DEVELOPING A HARMONISED FRAMEWORK FOR CONSTRUCTION CRAFT SKILLS TRAINING IN NIGERIA

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DEPARTMENT OF QUANTITY SURVEYING
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MAY, 2015

DECLARATION

I declare that the work in this thesis entitled "**DEVELOPING A HARMONISED FRAMEWORK FOR CONSTRUCTION CRAFT SKILLS TRAINING IN NIGERIA"** has been carried out by me in the Department of Quantity Surveying under the supervision of Dr. A. D. Ibrahim, Dr. Y. M. Ibrahim and Dr. Y. G. Musa-Haddary.

The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this thesis was previously presented for another degree or diploma in this or any other University.

Peter Gangas CHINDO	_____	_____
Name of Student	Signature	Date

CERTIFICATION

This thesis titled "**DEVELOPING A HARMONISED FRAMEWORK FOR CONSTRUCTION CRAFT SKILLS TRAINING IN NIGERIA"** by Peter Gangas CHINDO meets the regulations governing the award of the degree of Doctor of Philosophy of the Ahmadu Bello University, Zaria, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This thesis is dedicated to my entire family members including those that departed this world like my parents, Mr and Mrs Chindo Gangas and my eldest brother Mr Sunday Chi-ganga.

ABSTRACT

Several studies on construction craft skills have identified a number of problems including ineffective training as responsible for shortages of craftsmen in the construction industry. In Nigeria, the problem of training craftsmen has been attributed to lack of a harmonised training framework. This research therefore examined existing training frameworks in craft skills training institutions and assessed the performance of the products of those institutions with a view to developing a harmonised framework for delivering effective training in Nigeria. Largely qualitative approach was adopted in conducting the research. Detailed literature review on training of craftsmen led to the development of a semi-structured interview guide which was used in conducting interviews in technical training institutions and construction organisations. In the technical institutions, senior management staff that specialised in technical training were interviewed while in the construction organisations, both management staff and craftsmen were interviewed. A total of six (6) training institutions were identified from a list of accredited technical training institutions published by the National Board for Technical Education and interviews conducted. For the construction organisations, nine (9) large construction firms were selected using purposive sampling and interviews were done with a management staff and three (3) craftsmen in each firm. Data obtained from the interviews were subjected to conceptual content analysis. The results showed the existence of different frameworks in each training institution with similarities, strengths and weaknesses. Other findings include the absence of direct collaboration between institutions and industry in delivering training; industrial training is poorly organised, supervised and the duration is inadequate; lack of prearrangement for the conduct of industrial training; training delivery is generic in most institutions regardless of the specific requirement of industries. Consequently, from the findings of the study, a harmonised framework for training construction craftsmen was developed which takes advantage of the strengths of the existing frameworks while minimising their weaknesses. The developed framework was validated using construction industry stakeholders. The study concludes that training of construction craftsmen can be delivered in a collaborative manner with all stakeholders in the construction industry performing roles based on their strategic advantage. It is recommended that sector specific technical training approach should be adopted and implemented in a collaborative manner for effective training; the developed framework for training of construction craftsmen should be adopted and implemented.

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Glossary of Abbreviations

BATC: Business Apprenticeship Training Centre
CITB: Construction Industry Training Board
CSCS: Construction Skills Certification Scheme
FSTC- Federal Science and Technical College
FSLC: First School Leaving Certificate
IIT: Institute for Industrial Training
ITF: Industrial Training Fund
JSS: Junior Secondary School
JSCE: Junior Secondary Certificate of Education
NBTE: National Board for Technical Education
NDE: National Directorate of Employment
NVQ: National Vocational Qualification
NVQF: National Vocational Qualification Framework
STC : State Technical College
SSC: Sector Skills Council
SSCE: Senior Secondary Certificate of Education
SSS: Senior Secondary School
VET: Vocational Education and Training

CHAPTER 1: INTRODUCTION

1.1 Background to the Study

The Construction Industry produces sky scrapers, roads, airports, ship yards, and several other structures. The production of these relies heavily on human and material resources. In terms of importance, Khalil and Lees (2006) ranked human resources higher than natural (material) and capital resources in both production and services process of an organisation. Additionally, Muya *et al.* (2006) argued that the quality of services offered by construction firms depend largely on the quality of their workforce. Furthermore, of the workforce in the construction industry, the craft skills constitute the majority and execute most of the jobs because the industry is still manual labour intensive (Fellows *et al.*, 2002). Regrettably, this class of human resource required by construction firms are in short supply in UK, Canada, USA, Asia and Africa (Agapiou *et al.*, 1995a; Agapiou, 1998; Gann and Senker, 1998; Mckenzie, *et al*., 2000, Forde and MacKenzie, 2004; Datoegoem, 2006; Issam, 2006; McGuinness and Bannett, 2006; Muya *et al.*, 2006; Chan and Dainty, 2007; Smith, 2009; Abdullahi, 2010; Kikwasi, 2011; Medugu *et al.*, 2011).

In order to make up for the shortfall in craft skills required in the construction industry, construction firms import craft skills from other countries or poach them from rival companies to improve their performance and out-play their competitors instead of training new ones (Agapiou *et al.*, 1995a; Muya *et al*., 2006). However, in both the developed and developing countries, poaching of skilled workmen is viewed as an indication of shortage of quality skilled workers in an industry and is reported to discourage investment in training by companies since most

organisations believe poaching is cheaper than training (Muya *et al*., 2006; Clarke and Herrmann, 2007; Wachira *et al*., 2008; Hansen, 2011). In contrast, Agapiou *et al.* (1995b) and Construction Industry Institute [CII] (2007) reported that poaching workmen leads to increase in cost of construction projects through direct cost of labour charged by poached workers which may lead to companies losing jobs as a result of high tender figures.

In addition, other implications of craft skills shortages are rework and low productivity which are also reported to have effect on overall construction project cost (Rubin, 2007; CII, 2007; Wang *et al.*, 2008). For example, Burati *et al.* (1992), Construction Industry Development Institute [CIDA] (1994) and CII (2007) showed that the works of poorly trained craftsmen are subject of rework coupled with low productivity and the direct costs of rework in construction projects are considerable and falls between 10-15% of contract value. This leads to an eventual increase in a project's final cost and cost-in-use through increase in company overhead cost and high incidence of maintenance. Since construction cost is a resultant of labour productivity, addressing the shortage of craft skills should therefore be the concern of all construction industry stakeholders especially Quantity Surveyors, who by training are expected to have the competence of managing construction projects both in-terms of human, material and financial resources (Royal Institution of Chattered Surveyors [RICS], 2006; Australian Institute of Quantity Surveyors [AIQS], 2007; Ibrahim *et al.*, 2010; Project Management Body of Knowledge [PMBOK], 2014).

To address the problem of construction craft skills shortage, the causes of the shortage must first be identified. Previous studies have stated various reasons for craft skills shortages (Zakeri *et al.*, 1996; Clarke and Wall, 1998; Jayawardane and Gunawardena, 1998; Conference Board of Canada [CBC], 2002; Ellison, 2003; deGraft-Johnson *et al.*, 2003; Sha and Jiang, 2003; Bokinni,

2005; Dainty and Bagilhole, 2005; Abdullahi, 2010; Medugu *et al.*, 2011), while the shortages in some countries are due to decline in quality of workmanship resulting from inefficient training, in some other cases, it is the quantity of craft skills available in the labour market that is far below the quantity the industry required (Arkani, *et al.*, 2003). Some of the notable reasons for shortages of craft skills workers are challenges of new technologies which require continuous update and sometimes change in nature of training such as broad based training of skilled workforce in-place of trade based training (Agapiou *et al.*, 1995a; Clarke and Wall, 1998; Gann and Senker, 1998; Makenzie *et al*., 2000; Datoegoem 2006 and Muya *et al*. 2006).

The approach to solving the skills shortage depends on the causes, as such; different suggestions and approaches have been used and in some cases implemented (Clarke and Wall 2000; Clarke and Herrmann, 2007; Arkani, *et al.*, 2003; Castaneda *et al.*, 2005). UK for example developed structures for training and certification to reverse shortages of construction craft skills (Gann and Senker, 1998; Agapiou, 1998; Makenzie *et al.* 2000). Hyari *et al.* (2010) proposed using multi-skilling to solve the problem of craft skills shortages in organisations. The study developed an optimisation model to aid field management personnel in assigning skilled workforce on site. The successes or failure of the different approaches to solving the skills shortage has been widely criticised (Arkani *et al.*, 2003; Preston, 2006; Clarke and Wall, 2000; Clarke and Winch, 2004). Castaneda *et al.* (2005) proposed a workforce management strategy, referred to as Tier II, as a comprehensive approach to address the problems of craft skills shortage in the US. The Tier II workforce management strategy is part of a two-tier strategy proposed by the Centre for Construction Industry Studies (CCIS) to provide a structure for long term evolution of an improved workforce. Castaneda *et al.* (2005) further explained that the Tier II strategy is based on utilisation of fewer, better educated, and skilled workers who perform craft functions and

some lower-management functions, while delivering improved project results in safety, quality, and schedule at improved or comparable costs. The strategy emphasises multi-skilling and craftsmen-level management skills, resulting in more productive workers which would receive a skills-based higher wage rate. One of the weaknesses of the strategy is that it emphasised the utilisation of trained workforce without considering the means of providing new crop of employees through pre-employment training.

In most developed countries the effort at addressing craft skills shortage is largely on improvement of the training system and attraction of youths to build career in the industry (Clarke and Wall, 1998; CBC, 2002; Ellison, 2003; deGraft-Johnson *et al.*, 2003). However, the case is different in developing countries where previous studies suggested lack of formal training as largely the cause of craft skills shortage and suggest investment in training to address the problem (Kumaraswamy, 1997; Gann and Senker, 1998; Makenzie *et al.*, 2000; Ziderman, 2001; Dainty *et al.*, 2004; Muya *et al.*, 2006). Regrettably, unstructured and poorly organised formal and informal training may likely prevent any meaningful change in training unless a holistic approach is adopted (Zakeri *et al.*, 1996, Jayawardane and Gunawardena, 1998; Sha and Jiang, 2003; Bokinni, 2005; Abdullahi, 2010).

In Nigeria, the problem of training craft skills is characterised by lack of efficient and effective vocational and technical training centres in addition to the absence of standardised and unified framework for training among others (Bamisile, 2004; Datoegoem, 2006). There are several routes of becoming a skilled person in Nigeria, the common ones are the Federal Science and Technical Colleges (FSTCs); the State Technical (Vocational) Colleges (STCs); the Industrial Training Fund (ITF) which has training centres for the provision of direct hands-on skills training to qualified and interested youths; the National Directorate of Employment (NDE) and a

few Privately own technical training institutions. The frameworks for training in these institutions are varied and lack uniform methodology. This has resulted in serious challenge in supervision and assessment of training delivered across the various training institutions in Nigeria (Datoegoem, 2006; Abdullahi 2010). Okoye and Chijioke (2013) reported cases of mismatch between the requirement of the industry and the training delivered by the institutions which has resulted in preference of artisans trained outside Nigeria against indigenous trained ones. According to the National Centre for Construction Education and Research [NCCER] (2013), quality comprehensive craft training is fundamental to the development of a skilled workforce and a skilled workforce is essential to safe, productive and sustainable construction and maintenance activities, which in turn, is critical to the nation's economic future. This therefore informed the need to develop a harmonised framework for training of craftsmen in Nigeria in order to provide a uniform basis for training, supervision and assessment of craft skills that will eliminate mismatch between training and industry needs thereby improving quality of locally trained craft skills, creating job opportunities, boosting economy, improving productivity and reducing project cost.

1.2 Statement of Research Problem

Previous studies have established the problems of technical skills training and the inadequacies of existing training frameworks in Nigeria (Bamisile, 2004; Datoegoem, 2006; Abdullahi, 2010; Odusami and Ene, 2011; Okoye and Chijioke, 2013). The studies highlighted that various institutions have different training programmes with little or no supervision of such programmes due to lack of harmonised framework for training. These have posed challenges in delivering uniform and systematic training while serving as criteria for supervision and assessment of

training across the country. As a result, there is mismatch between training and industry requirement (Okoye and Chijioke, 2013). Although previous studies acknowledged the existence of training frameworks and its lack of harmony, there is however no evidence of studies on existing training frameworks in Nigeria. The emphasis of previous studies are largely on causes of shortages, policies of training and perceptions of stakeholders on crafts skills in Nigeria. This therefore create the need to study the existing frameworks in order to understand the methodology of training and develop a framework for delivering effective training in Nigeria. This gab is what this study sought to fill.

1.3 Need for the study

Studies on construction craft skills shortages have become topical in most nations and particularly on issues surrounding training structures. Some nations have developed structures for training and utilised it to train youths in order to create employment, boost economy, improve productivity, reduce incidence of rework resulting from poor and insufficient labour, and eventually cost of construction projects (Burati *et al.*, 1992; CIDA, 1994; Clarke and Wall, 1998; CBC, 2002; Ellison, 2003; deGraft-Johnson *et al.*, 2003; CII, 2007). Burati *et al.* (1992); CIDA (1994); CII (2007) showed that the works of poorly trained craftsmen are subjects of rework coupled with low productivity. In addition, the direct costs of rework in construction projects are considerable and falls between 10-15% of contract value. Barker (2011) considers the benefits of investment in training for scarce skills in the South African construction and engineering industry. The report suggested that reducing skill shortages provide benefits for organizations, individuals, families, regions and national economies. The study argued that since training improves the job performance of employees, it should therefore reflect on their productivity,

quality of work and services. Similarly, Rubin (2007) found that investing in training could have double-digit returns in productivity, reduced absenteeism and need for rework, amongst others.

The absence of harmonised framework for training craft skills in Nigeria has prevented the nation from creating jobs, boosting economy, improve productivity, reduce rework and projects cost since most of the locally trained craft skills are denied employment in the industry because they lack sufficient skills (Simire, 2010; Okoye and Chijioke, 2013). In addition, the employment of foreign workmen has created difficulty in establishing reliable productivity and cost data since the payments to those workers are usually high (Rubin, 2007; CII, 2007; Wang *et al.* 2008). With an average population of 175 million people and unemployment rate of 26% (National Bureau of Statistics [NBS], 2011; NBS, 2012), Nigeria has the capacity to create one million jobs on average to replace those imported (Simire, 2010; Okoye and Chijioke, 2013). Additionally, solving craft skills shortage through training will potentially reduce cost of construction projects by providing efficient skills workers at affordable cost and eventually, reliable productivity and cost data for use in the industry will be established. The development of a harmonised training framework will assist in achieving this by giving Nigerian trained craftsmen the requisite skills and experience to be gainfully employed in the construction industry. Ultimately, it will boost the Nigerian economy, provide reliable productivity and cost data and reduce capital flight resulting from payments to expatriates and likewise reduce employees' turnover, absenteeism and injuries in the construction industry.

1.4 Research Questions

The following research questions are outlined from the background and the need identified for the study:

i. What is the mode of training construction craftsmen?

ii. What are the existing training systems in Nigeria? What are the key components in existing training systems?

iii. What are the key issues in training system of developed countries that can contribute to the development of a harmonised training system in Nigeria?

iv. What are the perceptions of craft workers and their employers on the performance of the products of existing training systems in Nigeria?

v. How can construction craftsmen be trained?

1.5 Aim and Objectives

1.5.1 Aim

The aim of this research is to develop a harmonised framework for training of construction craft skills with a view to providing efficient manpower for the construction industry.

1.5.2 Objectives

i. To articulate construction craft skills training frameworks with a view to understanding the mode of construction craft skills training.

ii. To evaluate existing frameworks of construction craft skills training in Nigeria.

iii. To assess performance of the products of construction training institutions in Nigeria.

iv. To develop and evaluate a harmonised framework for delivering effective construction craft skills training in Nigeria.

1.6 Research Methodology

To achieve the objectives of this research, detailed review of related literature was done using databases of journals, textbooks, conference papers and internet searches. Discussions were done at relevant academic and industrial seminars and conferences which guided the focus of the research. Subsequently, a semi-structured interview guide was developed and used as a guide in conducting interview with relevant stakeholders. At the validation stage, focus discussions was employed to validate the developed framework.

Following the development of the interview guide, interviews were scheduled and conducted in six training institutions and nine construction organisations from the months of March, 2013 and February, 2014. An interview session took average of 90 minutes. For the training institutions, the list of accredited training institutions in Nigeria published by the National Board for Technical Education (NBTE) was first used to identify relevant training institutions that offer construction related courses. In the course of conducting interview in the institutions identified in the list, more training institutions were identified and interview scheduled and conducted. For the interviews in construction organisations, the organisations were selected based on purposive sampling and both management staff and craftsmen were interviewed in order to assess the performance of the craftsmen.

To validate the framework, focus group discussion was used in obtaining response from stakeholders (NBTE, Federal and State Technical Training institutions, Industrial Training Fund and Construction organisations) on the developed framework.

1.6.1 Sketch Outline of the Research

It is proposed here that the challenge in delivering a uniform and systematic training while serving as criteria for supervision and assessment of training craft skills across Nigeria should be solved by developing a harmonised framework. In developing the framework, four main steps were undertaken. The first step was to define the purposed of the framework. The purposed of developing a harmonised training framework is to provide a structure that will guide in the delivery of effective training of craftsmen in Construction Industry in Nigeria, as its absence has prevented the nation from creating jobs, boosting economy, improving productivity, reducing rework and project cost. The strengths and weaknesses of existing training frameworks were identified and in the proposed framework, effort was made to address those issues with the view that effective training will be provided to construction craftsmen in Nigeria. Specifically, the framework addressed the issues of mismatch between industry requirement and training provided in the institution in addition to the issue of field experience which was lacking in technical training in Nigeria. The second step was devoted to collecting information. This was done through collection of data from the field and literature review. It was noted that the accuracy of the framework depends largely on the validity of the data collected.

Thirdly, the Framework was built. This comprises of grouping all the themes or issues into relevant classifications identified from the analysed data. In the fourth step, the framework was validated. This entails validation of the developed framework by construction industry training stakeholders.

Finally, the dissertation was written and structured in six chapters as follows:

Chapter 1.0: Introduction

Chapter 2.0: Literature Review

Chapter 3.0: Research Methodology

Chapter 4.0: Data Presentation, Analysis and Discussion

Chapter 5.0: Presentation and Validation of the Framework

Chapter 6.0: Summary, Conclusions and Recommendations

1.7 Scope and Limitation

1.7.1 Scope

The study focused on process of training craft skills workers in the construction industry at pre-employment stage with emphasis on vocational and technical training institutions and construction organizations. Traditional trades such as Masonry, Painting, Plumbing installation, Electrical installation, Tiling, Carpentry and Joinery, Steel-fixing (Fitters), Plant operators, Plant mechanics, Scaffolding, and so on were considered while emerging trades in the industry were explored. Data was collected in Lagos and Kaduna States and the Federal Capital Territory (FCT) Abuja particularly because of the concentration of training institutions and construction organisations in the States and the Federal Capital Territory. Other issues such as facilities, funding and manpower (trainers) were not the primary focus of this research.

