed to most of the semi-skilled workers.

The study also sought to understand from the site managers the training areas that were captured in their latest training sessions. This was to understand if the training needs of the workers were being taken into consideration. According to the findings, health and safety training had the highest percentage. This was followed by masonry, plumbing, steel fixing, painting, welding, electrical (wiring) and carpentry respectively. Roofing and inspection of construction materials had the lowest percentage. Health and safety training was conducted as a measure to reduce the number of injuries and health related cases in a construction site.

The findings showed that, even though training in various trades were being offered in some construction sites, the effort was minimal. However, the training sessions captured the training needs of the workers. According to the interviews conducted with experts in academia, masonry had the highest number of trainees as compared to electrical (wiring). This was because, electrical (wiring) training required a lot of mathematical and analytical skills, which was not appealing to most semi-skilled workers due to either their limited education or poor proficiency at the level of Mathematics. The study successfully attained the objective.

5.2.3 Objective Two: To Identify the Existing On-Site Training and Certification Programmes Offered at the Construction Sites in Kenya

The second specific objective of the study was to identify the existing on-site training and certification programmes offered at the construction sites in Kenya, to the semi-skilled workers. To achieve this objective, the researcher obtained responses from the semi-skilled workers, site managers, NITA official, NCA official and an expert in academia. According to the responses of the interviewees, there were existing on-site training and certification programmes for the semi-skilled workers. This was also confirmed by the site managers, whose responses showed that majority of the active construction sites conducted on-site training and certification programmes. However, some construction sites did not offer any form of training to their workers. The contractors in these construction sites thought training was expensive and did not see it as a priority and therefore chose to dedicate more time to construction. These contractors held the belief that trained workers did not stay in their jobs, rather they opted out to venture into more lucrative areas of the sector. They were therefore apprehensive on matters of training urging their workers to focus solely on their jobs and seek training elsewhere and at their own time.

According to the responses of the site managers who conducted on-site training and certification programmes, majority indicated that the main training technique used during on-site training were coaching, mentoring and apprenticeship respectively. These findings were also supported by the responses obtained from the semi-skilled workers. Vestibule and job rotation had the lowest percentage. The findings of the interviews indicated that NCA offers on-site sensitization and apprenticeship programmes in construction sites. The possible reason why coaching was used by majority could have been because of the practical nature of on-site training. It was easier and economical to engage a training expert or experienced employee to train semi-skilled workers. Also, the trainers can provide timely feedback helping the semi-skilled workers perfect their skills.

Majority of the construction sites offered safety training, skills training and technical or technology training respectively. Quality training had the lowest percentage according to the findings. Most of the construction sites offered training on a monthly basis with some choosing to have the sessions quarterly and yearly. Weekly and intervals of more than one

year, accounted for the lowest percentage. Majority that offered training on a monthly basis conducted it for a duration of 0-7 days only. This can be attributed to the difficulty involved in organizing and conducting training. According to the findings from the interviews, NCA offered sensitization programmes for 2 hours per construction site and the apprenticeship programmes for a duration of 6 months. NITA on the other hand offered their trainees trade tests three times a year; in April for all grades, August for grades I and II and December for grade III.

Most of the on-site training and certification programmes were organized by non-governmental bodies, with governmental bodies such as NITA and NCA also trying to match up by either working individually or in partnership with non-governmental bodies. According to the interviews, some training institutions and construction companies had partnered with NITA to act as training centers for semi-skilled workers. NCA had accredited some construction companies to offer training to the semi-skilled workers. The authority also conducted the training themselves during planned visits to sites or through their apprenticeship programmes.

The findings indicated a tie in percentage between the semi-skilled workers who received certification and who did not receive any certification after the training programme. It was noted that those who attended NCA sponsored on-site training sessions received a certificate of attendance and obtained provisional and full accreditation cards from NCA. Provisional accreditation was given to those semi-skilled workers who were yet to obtain a competency certificate while full accreditation was given to those who had obtained one. After undergoing the apprenticeship programme by NCA or training offered by NITA accredited training centers or construction companies, the semi-skilled workers could then book a trade test with NITA. The accredited training centers offer a certificate of attendance to the semi-skilled workers after attaining the stipulated number of training hours. NITA clarified that it was an examining body and also offered training to semi-skilled workers. The authority, NITA, had also rolled out Recognition of Prior Learning (RPL).