1.7.2 Limitation

The key limitations here are in the manner that data was collected. Some of the respondents (craftsmen particularly) were not able to adequately express themselves in the English language and as such could bring in bias in the results obtained. In addition, the conduct of face-to-face interview necessitates direct contact of the researcher with respondents thereby influencing some

responses. This had likely influence on the data and the results obtained. The framework is only developed for initial (pre-employment) training and may not be suitable for other technical training like retraining of employed craftsmen.

CHAPTER 2: LITERATURE REVIEW

2.1 Availability and Shortages of Construction Craft Skills

Previous studies have established shortages in craft skills across the world in a variety of construction trades (Agapiou *et al.*, 1995a; Agapiou *et al.*, 1995b; Agapiou 1998; Chan and Dainty, 2007; Gann and Senker 1998, Mckenzie, *et al*., 2000, Forde and MacKenzie, 2004; Datoegoem, 2006; Issam, 2006; McGuinness and Bannett, 2006; Muya *et al.*, 2006; Smith, 2009; Abdullahi, 2010; Wong *et al*, 2010; Kikwasi 2011; Medugu *et al.*, 2011). In Latham's (1994) report entitled "Constructing the Team", severe skills shortage in UK was identified. The study of Agapiou *et al*. (1995b) on forecasting the supply of construction skills in the UK, also reported shortages of skills workers particularly bricklayers, carpenters and plasterers. Similarly, the report of Egan (1998) noted that workforce trainees had almost halved since 1970s and recommended the need to improve health and safety training for staff and for training at all levels with a view to improving quality of craft skills in the UK. Although the level and nature of the shortage vary from country to country, in UK for example, several years after Egan's report, CITB (2002) reported a 79 percent skills shortage and five years later Clarke and Herrmann (2007) conducted a research asking the same question used in the CITB survey and confirmed the finding with a 79 percent skills shortage.

Although it is generally agreed that there are shortages of craft skills in construction industry, the dimension of the shortages is however arguable. Chan and Dainty (2007) argued that resolving skills shortages only represents one aspect of dealing with skills challenges in UK. The other aspect of skills challenge is skills gap which is described as the 'skills deficiencies of employees'. In addition, they explained that while research into skills shortages regarded shortfalls from a more quantitative perspective, research into skills gaps was concerned with the

descriptive content of those skills deficiencies (shortage in area). Again, Department of Education, Science and Training (DEST) (2002) elaborated further that:

"Skill shortages exist when employers are unable to fill or have considerable difficulty in filling vacancies for an occupation, or specialised skill needs within that occupation, at current levels of remuneration and conditions of employment, and reasonably accessible location."

Shortages are typically for specialised and experienced workers, and can coexist with relatively high unemployment overall or in the occupation. An occupation may be in short supply even though not all specialisations are in shortage. Occupations may be in shortage in particular geographical areas and not in others. Skill shortages generally involve skills that require a significant period training and/or experience. On skills gaps, DEST (2002) also explained that:

"Skill gaps occur where existing employees do not have the required qualifications, experience and/or specialised skills to meet the firm's skill needs for an occupation. Workers may not be adequately trained or qualified to perform tasks, or may not have up-skilled to emerging skill requirements".

In this sense, skill gaps do not simply relate to formal qualifications. Employees in an occupation may have the necessary vocational qualifications for the occupation, but not the specialised knowledge, skills and experience needed to adapt to new technology and new methods of working.

Having explained the different dimensions of skills shortages, instead of training new craft skills to boost supply and improve/update the existing stock, Forde and Mackenzie (2004) reported a long-term decline in the level of apprenticeships. The number fell from around 218,000 in 1970 to 53,600 in 1990, indicating a much lower drop of about 50 percent in training than Egan

reported. In a more recent study, Abdel-Wahab *et al*. (2010) cited Construction Product Association (2008) still reported labour shortages across various construction trades such as steel benders and fixers; plasterers, carpenters and joiners. They noted that the shortages have resulted in companies' inability to meet clients' demand. This questioned the efficacy of the recommendations in earlier reports and researches, or probably the recommendations were not implemented. In the area of conservation craft skills, Preston (2006) reported skills shortages too. The report suggested that skills requirement for conservation works is also in short supply and the implication is that heritage building may not be protected as envisaged.

Following this trends, there have been efforts to improve skills training in UK with the view to reversing the trend. In an effort to address the skills shortages, several studies have been undertaken to formulate strategies to cope with or to solve the problem of skills shortages. For example, Dainty and Bagilhole (2005) encouraged the use of non-traditional recruitment in the UK industry over the past decade. Some other researchers explored tapping into women and ethnic minorities, while looking at the option of adult training and in some cases retraining (Clarke and Wall, 1998; CBC, 2002; Ellison, 2003; deGraft-Johnson *et al.*, 2003). There are available evidences on the effort of various nations in using levy schemes to support training of skills workers as a means of reducing skills shortage (Muya *et al.*, 2006; Abdel-Wahab *et al*., (2010). The expansion of the EU was also seen as opportunity that could provide short-term solutions to the problem of skills shortages (RICS, 2005), but judging from the contrasting statistical evidence in recent Danish research, Clarke (2005) opined that the expectations seems very unclear. Mackenzie *et al.* (2000) examined responses of employers in tackling the skills shortage problem. The study revealed that employers considered the Construction Skills Certification Scheme (CSCS), stability of the industry and shift towards direct employment as

preferred ways for mitigating the skills shortages in the UK. In response to the call by Mackenzie *et al.* (2000), Barrick (2003) reported that the Office of Government Commerce (OGC) is recently encouraging the engagement of only those contractors who hire CSCS registered labour. To some extent, there are reports indicating a decline in the proportion of self-employment in the twenty first century compared with what obtains in the twentieth century (Pearce report, 2003). Although not all the efforts succeeded, however, some of the attempts assisted in reducing the severity of the shortages.

Notwithstanding the seemingly success reported above, the study of Clarke and Herrmann (2007) investigated how firms develop human resources in response to skills shortages; the study used questionnaire survey and also drew data from data bases of social and private house-builders in addition to a detail investigation of firms. The study revealed worsening skill shortages and hard-to-fill vacancies in UK. Although the study included site managers, the result for the skills workers confirmed the persistence of shortages and reported that firms rely for recruitment on traditional and informal methods and procedures. There are also evidences of reliance on experience not qualifications as basis for recruitment coupled with cases of "poaching" which is a symptom of craft shortage in an industry. Further to that, Clarke and Wall (1998) asserts that "poaching" is an especially British problem, being foreign to countries like Germany, Netherlands and Denmark. It was argued that in those countries, occupational labour markets prevail and training provision is three to four times higher and wages are regulated through collective bargaining. It is however not in all trades that shortages are severe. For example, Clarke and Herrmann (2007) concluded that the shortages are severe in trades such as carpenters and joiners, bricklayers and plasterers. In a similar vein, Morgan *et al.* (2008) reported cases of difficulty of recruiting carpenters and plasterers by firms in the UK. Recently, Abdel-

Wahab *et al*. (2010) still reported evidences of shortages in trades like steel benders and fixers; plasterers, carpenters and joiners. On a general level, Forde and MacKenzie (2004) notably reported the use of non-standard labour and subcontracting as evidence of craft skills scarcity in UK. As a way of addressing the problem of craft skills shortages in the UK, Gann and Senker (1998) and Agapiou (1998) reported that structures for training and certification were developed, with the hope that it will provide avenue for training and certification of both existing stock of craft skills and new entrants in the industry.

The shortage of construction craft skills in developed countries is not only in UK. There is hardly any developed country that is self-sufficient in terms of both quality and quantity of craft skills. For example, US is battling with its share of craft skills crises. In a survey of facilities owners by construction user's roundtable, Rosenbaum (2001) reported that 82 percent of 162 respondents had shortages of skilled craft labour, while 78 percent believed that the shortages had worsened over the past three years, some reports suggest severe to mild recruitment challenges which is reported to have worsened due to poor wages and reluctance of employers to train despite the need for more skilled workers. Many other nations like Germany, Canada, Netherland and many more have experience different dimensions of craft skills crises (Clarke and Wall, 2000; CBC, 2002; Malcomson *et al.*, 2003). In most of those developed countries the challenges are in attracting, retaining, training and retraining craft skills compared with developing countries where teaming unemployed youths have indicate interest to work in the industry but lack of effective training system has hindered them. In contrast, in the US, youths are not interested to build career in the construction industry. A study on US construction industry's contribution to employment confirmed that. In the study, although construction industry's contribution to employment is placed at 5.2 percent of all workers, an occupational survey of junior and senior

high school students showed that construction was ranked 248th out of 250 occupations, preceding only custodial care and migrant farm work (Issam *et al.,* 2006). This explained why attraction and retention of individuals to the industry in US is a challenge. However, in sub-Saharan Africa, some researchers suggest availability of individuals willing to enter the industry even though most of them are unskilled but because they are poorly trained or not trained at all, they were unable to gain entry (Muya *et al.*, 2006; Kikwasi, 2011).

Apart from earlier strategies to mitigate craft skills shortages, another approach is the improvement of vocational skills qualifications. Despite these improvements in the vocational skills qualifications, severe skills problems still exist particularly in relation to the framework of National Vocational Qualifications (NVQs) which underpins the industry's craft skills framework. There are indications that suggest that the current qualification structure is out of step with industry needs and is in dire need of reform. Clarke and Winch (2004) suggested a need for greater integration between the regulators of training, training providers, trainees and employers as they recommended a three-tier system of block release, simulation and work experience in the pursuit of qualifications. Similarly, Callender (1997) suggested that qualifications should result from a training course but regrettably, NVQs as designed are not necessarily linked to any course structure, nor are training providers required to follow a particular training course syllabus. This also reinforces the recommendation of strengthening the theoretical base as a starting point for reformation of the NVQ system (Clarke and Winch, 2004).

Although Ireland, a European country also had cases of increasing demand for craft skills, a success story is however reported (O'Connor, 2006). O'Connor (2006) studied success of the training system in Ireland and identified the structural weaknesses of the system. The study found that the success of the Ireland training system was attributable to social partnership and the

capacity of the training agencies to respond to the national need by providing additional places for the educational release element of the training system. The system enjoyed overwhelming support of all stakeholders.

While the report in developed countries is a mixture of successes and failures, there are however, mostly reports of shortages of craft skills in most developing countries without commiserate effort to improve the situation. The reason for the shortages in most developing countries is attributed to unstructured and poor informal mode of training rather than lack of interest on the part of youths to enter the industry as the case of developed countries. Some of the studies indicated that youths are willing to enter the industry but the quality of the stock of those entrants was reported to be poor (Muya *et al.*, 2006; Kikwasi, 2011). It was opined that with proper training, the quality of the existing stock of workers can be improved. In addition, most of those studies suggested that unstructured and poor informal training has accounted for majority of the available skilled workforce in developing countries (Zakeri *et al.*, 1996, Jayawardane, and Gunawardena, 1998; Sha and Jiang, 2003). Because of the demand for improved quality of construction products, just like in developed countries, incidences of poaching were also reported in developing countries, this is because there are fewer experienced skilled workers compared to the demand of the industry.

The situation is even worse in sub-Saharan Africa where Muya *et al.*, (2006) studied construction craft skills requirement with a focus on Zambia. The study identified training as one of the causes of craft skills manpower shortages in Africa. It was further revealed that majority of the existing stock of construction craft skills is poor in quality and recruitment strategies for craft skills largely depend on pool of unemployed construction workers. There are indications that on-the-job training is highly relied upon to train and sometimes migrant workers are employed for

those skills that are not available in the market. It was therefore suggested that training should be improved through a sector specific training levy. The study agrees with the finding of Clarke and Herrmann (2007) that construction firms resort to poaching to meet their demand primarily due to insufficient supply of craft skills workers on demand.

Other studies in Kenya and South Africa (Wachira *et al.,* 2008; Kentz Corporation, 2012) highlighted similar findings of poor quality trade workers and shortages principally due to weak training system or in some cases complete absence of training system. On the availability of craft skills, the survey conducted by Muya *et al*. (2006) reported less than 22 percent of the respondent suggesting severe scarcity while 25 percent and 6 percent responded that it was sometimes and rarely available. It was however argued that the response may not be an indication of the quality of the skills but mere willingness of individuals to find jobs due to very high unemployment rate estimated at about 16% in Zambia then. The fact that individuals are willing to work in the industry suggest the availability of a pool of individuals that if properly train will increase or very likely reduce the severity of the extent of craft skills scarcity in the region. One interesting revelation is the ease with which recruitment level improves for craft skills offer by training organisations. For Muya *et al.* (2006), it was easier to recruit carpenters and bricklayers because there are more schools offering them. This also suggested that with increase in training channels, quality of craft skills may improve and shortages may reduce. However, for those trades with fewer training schools, the study suggests that it was difficult to recruit those skilled persons. This reinforces the need for improvement in training particularly in developing countries.

In a related study, Kikwasi (2011) evaluate construction skills in Tanzania, using questionnaires and interviews to assess the availability of management/supervisory employees and operatives.

The study concludes that there is scarcity of craft skills in Tanzania just like in other countries of the world. On the quality of the available craft skills in Tanzania, the study suggests poor quality and that the employers do not enquire about the training background nor bother to test the competence of the skills workers before engaging them. This revelation is worrisome just as the study indicated that the work of the craftsmen has subjected some of the structures surveyed to danger of collapse due to unsafe practices of the incompetent craft skills personnel.

In Nigeria however, a study of some selected cities in the northern region (Abdullahi, 2010 and Medugu *et al.,* 2011), sought the opinion of 85 construction professionals and contractors on shortages of craft skills workers and found that 92% of the respondents suggested that there is shortage of craft skills workers. The study further indicates that the severity of the shortage is evident in Tilers, Interior Decorators, Electricians, Glaziers and Iron benders. Interestingly, 72% of the professionals and 61% of the contractors further indicated that craft skills workers are fairly skilled in Nigeria; which suggests low quality of workmanship in the industry. Even in trades were skills workers are perceived to be readily available (example- Masons, Plasterers, Carpenters and Painters), quality of work is usually not satisfactory (Bokinni, 2005; Abdullahi, 2010). Similarly, Bokinni (2005) observed that the scale of construction projects is posing a great challenge to developing countries, especially in terms of manpower. The study further stress that unless an adequate supply of appropriate trained workers can be ensured, the industry will consistently fail to satisfy the demand of the market for an adaptive, innovative and capable service.

In developing countries, some suggestions on the way forward were given, for example, the problem of integrating formal and informal craft skills training is emphasized and suggested by several authors (Gann and Senker 1998; Jayawardane, and Gunawardena, 1998; Rosenfield and

Warswaski, 1998; Bokinni, 2005; Muya *et al*., 2006; Wachira, 2008 and Abdullahi, 2010; Francis and Prosser, 2014). The practicality of this integration within the domain of construction industry is still not verified and perhaps is a subject of further research. In the same vein, Muya *et al.* (2008) suggested an improvement in training through a sector specific training levy to address funding problem in sub-Saharan Africa since most construction companies do not have property right over human capital they invested in. Other recommendations are as follows (Bokinni, 2005; Datoegoem, 2006; Abdullahi, 2010):

i) Re-organisation of training programs to accommodate existing stock of craft skills workers who wouldn't want to leave their jobs for long period of training as well as providing a well structure level that will clearly spell out mile stones for progression in the industry.

ii) Development of a unified sector specific framework for training and certification of trainees with clear aim and objectives.

iii) Encouraging the training of trainers in craft skills centres especially in areas of dire need.

iv) Re- branding the image of the industry through awareness on construction industry, blue collar jobs and industry's opportunities to workmen as a means of attracting bright young men and women to take up career in the industry.

2.1.1 Demographic Trends of Construction Craft Skills Shortages

Although the shortage of craft skills is global, the nature and causes of craft skills shortages varies from one country to another. While the shortages in some countries is connected to lack of interest by young people to build career in construction industry (Clarke and Wall, 2000; CBC, 2002), in other countries, it is majorly due to poor or complete lack of efficient formal training (Muya *et al.*, 2006; Kikwasi, 2011; Datoegoem, 2006; Abdullahi, 2010). In many other countries such as UK, the impact of ageing population is a serious threat (Chartered Institute Of Building [CIOB], 2008). In the UKs' construction industry, the total number of workers over 60 has

increased more than any other age group and the biggest reduction is in the total of workers under 30. In a survey conducted by CIOB (2008) the result shows a general consensus that the number of young people entering the industry is declining; 65% of respondents have noticed a decrease in the number of workers aged 16-30. This suggests that a great deal of knowledge and many vital skills are about to be lost with fewer professionals in line to replace them. Similarly, in NCCER (2013) report, is was reported that according to the "Talent Pressures and Ageing Workforce Industry Report Series," conducted by the Sloan Centre on Aging & Work at Boston College, of 58 construction firms surveyed, 50% indicated the aging workforce would "negatively" or "very negatively" affect their business a figure significantly higher than other business sectors studied. With many workers rapidly approaching retirement age, the industry faces a significant skills shortages and gap as fewer skilled workers are available to take their place.

The implication of ageing population is varied and much more than skills shortages and gaps, ageing population indicates high turnover of workforce that are retiring therefore in terms of training, it suggests potential scarcity of trainers in the industry that will supervise new workers and ensure they acquire sufficient skills to work on their own. In addressing the problem of ageing population, there are attempts at increasing retirement age (CIOB, 2008; NCCER, 2013) in order to retain skilled workforce but this measure is ineffective in terms of labour force because many construction jobs are physically demanding and so it's not always possible to safely extend the retirement age for all sectors of the industry. However, in terms of trainers, the measure may serve on a temporal basis.

2.2 Efforts Aimed at Improving the Training of Construction Crafts Workers

It has been suggested from literature that negligence or lack of training craft skills is a major cause of skills shortages in the construction industry. Efforts are made to improve the condition of training of crafts skills workforce, for example, Steedman (1998) review quantitative trends in skill formation at intermediate (craft) level in engineering and construction over the past decade in Britain and Germany and provided a new assessment of standards aimed at in the construction industry in the two countries. The study found that the volume of training in both construction and engineering sectors in Britain has not changed. Similarly, Agapiou (1998) review recent development in construction operatives training in the UK. The paper started by tracing the prevailing trends in the provision of craft training in the UK construction industry and highlighted the fragmentation of funding arrangements and its effects on the structure of training. Also, recent developments in government policy for youth training in the UK in general were reviewed. Furthermore, the paper discussed formalized training procedures and the roles of the different training organizations in the construction industry in UK. In addition, the paper presented the aims, objectives and key characteristics of the UK's qualifications and finally identified the factors that have constrained the implementation and delivery of the new qualifications in the UK. One of the key findings of the study is that there is an undue emphasis on the acquisition of qualifications rather than the quality and breadth of training which causes further discrimination against minority trades and trainees who are unable to progress quickly through the system. Hunter (2014) reported the effort of US government to improve better access to job training. In the effort, the workforce innovation and opportunity Act was signed into law. Some of the changes include ensuring that basic skills training in subjects such as remedial math, English and reading conducted through local Workforce Investment Boards align with skills

needed to apply for and complete registered apprenticeship programmes. The idea is to remove unnecessary impediment to access to training and is viewed as an important step toward addressing the shortage of qualified workers in the construction industry.