According to majority of the site managers, on-site training had a positive impact on job performance. Only a few were not sure of the effect the training had on job performance of the semi-skilled workers since the workers kept shifting from one site to the other,

making it difficult to assess. Majority of the site managers ranked quality management as the strongest driver of training in a construction site, followed by new technology and product innovation and workplace change respectively. Industrial awards with training clauses and coverage of employees by industrial awards had the lowest ranking. The study successfully attained the objective.

5.2.4 Objective Three: To Investigate the Existing Communication and Awareness Tools Utilized in Awareness-Raising of Existing On-Site Training and Certification Programmes in Kenya.

The third objective of the study was to identify the communication and awareness tools utilized in raising awareness of the existing on-site training and certification programmes. To achieve this objective, the researcher obtained responses from site managers, semi-skilled workers, NITA official, NCA official and an expert in academia. According to the findings from site managers, majority attested to using direct communication to inform the semi-skilled workers about the on-site training and certification programmes. Advertising and publications had the lowest percentage with no respondent using press release to raise awareness. This was attributed to the cost involved in using such channels. The findings from the semi-skilled workers show that, majority learnt about the existing on-site training and certification programmes through direct communication. Only a few confirmed to have learnt about the trainings through advertising and publications. No respondent reported to have received communication through press release. According to NITA and NCA officials, the main communication and awareness tool used was direct communication through site visits. The authorities reported to use bulk SMS and social media also in raising awareness.

The findings from majority of the responses of the site managers indicated that the attendance of the semi-skilled workers to the training sessions was good especially in the case where direct communication was used as a tool of awareness. Only a few site managers indicated poor attendance which was attributed to either the tool used or other factors such as cost and limited time. NCA reported a very good attendance of the semi-skilled workers to the on-site sensitization trainings that they had organized and low attendance in the apprenticeship programmes. The low attendance was attributed to the fact

that the programme had only been recently rolled out and they had not conducted enough awareness campaigns. NITA also rated the attendance as good and noted that the semi-skilled workers who attended were very enthusiastic about the trades they were practicing under.

According to the findings, all semi-skilled workers expressed willingness to attend future on-site training and certification programmes despite the fact that there were barriers affecting their attendance. They cited the following as their motivating factors: Increased income, better job performance, improved knowledge and skills, better job opportunities and reduced lay-offs. The study therefore successfully attained the objective.

5.2.5 Objective Four: To Present Guidelines Through Which Greater Awareness of Existing On-Site Training and Certification Programmes by Semi-Skilled Workers can be Achieved in Kenya.

The fourth objective of the study was to present guidelines through which greater awareness of existing on-site training and certification programmes by semi-skilled workers can be achieved in Kenya. To achieve this objective, the researcher obtained responses from semi-skilled workers, site managers, NITA official, NCA official and an expert in academia. The interview respondents, NITA, NCA and expert in academia, presented some of the challenges they had experienced in raising awareness of the on-site training programmes and some of the measures they had put in place to improve on-site training. The semi-skilled workers and site managers also gave their opinion on some of the measures that can be put in place to improve on-site training.

According to the findings from the NCA official, majority of the semi-skilled workers did not have a mobile phone that could connect to the internet. Therefore, they could not easily access social media. Also, some had blocked promotional messages which the authority used to reach out to as many semi-skilled workers as possible. To achieve greater awareness of existing on-site training and certification programmes, the authorities, NITA and NCA, aimed at increasing their frequency of field visits and awareness raising campaigns. NCA also planned to seek more partnerships with contractors to improve communication and delivery of training and increase the number of personnel charged with training to reach more semi-skilled workers. Some of the semi-skilled workers and site

managers suggested that the authorities should diversify their communication and awareness tools instead of being over dependent on direct communication. The respondents also suggested that NCA and NITA could utilize contractors and site supervisors who have access to the online platforms used in raising awareness, to spread information to the semi-skilled workers about the organized on-site training and certification programmes. Following physical training, NCA stated that they intended to print manuals, booklets, and other reference materials to aid semi-skilled personnel in remembering what they had learned and disseminate accurate information to others who had not been there.

The findings also indicated that when NCA and NITA organized on-site trainings, they were faced with the challenge of tight schedules on the side of the contractor. They were forced to work with the contactor's convenient timelines. The time spared by contractors for the authorities to conduct on-site training was not sufficient to ensure competency of the semi-skilled workers. The authorities therefore planned to merge with more technical training institutes across the country to offer certified construction courses to the semi-skilled workers. The site managers suggested that the authorities ought to sensitize contractors on the existing and future incentives provided for encouraging training of semi-skilled workers.

Greater awareness can also be achieved by:

i. Incentivizing sharing of information with friends. The authorities in charge of training could offer merchandize or other gifts to all those who refer their friends to attend on-site training and certification programmes or give discounts on fees charged with regards to training and certification.
ii. All those skilled workers who are beneficiaries of on-site training and certification programmes, could be encouraged to share their testimonials/ reviews with semi-skilled workers to encourage them to attend on-site training and certification. A few could be tagged along by NCA or NITA during the awareness campaigns or they could also share through other platforms easily accessed by semi-skilled workers.
iii. Eliminating language barriers through the authorities assigning trainers with vast understanding of the main language spoken by the semi-skilled workers in every

geographical region in the country. The communication and awareness campaigns could be tailored to the language the semi-skilled workers understand best.

iv. Identifying and nurturing skilled workers who are beneficiaries of the on-site training and certification programmes and have good reputation and work in the industry. These workers could be offered job upgrade scholarships to encourage other semi-skilled workers to attend and spread information on the benefits of on-site training and certification.

5.3 Revisiting the Study Proposition

The study proposition was that the low level of awareness of the existing training and certification programmes offered at the construction sites in Kenya has resulted in low level of uptake by the semi-skilled construction workers. According to the findings, 45% of the respondents were poorly aware, 47% were moderately aware and only 8% were highly aware. The high level of poor awareness can be attributed to the fact that most governmental and non-governmental bodies used direct communication as the main tool in raising awareness, therefore limiting the extent of awareness. The findings of the interview held with NCA official indicated low turnout of the semi-skilled workers, especially of the venue based trainings. These findings fully support the Study Proposition.

5.4 Study Conclusion

The study determined that the extent of awareness of existing on-site training and certification programmes ranged from moderate to poor in majority of the semi-skilled workers in the construction industry. As a measure to improve this, governmental and non-governmental bodies involved in training need to improve on their strategies in raising awareness. Since most of the organizing bodies utilized direct communication as their main mode of communication and raising awareness, it would be important if they looked keenly on diversifying the tools used. This would include tools such as advertising through social media and publications such as brochures, with an aim of reaching more semi-skilled workers. Also, in the case of using direct communication, the authorities should increase their frequency of site visits and make the engagements with the semi-skilled workers more welcoming and interactive.

Semi-skilled workers have diverse training needs that need to match up with the training programmes offered in construction sites, as a way of reducing the existing knowledge and skill gap. More training techniques need to be introduced during the on-site training programmes to ensure that more semi-skilled workers benefit in terms of skill improvement and better remuneration resulting to better livelihood holistically. Majority of the construction sites conducted their training for a duration of 0-7 days. The duration should be revised as it is not adequate in most cases to ensure competency of the semi-skilled workers, especially in the case where training is offered for a few hours. To improve on expertise of the semi-skilled workers, the duration ought to be improved with more partnerships between governmental and non-governmental bodies to relive the financial burden of training on either.

Since the trainings organized had a positive effect on job performance of the semi-skilled workers and they were all willing to attend future trainings, government and non-governmental bodies engaged in training activities are encouraged to improve the extent of awareness of the existing on-site training and certification programmes by increasing the frequency of their awareness campaigns and engaging more tools as a measure to reach more semi-skilled workers.

5.5 Recommendations

The following are recommendations of the study based on the research findings and conclusions drawn:

1) The government of Kenya, through authorities such as NCA and NITA should be keen on increasing resource allocation especially finances, to on-site training programmes. The increased resources are to enhance awareness-raising campaigns and improve the delivery of the programmes, to reduce the existing skill gap.
2) Governmental and non-governmental organizations that provide on-the-job training and certification to semi-skilled workers in the construction sector should seek out and support skilled workers who have benefited from these programs, have a solid reputation, and are employed in the sector. Scholarships and job upgrades could be

provided to these individuals in order to promote on-site training and certification and entice other semi-skilled workers to attend.