Kentz Corporation (2012) reported difficulty in filling vacant spaces in engineering and construction sectors of South Africa. To reverse the trend, the company established training centres in which traditional training that span four years averagely was shortened to 18 months on average with emphasis on practical (constituting 70 percent of training) while theory takes the remaining 30 percent. The training is entirely industry based but provided opportunity for trainees to go for competency assessment and certification. Based on previous studies, there are strong indications that for effective training, effort should be on developing a system of training with the right mixture of theory to practical content. It is also obvious that industry based training alone is not adequate but requiring industry input to balance skills acquisition.

2.2.1 Barriers and Challenges in Training Construction Craftsmen

Despite the establishment of the existence of skills shortages in the construction industry and the development and proposal of solutions for solving skills shortages, the problems still persists. It therefore suggests that there are reasons behind the failure of these previous efforts. In trying to find these reasons, previous studies (NCCER, 2013; CBC, 2002) found several barriers to craft skills training in the construction industry. Some of the studies that identified barriers to training construction craftsmen include NCCER (2013), CBC (2002) and Construction Sector Council [CSC] (2009). The barriers in NCCER (2013) include:

a. Resources for Craft Workforce Development

Some contractors view training as waste of resources (wasted investment) since they have no property right on their employees. This has been identified as a barrier to training. Some of

the contractors think that if they train their craft workforce, they are helping their competitors who may attract the trained worker with higher wage, while increasing their chances of losing jobs if they include the cost of training in their bid package. This confirmed earlier findings of poaching as disincentive to construction craft skills training (Clarke and Wall, 2002; Muya *et al.*, 2006). Another dimension is the rate of retirement of skilled craftsmen due to age. It is viewed as a barrier because with the retirement of more experienced and skilled workers, there will be insufficient number of experts to provide on-the-job training which is suggested to be the most dominant means of training. It is argued (NCCER, 2013) that the clients and his customers are paying for the loss of skills because they bear the cost of poor job and at higher rate primarily due to refusal of contractors to train.

b. Industry Image

One of the barriers to training is the general negative public perception of the construction industry. This has largely inflicted on the industry and has discouraged bright young people especially from building career in it. NCCER (2013) reported that less than 10 percent of the industry's contractors are committed to image enhancement and training development in the US. This barrier is largely the case in developed countries where attraction and retention of workers particularly youths has been highlighted as problem. In developing countries however, studies suggests the availability of unemployed youths with interest to build career in the industry but lack of effective and efficient training system has hindered them from gaining access into the industry. The fact that unemployed youths are available to pick up job in the industry does not reflect the absence of problem in attracting particularly bright youths into the industry. Some researchers have however indicated that construction industry in developing countries is also faced with the challenge of poor image which has resulted in

people regarding working in it as inferior and on last resort only (Datoegoem, 2006; Abdullahi, 2010).

Also regarding the image of the industry, NCCER (2013) reported the finding of a survey conducted by RIDGID, a leading supplier of professional grade tools. The study found that only 6 percent of high school-age respondents showed interest in a Building career in construction industry. The remaining 94 percent were uninterested in pursuing career in construction industry. A further survey was conducted on those that were not interested in pursuing a career in the construction industry and majorly the following summarised perceptions were found to be the barriers to attracting them to build skilled craft career in the construction industry:

i. Perceived lack of knowledge of the industry- some of the respondents claimed they have very little knowledge of the industry, as such will not build career in it.
ii. Assumptions regarding need of mechanical skills or innate ability to fix things- some of the respondents view the industry as too mechanical and since they are not mechanically inclined and good at fixing things, they are not interesting in building career in it.
iii. Perceived lack of opportunities- Some of the respondents believe there are very few opportunities available to them in construction.
v. Some respondents also believe there is a better future working in computers than working in skilled crafts.
vi. The youths believe there are limited opportunities for career advancements, relatively low salaries, and less-than challenging work in the construction industry. This is the problem that requires attention because youths are interested in jobs that provide avenue for rapid career advancement, competitive salaries, and skill development, as well as meaningful and fulfilling work.

vii. The perception that craft skilled jobs are old-fashioned has discouraged some youths from developing interest in construction careers because they do not think crafts jobs are cool.
viii. There is also the perception that construction industry is not high-tech, as such youths are not interested in building a career in it.
ix. Some respondent perceived working in an office is more respected than crafts jobs. Based on that, they perceived construction as not prestigious industry.

c. Owner Participation and Commitment

This barrier stem from the fact that owners of projects are beneficiaries of craft skills and also pay for the lack of training through the cost of low productivity and poor quality of work, they should therefore invest in their training. There were suggestions that owners should devise ways of forcing contractors to invest in training. Some of the suggestions are that owners should only do business with contractors that train.

According to CSC (2009) report on the response of employers on the extent to which a series of factors were barriers to their organization supporting construction-related employee training, majority of the respondent indicated lack of funding from sources outside their company (including from federal and provincial programmes, unions, industries, and so on) as the most significant barrier to training. This was immediately followed by those that said too few staff to allow workers to take time off work to receive training is a barrier, then those that said loss of revenue when workers are away at training is a significant barrier to training. Table 2.1 shows the barriers to training identified and used in the survey.

Table 2.1: Barriers to Training

Lack of external funding for training
Too few staff to allow workers to take time off work to receive training
Loss of revenue when workers are away at training
Expenses related to training programme or courses are too high
Insufficient staff to provide in-house training
Lack of training programme in your area
Too few journey persons to supervise apprentices
Lack of available seats in training programmes
Lack of manufacturer/union/association-supported training in your area
Employees are not interested in taking training or upgrading their skills
No space or infrastructure to offer training in-house

Source: CSC (2009)

Also, Rubin (2007) reported the result of a Construction Industry Institute (CII) study on cost and impact of training. The study identified barriers to training, indicating that lack of craft

workers interest in entering formal training programme is the severe barrier while the turnover after receiving training is the least barrier. Table 2.2 shows the details of the identified barriers. These factors are very similar to those in Wang *et al.* (2008). The findings are also not much different.

Table 2.2: Common Barriers to Formal Training

	Severity
Lack of new craft workers interested in entering the formal training programme	High
Training schedule conflicts with work schedule	
Training requires too much time to complete	
Lack of financial resources	
Lack of adequate instructors	
Once trained, employees leave the organization	Low

Source: Construction Industry Institute (2007); Rubin (2007)

Similarly, Wang *et al.* (2008) examines the current state and effectiveness of construction craft training via 93 respondents from a wide range of U.S. industrial and commercial construction firms and associated craft training centers. Amongst other issues, the study examines 12 identified barriers of advancing craft training in construction.

The result shows that *lack of new craft workers interested in a training programme* was the most serious barrier hindering the implementation of craft training in construction. This was followed by *training schedule conflicts with work schedule* and *training requires too much time to complete*. In the same study, the following factors: *training location is not accessible, lack of adequate training facilities,* and *lack of adequate instructional material* were identified as the

barriers having the least impact on advancing formal training in construction. In a similar vein, Liska (1994) investigated the reasons that construction contractors did not train their employees. Arranged in order of decreasing significance, the barriers were: *lack of money, lack of time, lack of knowledge, high employee turnover, workforce too small, past efforts not effective, hiring only trained workers, and lack of employee interest*. Comparing the study of Wang *et al*. (2008) and Liska (1994), there is consensus on most of the factors as barriers to craft skills training in the construction industry. Table 2.3 show the barriers identified by Wang *et al*. (2008) arrange in order of descending importance.

Table 2.3: Common barriers of Construction Crafts Training.

Common barriers for formal construction craft training
Lack of new craft workers interested in formal training programs
Training schedule conflicts with work schedule
Training requires too much time to complete
Lack of financial resources
Lack of adequate instructors
Once trained, employees level our organization
Lack of support from job site supervisors
Inadequate completion rates of existing training programs
Language barriers
Training location is not accessible by our employees
Lack of adequate training facilities
Lack of adequate instructional material

Source: Wang *et al.* (2008)

Although Femi (2014) called them factors militating against training in construction craft skills, invariably; the factors are barriers to training of construction craftsmen. The study identified 22 factors militating against construction technicians training in Nigeria. Of the 22 identified factors, the study found that lack of adequate encouragement is the most predominant factor militating against training of construction technicians. This finding suggests that technicians are not encouraged by managements of construction organisations to go for training. The reasons for

that may not be unconnected with the findings of other studies (example, Morgan *et al.*, 2008) that organisations view training as unnecessary expense and since they have no property right over the staff they trained, therefore training is usually avoided. It is also surprising that barriers such as lack of available time for training and absence of training/staff development in the organisations are ranked lower than lack of adequate encouragement in the list. These are however the opinions of those respondents. The identified factors are listed in Table 2.4

Table 2.4: Factors militating against construction technical training in Nigeria

S. No	Factors
1	Lack of adequate encouragement
2	Lack of enforcement of intellectual property right
3	Poverty/lack of fund
4	No training/staff development
5	Inadequate motivation for skill training
6	Lack of available time for training
7	Lack of effective regulatory body
8	Poor planning and execution of policies
9	Negative attitude of management
10	Lack of foresight
11	Lack of sensitivity
12	Corruption
13	Lack of support and encouragement
14	Government negligence to training of craftsmen
15	Lack of cooperation by managers
16	Lack of qualified staffs
17	Absence of knowledge of training functions
18	Ignorance of the trainee
19	Frequent dispute
20	The procedure for technical training too cumbersome
21	Expected financial benefits of training not known
22	Changes in social situation

Source: Femi (2014)

Some of the limitations of the study however are that, it did not identify the training programmes available in construction organisations in Nigeria and also did not identify the types of training programmes available in the construction industry vis-a-vis the training programmes established by the Government.

2.2.2 Employers View on Cost of Training Construction Craftsmen

Employers view on cost of craft skills training may be a hindrance to training. Depending on the training system adopted, the cost of training construction craftsmen is sometimes substantially borne by the organisation that is providing the training but usually with support from government based on agreement signed before the training commenced. A typical example of this type of training system is the German dual system of training (Boehm, 1996; Hippach-Schneider, *et al.*, 2007; Mohrenwieser and Zwick, 2009). However, there are some other systems where the cost of training is entirely the responsibility of the general public, where funds are raised true compulsory levy on liable companies and budgetary provisions (Clarke and Wall, 2000; ITF, 2012). In some other systems, the employer and the trainee share the cost of training through payment of low wages to the trainee for the entire period of the training (Waddoups, 2014).

Whatever system is used, the net cost of training is the main concern of stakeholders particularly employers because of the perceived effect it has on the general performance of the organisation. On that, Almeida and Carneiro (2009) estimated the rate of return to firm investments in human capital in the form of formal job training. In doing the research, they use a panel of large firms with detailed information on the duration of training, the direct costs of training, and several firm characteristics. The study found that only 8.6 percent of the respondents are committed to training. In contrast to most perceptions that training is a liability to organisations, the results of this research however suggest that formal job training is a good investment for firms possibly yielding comparable returns to either investments in physical capital or investments in schooling. On that note, Ng (2005) asserts that according to the human capital theory, individuals invest in human capital as long as the net present value of the benefits is positive.

It is therefore not surprising that employers hold different views on the cost of training, for example, Morgan *et al.* (2008) reported that nearly all interviewees in a study he conducted complained of 'hidden costs' of training associated with the loss of productivity and supervision of trainees. To them the time and resources used to train is unnecessary additional cost. While citing CITB (1993); Agapiou (1998); Hogarth and Hasluck (2003), Abdel-Wahab *et al*. (2010) noted that training apprenticeships in construction are more expensive than those in other industries because of the high cost of equipment and materials, the requirements for low instructor/ trainee ratios compared with other occupations and the longer duration of apprenticeship training. To buttress this point, Agapiou (1998) cited an example with the NVQ in carpentry and joinery which requires the construction of a realistic staircase by a trainee for competency assessment. To achieve that, there must be enough space to allow the construction of full size rather than half size models for assessment. Constructing this model is resource intensive in terms of materials and many of those materials (example timber) are expensive and not reusable. Based on this, it was lamented that the cost of training can act as a disincentive to train particularly for small employers (Agapiou *et al.*, 1995a; Agapiou, 1998).

There are evidences in literature that suggests that firms will be reluctant to invest in general or transferable skills because of training externalities that make it difficult to obtain a return on such investments (Becker, 1962; Waddoups, 2014). The studies explained that problem emerges when an incumbent firm provides general training to workers, who then take the newly acquired skills to a competing firm where post training wages at the incumbent firm are not commensurate with perceived productivity. Unless a wedge between post- training wages and productivity is placed, otherwise the firm may not earn a return on its training investment and regrettably, the existing employment system does not allow the placement of such wedge on labour (Muya *et al.*, 2000).

Another dimension is the concern some employers have on the time experience staff spends in coaching trainees which they claimed was part of the employee's productive hours. Based on that, employers are adopting some strategies to reduce the cost and risk of training. For example, Waddoups (2014) noted that one way to make employer- provided general training economically feasible is for firms to pass the costs on the trainees through low wages that are commensurate with their low productivity during training. By the use of this strategy, employers have already shared the cost of training with the employee such that if the employee decides to take another employment after completing the training as the case may be, the employer may not lose his investment as he has already recoup through payment of low wages at the time of training.

Also, there are complaints about micro-firms not contributing despite receiving benefits from training grants. This complaint is especially important where training is finance with public funds. In fact, training is often viewed as a cost centre to be controlled or downsized during lean times (Kraiger, 2003; Tharenou et al., 2007). Similarly, Idhammar (2014) explained that training is not always looked upon as an investment by management, but often, training budgets are reduced by managers who suffer from short sighted initiatives from top management.

However, in analysing the impact of increasing the share of apprentices and the cost of the share of unskilled or semi-skilled employees on establishment performance, Mohrenweiser and Zwich (2009) showed that an increase in the apprentice share in trade, commercial, craft and construction occupations has a positive impact on establishment performance. This suggests that training is not entirely a waste of resources since organisations can and sometimes do recouped their training cost (Boehm, 1996; Hippach-Schneider, *et al.,* 2007; Mohrenweiser and Zwich, 2009). Mohrenweiser and Zwich (2009) further argued that "*the absolute level of measurable costs and benefits during apprenticeship training is less important for the decision on the share*

of apprenticeship than their marginal contribution in relation to substitutes (unskilled and semi-skilled employees)".

Although grants are usually provided to support organisations that trained, there is however an indication of a general dissatisfaction with the level of financial assistance received by organisations. Notwithstanding the general dissatisfaction, there are suggestions of preference of direct funding by government to firms that carry out training instead of through 'agencies' and training providers.

2.2.3 Benefits of Training

Although there are barriers to training craft skills in the construction industry, these however those not suggest the absence of benefits of training craft workers. Wang, *et al.*, (2008) opined that not knowing the effectiveness of craft training efforts impedes the development and implementation of craft training programmes throughout the U.S. construction industry. This suggests that with more awareness on the benefit of training, chances are that organisations will be willing to train craft workers. On that, previous studies have attempted to expose the benefits of training, for example, Barker (2011) considers the benefits of investment in training for scarce skills in the South African construction and engineering industry. The report suggested that reducing skill shortages provides benefits for organizations, individuals, families, regions and national economies. Companies were therefore urged to work with national governments to reduce skill shortages and obtain competitive advantage through investment in training. Similarly, in analysing 67 previous studies on training, Tharenou *et al.* (2007) suggested that training is positively related to human resource outcome and organisational performance. The study argued that since training improves the job performance of employees, it should therefore reflect on their productivity, quality of work and services. In aiming to give sceptical owners and

contractors some proof that craft training pays off, Rubin (2007) shows the results of a new survey released by the construction industry institute on how some chronic and costly jobsite labour problems can be mitigated. The study relied on responses from more than 90 training managers in owner, contractor and vendor organizations, on average, most of the responded have spent 23 years in the industry. With 75 percent of the responses from construction firms and the balance from training centers in the U.S. and Canada. The study found that investing 1% of a project's labour budget in training could have double-digit returns in productivity, reduced absenteeism and need for rework, amongst other things. In real terms, for both capital and maintenance projects, the 1% investment netted benefits ranged from an 11 percent hike in productivity to a 27 percent decrease in injury rates. Table 2.5 shows the detailed of the findings.

Table 2.5: Investing 1 percent of total projects budget in training

	Project Type	
	Capital	Maintenance
Benefits of Training		
Productivity improvement	11%	10%
Turnover cost decrease	14%	14%
Absenteeism cost decrease	15%	15%
Injury decrease	26%	27%
Rework decrease	23%	26%

Source: Construction Industry Institute (2007), Rubin (2007)

Corroborating both Rubin (2007) and CII (2007), Wang *et al.* (2008) identified improved productivity, reduced turnover, reduced absenteeism, reduced injuries and reduced rework as benefits of training craft employees. Another study by Wang *et al*. (2010) still identified improved productivity; reduced turnover, which leads to reduced orientation and hiring cost; improved quality; reduced absenteeism; and improved safety as benefits of craft skills training. In the same vein, Odusami and Ene (2011) and NCCER (2013) identified improved safety performance, decreases in absenteeism, turnover, rework and increased productivity as benefits of craft training in the construction industry. Dai *et al*. (2009) also conducted a nationwide

survey involving 1,996 craft workers in the US on factors that affect their productivity. They used focus group discussion to conduct the research and found that availability of skill training and qualified craftsmen are amongst the factors militating against craft skills' productivity.

Again, Tharenau *et al*. (2007) described the outcome variables of training using Dyer and Reeves' (1995) four-category definition of organisational effectiveness for evaluating effects of HR practices. In the categorisation, the outcomes were divided into: *"(a) HR outcomes (low absenteeism and turnover, motivation, high job performance); (b) organizational performance outcomes (productivity/output, quality, service); (c) financial or accounting outcomes (profit, return on invested capital [ROI], return on assets [ROA]) and (d) if they are publicly listed companies, stock market outcomes (shareholder returns, stock value)."*

These suggest that training has the capacity to improve organisational performance through improved productivity/output, better quality work or workmanship and improved service delivery. This in turn has effect on overall cost of production or service as the case may be (Medubu, *et al.*, 2011). Bills and Hodson (2007) also noted the positive effects of the provision of training on organizational performance. To them, training is beneficial to organisations that invest in it, arguing that training may improve production largely because of better output as a result of training. They also pointed that organisations that train heavily are more innovative and more readily adapt to new technologies. In contrast to improve performance through training, Medugu *et al.* (2011) indicated that the work of poor skilled workmen is a subject of poor workmanship, resulting in rework, decline in productivity and overall increase in cost of production.

In terms of cost, Wang *et al.* (2010) estimated that the benefit to cost ratio of training ranges from 1.5:1 to 3.0:1. The result was from an established benefit/cost (B/C) model of the Canadian

Apprenticeship Forum (2006). Benefits and costs were calculated per apprentice per year. The costs included wages and benefits, opportunity cost, disbursements and administration. Benefit components included revenue generated by the apprentice which was determined by total annual chargeable hours of work and charge-out rates (Wang *et al.*, 2010). Table 2.6 presents a summary of findings of previous studies that estimated B/C of construction craft skills training.

Table 2.6: Estimates of B/C ratio of construction craft skills training

Studies	B/C ratio
Canadian Apprenticeship Forum (2006)	1.38:1
An assessment of implementation requirements for the Tier II construction workforce strategy, Dissertation by Pappas, M., University of Texas at Austin, 2004.	2.8:1–3.1:1
Determining the Quantitative Return on Investment (ROI) of Craft Training by Cox and Issa, University of Florida, 1999.	1.9:1-7:1
Brandenburg *et al.* (2006)	2.7:1

Source: Wang *et al.* (2010)

Furthermore, in a review of worker training in the US, Bills and Hudson (2006) indicated that vocational education and training has substantial employment benefits and are particularly likely to materialise when states carefully target their investment in vocational education programmes and when there are clear linkages between the content of training and the skills demand of the available jobs. This buttress the point earlier made and reinforces the need for a robust and effective training system in a state. In a similar vein, Muehlemamm *et al.* (2010) analysed the training behaviour of firms in Germany and Switzerland and found that first, when firms trained, it lower expected firing costs assuming the trainee was eventually employed and a firm is likely to generate other post-training benefits. They explained that over a period of usually three years, employers learn about the true ability of apprentices haven spent sometime in the firm. Therefore, apprenticeship training can be used as a screening device to reduce the risk of a bad match. In addition, while a firm cannot influence the absolute level of firing costs of an individual worker, it can lower the probability that such an event occurs by hiring former

apprentices. On average, the expected tenure of a former apprentice is longer compared to workers hired externally because the training firm has a relative information advantage and only hires those that best fit the job requirements. Secondly, through lower hiring costs, a firm can save recruitment and adaption cost that would arise by hiring skilled workers externally. They further explained that while recruitment costs include costs of advertisement, interviews and other incidental cost, adaption costs arise primarily because externally hired workers have no prior knowledge about firm-specific production flows and may require some on-the-job training before they can work effectively, which has added cost to the employer.

2.3 Main Issues in Craft Skills Training Programme

There are main issues that require attention in a training programme. These are the funding of the programme, trainers, assessment and certification and the stakeholders.

2.3.1 Funding of Construction Craft Skills Training

There are varieties of funding options for construction craft skills training. Previous studies have established the existence of these funding options (Abdel-Wahab *et al.*, 2010; NCCER, 2013). In US for example, NCCER (2013) reported that funding options include "*cents-per-hour agreements, tuition, grants, scholarships and employer funding through direct budgeting and/or tax credits for hiring and training. When training in cooperation with education, there are additional funding options available as well. The most sustainable and successful training programs use a combination of all these strategies."*

Notwithstanding the existence of those strategies, for many reasons highlighted by researchers (Clarke and Wall, 1998; Syben, 1998; Muya *et al.*, 2006; Odusami and Ene, 2011) the funding of craft skills training is a major concern of governments of many nations because funding is

identified as one of the greatest obstacles to implementing quality training programme (Agapiou, 1998; Abdel-Wahab *et al.*, 2010; NCCER, 2013). On a general level, Odusami and Ene (2011) stated that funding of training in construction is an expensive enterprise and is usually provided for, collaboratively by: Government, Companies (firms) and Users fee. Government placed priority on training of craft skills because of its importance to national development in terms of technological growth, provision of infrastructure and employment opportunity.

To provide the quantity and quality of craft skills required by the construction industry of any nation, investment in training and education of crafts skills is required. One of the common ways of funding craft skills training especially at pre-employment stage is through national budgets and levy schemes (Kuruvilla *et al.,* 2002; Muya *et al.,* 2006; Abdel-Wahab *et al.*, 2010; National Board for Technical Education [NBTE], 2013). India is an example where most of the funds for skills development came from Government and private investors with just a chuck of support from World Bank and European Union (King, 2012). The amount provided by government is often inadequate consequently the introduction of contribution by stakeholders and donor organisations. For example, to compliment funding of training through national budget, Muya *et al.* (2006) suggested the introduction of training levy in Zambia.

In Nigeria however, Industrial Training Fund [ITF] (2012) reported the imposition of a compulsory contribution of 1 percent of companies' annual expenditure on staff salaries/wages for training of skills workers. The contribution is limited to organisations with not less than five staff strength. One of the arguments in support of levy system as means of funding skills training is that individual organisations are afraid of losing their investment in training since companies do not have property right on their human capital. Poaching is therefore a common practice by construction firms whenever they are faced with the challenge of increasing skills workers and

the labour market is incapable of meeting their need. Most worrisome is the high percentage of firms preferring to poach than train as noted in Clarke and Herrmann (2007). This indicates the reluctance of firms to train craft skills but prefer to pay higher wage to attract them. On that, some firms view training of craft skills as wasteful venture and are not willing to invest in training since with little enticement by higher wages; craft worker may leave (Briscoe *et al.*, 2001). Morgan *et al.* (2008) noted the anguish of some employers losing their skills men stating that:

'*.....having gone to the expense and trouble of putting apprentices through their training they leave*'.

The levy system is therefore regarded as the most effective means of ensuring industry wide funding of training in both developed and developing nations (Johassan, 2002; Ziderman, 2001, ITF, 2012).

Levy system is therefore adopted as means to funding training particularly in the construction industry although in different forms. For example, Clarke and Wall (1998) examine the levy systems of three European countries (the UK, German and the Netherlands), they noted that the Netherlands has the highest investment in training with a total levy contribution of 4.3 per cent, followed by Germany with a variable levy of around 2.8 per cent. The UK is reported to have the lowest levy rates of 0.25 per cent of a firm's payroll and 2 per cent for labour-only subcontractors. The amounts raised from levy charges in the three countries were also supplemented by the respective governments. The levy system in Nigeria is very much like that of UK although it is very difficult if not impossible to generate contribution from labour-only-subcontractors in Nigeria since most of them are small in size and highly on organised. One of the challenges in the levy system in Nigeria is that only companies doing business directly with

government are compelled to pay the levy usually through denial of prequalification for future projects in the event of default.

There are diverse approaches of generating training levy with a common purpose of supporting training activities. Studies have shown that they are generally grouped into two major categories namely (Ziderman, 2001; Ziderman, 2009; Abdel-Wahab *et al*., 2010):

i. Revenue generation schemes
ii. Levy grant scheme.

The revenue generation schemes allows generated levy to be used in providing training in public sector institutions regardless of industry while the levy-grant schemes encouraged training investment by firms. In terms of accountability, the management of the training funds has been criticised in developing countries especially (Ziderman, 2001; Ziderman, 2009). Because the funds is often used to provide training at national level, cutting across industries, provision of industry specific training is largely undermined (Muya *et al.,* 2006). There are indications of the acceptability of sector specific levy by employers because of a greater industry-specific orientation, less bureaucracy and greater sense of ownership by the companies that contribute to it (Ziderman, 2001). Similarly, the findings of Muya *et al.* (2006) also corroborated these arguments.

On the effectiveness of the levy scheme in funding training, reviewing levy-grant scheme in the UK construction industry, Abdel-Wahab *et al*. (2010) noted that it has not served as incentive to employers to train, instead; training opportunities has decreased in the UK. They argued that the levy-grant scheme is insufficient to alleviate labour shortages and poor participation level in training. They opined that for the levy-grant to be effective, payers must see it as integral part of their business activities and not mere tax.

In Zambia however, the study of Muya *et al,* (2006) found that an overwhelming majority of contractors surveyed supported the idea of introducing sector specific training levy. The use of similar sector specific levy was likewise reported in Bostwana (Franz, 2000). King (2012) reported similar private sector support to train skills workers in India. In contributing to train skills workers, the approaches may vary but the partnership of stakeholders in the industries to support training is proved to be inevitable in both developed and developing countries.

Another means of funding training is the user fee. Although not widely practice in developed countries likely because of the need to attract youths to construction industry, user fees as source of funding training in developing countries has generated debate amongst researchers (Ziderman 2001, Muya *et al*., 2006; Odumsami and Ene, 2011). It was suggested that trainees should finance the full cost of their training since they are the direct beneficiaries of such training through higher wages as a result of the post-training value of the skills they acquired. Research evidence however suggests that trainees are either not able to pay for training or not willing because they do not see the need to bear such cost (Odusami and Ene, 2011). Agreeing with other studies, the study of Muya *et al.* (2006) found that in Zambia, training institutions only raised between 30-40% of their budgets from user fees. The resulting shortfall in budget must somehow be complemented if quality training is to be given. As a result, most countries adopt cost sharing schemes where some level of user fees are paid by trainees to be complemented by government either through direct levy or fiscal budget allocations to training institutions while employers bear some cost through low productivity of industry trainers, provision of facilities and consumable during industry training (Ziderman, 2001; Muya *et al.,* 2006; Abdel-Wahab *et al.*, 2010; NBTE, 2013).

2.3.2 Trainers in Construction Craft Skills Training Programme

Previous studies (Sockice, 1994; Industrial Training System in other Jurisdictions [ITSJ], 2014) show that good teachers are the most important school-based factor in academic achievement and the success of vocational education is dependent on them in both the on-the-job and off-the-job environments and because it is also reported that some teachers in vocational schools lack recent workplace experience in the occupation and some trainers and supervisors of apprentices in companies often lack preparation on how to teach, some of the apprenticeship programmes have provided for assessment of personnel of the industry to ensure that only those that are qualified provide training. In addition to the assessment of the industry trainers, those systems have also provided for the training and retraining of trainers to ensure good delivery of the training (Boehm, 1994; Steedman, 2010). Hansen (2011) explained that in the German training system for example, conscious decisions are taken to recruit the teaching staff for its lower- and middle-level trade schools directly from the trades, and to limit links between these schools and higher education. These policies proved mutually reinforcing in disposing these schools to remain true to their original calling: to serve young people entering local crafts and industry. The appointment of instructors is based on their practical training and experience rather than their academic certificates.

2.3.3 Assessment and Certification of Construction Craft Skills

After acquiring relevant skills, the issue of assessment and certification play a role in determining those with relevant skills from those without the skills. Studies have suggested the existence of diverse method of assessment and certification (Agapiou, 1998; NCCER, 2013; Ab

Rahman, 2014). According to NCCER (2013) most certification and license processes require knowledge or written tests but do not use hands-on skills examination. In the process of assessment and certification of craft skills however, the common requirements are: minimum experience and other qualifications/ stipulated requirement before sitting for the examinations. After meeting the requirement and passing the relevant examinations, the craft worker is then certified or licensed. To ensure continuous development of skills, the certified skills worker is required to annually attend and pass continuing skills education programme which qualifies him to retain the credential.

For NCCER, two levels of certification are offered. There is the *knowledge verified credential* which is issued to craft professionals who successfully pass a written assessment and the *performance verifications* are used to determine hands on skills qualification. A craft professional that passes the written assessment and the performance verification is granted a *certified plus* credential which is the highest credential in most crafts. After taking the assessment, all craft workers that passed are given a "targeted" task specific training prescription that outlines strengths and deficiencies. The craft workers use the training prescriptions to further upgrade their competency levels. For contractors that have training facilities and training organisations, the training prescriptions is used as basis to offer task specific module-based training to elevate the competency level of those workers.

As Ab Rahman *et al.* (2014) noted there is a general shift from assessment of natural features which is the traditional method of assessment in general education and applied to Vocational Education and Training (VET) to competency based assessment in VET. According to Ab Rahman *et al.* (2014), competency in VET refers to individuals who are able to consistently implement the knowledge and skills based on the required performance standards at work and

have the ability to meet the performance standards in the workplace. They summarised that competency is the ability to perform tasks in the workplace while citing Gillis & Bateman (1999), they further explained that competency at work refers to (i) the performance of technical skills that can be accepted (ii) organizational tasks (iii) provide appropriate feedback and reaction when there is a problem or mistake (iv) fulfil a role in all of the work (v) the transfer of knowledge and skills to new situations. Also while explaining competency based assessment, Ab Raham *et al.* (2014) added that competency based emphasises a minimum standard. It adds on criterion levels, value orientations, and quality to the definition of the movement and the levels of criteria are; cognitive, performance and consequence.

Furthermore, Ab Rahman *et al.* (2014) used Blank (1982) to differentiate between Competency Based Programme and Traditional Programme as follows:

> "*The traditional approach is usually based on text books, reference materials, and other materials that do not meet the requirements of employability, students rarely know what they are learning, the programme is built based on the chapter, unit blocks and other segments of the book which gives some meaning only to employability, depending on the instructor teaching giving lectures and demonstrations, teacher-centered, students only receive little feedback from the instructor, usually require a group of students to spend the same amount of time on each unit of instruction, depending on the paper-pencil exams and usually comparable normative student performance. Competency approach was specifically set student achievement that have been identified as crucial in employability, student-centred teaching, providing high quality, good design, using the media to help trainees master the tasks given, have the time to respond during the learning process. Require each individual trainee to perform their duties to a high level*

of proficiency in a job like before receiving credit for achieving each task, the performance compared to fixed standards."

With the NVQ framework, assessment is also based on student's performance. As elaborated by Agapiou (1998), in the development of NVQs, emphasis was placed on performance criteria and range statements rather than on a simple list of what was to be learned. Separate assessments are not necessary as long as students are capable of undertaking specific tasks, in addition to acquiring necessary knowledge and understanding. The emphasis is on what students can do, rather than what they know. NVQs are based on student-centred learning in which students are given responsibility for accumulating portfolios of evidence to show that they are capable of performing the specified tasks. Those judging the evidence and making the assessments can be the trainers or people in the workplace. There is less emphasis on completion time or passing exams and there are no compulsory written tests. As long as the students can demonstrate sufficient competence in performing a set of task, he is certified at the level being assessed.

2.3.4 Stakeholders of Construction Craft Skills Training

Stakeholders of construction craft skills training are beneficiaries of the output of the training organisations. The stakeholders are commonly the industry groups (employers of the product of training colleges), skilled (trades) unions (including trainees) and government (including: training providers [colleges]; training regulatory organisations and all agencies of government that are involve in training) (Bills and Hodson, 2007). All stakeholders have common benefit which is the survival of the trades. The unions as stakeholders try to defend their work and wages by monopolising the training systems in most nations (Bills and Hodson, 2007). For example, in US, the craft unions are involved in setting the curriculum and knowledge areas to be thought. Part of the training is usually taken in the community colleges or trade schools. Similarly, studies

indicate that the union is actively involved in apprenticeships in Europe (Clarke and Wall, 2000; Bill and Hodson, 2007). Just like in US, the contents of apprenticeship programme are jointly negotiated by the industry stakeholders. The role of the stakeholders in the provision of training is very important ranging from determination of the training system and cooperation in delivering the training in both the industry and the classroom.

To ensure the survival of craft skills training system in a nation, every party look at his area of strength and provide support for the success and survival of the trades. The interest of government is mostly economic and social benefits. Bills and Holden (2007) made a case for the social contribution of skills training in the society. On the economic part, the ability of the system to produce sufficient craft skills of high quality to meet the need of the national industry determines the survival of the industry and ultimately the performance of the economy. Government therefore ensures that funds are provided either directly through budgetary provisions or indirectly through levy. Also, in performing its role, government provide the required regulation through policies and establishment of training standards. The industry groups (employers of the craft skills) equally participate in the skills training often through collaboration in providing training and funding. Bill and Hodson (2007) portray a picture of the employer as either a "make or buy" employer. The make employers are those that participate in training either through planned on-the-job training or through off-the-job training in a college or craft school. While the "make" employer participate in training, the "buy" employer relies on hiring craft skills employees mostly through increased wage incentives. Bills and Holden (2007) cited Osterman (1995) that *"Firms that place heavy emphasis on hiring employees with previously acquired skills are less likely to provide training."* This practice is a disincentive to training and may exacerbates the skills shortage crises in the economy.

Because of the benefits accruable to all stakeholders of craft skills training, there is no gain in emphasising and encouraging collaboration in providing efficient training because there is evidence that employers gain from providing or supporting training, much as employees gain from participating in training programme (Bills and Holden, 2007).

2.4 Concept of Training

Training aims at developing skills through the change of trainee's behaviour, it is variously defined in literature as follows:

> Goldstein (1980); Latham (1988); Tharenou *et al.* (2007) defined training as the systematic acquisition and development of the knowledge, skills, and attitudes required by employees to adequately perform a task or job or to improve performance in the job environment.
>
> Salas *et al.* (1999) and Tharenou *et al.* (2007) argued that training should impart new knowledge and skills if the training is relevant, based on employee and organizational needs, and effectively designed and delivered.
>
> Beardwell and Holden (2001) stated that "training is a planned process that is used to change attitudes, knowledge, skills and behaviour through the learning experience in order to achieve effective performance in a specific activity or range of activities".
>
> Farlex (2012) defined training as the process of bringing someone to an agreed standard of proficiency.

Specifically relating to craft, NCCER (2013) described craft training as: "*a general term used to describe delivery of knowledge and skills necessary for trainees to meet the minimum skills requirements for a craft and a career in construction.*"

More recently, Milhem *et al*. (2014) defined training as a planned process to modify attitude, knowledge, skill or behaviour through learning experience to achieve effective performance in an activity or range of activities.

All the definitions above emphasised that changing learner's attitude and improved performance is the ultimate aim of training. Drawing from those definitions, training is therefore the acquisition of knowledge, skills, and competencies as a result of the teaching of vocational or practical skills and knowledge that relate to specific useful competencies. The goal of training is to improve one's capability, capacity, productivity and performance (Bills and Holden, 2007). Because training is an activity leading to skilled behaviour, in military, it is commonly referred to as drill; it involves multiple repetitions (practice) to achieve perfection (Lussier and Shandrick, 2006). Additionally, Tharenou *et al.* (2007) reviewed existing literature on training with the aim of advancing understanding on the effectiveness of training on organisational performance. In the review, they argued extensively on the link between training and organisational output. The study suggested that training affects employee's attitude, behaviour and improves individual's productivity which also translates into company's productivity. Furthermore, the study proposed a theoretical framework shown in Figure 2.1 below that links training to organisational output. The framework shows that training has a direct effect on human resource (HR) outcomes and an indirect effect on organizational performance that is mediated through HR outcomes. In the review, Tharenou *et al.* (2007), used Ostroff and Bowen's (2000) classification scheme of employee attributes to represent HR outcomes as it encompasses all of

the variables in the various models: attitudes (e.g., collective employee satisfaction) and motivation; behaviours (e.g., performance-related), and human capital (e.g., workforce knowledge, skills and abilities). According to Ostroff and Bowen (2000), employees' collective attitudes, behaviours, and human capital should influence organizational performance.