3) The government through NITA and NCA should engage more contractors to improve communication on the exiting on-site training and certification programmes and the modalities of delivery. Contactors are in the best position to articulate information as they engage directly with the semi-skilled workers.
4) Governmental and non-governmental bodies engaged in on-site training and certification should be keen on increasing the frequency of conducting awareness raising campaigns and also on diversifying the tools used in communication and awareness raising.
5) The government should benchmark with other countries that have been successful in implementing on-site training and certification among the semi-skilled workers. These countries include Singapore, Malaysia and South Africa.

5.6 Areas of Further Research

The researcher wishes to invite further research in the following areas:

1. A study should be done to investigate the effectiveness of the existing on-site training and certification programmes offered by governmental bodies in Kenya. This study will help to understand if the existing on-site training programmes need to be redesigned to match the current trends.
2. A study should be done on the factors affecting the implementation of on-site training programmes among the semi-skilled workers in Kenya. This study will help governmental and non-governmental bodies engaged in on-site training and certification for semi-skilled workers in Kenya, understand how other factors play a role in affecting implementation of on-site training and how best they can be addressed to improve delivery on on-site training.

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APPENDICES

APPENDIX I: RESEARCH AUTHORIZATION LETTER

DEPARTMENT OF REAL ESTATE, CONSTRUCTION MANAGEMENT & QUANTITY SURVEYING

P.O. Box 30197, 00100 Nairobi, KENYA, ***Tel: No. +254-782383848***
E-mail: *recmqs@uonbi.ac.ke*

Ref: B53/35020/2019 **Date:** 14th July, 2022

To Whom It May Concern

Dear Sir/Madam,

RE: RESEARCH LETTER - LINET WANDIA MACHARIA B53/35020/2019

This is to confirm that the above named is a student in the Department of Real Estate, Construction Management and Quantity Surveying pursuing a Master of Arts course in Construction Management.

She is carrying out a research entitled ***"An Investigation on the Extent of Awareness of the Existing On-site Training and Certification Programmes by the Semi-Skilled Construction Workforce in Kenya; A Case Study of Construction Sites in Nairobi City County"*** in partial fulfillment of the requirements for the degree programme.

The purpose of this letter is to request you to allow her access to any kind of material she may require to complete her research. The information will be used for research purposes only.

Any assistance accorded to her will be appreciated.

CHAIRMAN
DEPARTMENT OF REAL ESTATE
CONSTRUCTION MANAGEMENT
& QUANTITY SURVEYING
UNIVERSITY OF NAIROBI

Isabella N. Wachira-Towey, (PhD)
Chairman & Senior Lecturer
Department of Real Estate, Construction Management & Quantity Surveying

APPENDIX II: INTERVIEW REQUEST LETTER TO NCA

P.O. BOX 14207 - 00400,
NAIROBI.
Date: 22nd July, 2022

TO,

THE EXECUTIVE DIRECTOR,

NATIONAL CONSTRUCTION AUTHORITY,

P.O.BOX 21046-00100,

NAIROBI.

Dear Sir,

RE: REQUEST FOR AN INTERVIEW FOR AN ACADEMIC RESEARCH

Am a master's degree student at the department of Real Estate, construction Management and Quantity Surveying in the university of Nairobi currently conducting a research study entitled ***"An investigation on the extent of awareness of the existing on-site training and certification programmes by the semi-skilled workforce in Kenya: A case study of construction sites in Nairobi city county."***

I hereby request to conduct an insightful interview with one of your officials charged with training and capacity building of construction workers on behalf of the Authority. The mentioned interview will take a maximum of 30 minutes and I would be glad to conduct it by July 2022 due to the limitation of time in my study.

Here attached, find my research authorization letter from the university. Am available to provide any information that may be required by the Authority through the contacts provide below.

Kindly consider my request and I look forward to hearing from you.

Yours sincerely,

Linet Wandia,

Reg. no. B53/35020/2019

Mobile Number: 0705278470.

APPENDIX III: INTERVIEW REQUEST LETTER TO NITA

P.O. BOX 14207 - 00400,

NAIROBI.

Date: 22nd July, 2022

TO,

THE DIRECTOR GENERAL,

NATIONAL INDUSTRIAL TRAINING AUTHORITY,

P.O.BOX 74494-00200,

NAIROBI.

Dear Sir,

RE: REQUEST FOR AN INTERVIEW FOR AN ACADEMIC RESEARCH

Am a master's degree student at the department of Real Estate, construction Management and Quantity Surveying in the university of Nairobi currently conducting a research study entitled ***"An investigation on the extent of awareness of the existing on-site training and certification programmes by the semi-skilled workforce in Kenya: A case study of construction sites in Nairobi city county."***

I hereby request to conduct an insightful interview with one of your officials charged with training and capacity building of construction workers on behalf of the Authority. The mentioned interview will take a maximum of 30 minutes and I would be glad to conduct it by July 2022 due to the limitation of time in my study.

Here attached, find my research authorization letter from the university. Am available to provide any information that may be required by the Authority through the contacts provide below.

Kindly consider my request and I look forward to hearing from you.

Yours sincerely,

Linet Wandia,

Reg. no. B53/35020/2019

Mobile Number: 0705278470.

APPENDIX IV: QUESTIONNAIRE FOR SEMI-SKILLED WORKERS

RESEARCH TOPIC: **AN INVESTIGATION ON THE EXTENT OF AWARENESS OF EXISTING ON-SITE TRAINING AND CERTIFICATION PROGRAMMES BY SEMI-SKILLED CONSTRUCTION WORKFORCE IN KENYA:**

(A Case Study of Construction Sites in Nairobi City County)

Researcher: Macharia Linet Wandia

Registration No: B53/35020/2019

University of Nairobi- Master of Arts in Construction Management

Questionnaire for the Semi-Skilled Construction Workers

Introduction

This questionnaire is for conducting an academic research on on-site training for the semi-skilled construction workforce. The research is aimed at establishing the on-site training programs offered at construction sites in Kenya and the extent of awareness of the existing programs by the semi-skilled workforce.

The questionnaire is to be filled by Semi-skilled staff on the construction site.

Kindly take part in the research by filling it as honestly as possible. The information filled will be treated with utmost confidentiality and shall only be used for this academic research.

Kindly fill in the information in the spaces provided or by use of a tick (√) where appropriate.

Do not write your name anywhere in this questionnaire.

Screening question:

1) Are you aware of the existing on-site training and certification programmes for the semi-skilled workers?

a) Yes [ ] b) No [ ]

Respondents that answer YES to the question should proceed with the survey. Those answering NO should exit from the survey

NOTE: There is no wrong or right answer, kindly feel free to express your opinion where needed.

PART A: Extent of Awareness and Existing On-Site Training and certification Programmes

1) How did you get to learn about the existing training and certification programme(s)?

	Medium	**Tick where appropriate(√)**
a)	**Direct communication** such as meetings, seminars, field visits, word of mouth	
b)	**Publications** such as flyers, posters and educational materials	
c)	**Advertising** through newspapers, television, radio, social media	
d)	**Press releases and news articles**	
e)	**Others, specify……** **……..** **……..**	

2) Which training technique was used during the on-site training and certification programme?

Coaching [ ]

Mentoring [ ]

Apprenticeship [ ]

Job Rotation [ ]

Vestibule training [ ]

Sensitivity training [ ]

Job Instruction Training [ ]

Not aware [ ]

3) Given in the table below are statements about the existing on-site training and certification programmes for the semi-skilled workers in Kenya. Kindly express your awareness by ticking where appropriate.

	Statements About The Existing On-Site Training And Certification Programmes For The Semi-Skilled Workers	Yes	No
a)	Are you aware of the existence of an apprenticeship programme offered by NCA for the semi-skilled workers?		
b)	Are you aware that the application process for the apprenticeship programme can be done online or in-person at Huduma center or NCA offices?		
c)	Are you aware of the downloadable form found on the NCA website used to apply for the apprenticeship programme?		
d)	Are you aware of the duration of the apprenticeship programme? If yes, indicate the duration …… ……..……		
e)	Are you aware of the trade tests offered by NITA that are undertaken after completion of the apprenticeship programme?		
f)	Are you aware that after completion of the trade tests in (d) above, the semi-skilled worker is offered a competency certificate?		
g)	Are you aware of any on-site training and mentorship programme set up by NCA and NITA in partnership with other training centers? If yes, indicate which ones …….... …… ……. …….		
h)	Are you aware of any construction companies in Kenya that are accredited by NITA, offering training to semi-skilled workers?		