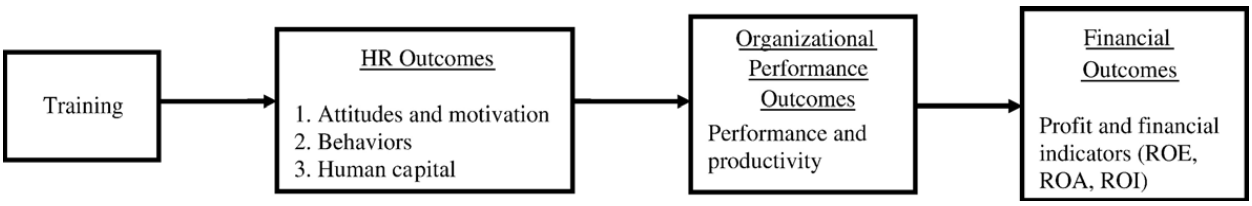


Figure. 2.1. Theoretical Model Linking Training to Organizational-Level Outcomes.
Source: Tharenou et al. (2007)

2.5 Purpose of Training

Previous studies suggest lack of understanding of the purpose of training crafts skills (Tharenou, 2007; Shelagh, 2014). Without good understanding of the purpose of training it is difficult for employers to provide training for the right purpose. For example, Tharenou *et al*. (2007) noted that training programmes are implemented for some other reasons other than improving performance such as legal compliance, rewarding and retaining employees, or because firms are compelled to train. This indicates that firms sometimes train in order to meet stipulated regulations or requirements only. Shelagh (2014) highlighted that the primary purpose of training is to help the learner improve his performance through effective and productive work. Similarly, Miltem *et al.* (2014) noted that the purpose of training in the work situation is to develop the abilities of the individuals and to satisfy the current and future needs of the organization. Agapiou (1998) opined that the purpose of training is twofold: first is to provide people with the skills they require in the industry, and secondly is to maintain those skills as technology and

working practices change. Training is therefore an ongoing planned process that replicates many of the stages involved in the task of work in order to achieve the intended benefit. But then, Shelagh (2014) noted that through training, employees' relevance in an organisation can improve and his self-confidence is enhanced, ultimately, employees will be happy resulting in improved production and lower rate of employee turnover. Further to that, training also served as a reward to compliant employees even though Tharenou *et al*. (2007) had earlier criticised the use of training as a reward mechanism to employees in place of performance improvement mechanism, it is however an effective motivator and strategy of attracting new employees.

Furthermore, training also helps employees to adjust to rapidly changing job requirements and guaranty replacement of retiring employees and those that voluntarily left (Shelagh, 2014). The ultimate purpose of training is to help organisation reposition itself in an ever changing business environment. It is for the purpose of ensuring organisations make the best use of their competitive advantage that training is organised regularly. Conclusively, drawing from above, it suggests that with proper implementation of training, its benefits will include the organisation sponsoring the training, the employee/trainee and other stakeholders like the client and the society at large.

2.6 Training Programme

Earlier discussions above have suggested that building a skilled workforce is critical to the success of any business. To this end, training programmes are designed to ensure the delivery of routine activities targeted at development of employees skills in organisations. Farlex (2012) defined Training programme as a programme designed for training in specific skills. It is also defined as a long-term training activity which (as opposed to a training project) comprises of a

series of courses, and usually has a flexible time and cost budget (Businessdictionary, 2014). It is a schedule of activities comprising of courses for a stated period of time. It indicates what should be learned, where and when for the complete duration of the training.

2.7 Methods of Craft Skills Training in the Construction Industry

Against the background laid in item 2.7 above; there are varieties of training programmes in used in the construction industry especially. Agapiou (1998) concluded that traditionally, there have been two main routes which construction craft skills have been developed: the formal route via apprenticeship and government-sponsored training schemes and the *ad hoc* (informal) training methods which have developed within the traditional construction trades. The *ad hoc* training methods were based on the trial-and-error method of learning a trade. On a general level, it is grouped into formal and informal training methods, with each of the methods having its strengths and weaknesses. The formal methods are highly preferred in recent times over informal methods because the formal methods emphasised the acquisition of background knowledge of principles behind the practice (Clarke and Wall, 2000). It is also argued that formal training allows for flexibility of skills resulting from technological advancement (Clarke and Wall, 2000). Within these general grouping, training methods are sub- grouped as follows:

2.7.1 On-the- Job Training (OJT)

This method of crafts skills training is perhaps the most widely used in developing countries. It refers to learning while doing the job (Atiomo, 2000). Milhem *et al* (2014) classified it into planned and unplanned on-the-job training. They explained that the unplanned training in both cases is not designed and unstructured, as such; learning is by chance not by intent, while the planned training is carefully designed to utilise the time spent away from the job to a maximum.

Milhem *et al*. (2014) further explained that on-the-job training is planned, structured, and mostly carried out at the trainee's workplace and sometimes in a special on-site training area. Also, in on-the-job training, managers, supervisors, trainers and colleagues spend large amount of time with trainees to teach previously determined skill sets. One of the outstanding benefits of on-the-job training is that over time, the work becomes an integral part of the training provided, so no further training is required if the trainee is eventually retained in the organisation. However, this is viewed in some cases as constrain of on-the-job training because the skills sets acquired are classified as specific and streamlined to a particular industry, thus, cannot be easily used in other industries.

Similarly, Goulding *et al.* (2011) asserts that "*experience-based or 'experiential' learning has the dual benefit of predominantly appealing to the adult learners experience base, as well as increasing the potential of performance change within the organisational environment*".

They highlighted the importance of OJT as a core method for capitalising on the value of experiential learning as a tool to develop new employees more effectively through the use of experienced co-workers. They further explained that it is particularly effective where a great deal of independence is granted to the task performer. Similarly, Goulding *et al.* (2011) proposed a visual reality (VR) solution called the VR Interactive Training Environment. Although this system is applicable to Offsite production (OSP), but to address the constrained inherent in OJT, the method provide a risk-free environment for learning and experiencing OSP practices. Goulding *et al*. (2011) further explained that *"the main concept of the VR training environment drew on the Chinese proverb ''I hear and I forget, I see and I remember, I do and I understand''; stressing that learning can be more effective through 'doing' rather than just through 'hearing' or 'watching'. This approach enables linking theory with practical*

experience, using the VR interactive training/learning environment". This approach however is only useful to construction professionals at levels higher than craft skills and may not be readily useful for hands-on skills acquisition.

To some extent, on-the-job training is commonly used by organisations because of its perceived cheapness. This may be true in the case of unplanned on-the job training since the effort of the trainee is also used as productive labour. Although it was argued that it is a cheaper method of training, avoiding unnecessarily expensive facilities like classrooms, laboratories etc., whilst reducing labour cost by utilising the trainees as non–trade tested skills labourers (Abdullahi, 2010), this assertion may not be entirely true judging from the rate at which trainees work often result to rework, low productivity and poor quality (Tharenou, *et al.*, 2007; Medubu *et al*., 2011). According to Milhem *et al*. (2014), in terms of expenditures, on-the-job training is three to six times cheaper than that spent on off-the-job training. This suggests why the method is commonly practiced in developing countries despite its disadvantages.

As earlier pointed out, on-the-job training emphasised the practical aspect of training because of its direct linked with the world of work, it however underplay the theory of the principle behind the practice. In addition, because of the absence of strong theoretical base inherent in on-the-job training, trainees are exposed to some weaknesses of the method such as: the trainees learning from a single learner and may only learn as much as the trainer knows; often the trainer may not teach the trainee all he knows due to pride and perceived security or poor memory (Idhammar, 2014). Also, the products of on-the-job training are criticised to be rigid and having difficulty in updating their skills/knowledge in order to adapt to current market demand in the industry due to development and technological changes.

In a survey conducted by Idhammar (2014), it was found that 65 percent of employers hire and train craft skills on-the-job by pairing new employees with older craftsmen. In buttressing the argument against on-the-job training, Idhammar (2014) illustrated the danger of on-the-job training saying:

> "*The on-the-job training chosen by 65% of respondents is often referred to as 'Follow Joe Training.' This means that Joe once upon a time was trained by another Joe. Because he has never received any professional training during his employment, Joe only knows 70% of what he needs to know to do a professional job. Now Charles, a new employee, is paired with Joe to learn to become a crafts person from him. Joe will most probably only teach Charlie 70% of what he knows, the rest is hidden in pride and job security or poor memory. If Charlie retains 70% of what Joe teaches him the theoretical results of this exercise is that Charlie now knows 34.3% of what he needs to know to be professional crafts person. One day Charlie will be the one to introduce a new employee".*

Additionally, Datoegoem (2006) observed that in Nigeria on-the-job training system lacks effective system of accreditation, certification and evaluation. However, with the recent approval of National Vocational Qualification Framework (NVQF) the argument that on-the job training system lacks effective system of accreditation, certification and evaluation in Nigeria may no longer be tenable but still, there is no harmonised system of craft skills training particularly for pre-employment training.

2.7.2 Apprenticeship Training

Apprenticeships involve a combination of in-school sessions and on-the-job training provided by employers (Construction Sector Council [CSC], 2009). Unlike on-the-job training, apprenticeship training combines classroom instructions and on-the-job training. Similarly, World Class Apprenticeship [WCA] (2014) also explained that apprenticeship is a form of vocational training based on a mixture of work-based and theoretical learning. The method of training employs some degree of theory on basics on the crafts with less emphasis on the science and much emphasis on practice. It is considered the most significant type of training in the construction industry (CSC, 2009). Because of the merit of having the right proportionate mixture of on-the-job training and classroom learning without much emphasis on classroom instructions, apprenticeship training is widely used across several countries especially European countries like Germany, Netherland, the United Kingdom (UK) and the United States (US). In UK for example for Government to count training as an apprenticeship and to be able to provide the relevant funds, an apprentice must have spent a period of time as an employee during the apprenticeship, and have an employed status at the time of completion. In a nutshell, the apprenticeship system entails a contract of training and employment designed to impart practical and theoretical skills leading to a qualification that provides entry to a trade occupation; it has been widely interpreted as a means of addressing market failure inherent in the provision of employer investment in transferable training (Stevens, 1996; Toner, 2008).

Generally, there are two types of apprenticeship training: the formal and informal or traditional apprenticeship training method. The formal method is usually registered with Ministry of Labour, and administered by employers or worker organisations (Adams (2008) in Abdullahi (2010)). An abridge version of this type of training is available in states Ministry of works and Business Apprenticeship Training Center (BATC) in Nigeria. Although this method is an

improvement on on-the-job training because of the introduction of theory, it however failed to address the problems of structure which will serve as incentive for further training of existing skills workers and means of enticing new entrants to the industry.

Historically, the informal or traditional apprenticeship training dates back to when crafts skills training was mostly carried out as family tradition with inclusion of friends primarily taking instructions and supervision from master craftsman, usually the most experience in the family trade. This is similar to what obtains historically in developed nations like Germany and US (Hansen, 2011). Generally, the disadvantage of the system is that non-relatives and friends find it difficult to gain entry, as such denying some bright persons the opportunity to build career in the industry. Some highlighted advantages and disadvantages of this training method are that the trainees may end up with the weaknesses and strength of their master and his skills may be outdated and not able to meet new technological demands. On the positive side, apprentices learn much about their trade from experienced journey people who possess formal qualifications in the trade. On the other hand, journey people, in the absence of consistent training standards, sometimes impart their bad habits by example, as well as the skills of the trade. Typical problems include safety 'shortcuts' that put workers at risk, wastage of materials due to poor measuring and estimation practices, and poor quality work due to lack of concern for performance and a tendency to take on more piece work than they can handle properly. The method is also not based on strategic learning but learning by chance since trainees only learned from what opportunities availed.

In comparing German training system with that of US, Hansen (2011) asserts that apprenticeship is widely practice in the US. It started as means of redistributing surplus labour just like in Germany. The basic difference being that, the German education and training system is anchored

in the economy through employers, associations and unions, which accord well with human capital model; the US system however, is governed primarily by academic interest divorced from the economy which fits better with the credentialist theory.

2.7.3 Formal (off-the-job) Vocational Training

Datoegoem (2006) described formal training or sometimes called off-the-job training as a programme consisting of basic theoretical classroom instructions in sciences and other related subjects in addition to practice. Formal training relies more on a simulated work environment to link theory and practice. Parey (2008) and Abdullahi (2010) have argued that because of the academic content in formal training, the method is difficult for less academically sound trainees to conceptualise. Formal training however, provide skilled workers the opportunity to update their skills easily since they have already acquired theoretical based knowledge that is required as foundation to build on. Notwithstanding the derivable benefits from off-the-job training, in a survey, Idhammar (2014) found that only 16 percent of employers have professional and structured training programmes for crafts people in their organisations. This finding is worrisome and challenging especially in an era that most countries are complaining of skills shortage.

Available literature suggests that some countries have already made effort in utilising the benefits of formal training. For example, Hansen (2011) asserts that Germany transits from the traditional informal apprenticeship to a formal apprenticeship system by the introduction of occupational licensing that made passing applied and written exams a legal prerequisite for practicing a trade. They further identified the following benefits of formal training:

i. Firstly, occupational certification effectively forced apprentices to serve out their training terms, where they failed to do so, they were barred from examinations. As a result, forfeiting the trades for which they had prepared.

ii. Secondly, publicly administered examinations provided officials and prospective apprentices with information on the quality of training offered by a particular master or firm. This system serve as check to both trainees and trainers as those trainers whose apprentices had low pass rates found it hard to recruit trainees. In a way, the system has introduced a form of self-assessment and quality assurance. In addition, when trainers proved incompetent or indifferent, local oversight boards possessed the information and authority to withdraw their right to train.

iii. Thirdly, the certification process has set public standards of training which both trainers and trainees were at force to comply. To pass the examinations, trainees must apply by themselves and trainers had to supply all-around systematic training to ensure trainees passed at least to improve the image of the training school. The system also forced trainers to provide training beyond what the work available in their shops could provide. It has become imperative for them to provide instruction and practice in aspects of the trade for which they had no paying customers.

iv. Fourthly, public examinations forced apprentices to work hard at their trades and in the part-time continuation and trade schools that grew up to accompany in-firm training with classroom instruction in reading, writing, arithmetic, science, drawing, and other useful skills.

v. Finally, the demand for licensed personnel created a competition for training spots that rendered many vocational programmes highly sought after and selective.

The formal apprenticeship system resulted on a hands-on, non-academic system of training and certification that tied vocational education and license to workplaces and their communities of practice in a way that made credentials reliable and valid indicators of the competencies they certified.

2.8 Construction Industry Technical Training in Developing Economies

Research evidence indicates that technical training in developing countries has suffered neglect and disconnect between industry requirement and competency of trained craftsmen which has resulted in most training carried out informally (Johanson and Adams, 2004). Informal training accounts for 80% of skilled workers in Iran, Sri-lanka and China (Zakeri *et al.*, 1996; Jayawardane and Gunawardena, 1998; Sha and Jiang, 2003). In sub-Saharan Africa, for example

in Kenya and South Africa, formal skills training accounted for only 3 trainees in 2002 (Wachira *et al.*, 2008) and 769 trainees in1990 against 5697 in 1970 (CIDB, 2004; Wachira *et al*., 2008) respectively. These reductions in quantity of trained skills workers from these institutions has resulted in the skills shortages experienced in sub-Saharan Africa. To meet industry demand, the shortfall must be augmented. As earlier reported, formal skills training is relatively expensive compared to in-formal skills training. This has therefore resulted to the growth of informal training for economic reasons. Having established the existence of informal skills training in sub-Saharan Africa, especially in Kenya and South Africa, Wachira *et al*., (2008) observed that it is pertinent for any training intervention to take advantage of the strengths and weaknesses of informal mode of skills training to provide sufficient skills workforce in the industry. Similarly, skills training is also done informally in Libya. Although there is informal skills training in Libya, the training is however delivered in Vocational Training Centres (BVTC); Intermediate Vocational Training Centres (IVTC); Advance Occupational Training Centres (AOTC) and Trainers Centres (TC). The Libyan system has provided for training of trainers which is hardly the case in most developing economies, for instance Zambia, where Muya *et al.*, (2006) reported that the trainers in skills institutions possess obsolete knowledge which requires upgrade. It is evident that there is no synergy amongst skills training programmes in developing countries which has resulted in difficulty in assessment and certification of craftsmen. Despite lack of available statistics to show the extent of the contribution of informal skills training in Nigeria, anecdotal evidence showed similar trend to other developing economies.

As earlier argued, informal craft skills training is attractive in developing economies because it is self-financing, it does not require any public funding or formal levy but relies on user fees or low wages paid to apprentices during training to fund itself. It also provide easy access to school

drop-out who cannot meet the minimum requirement of formal training centres, easy entry for all category of ages who cannot find employment in the formal sector and those without any education at all. However, researchers such as Hansen (2011) have criticised informal skills training basically because it is not systematic, has minimal external input (example from colleges), exposing trainees to the danger of limiting their knowledge to the current skills and knowledge of their master. In informal training, learning is by accident rather than by intent, the complete absence and in very rare cases minimal theoretical content and the use of ad hoc curriculum erodes the necessary foundation of new skills thus making it difficult to adapt. This is critical in the case of new material entering the market; its narrow and static range of skills offered has made it difficult to cope with technological improvements and the need for skills enhancement to widen geographical market (Kent and Mushi, 1995; Johanson and Adams, 2004; Ziderman, 2003). The system is also highly unstructured without any unified programme (everyone doing it his own way), system of accreditation, assessment and certification. The success of the training system is left to chance, as a result, the economies are suffering severe shortages of skilled operatives, resorting to poaching from one organisation to another, and in acute cases, outright importation of operatives at the detriment of the economy and denying locals the benefits of quality life through improved income if properly trained and developed.

According to World Bank report, sub-Saharan Africa mostly developing economies requires average growth rate of between 6-8% in Gross Domestic Product (GDP) to meet MDGs by 2020 (African Development Bank [ADB], 2002). Achieving this growth rate requires the input of construction industry which is claimed in both developing (Nigeria inclusive) and developed countries to have the potentials of contributing between 4 to 14% of Gross Domestic Product (GDP) (Gann and Senker, 1998; Jayawardane and Gunawardena, 1998; Organisation for

Economic Cooperation and Development [OECD], 1998; Wells, 2001; Muya *et al*., 2006). However, this contribution can be hindered due to insufficient and efficient crafts skills workers in the sub region. The problem of insufficient and efficient crafts skills workers in most developing economies as earlier mentioned is linked to unstructured and poor/informal mode of training (Zakeri *et al.*, 1996; Jayawardane, and Gunawardena, 1998; Sha and Jiang, 2003). Some obvious disadvantages of informal skills training are:

i. Poor facilities: - The facilities at the disposal of informal trainers are mostly outdated and insufficient in quantities. This can be attributed to insufficient finance at the disposal of the trainer, which could be an individual or a team with an overall master.

ii. Low funding: - Informal trainers are not disposed to source for training funds were available due to strict policies. In Nigeria however such provisions are out rightly not available.

iii. Unstructured programme:- Various trainers have different training programmes with little or no supervision of such programmes due to lack of unified framework for training. In worst cases, the sole trainer may end up passing his strength and weakness to his trainees since they only learnt from him.

iv. Inadequately trained trainers: - Majority of the trainers need further training themselves. One also wonders where trainers get their training. What is their qualification? Do they have opportunity to update their skills? All these are observed as shortcomings of informal training.

v. Poor method of assessment: - Obviously the only assessor is the overall craft master, judging from the ability of the apprentice to carry out certain task and the years he/she has spent (serving the master).

vi. Lack of equal opportunity for new entrant, limiting such opportunity to family members and close relatives and friends. This method may preclude brilliant young stars that may want to build carrier in the chosen skill.

The alternative to informal skills training is formal skills training; however, studies have shown that formal skills training institutions are ill-prepared both in manpower and facilities to equip trainees with the skills needed to operate in the construction industry (Zakeri *et al.*, 1996; Jayawardane, and Gunawardena, 1998; Sha and Jiang, 2003; Datoegoem, 2006; Abdullahi,

2010). The research findings of Muya *et al.*, (2006) in sub-Saharan Africa, established the problem of poor funding of skills training centers and concluded that funding for training should be improved through a sector specific training levy. In Nigeria, Datoegoem, (2006) and Abdullahi, (2010) reported that there is no uniformity in training and the framework for training are not unified. The assessment and certification systems are no longer reliable; employers questioned the certificates and no longer use them for recruitment. Often, they prefer poaching from other organisations, which is a disincentive to training or train new workers on-the-job especially where organisation cannot afford to pay high wages commonly charged by poached operatives. The effort of NBTE to develop an NVQF is hopefully going to address the challenges of assessment and certification but still, the process (training) of acquiring the skills is not attended to.

2.8.1 Challenges of Construction Technical Training in Developing Economies

Research reports have shown variety of challenges facing construction industry in training skills workers in developing economies (Zakeri *et al*., 1996; Jayawardane, and Gunawardena, 1998; Sha and Jiang, 2003; Bokinni, 2005; Datoegoem, 2006; Abdullahi, 2010). Most disturbing is the absence of unified framework for skills training in Nigeria (Datoegoem, 2006). Some of the studies noted that without effort to provide a unified framework for training, the introduction of the NVQF which is an umbrella for skills qualification for all industries in Nigeria may not provide the desired solution to skills shortages. Construction industry must therefore take the challenge of providing a unified skills training framework for her manpower especially at crafts skills level, otherwise the situation will remain the same (Datoegoem, 2006). Furthermore, many more studies (Zakeri *et al*., 1996; Jayawardane and Gunawardena, 1998; Sha and Jiang, 2003; Bokinni, 2005; Datoegoem, 2006; Abdullahi, 2010) have identified many other challenges that

need to be addressed to improve craft skills training such as: poor facilities, low funding, lack of unified skills training programme, inadequate trained personnel (trainers), poor method of assessment and certification, improving the image of the industry in order to attract bright young men/women into the industry. Based on those studies, some other challenges are further highlighted below:

i. Issues of poor facilities, the industry's training institutes are equipped with outdated and insufficient facilities. Funding is often not adequate, sometimes due to inadequate resources to meet public needs and often times due to lack of genuine concern for the industry. This attitude must change, and the industry must be at the fore front for the change.

ii. Funding of skills training is posing serious threat to providing efficient and sufficient skills manpower in the industry. However, the industry can address this challenge by encouraging collaboration in training by industry players.

iii. Various trainers have different training programmes with little or no supervision of such programmes due to lack of unified framework for training. In worst cases, especially in informal training sector, the sole trainer may end up passing his strength and weakness to his trainees since they only learnt from him. The situation is not entirely different even in public sector. In the formal sector, training is rather in a chaotic state, with every training organisation having its own structure (framework). This is also attributed to lack of structure; hence provision of training does not seems to have clear direction as regards who it is meant for even within the technical grade. For instance, if the NBTE successfully develop NVQF, the industry should then provide training structure such that skills training may eventually takes that form.

iv. The knowledge of trainers is criticized to be outdated and narrow, majority of the trainers need further training themselves. Many times the trainers lack the skills to train or lost touch with the industry. There are cases of university graduates with little background on skilled trades employed as instructors without any further training. Some other times the problem is lack of regular upgrade of existing knowledge. The industry is highly dynamic, with continuous change in materials and components, also requiring constant improvement of knowledge to adapt. Another disturbing issue is the gradual ageing and retirement of existing stock of trainers with little or no qualified hands to replace them. There is no system effort to train trainers both new and old ones.

v. Assessment method is very weak; a more systematic assessment method that is practically oriented should be developed. Trainees are assessed through written exams and practical in schools after attaining the required period of training. This method is not providing sufficient information on the extent the trainee has acquired the desired skills.

For proper assessment of skills, the trainee should be made to do the work while the assessor observed performance over a period of time then followed with written exams.

vi. The image of the industry workers especially at craft skills level is such that bright young ones are hesitant in aspiring to build a career in the industry. This challenge is not limited to developing economies as stated in a report of (CBC, 2002):

> *"Youths are often poorly informed about opportunities in the skilled trades, especially regarding working conditions, job satisfaction, salary expectations, and opportunities to learn new things. They are frequently misinformed by parents, teachers and guidance counsellors, who regard the skilled trades as "dead end" or second best jobs, to be pursued only when other avenues are closed. Many parents under the guise of "wanting the best" for their children (i.e., opportunities they never had, like going to university) route them into academic streams. Teachers and guidance counsellors still regard the trades as best suited for students who have difficulty achieving academically and do not recommend them as first choices for students who achieve at relatively higher levels of performance."*

To solve this problem, CBC (2002) suggested that youths should be exposed to more and better information earlier in their education for them to make informed career choices that include frequent choice of careers in the skilled trades. In this context, making informed career choices means making decisions on the basis of having a good understanding of skilled trades, including:

a. What they involve, including nature of work and working conditions
b. What they pay
c. How satisfying they are
d. The opportunities they present for reward and advancement
e. The importance of being entrepreneurial in the pursuit of continuous employment in their trade [e.g., representing the interests of the firm when doing a job]
f. The requirement to relocate to follow labour market demand
g. The ability to multitask across craft lines.

vii. Relatively unattractiveness of "white collar" jobs: Again in both developed and developing economies, many times youths prefer white collar jobs than skilled trades, arguing that skilled jobs are not challenging like working with computers etc. As highlighted in a report "Solving the Skilled Trades shortage" (CBC, 2002):

> "*Youths perceptions are also that skilled trades are cold, dirty, outdoor, seasonal, boom and bust occupations that involve repetitive work, low job satisfaction, and little imagination for even less compensation. The reality is very different. In many instances, going into the skilled trades also involves going into computers in a sophisticated fashion. For example, in the pipe trades, "Some technologies (like, new leak and spill techniques, advanced control valves) require that workers require new and demanding skills that draw on analytical, computer diagnostic capabilities. This sort of skill deepening draws the worker into the process and increases their knowledge of the materials and parameters of operation. There are also many examples of new technologies that simplify tasks to the point where previously required physical dexterity and strength are simply no longer needed." These new realities are not generally perceived by youth making career decisions. While there is some truth in the other claims about work conditions in the skilled trades the youth perspective is grossly exaggerated. In reality, many skilled tradesmen work in attractive conditions, involving creative applications of their skills and knowledge for lucrative remuneration. Job satisfaction among tradesmen is often high because they do challenging work and take pride in their craft."*

2.9 Construction Industry Technical Training in Developed Economies

Gann and Senker (1998) suggested that several efforts have been made to improve training of operatives in developed economies. This effort became necessary due to severe shortages apparently due to inadequate/neglect of training in developed economies and the need to modernise training basically due to technological advancement. Resulting from that, developed economies have developed framework for training, assessment and certification of operatives with clearly spelt out levels of progression in the industry (Gann and Senker, 1998). For example, in UK, training efforts have been harmonised through the Construction Skills Certification Scheme (CSCS) card. The scheme provides a register of skills competence and qualifications of individual workers with the benefit of skills recognition, competence and qualifications, and the promotion of greater health and safety and personal training awareness (Mackenzie *et al.*, 2000).

Clear levels of progression in the industry is given by Construction Industry Training Board (CITB), starting with NVQ1 which is the lowest and starting level, NVQ2-3 which is an intermediate skills level and NVQ 4+ which is a higher skills level. Holders of these skills levels are certified to poses the minimum skills required and give any user of skills workers the confidence of high standard of workmanship and competence (CITB, 2003). Despite the success of CSCS in the UK, it was however not without challenges which require continuous improvement. One of the challenges faced by the scheme is the training of specialist operatives which is largely carried out on a supply and demand market led basis by the industry (Cano-lopez *et al.*, 2008). History has shown that specialist trade had no provision for formal training and assessment, the CITB therefore commissioned a report (Larpent, 1996) on specialist subcontract support within NVQ delivery. The outcome gave rise to the development of a work-

based delivery method named “on site assessment and training” (OSAT). After running a pilot test on OSAT, the strategy had to change due to lack of available assessors (Billborough, 2002 in Cano-lopez *et al*., 2008). Some of the strengths of NVQs as identified by researchers are that they are competence-based qualifications, with most of the learning taking place in workplace and assessment is normally through on-the-job observation and questioning (QCA, 2008 in Cano-lopez *et al.*, 2008). Also, NVQ assessment process gives greater efficiency in time and cost when formally qualifying workers (Cano-lopez *et al.*, 2008).

Recently, the challenges of the right type (multi-skilling or single skilling), and the right composition of skills for training has been highlighted (Clark and Wall, 2000). Clarke and Wall (2000) further observed that the different training systems in UK, Germany and the Netherlands have affected the results obtained in each country. For instance, In the UK, a trade based approach is adopted, where a 16 year old enter into a trade-specific training programme, culminating with a qualification in a chosen trade. Steedman (1992) in Clarke and Wall (2000) however opined that the introduction of NVQs has further narrowed the breadth of knowledge acquired, making skills more trade based than industry based. In contrast, the Germans employed a holistic approach to training, adopting industry-based system, where a trainee entered into a broad-based course covering many practical aspects of the construction industry with compulsory educational component, and finally specializing in one of the 14 recognised trades. This system creates a workforce that is broadly skilled since practical knowledge is not confined to the boundaries of a single trade. Also the system provides sufficient theoretical and educational content that allow workers to transfer easily from one task to another, even without practical experience, and to progress to higher grades (Clarke and Wall, 2000).

The Dutch system has a rather long list of trade profile compare to UK's and German's. It has a profile of 26 trades, which training is first given on industry wide basis before streamlining to specific trade. The system provides for training route on occupational division, for example, woodworking or concrete working occupations, and specializing in one of the 26 trade 'profiles' in the third year of training. Emphasis on practical training accompanied by theoretical knowledge with a wider curriculum covering the construction industry in general is highlighted. The Dutch system also emphasized the understanding of the construction process holistically against specific trades (Clarke and Wall, 2000).

The implication of the different systems is that while the Germans and Dutch approach training holistically and more universally, the UK system is however specific and does not exhibit universality, for instance, carpentry and bricklaying maintain a craft form and remain synonymous with contractual divisions, thus maintaining a simple divide between the work of the bricklayer and the carpenter. Unlike the Netherlands and Germans, in the UK, the bricklayer remains someone who lays bricks, but in the Dutch system, a carpenter is the key construction worker, as reflected in the training where they are twice as numerous as the bricklayers (Clark and Wall, 2000). Following this example developing economies can reflect on the merit and demerit of the different systems with a view to adopting an abridge version that will meet their needs.

2.9.1 System of Craft Skills Training in the United Kingdom.

In Britain there are a number of routes by which school-leavers can enter construction training (Housing Research, 1996). The two major routes for training construction workers is full-time vocational training and apprenticeship programme. Researchers have raised concern on how well

connected to industry needs college-based vocational education is (ITSJ, 2014). In contrast, the apprenticeship system is regarded as producing good outcomes and superior industry links in comparison to other vocational training, regrettably, it only account for a relatively minor part of United Kingdom's vocational education and training system. The United Kingdom (UK) has a Qualification framework with spelt out levels of competencies and qualifications starting from NVQ level 1 to NVQ level 4 (Clarke and Wall, 2000; Anderson, 2014). Apprenticeship frameworks are available at Level 2 in all sectors and at Level 3 in most sectors. There is no rigid minimum time for the completion of an apprenticeship but most Level 2 apprenticeships take between 9 months and a year to complete while most Level 3 apprenticeships take between 18 months and two years to complete. Apprenticeship must receive a minimum of 280 guided learning hours per year of which a minimum of 100 hours (approximately one day a month) must be off-the-job (ITSJ, 2014).

In recent times, as reported in the Training Skills Survey Report [TSSR] (2011), the ConstructionSkills is the Sector Skills Council (SSC) for construction licensed by the UK Commission for Employment and Skills (UKCES). SSCs approve all the vocational qualifications offered by further education colleges, design and approve apprenticeship frameworks and set National occupational standards on which NVQ is based (ITSJ, 2014). Furthermore, it is the body responsible for modern apprenticeship which is delivered through a partnership comprising CITB-ConstructionSkills, the Construction Industry Council (CIC) and CITB-ConstructionSkills NI. This of course does not undermine the existence of full-time vocation skills training college where an appreciable number of youths are reported to have joined (Steedman, 2010). Operating as a partnership ensures that ConstructionSkills' covers the whole industry in the UK, and all the issues the industry faces. One of the key components of the

training system in the UK is the ConstructionSkills Sector Skills Agreement which is a collaborative agreement between construction employers, training providers and Government that ensures the delivery of the right training in the right format for employers and individuals in the workforce such that the present and future skills needs of the industry are met.

The WCA (2012) identified four core participants in any UK government-funded Apprenticeship, these are:

i. The employer; who offers a place which is the primary provider of learning in the workplace, pays the apprentice a wage, and supports their learning time requirements.
ii. The Apprentice; who is expected to contribute to the productivity of the employer and to undertake the requisite learning.
iii. The training provider (which might be a further education college, group training association or other work-based-learning provider) provides off-the-job tuition and often takes on much of the bureaucratic workload associated with the Apprenticeship on behalf of the employer.
iv. The Government through the Skills Council provides funds to cover the training costs of the apprenticeship, although typically not the wage costs of training time.

The apprenticeship training method is a practical work-based scheme which comprises of a structured apprenticeship training programme combining college study and on-the-job training (WCA, 2012). The constructionskills usually arrange the partnership agreement between the apprentice and the employer where trainees spend two years attending training in college on a full time basis and a site placement of up to 12 months is guaranteed and provided by the employer after the college training. During the training, incentive is given to the trainee in form of tools, accommodation, transport and subsidy on training fee by both the Constructionskills and the employer. A structured work-based training is planned and supervised through gathering of work-based experience and recorded on a diary which must be signed by the industry work-based recorder (WCA, 2012).

The importance of Work Based Evidence (WBE):

Before offering apprenticeship training an employer must be able to provide opportunity for wide range of specific craft-related work experience, as well as practical activities. The apprentice must also be given the opportunity to gather evidence of this experience with supplementary evidence in form of photographs, timesheets, and delivery notes etc. Apprentices cannot achieve certification without evidence from the workplace. Employers are therefore encouraged to assign a local apprenticeship officer who with the help of the college will discuss what evidence is needed to meet the qualification requirements for Work Based Evidence. It is therefore a good practice for the employer to appoint one or more work based recorders to support and guide apprentice with the gathering of evidence, and to verify that standards have been met. The work based recorder works closely with the college assessor to help in deciding if an apprentice is competent (WCA, 2012).

Work Based Evidence key responsibilities:

In the Constructionskills Employer's Pack for Construction Apprenticeships [CEPCA] (2012) the key responsibilies for achieving work based evidence are listed as follows:

i. All qualifications in construction crafts require work based evidence from the apprentice.
ii. A diary of evidence must be kept, with each job recorded.
iii. Every recorded entry must have a witness signature from a work based recorder.
iv. The work based recorders should be identified by the company from within its workforce.
v. Companies can have more than one work based recorder, there is no limit to numbers.
vi. Work based recorders should complete a half-day work based recorders course at a local college.
vii. The witness signature is to confirm that the apprentice has performed the task recorded.
viii. The standard required is 'industry's standard' which means acceptable to the company employing the apprentice.
ix. Gathering evidence should start from day one.

x. The company should have a monitoring system to ensure the diary of evidence is being completed throughout the training, although completion ultimately is the responsibility of the candidate. It should never be left until the end of the course.

xi. If the apprentice is unable to complete all the required tasks due to the nature of company contracts, the ConstructionSkills Apprenticeship Officers should be contacted immediately.

To further ensure good training, mentorship is provided to the apprentice. The mentor is usually a senior skilled worker who preferably is a volunteer who offered to serve as a mentor to the apprentice rather than being appointed, the idea is to ensure the effectiveness of the mentorship. Experience shows that the most effective mentors are volunteers who are keen to help. It is believed that effective mentors are able to respond to the needs of their apprentices flexibly, in a sympathetic and enthusiastic manner. It is important that the apprentice feels comfortable with their mentor and that they have the confidence that the mentors can help them to learn. It is expected that through mentorship the apprentices are assisted, ensuring they receive the support and guidance they need to develop their skills to reach their full potential.

The importance of the Sector Skills Councils

As contained in Bilbrough and Moir (2003), the Sector Skills Councils (SSCs) are strategic organisations and a source of funding for the development of building skills training. SSCs have been designed by the government to be independent, UK-wide organisations developed by groups of influential employers in industry or business sectors of economic or strategic significance. SSCs are employer-led and actively involve trade unions, professional bodies and other stakeholders in the sector. They are licensed by the Secretary of State for Education and Skills, in consultation with Ministers in Scotland, Wales and Northern Ireland, to tackle the skills and productivity needs of their sector throughout the UK.

SSCs give responsibility to employers to provide leadership for strategic action to meet their sector's skills and business needs. In return they receive substantial public investment and

greater dialogue with government departments across the UK. This will enable sector employers to have a far greater impact on policies affecting skills and productivity, and increased influence with education and training partners. Each SSC will agree sector priorities and targets with its employers and partners to address four key goals: reducing skills gaps and shortages; improving productivity, business and public service performance; increasing opportunities to boost the skills and productivity of everyone in the sector's workforce, including action on equal opportunities; and improving learning supply, including apprenticeships, higher education and national occupational standards. There are currently seven built environment and heritage related SSCs. Four are operational as a Trailblazer or Licensed SSC and three are still under development.