4) How would you rate your awareness of the existing on-site training and certification programs for the semi-skilled workforce based on your answers in (3) above?

If you respond *yes* in:

6-8: highly aware (4)

3-5: moderately aware (3)

1-2: poorly aware (2)

0: not aware (1)

(1) Not Aware	(2) Poorly Aware	(3) Moderately Aware	(4) Highly Aware

PART B: Training Needs

5) What training areas appeal to you on a construction site?

Please tick the appropriate box to indicate your response to the following statements.

Training Area	
Masonry	
Plumbing	
Electrical (Wiring)	
Tiling	
Painting	
Carpentry	
Welding and fabrication	
Types of Construction materials	
Inspection of construction materials	
Site health and safety	
Water supply/ waste management	
Basic building construction process	
Basic measurement and cost estimation in building construction	
Drawings interpretation	
New construction technology and innovations	
Communication skills	

Others,

Specify……

…..……

……

6) Would you be open to attend any future on-site training and certification programmes?

a) Yes [ ] b) No [ ]

7) If YES, what would be your motivation to attend the on-site training and certification programmes?

……..

……..

……..

……..

……..

8) In your opinion, what are some of the measures that can be put in place to raise the levels of awareness of the existing on-site training and certification programmes among semi-skilled workers?

……

……

……

Thank you for taking the time to complete the questionnaire.

APPENDIX V: QUESTIONNAIRE FOR SITE MANAGERS

RESEARCH TOPIC: **AN INVESTIGATION ON THE EXTENT OF AWARENESS OF EXISTING ON-SITE TRAINING AND CERTIFICATION PROGRAMMES BY SEMI-SKILLED CONSTRUCTION WORKFORCE IN KENYA:**

(A Case Study of Construction Sites in Nairobi City County)

Researcher: Macharia Linet Wandia

Registration No: B53/35020/2019

University of Nairobi- Master of Arts in Construction Management

Questionnaire for Site Managers

Introduction

This questionnaire is for conducting an academic research on on-site training and certification programmes for the semi-skilled construction workforce. The research is aimed at establishing the on-site training programs offered at construction sites in Kenya and the extent of awareness of the existing programs by the semi-skilled workforce.

The questionnaire is to be filled by the site manager at the construction sites to get their perspective on the research topic.

Kindly take part in the research by filling it as honestly as possible. The information filled will be treated with utmost confidentiality and shall only be used for this academic research.

Kindly fill in the information in the spaces provided or by use of a tick (√) where appropriate. Do not write your name anywhere in this questionnaire.

Screening question:

1) Have you ever conducted any on-site training and certification programme for the semi-skilled workers in your construction site?

   Yes [ ] b) No [ ]

Respondents that answer YES to the question should proceed with the survey. Those answering NO should exit from the survey

NOTE: There is no wrong or right answer, kindly feel free to express your opinion where needed.

PART A: Existing On-Site Training and certification Programmes

1) How would you rate the attendance of the on-site training and certification programmes by the semi-skilled workers?

(1) Very poor	(2) Poor	(3)Fair	(4) Good	(5) Excellent

2) What communication and awareness tools are used to inform the semi-skilled workers about the training programme(s) at the construction site?

	Medium	**Tick where appropriate(√)**
a)	**Direct communication** such as meetings, seminars, field visits, word of mouth	
b)	**Publications** such as flyers, posters and educational materials	
c)	**Advertising** through newspapers, television, radio, social media	
d)	**Press releases and news articles**	
e)	**Others, specify……**	

3) How frequently does your organization conduct on-site training?

(1) Rarely	(2) Yearly	(3)Quarterly	(4) Monthly	(5) Weekly

4) What type of training programme(s) are offered at the construction site in Kenya?

Technical or technology training [ ]

Quality training [ ]

Skills training [ ]

Safety training [ ]

5) Who are the organizers of the on-site training and certification programs for the semi-skilled offered at the construction site?

a) Government of Kenya [ ]

b) Non-governmental bodies [ ]

c) Not aware [ ]

Name them

.....