CITB Construction Skills (licensed September 2003)

This is the largest SSC and is also the standard setting body for built heritage occupations. In partnership with City and Guilds CITB, it is the awarding body for construction trade crafts NVQs. As the last remaining industrial training board, CITB collects levy from employers and pays out training grants. It also supports a system of on-site assessment and training to enable experienced workers to achieve NVQs in the workplace. CITB-Construction Skills covers a wide range of sectors in the development and maintenance of the built environment, including the heritage building sector. It represents around 7% of the national economy in terms of GDP and includes house building (public and private), infrastructure (roads, railways and utilities), non-residential building in the private sector (schools and colleges, hospitals, offices), industrial building by the private sector (factories, warehouses) and commercial building by the private sector (offices, shops, entertainment, health and education). Other SSCs are:

i. Creative and Cultural Industries Sector Skills Council (development phase commenced April 2004).

ii. Energy and Utility Skills (licensed February 2004)
iii. Summit Skills (licensed December 2003)
iv. Lantra (Trailblazer SSC from November 2001)
v. Asset Skills (development phase commenced October 2003)
vi. Proskills (development phase commenced September 2002)

2.9.2 System of Craft Skills Training in Germany

The German system of vocational training is based on a streamed system of general education where secondary education is differentiated at the age of ten into three educational tracks that prepare students for trades, commerce and university respectively (Sharpe and Gibson, 2005; Hummelsheim and Baur, 2014). The educational system provides a sort of pre-vocational training for nearly all types of secondary schools as work experience to help secondary schools graduates make career choices (Steedman, 2010; Roth, 2014). At the Upper secondary school however, many researchers (Sharpe and Gibson, 2005; Bosch, 2006; Muehlemann *et al.*, 2010; Lange, 2012) reported that Germany has a tradition of developing skilled trades and is claimed to have almost two third of school leavers going into the training system. Muehlemann *et al.*, (2010) also reported that apprenticeship training is the most popular formal education for young people at the upper secondary level in Germany. In a report on the state of apprenticeship, Steedman (2010) reported that the routes through post-16 education and training provision are varied and complex. First, firms recruit the best-qualified candidates for apprenticeship at 16 or 17; then the less well-qualified normally attend a full-time preparatory course at a vocational college or take a temporary job for a year or longer while waiting to re-apply for an apprenticeship. The average entering age into apprenticeships is 18 years, a full year older than the end of secondary school at 17 years in most developed countries. However, unsuccessful applicants are encouraged to attend pre-apprenticeship vocational colleges, where skills are consolidated. According to Hippach-scheinder and Toth (2009) of the vocational schools, the

full-time vocational schools have the highest numbers of students, it prepare students for an occupation or for vocational training, usually in the dual system. In most cases, attendance at a full-time vocational school is credited as the first year of training in the dual system. The full-time vocational school introduce students to one or more occupations, provide them with partial vocational training in one or more training occupations, or take them through to a vocational training qualification in one occupation. The range of training provision in schools of this type is extremely diverse with around 350 state recognised training occupations (Lange, 2012).

Previous studies have described the German apprenticeship model as most comprehensive and detailed regulatory system for apprenticeship training compared with other training systems in the western world (Raggart, 1998; Sharpe and Gibson, 2005; Bills and Hodson, 2007). In consonance Hippach-Schneider *et. al.,* (2007) explained that Germany is one of the European countries in which learning on the job is a traditional component of the education system. Perhaps the German system is effective because vocational training is aimed at imparting comprehensive professional competence in the occupation. It is also likely that the success of the German training model is because the content of vocational training is guided by the requirements of the labour market and the need for individuals to acquire skills, knowledge and competences that enable them to prove themselves on the labour market successfully (Eichorst *et al.,* 2012). To ensure that training requirement is guided by the labour market, the German systems of training combine vocational education in schools with work-related training and learning in companies, which provide apprentices with the necessary theoretical and practical knowledge (Muehlemann *et al.*, 2010).

Training programmes are designed on the principle that they should be as broad as possible and as specific as necessary (Clarke and Wall, 2000). The broadness and specific nature of the

training ensures that tradesmen are versatile and can move from one trade to another while ensuring they are highly skilled in at least one trade (Clarke and Wall 2000; Eichorst *et al.,* 2012). The dominance of the dual training system in German has been acknowledged (Boehm, 1996; Syben, 2008; Lange, 2012). The training system is described as "dual" because training is conducted in two places of learning: companies and vocational schools (Oulton and Steedman, 1994; Hippach-Schneider, *et. al.,* 2007). Lange (2012) also explained that the duality of the system refers to a combination of firm-based and college-based apprenticeship training. Similarly, the ITSJ (2014) explained that the central principle of the dual system is complementary learning in school and workplace. It is believed that theoretical learning at school facilitates a well-grounded approach to practical problems, while workplace experience provides real world examples and applications.

Although comparing vocational and technical training in UK and other European countries, Clarke (2006) better describe German training system as a:

> *"Training systems that revolves around the acquisition of applied theoretical knowledge, whereby the trainee learns to recognize theoretical propositions in practical situations. This involves substantial elements of college-based work in which both the theoretical and the simulatory elements of the experience are introduced, followed by controlled practice in operational conditions under the guidance of a senior worker. It is built around college-based block release for abstract and theoretical knowledge combined with simulatory practice in well-equipped training workshops to understand how this is applied, plus work experience in firms. This system is regulated jointly by the state, the education authorities responsible for college training, employer representatives*

responsible for training and work experience in the workplace, and trade unions representing those who receive training and the current workforce."

Training in this respect is no longer a system resting on the goodwill of the individual employer but on all stakeholders in the construction industry. In an attempt to re-examine the unique political economy of German dual apprenticeship training model and its underlying philosophy, Lange (2012) explained that the German apprenticeship training model is founded on a partnership between education, industry and commerce. Employers, trade unions, and both federal and state governments share various responsibilities for the planning, coordination and delivery of initial vocational education and training. Also, the content of delivery of the apprenticeship training model is determined by negotiation between the "social partners", that is employer associations and trade unions at the sectoral level.

On the educational qualification required for training in the German system, generally, candidates for vocational training are expected to have completed a compulsory secondary education which is usually achieved at the age of 18 years with some aspects of pre-vocational training embedded in curriculum. For candidates older than 18 years who have not completed the compulsory secondary education, it is required that they do so before commencing the training (Boehm, 1996; Hippach-Schneider, *et. al.,* 2007; Syben, 2008). Apart from compulsory full-time education which must have been completed by the time of commencing vocational training, there are no further requirements for access to training in the dual system; it is essentially open to all.

In the German training system, the duration of the training is three years on the average (Clarke and Wall, 2000; Lange, 2012). To begin an apprenticeship, the apprentice is required to sign a contract with the employer with a provision for initial probation for a period of one to three months, which subsequent termination of the contract by the employer before the end of

apprenticeship is legally difficult and unusual (Sockice, 1994). Researchers (Sockice, 1994; Oulton and Steedman, 1994; Boehm, 1996) also explained that usually in a 3 years apprenticeship in an enterprise or other workplaces, an apprentice combine training in the workplace with one or two days per week college training in a vocational school in the German Training system. Hippach-Schneider, *et. al.,* (2007) similarly explained that an apprentice is trained in the enterprise for three to four days a week and in the vocational school for up to two days a week. Neimeyer (2014) investigated the working boundaries between education and work and found that schools are no longer the only place for learning. This suggests the acceptance of other platforms like workplace as places for learning too. ITSJ (2014) reported that the German system is thorough and has a high level of industry buy-in. In terms of cost, the German system of training is substantially borne by the private sector where organisation providing the in-company training bears the direct cost of the training and pays the trainee remuneration for training that is regulated by collective agreement between the parties (Boehm, 1996; Hippach-Schneider, *et al.,* 2007; Mohrenweiser and Zwick, 2009).

One of the challenges of the apprenticeship training system is securing placement for apprenticeship. Sharpe and Gibson (2005) reviewed national apprenticeship systems of several countries and concluded that while the responsibility for finding an employer willing to provide the apprenticeship training rests with the aspiring apprentice in other systems, the German system however places a great deal of resources into structuring this search to render it both coherent and transparent. The search process is encouraged and integrated into the last two years of secondary school education, where classroom time and resources are spent disseminating information about potential apprenticeships. The Chamber of Commerce also publishes the list of potential apprenticeships offered by employers. Roth (2014) investigated the effects of social

networks on finding an apprenticeship in the German vocational training system. Using both youths' social networks and mothers' social networks to obtain data for the research, they concluded that the youths' social networks have no effect on the success of an apprenticeship but the mothers' social networks play a crucial role in securing placement for apprenticeship in Germany.

To ensure retention of youths in the apprenticeship, there is provision for remuneration of the apprentice. Apprentices are paid lower rates than it is paid to fully skilled workers. Hummelsheim and Buar (2014) see it as the significant cost of the dual system of training. The amount of the remuneration increases with every year of training, and averages about one third of the starting pay for a trained skilled worker. The professional competences in the occupation to be acquired in in-company training are specified in a training directive and put in concrete form by the training enterprise in an individual training plan. Training may take place only in training enterprises in which the skills required by the training directive can be imparted by training personnel who are appropriate both personally and in terms of specialised knowledge. The suitability of training enterprises and in-company training personnel is monitored by the relevant autonomous industrial bodies. Proper provision of the training itself is also monitored by the bodies. The training enterprise draws up an in-company training plan for trainees. This plan must correspond to the training directive in terms of its practical and time structure, but may deviate from it if particular features of company practice require this and, for the rest, all training content is included. For the teaching in the vocational school, a framework curriculum, harmonised with the training directives, is drawn up for every recognised training occupation (ITSJ, 2014).

Because previous researches (Sockice, 1994; ITSJ, 2014) show that good teachers are the most important school-based factor in academic achievement and the success of vocational education is dependent on them in both the on-the-job and off-the-job environments and because it is also reported that some teachers in vocational schools lack recent workplace experience in the occupation and some trainers and supervisors of apprentices in companies often lack preparation on how to teach, the German apprenticeship programme has provided avenue for assessment of personnel of the industry to ensure that only those that are qualified provide training. In addition to the assessment of the industry trainers, the system has also provided for the training and retraining of trainers to ensure good delivery of the training (Boehm, 1994; Steedman, 2010). Hansen (2011) explained that in the German training system, conscious decision are taken to recruit the teaching staff for its lower- and middle-level trade schools directly from the trades, and to limit links between these schools and higher education. These policies proved mutually reinforcing in disposing these schools to remain true to their original calling: to serve young people entering local crafts and industry. The appointment of instructors is based on their practical training and experience rather than their academic certificates.

In terms of assessment, previous studies suggest that the German system has a good assessment system which some researchers viewed as rigid and strict (Boehm, 1994; Steedman, 2010). In the report of the ITSJ (2014), it is highlighted that a standardised national assessment of VET qualifications can help ensure consistency in standards, the mix of skills acquired and the level of skills necessary. It also allows competencies to be gained in diverse ways and provides a clear basis for recognition of prior learning. The report further suggested some of the approaches that could be used as: periodical inspections of vocational training providers, inspection of

examination bodies, random evaluation of student performance, self-evaluation of providers and peer reviews and clear national guidelines of assessment.

Characteristics of the dual study programmes:

i. Alternate between theory phases in the institution of higher education or academy and practical phases in the training enterprise;
ii. Regulate the practical training in a training, student-employee or unpaid-trainee contract;
iii. Are characterised by close dovetailing of the content of vocational activity in the training enterprise and the acquisition of theoretical knowledge in the institution of higher education/ academy;
iv. Involve close coordination of and cooperation between institution of higher education/academy and enterprise.

Similarly, Hummelsheim and Buar (2014) described the basic aspects of the dual system. These are basically the main features of the dual training system. Table 2.7 below shows Hummelsheim and Buar's (2014) summarised basic aspects of the dual training system:

Table 2.7: Basic aspects of the dual system

Basic aspects	Part-time vocational education	Initial vocational training
Legal framework	Specific school laws in the 16 *Länder* (regions)	Federal training laws, industrial rules and regulations
Responsibility	Ministries of education and culture in the 16 *Länder*	Employers with federal and union monitoring
Venue	Part-time school, classroom	Enterprise, workplace
Duration	1–2 days/week	3–4 days/week
Total training period	Usually 3 years, sometimes 2 or 3.5 years	Usually 3 years, sometimes 2 or 3.5 years
Teacher qualification	Two-phase qualification: university degree followed by two-year practical training in part-time vocational schools	Must qualify as master craftsman or pass trainer aptitude test; no university degree needed
Teacher status	Civil servant	Employee or executive
Curriculum	Framework curriculum: 1/3 general education and 2/3 vocational training. Job-related theory, activity-based approach	Training is directive, vocation-specific, related to job. Activity-based approach
Financing	Funding from the 16 *Länder* and municipal revenues. No fees to students	Enterprises are responsible for funding
Costs	Staff salaries, training materials	Staff salaries, training materials, and pay for apprentices
Contract	No contract	Private legal contract between enterprise and apprentice
Guiding principle	Occupational competences	Occupational competences

Source: Hammelsheim and Baur (2014)

Both Sockice (1994); Oulton and Steedman (1994) opined that the German apprenticeship programme is highly structured with a requirement for apprentice to write external qualification examination in both theory and practical aspect of the training upon successful completion of the programme. Passing the external examination is a minimum requirement for obtaining a skilled worker's certificate. The German dual system is however criticized as rigid, for example, it is argued that apprenticeship most not be three years or more, at least a modular system can make it a bit flexible (Boehm, 1996). The report of the ITSJ (2014) also highlighted that the system does not provide for youths with low educational qualifications which is the minimum requirement for entry into apprenticeships. In addition, students are expected to make career choices relatively early and transitioning to higher education at a later stage is difficult.

2.9.3 System of Craft Skills Training in Canada

The training of construction craftsmen in Canada is similar to that in the UK, as noted in Review of Changes to Apprenticeship Training [RCAT] (2005), there is no single training system in Canada. But essentially, all the training systems ensure the linkage of institutions training with industry requirement and practice. Bosch (2006) noted that presently most initial vocational training in Canada is school-based. Although the school–based vocational training is reported to be the pre dominant training system in Canada, the apprenticeship is still cited as a very significant training system in the construction industry in Canada (Sharpe and Gibson, 2005; CSC, 2009). The system is a work-based mentorship model in which skilled tradespersons pass on knowledge and skills to learners in a workplace setting, leading to industry certification of competencies in a skilled trade. Learners develop competencies as prescribed by a

comprehensive set of industry standards. Apprenticeship combines alternating periods of on-the-job and technical training in a vocational training center, the ratio of institution to industry training is 20% to 80% at the minimum (Sharpe and Gibson, 2005; Apprenticeship in Canada, 2014; Apprenticeship-Career in Construction [ACC], 2014).

Sharpe and Gibson (2005) and Apprenticeship in Canada (2014) further explained that the duration of apprenticeship in Canada is generally between 2-5 years, depending on the trade and the jurisdiction. However, for most trades, the duration of apprenticeship is four years. Like several other countries such as, UK and Germany, apprentices are paid employees receiving incremental wage as they acquire more skills and progress through the various levels of apprenticeship. Just like the UK and German training system, it is a basic requirement for a contract of apprenticeship to be signed by the employer and apprentice, and registered with the provincial or territorial authority responsible for administration of the apprenticeship programme (Sharpe and Gibson, 2005; Apprenticeship in Canada, 2014; ACC, 2014). It is a common saying in Canada that no employment no apprenticeship (Sharpe and Gibson, 2005). This is because of the importance attached to finding an employer that is willing to train. Without an employment, an apprentice may have to enrol in an institute to acquire foundation skills in a trade (Sharpe and Gibson, 2005). The CBC report (2002) explained that in Ontario for example, apprenticeship methodology is generally adopted where an interested person must:

i. First, find an employer who wants to hire an apprentice;
ii. Then, either they or the employer must contact a training consultant at the closest Ministry of Training, Colleges and Universities apprenticeship office;
iii. The training consultant will meet the trainee and the employer at the workplace to assess the employer's ability to train;
iv. Once the consultant determines that a high standard of training can be provided, the trainee and the employer sign an apprenticeship contract, which registers the trainee as an apprentice, and training begins.

Similarly, Apprenticeship in Canada (2014) elaborated further and listed the following as the fundamental elements of Canada's apprenticeship programme:

i. The existence of contract of apprenticeship which establishes an ongoing relationship between the employer and apprentice, setting out the obligations of each party;
ii. The majority of skills development occurs in the workplace (learning by doing) under a mentorship model, with a skilled tradesperson teaching and supervising the apprentice;
iii. The system is industry-driven (employers and workers in the labour market create the basic supply and demand conditions which drive the system);
iv. The programme is largely paid for by the investment of employers and apprentices; and
v. The standards which define occupations and journeyperson competency are developed and approved by industry.

In Canada, training is structured in a way that colleges and unions provide most classroom learning, with some private training companies and other organizations also offering training (RCAT, 2005). In an effort to improve on the traditional method of training where training takes place in a confined classroom setting, alternate delivery methods like independent study or online learning are in use in some programmes to facilitate and increase the extend of reach. The use of modular learning programmes is also reported, it is designed to provide employers and apprentices with greater flexibility. Similarly, the training programme contained short-term, competency-based programmes designed in consultation with specific industries and to meet the requirements of the industry in a province (RCAT, 2005).

In variance with the UK and German apprenticeship, in the Canadian method an apprentice must enter a contract with an employer who can either be a business that hires the apprentice, or a union or other organization while the apprentice works for one or more organisations (RCAT, 2005). Three different ways by which an interested person can find a sponsor and register as an apprentice are described in Apprenticeship Career in Construction [ACC] (2014):

i. Go through an apprenticeship and training committee
ii. Arrange employment through a labour organization
iii. Contact an employer directly.

Part of the requirements for engagement as apprentice is evidence of successful completion of secondary school. Like in the German training system, applicants without secondary schools qualification are required and assisted to obtain such before enrolling for training. In the Canadian training model, trades are categorized into compulsory and voluntary trades, the requirement for each category is different, for example, the compulsory trades requires certification or registration as an apprentice in order to work while the voluntary trades offer apprenticeship programmes and certification for people who want to improve their skills, employment opportunities and earnings. In contrast with the highly comprehensive system in Germany, the apprenticeship programme in Canada placed the responsibility of finding and registering with a training institution on the apprentice who is also responsible for scheduling classroom time but with the assistance of the employer. Although there are public and private technical institutions that offer technical training, the Canadian Apprenticeship forum, a non-profit organisation is the promoter and supporter of apprenticeship in Canada (ACC, 2014). The Canadian apprenticeship programme is described as flexible over that of Germany especially and UK, it is however also cited by Canadian Apprenticeship Forum [CAF] (2004) in Sharpe and Gibson (2005) as:

> *"Inflexible with the block release component of apprenticeships cited as a significant structural deficiency in the apprenticeship system. Block release refers to the period in which apprentices attend the academic portion of apprenticeship training, often for two weeks at a time, which causes income interruptions for apprentices and productivity interruptions for employers. The call for more flexible training arrangement was*

universal across both occupational sectors and stakeholders, such that apprentices could fulfil their vocational training in the evenings or on weekend."

Apart from the apprenticeship programme described above, there is the ***Secondary School Apprenticeship Programme*** (SSAP). This option provides an early start on construction career for young secondary school students. It is also a mixture of school and on-the-job training which allows apprentice to earn credit towards both certification and high school certificate. There is provision of scholarship for eligible students in some of the programmes which serves as incentive for attracting serious and intelligent young people to construction industry. Again, completion of grade 10 and attaining the age of 16 is a minimum requirement for qualification. SSAP involves an agreement between apprentice, an employer and the school. The apprentice schedule will depend on the agreement but the following are various options available (Canada Apprenticeship Careers in Construction [CACC], 2014):

i. Working as an apprentice for one semester, and going to school the next semester
ii. Working half a day and going to school the other half
iii. Working during the summer, and on holidays and weekends, and attending school during the regular term
iv. Working one or two days a week and going to school the other days.