.....

6) How long did the training programme take?

a) ……...Days

b) ……weeks,

c) …….. months

d) ……...years

7) Based on the following training techniques, under which training technique did the semi-skilled workers train?

Coaching [ ]

Mentoring [ ]

Apprenticeship [ ]

Job Rotation [ ]

Vestibule training [ ]

Sensitivity training [ ]

Job Instruction Training [ ]

PART C: Training Areas

1) Which of the training areas were captured during the last training session you conducted?

Training Area	
Masonry	
Plumbing	
Electrical (Wiring)	
Tiling	
Painting	
Carpentry	
Welding and fabrication	
Types of Construction materials	
Inspection of construction materials	
Site health and safety	
Water supply/ waste management	
Basic building construction process	
Basic measurement and cost estimation in building construction	
Drawings interpretation	
New construction technology and innovations	
Communication skills	

2) Did the semi-skilled workers receive certification or any form of recognition at the end of the program?

a) Yes [ ] b) No [ ]

3) To what extent did the training influence how learners perform in their jobs?

(1) Not at all	(2) Little	(3)Somewhat	(4) To a large extent	(5) To a great extent

4) Given in the table below are drivers of training in most workplaces. Kindly express their influence on on-site training of the semi-skilled workers.

	(1) Not at all influential	(2) Slightly influential	(3) Moderately influential	(4) Very influential	(5) Extremely influential
Workplace change					
Industrial awards with training clauses					
Coverage of employees by industrial awards					
Business plans which include training					
Proportion of managers and professionals in the workforce					
Quality management					
New technology and product innovation					

5) In your opinion, what are some of the measures that can be put in place to raise the levels of awareness of the existing on-site training and certification programmes among semi-skilled workers?

……

……

……

Thank you for taking the time to complete the questionnaire.

APPENDIX VI: INTERVIEW SCHEDULE WITH NCA OFFICIAL

RESEARCH TOPIC: **AN INVESTIGATION ON THE EXTENT OF AWARENESS OF EXISTING ON-SITE TRAINING AND CERTIFICATION PROGRAMMES BY SEMI-SKILLED CONSTRUCTION WORKFORCE IN KENYA:**

(A Case Study of Construction Sites in Nairobi City County)

Researcher: Macharia Linet Wandia

Registration No: B53/35020/2019

University of Nairobi- Master of Arts in Construction Management

Interview Schedule with an NCA Official in the department of Training and Capacity Building

Introduction

I would like to thank you for the opportunity to conduct this interview. The contribution you make shall be very crucial to the study and will enable the researcher achieve the objectives of the study. The research is aimed at establishing the on-site training programs offered at construction sites in Kenya and the extent of awareness of the existing programs by the semi-skilled workforce. The information provided will be treated with utmost confidentiality and anonymity and shall only be used for this academic research. The interview shall be recorded for the purpose of transcribing/processing.

Interview Questions

1. Literature that has been reviewed in the study indicates that there are existing on-site training and certification programmes for the semi-skilled workers in Kenya. Do you agree with this? What are some of the on-site training programmes being offered currently to the semi-skilled construction workers by NCA to improve the existing skill gap?

2. Have any of the construction sites been accredited as training centers by NCA? If yes, how would you rate the attendance of the on-site training by semi-skilled workers? Are there any measures that have been put in place to improve this attendance?

3. What training areas have the largest skill gap and what are some of the measures put in place by NCA to ensure that the training needs of the semi-skilled workers are met?

4. What communication and awareness tools are being used by NCA to improve the level of awareness of the existing on-site training and certification programmes for the semi-skilled workers? How would you rate the performance of the tools in raising awareness? How frequent are the awareness campaigns?

5. Are there any challenges that have been experienced in raising awareness of the existing on-site and certification programmes for the semi-skilled workers? Kindly list some of the challenges and how they can be mitigated.

6. What measures can be put in place to improve on-site training?

Thank you for taking the time to respond.

APPENDIX VII: INTERVIEW SCHEDULE WITH NITA OFFICIAL

RESEARCH TOPIC: **AN INVESTIGATION ON THE EXTENT OF AWARENESS OF EXISTING ON-SITE TRAINING AND CERTIFICATION PROGRAMMES BY SEMI-SKILLED CONSTRUCTION WORKFORCE IN KENYA:**

(A Case Study of Construction Sites in Nairobi City County)

Researcher: Macharia Linet Wandia

Registration No: B53/35020/2019

University of Nairobi- Master of Arts in Construction Management

Interview Schedule with NITA Official from the Department of Industrial Training and Skills Development

Introduction

I would like to thank you for the opportunity to conduct this interview. The contribution you make shall be very crucial to the study and will enable the researcher achieve the objectives of the study. The research is aimed at establishing the on-site training programs offered at construction sites in Kenya and the extent of awareness of the existing programs by the semi-skilled workforce. The information provided will be treated with utmost confidentiality and anonymity and shall only be used for this academic research. The interview shall be recorded for the purpose of transcribing/processing.

Interview Questions

1. Literature that has been reviewed in the study indicates that there are existing on-site training and certification programmes for the semi-skilled workers in Kenya. Do you agree with this? What are some of the on-site training programmes being offered currently to the semi-skilled construction workers by NITA to improve the existing skill gap?

2. Does NITA have an apprenticeship program for the semi-skilled workers in the construction industry? Kindly enlighten me more about the programme?

3. NITA rolled out Recognition of Prior Learning (RPL) as a measure to improve the existing skill gap in the construction industry. What are the requirements of enrolling in the programme? How is the attendance of the semi-skilled workers?

4. Have any of the construction sites in Kenya been accredited as training centers by NITA? If yes, how would you rate the attendance of the on-site training by semi-skilled workers? Are there any measures that have been put in place to improve this attendance?

5. What training areas have the largest skill gap and what are some of the measures put in place by NITA to ensure that the training needs of the semi-skilled workers are met?

6. What communication and awareness tools are being used by NITA to improve the level of awareness of the existing on-site training and certification programmes for the semi-skilled workers? How would you rate the performance of the tools in raising awareness? How frequent are the awareness campaigns?

7. Are there any challenges that have been experienced in raising awareness of the existing on-site and certification programmes for the semi-skilled workers? Kindly list some of the challenges and how they can be mitigated.

8. What measures can be put in place to improve on-site training?

Thank you for taking the time to respond.

APPENDIX VIII: INTERVIEW SCHEDULE WITH AN EXPERT IN ACADEMIA

RESEARCH TOPIC: **AN INVESTIGATION ON THE EXTENT OF AWARENESS OF EXISTING ON-SITE TRAINING AND CERTIFICATION PROGRAMMES BY SEMI-SKILLED CONSTRUCTION WORKFORCE IN KENYA:**

(A Case Study of Construction Sites in Nairobi City County)

Researcher: Macharia Linet Wandia

Registration No: B53/35020/2019

University of Nairobi- Master of Arts in Construction Management

Interview Schedule with an Expert in Academia from a Government Technical Training Institution

Introduction

I would like to thank you for the opportunity to conduct this interview. The contribution you make shall be very crucial to the study and will enable the researcher achieve the objectives of the study. The research is aimed at establishing the on-site training programs offered at construction sites in Kenya and the extent of awareness of the existing programs by the semi-skilled workforce. The information provided will be treated with utmost confidentiality and anonymity and shall only be used for this academic research. The interview shall be recorded for the purpose of transcribing/processing.

Interview Questions

1. Literature that has been reviewed in the study indicates that there are existing on-site training and certification programmes for the semi-skilled workers in Kenya. Do you agree with this? What are some of the on-site training programmes being offered currently to the semi-skilled construction workers to improve the existing skill gap?

2. How would you rate the attendance of the on-site training by semi-skilled workers? Are there any measures that have been put in place to improve this attendance?

3. What training areas have the largest skill gap and what are some of the measures put in place to ensure that the training needs of the semi-skilled workers are met?

4. What communication and awareness tools are being used to improve the level of awareness of the existing on-site training and certification programmes for the semi-skilled workers? How would you rate the performance of the tools in raising awareness? How frequent are the awareness campaigns?

5. Are there any challenges that have been experienced in raising awareness of the existing on-site and certification programmes for the semi-skilled workers? Kindly list some of the challenges and measures put in place to mitigate the challenges.

6.What measures can be put in place to improve on-site training?

Thank you for taking the time to respond.