The benefit in having various options is that it provides flexibility in the programme that allows interested participants to acquire skills as well as conventional education.

Furthermore, for those in part-time employment in construction there is a window of opportunity to register as a secondary school apprentice, this is however limited to some trades. Interestingly, the apprenticeship programme in Canada has also provided opportunity for those taking Career and Technology Studies (CTS) classes in high school to receive credits towards an apprenticeship. This is also applicable to some post-secondary training. The credits can shorten

the time it takes to complete an apprenticeship and become a certified journeyperson (CACC, 2014). Sharpe and Gibson (2005) added that some apprenticeship programmes also have previous learning assessment and recognition (PLAR) mechanisms, such that experienced trades-people can demonstrate their knowledge of skills and receive exemptions from academic portions of the programme.

Unlike in most European countries, UK and US, Sharpe and Gibson (2005) reported that an apprentice in Canada may choose not to sit for qualification examination at the end of the apprenticeship programme. In contrast with the developed nations, the qualification examination may only be written component, but does not always include an assessment of practical abilities of the candidate. Also, there is no restriction on employment due to lack of trades qualification in many trades but is in others, although this designation varies by province. This flexible position may be due to shortage of skills workers particularly in construction industry in Canada.

The flexibility of the Canadian apprenticeship programme has also provided another method although for training women in skills jobs. The method provided involves 50 weeks of preparation, including 30 weeks of intense classroom instruction and 20 weeks of paid work experience in the workplace. The main focus of the programme is to produce qualified women and match them with employers who require skilled tradesmen. It is also notable that in this model, there is combination of school and industry learning. This is in consonance with training programmes discussed previously.

In addition to efforts discussed earlier, there are current efforts at improving training of craftsmen (CBC, 2002). As part of the effort, the Canadian government is considering replicating the best practice in the Saskatchewan Indian Institute of Technologies' Construction Career Development Project. Although the target is not only to provide training but also to attract and

retain immigrant youths in the construction industry, the project however sets to break Aboriginal youth's cycle of dependency and put them on a career path to self-reliance and empowerment. This is achieved by finding the youth seasonal construction jobs even at the most junior level and then works with the youth and the employers to ensure the job is maintained. The method ensures the youth receives formal training at the local community college while working in the industry. Again, the programme promotes institution and industry learning since the youths receives both classroom training and work based training which eventually leads to qualification.

Additionally, Getting Started (2014) listed two other routes to start a career in construction industry in Canada as follows:

> i. Enrol at a university, community college or technical institute and study for the construction career of your choice. Obviously study at the university level and those leading to diploma are beyond the scope of this study.
> ii. Find a job as a construction labourer and learn the skills you need on the job.

For those studies/ training leading to craft skills qualifications, the community college or technical institute is relevant and is the concern of this study. CSC (2009) skills report noted that the community colleges provide a large part of construction training through programmes such as apprenticeship, pre-employment, pre-apprenticeship and customized courses. The basic difference with traditional apprenticeship programme is the relationship between the employer and the apprentice and the amount of time spent in the industry for training, but industry based training in the community college training is also emphasized (STA, 2014). Research evidence also shows some training activities by Governmental organisations and industry unions. CSC (2009) reported that in Canada, most workers compensation boards provide health and safety training to workers but it is not industry specific and focuses on generic health and safety training. However, Construction safety associations offer industry specific training.

2.9.4 System of Craft Skills Training in the United States

Bills and Hodson (2007) argued that unlike many comparable post-industrial societies, the United States (US) lacks an integrated and centrally administered system of training. The US system of training is referred to as "non-system" or an "ill-defined" system. The training in the United States is occupation or to a lesser degree, industry-specific (Bills and Hodson, 2007). There is generally no broader framework of training, as a result; there is little cumulative development of training programme education, evaluation techniques, or training delivery structures. Different occupational groups tend to put together their own requirements and training programmes in an effort to convince the broader public of the legitimacy of their jurisdictional claims through certification, licensure, and other mechanisms of social closure. However, Hansen (2011) reported that the apprenticeship training method is widely practice in the US, this contrast with an earlier report by Bills and Hodson (2007) which reported that unlike many advanced economies, the US has no appreciable tradition of apprenticeship as worker training mechanism. Notwithstanding, there are reports that suggest early systems of apprenticeships in the US were generally displaced by vocational high schools followed by community colleges. However, the appreciable apprenticeships that exist in the US follow no nationally organised system.

In terms of history, it started in similar way with the training system in Germany which has developed to a modern training system over the years. In the system, skills are acquired through extensive apprenticeship programmes that combine classroom instruction with an on-the-job apprenticeship in which the trainee's work is supervised by a senior worker. Like it is practice in training system of most European countries such as Germany, Switzerland, Netherlands, UK and many more, the lower labour rates are paid to the trainee in order to offset cost of investment

which is usually high. A typical apprenticeship in the US involve several weeks to several months of full time classroom instruction or its equivalent for a longer period in addition to a year or more of on-the-job learning in an approved organisation.

The duration of the training varies from one institution to another but generally emphasize the combination of college and industry training. Unlike the UK, in US work based evidence are measured in Hours, usually on a diary which must be signed by industry supervisor. The NLETF (2012) highlighted that depending on the availability of work and on local training schedules, it can take an individual from 2 to 4 years to complete the apprenticeship. Again, just like the training systems in other developed nations, for example UK, Germany, Canada, age limit is usually 18 years or older with proof of high school graduation as basic requirement. Applicants are also requested to submit a transcript to enable the institution assess the performance of the applicant. Upon submitting the required documents for enlistment as apprentice, the candidate is scheduled for an interview with the Apprenticeship Committee. Only after the candidate has passed the interview before he/she is placed in an employment eligibility pool. A candidate assumes the status of an apprentice once he begins working for a participating employer. Incentive is usually given to attract employers into the scheme (CITC, 2012). It is further reported that the entire programme consists of 4,000 to 8000 hours of on-the-job training (OJT) experience and a minimum of 320 to 640 hours off- the-job related supplementary instruction (RSI) or job related training before an apprentice is promoted to Journeyperson (CCP, 2012).

2.10 Components of Training Programmes

In identifying components of a training programme for preparing Middletown division of fire company officers, IAFC (2003) in Botts (2008) listed *training, experience, self-development and*

education as the four broad components for skills development. Similarly, Lussier and Shandrick (2006) made a case that military officers require *education, training, practice and experience* to develop skills in battle command. Although IAFC (2003) in Botts (2008) use the term self-development for the third component while Luissier and Shandrick (2006) use practice, it is logical to argue that practice is targeted at self-development therefore it is in that regard that the two words were probably interchanged. The target of training programme is to change the behaviour of the trainee to a skilled behaviour through structured activities designed and grouped into four components earlier stated. For this study, the four components in Lussier and Shandrick (2006), that is, education; training; practice and experience are adopted. The components are further discussed below:

2.10.1 Education

The importance of education to skills acquisition has been by Luissier and Shandrick (2006). It is vital in all aspect of human endeavour. It is often used loosely, for example, Fryer (2004) described education as the broad process in which an individual's whole outlook on life is shaped by a succession of varied experiences. Luissier and Shandrick (2006) described educational activities as broad-based and more conceptual, aiming at developing critical faculties. Consequently, in training programme, education aimed at bringing trainees to a state of knowing reason things are done in some particular ways and why it is important to do those things. Idhammar (2014) explained that if people do not know why you want them to do something, you cannot expect them to be committed or to take on responsibilities. This suggests that craftsmen need to be educated on the science or idea behind their crafts and most importantly the materials used in doing the work.

Furthermore, education is required for skills development in order to acquire considerable body of knowledge from wide range of allied fields such as science, art, technology, history and so on. It aims at developing one intellectually to a level of mature life. It also builds the capacity and ability of one to reason and judge objectively. This is a basic requirement in skills development since it involves decision making especially at higher level of trade. Additionally, in technical training, it is argued that the acquisition of sufficient amount of general schooling ensures the transferability of skills across firms after the apprenticeship (ITSJ, 2014). On this, studies (ITSJ, 2014) suggest that without general education, it is difficult for tradesmen to adapt to new skills requirement as a result of development in technology. However, with general education, it is easier for tradesmen to adapt to new skills needs through further training since the foundation has been there. It is therefore not surprising that most training systems required general education as basic requirement for entry into vocational and technical training college, while some countries made it a basic requirement for training, others combine general education with technical training and directly linked the training with industries for the trainees to acquire experience while on training (Bosch and Charest, 2006; ITSJ, 2014). For most developed countries, in addition to general education, trade focused education is also an important component of the training programme (Bosch and Charest, 2006; ITSJ, 2014). With trade focused education, specific industry issues are addressed, thus trainees are better equipped to perform specific industry task. Despite the relevance of education, it was argued that knowledge alone is not sufficient to produce a skilled behavioural performance, hence the need for training, practice and experience (Luissier and Shandrick, 2006).

2.10.2 Training

Fellows *et al.,* (2002) discussed training under two broad headings, namely apprentice training and management training. At crafts skills level, apprenticeship training is applicable. The primary purpose of training is to ensure that task is performed in a correct or effective manner. To achieve this objective, learner is engaged in activities designed to accomplish some significant change in the way tasked is performed. This has resulted in several training programmes adapting training system that allow trainees to receive some foundational training in the institution and proceed to the industry for further training (Oulton and Steedman, 1994; Bosch and Charest, 2006; Hippach-Schneider, *et. al.*, 2007; ITSJ, 2014). Even at higher education level, this form of collaborative training between institutions and industry is encouraged to ensure the aim of the training is achieved (Lowe, 2006). Because the methods of training are usually more mechanistic where learning relies more on stimulus and response and reinforced through practice, systems of training especially of those countries adjudge to have effective training system lay emphasize on learning in the industry (Oulton and Steedman, 1994; Bosch and Charest, 2006; Hippach-Schneider, *et. al.*, 2007; ITSJ, 2014). Since the desire is to create a change in the behaviour of the learner and to make the performance conforms to an expert's way of doing things, training therefore consists of activities designed to achieve that desired objective (ITSJ, 2014).

To achieve the objective of training, the learner is made to perform under the observation of a coach and most necessarily under fully realistic conditions while consciously attending to the elements of task performance to verify that task is performed correctly (Luissier and Shandrick, 2006). As opposed to other forms of learning, during training short segments of task are performed in a slow tempo by the trainer, followed by immediate repetition also in a slow tempo

by the trainee. At this point, emphasis is for the trainee to understand the steps in performing the task. Because the learning is conscious of the effort in doing the task, he/she feels task as work, thus taking more time and effort to perform the task. This is evident in technical training where during workshop practice, the instructor demonstrates for the trainees to replicate immediately.

2.10.3 Practice

Although training and practice goes hand in hand, there is a thin line that separates the two. Again, Luissier and Shandrick (2006) explained that the essence of practice is to make performance faster with little conscious effort. As opposed to training, during practice activities are repeatedly carried out to ingrain the task in the mind of the trainee. The aim is to ensure that task is performed in a variety of ways almost effortlessly. At this stage, the learner feels work like play and does not take much time and energy to perform the task. The ultimate in practice is for the learner to perfect acquired skills. Additionally, the activities performed during practice are targeted at developing expertise. In all skills training programmes, the place of practice is highly revered because it is at that stage that skills are developed (Luissier and Shandrick, 2006). Ab-Rahman *et al.* (2014) asserts that practical activity is very significant in VET system adding that the nature of practical work is closest to actual job. It helps trainee in appreciating work situation in a simulated form. In technical colleges, it is during workshop practice that skills are developed and ingrained in the mind of the trainees to the extent that task is performed automatically. While it is important to start developing skills in technical training institutions, the industry is found more suitable for practice because the environment is more realistic than that of the institution. Like the case of training, most training institutions integrate training programme in both institution and industry in order to provide good platform for trainees to practice what they were taught (Oulton and Steedman, 1994; Bosch and Charest, 2006; Hippach-Schneider, *et.*

al., 2007; ITSJ, 2014). To make the point clearer, Luisser and Shandrick (2006) attempts at differentiating training from practice thus:

Difference between Training and Practice

There seems to be an interface between training and practice activities such that they are often used interchangeably. Luissier and Shandrick (2006) explained that:

> *"Training and practice appear to be similar activities in that they usually involve task performance under real or simulated conditions and because both are significant components in gaining proficiency. It is usually those two activities that are not clearly differentiated and those two terms – training and practice – that are normally used almost interchangeably. For example, when sports teams hold the activity called practice, there is much that occurs that we would call training, and when the Army conducts simulated tactical training exercises there is often much more of what we would call practice. Above, we have emphasized a distinction based on the purposes of the two activities. Training is designed to shape the manner in which the task is performed so that it occurs in an expert form; practice is designed to make the behaviour more automatic, that is, less consciously controlled – and make it smoother, faster, or otherwise more effective and to increase retention. Here we identify some other key and typical differences between the activities that support training and practice."*

Table 2.8: Differences between Training and Practice

Training	Practice
Changes form of behaviour	Makes behaviour more automatic & effective
Conscious attention on own performance	Conscious attention on external situation
Slower tempo	Realistic tempo
Part-Task	Full-Task
Short segments with immediate repetition	Long continuous performance
Coaching vital	Coaching not necessary
Process feedback required	Outcome feedback required
Realism less important	Realism very important
Suited to individual/small group exercises	Suited to large-scale collective exercises
Explicit description of process important	Descriptions not required
Concentration on difficult and high-risk tasks and on areas of personal weakness	Tasks occur with natural frequency
Systematically varied conditions	Realistically varied conditions
Usually feels like work	Sometimes feels like play

Source: Luissier and Shandrick, 2006

2.10.4 Experience

Although education, training and practice are important in a training programme, to reach expert proficiency level, experience is required. Experience is acquired through performance of task in real work environment because there are skills that cannot be acquired even with the use of high-fidelity simulations; only real work environment provides the atmosphere for learning those skills (Luissier and Shandrick, 2006; Bills and Hodson, 2007). A mason for example may never

appreciate the effect of height to output until he finds himself working in a high rise building. Similarly in military training, the stress resulting from the high cost of failure, the psychology of sacrifice, and the ability to take calculated risks in decisions cannot be adequately acquired even with the most advance simulation techniques except in real war situation (Luissier and Shandrick, 2006).

Often training and practice are done with models or simulations but real work environment is more complex and unpredictable than it is presented during training and practice. It is as a result of this that training programmes of several developed societies adopt collaborative skills training where the industry and the institutions partner to train (Clarke and Wall, 2000). This collaboration is evident in countries like Germany, Netherlands, Canada and UK for example; where apprenticeship training system is adjudged to be most effective. The system is fashioned in a collaborative manner such that the trainee acquires foundation training and general education in the institution while experience is acquired in the industry (Clark and Wall, 2000; CBC, 2002). This arrangement ensures acquisition of employability skills as well as smooth transition from training institution to industry. Apart from collaborating with the industry to train skilled workers, most structures of training of countries reported to have comprehensive and effective training programmes, alternate training between institution and industry in an average ratio 1:3 (Sockice, 1994; Oulton and Steedman, 1994; Boehm, 1996; ITSJ, 2014). As earlier stated, the aim is to provide trainees the opportunity to develop skills through practice as well as acquire experience while in a realistic world of work. Furthermore, Bills and Hodson (2007) corroborated that workers acquire most of the skills they work with in the workplace (learning by experience). More precisely, the study asserts thus: "*it is generally assumed that workers learn the skills they need to do their jobs in the course of doing them or through institutionalised*

mechanism of skills enhancement within internal labour markets". This institutionalised mechanism is the training system in use by the state. As a result, training systems are consciously organised and developed to ensure the transfer and acquisition of skills either while in school or as they transit from school to industry.

2.11 Training Frameworks

In a review of training systems adopted by several countries Sharpe and Gibson (2005) showed that there is no "one-size-fit-all" system of technical and vocational training. The approach varies from one country to another but generally there are common features in all the frameworks. Similarly, Gann (1989) suggests that training arrangements and the acquisition of skills vary considerably across the construction industry. The common approach is the combination of college-based (school-based) training usually delivered in a training institution and a structured learning on-the-job with actual work experience in an approved company (Oulton and Steedman, 1994; Sharpe and Gibson, 2005; Hippach-Schneider, *et. al.*, 2007). Countries with high presence of world leading companies take advantage of the presence of those companies and developed a comprehensive apprenticeship training system which serves as avenue for young people to build career in a chosen trade or vocation. Some common systems of training in use are:

2.11.1 Dual Training System (DTS)

The dual training system aims to combine general transferable skills acquired during college-based training with structured learning on-the-job and actual work experience within a training company. The training system is described as "dual" because training is carried out in two places of learning: companies and vocational schools (Oulton and Steedman, 1994; Hippach-Schneider, *et al.,* 2007). The ITSJ (2014) also described dual training as a training system that is

complementary between school and workplace learning. It was argued that theoretical learning at school facilitates a well-grounded approach to practical problems, while workplace experience provides real world examples and applications (ITSJ, 2014). In studying the German dual training system, Gough and Macintosh (2007) elaborated that the two schools college and institution as platforms for learning) have generally provided a rigorous introduction to areas of academic knowledge relevant to the *Berufe* (these are clusters of skills, knowledge and practical capacities that are seen as separate occupations by agreement between the social partners in German training system). The formal training complements the second element of the German system, the company-based workplace training overseen by apprentice supervisors or *Meister* (Foreman that studied the skills to train apprentice in their occupation). While the apprenticeship school and the workplace training may use different approaches to learning, a final examination brings the two together and gives coherence to the two forms of training.

Furthermore, Gough and Macintosh (2007) noted that the learning in both places is tested by final examination that includes both school-based and work-based components. To achieve the desire of the dual training system, the training is fashioned in a way that the trainee alternates between the institution and the organisation. There are different patterns of alternating the training, the choice of any depends on the industry and the training institution. It is generally difficult to state any particular pattern of alternating because it varies between country to country and industry to industry. For example, training can start in the institution for a period of one year, where general education and school based practical are taught and in the second year of training, the trainee switch learning environment to the industry where he receives training based on a standardised training guideline. Within the period of the industry training, the trainee still visits the institution to receive further instructions from institution based supervisor. Some systems

require trainee to visits the institution one day in a week while others require two days. The entire arrangement of the pattern depends on the nature of the industry but basically, training combines both institution and the industry as platform for learning (Sockice, 1994; Oulton and Steedman, 1994; Boehm, 1996; ITSJ, 2014).

Because it is the combine effort of the industry and the institution to train in a dual training system, the capability of the organisation to provide industry training is usually assessed before trainees are sent to the organisation. It is also the responsibility of the training institution to secure placement or at least provide a platform for trainees to meet organisations that are capable and willing to provide industry training. It is claimed that the system provides solution to educational mismatch inherent in a purely school-based training system especially in a world of perpetual technological change (ITSJ, 2014). Also the involvement of the industry in the training ensures timely review and adaptation of curriculum to meet changing needs (ITSJ, 2014). The dual training system also ensures that the trainees acquire employability skills and are assured of the acquisition of transferrable skills devoid of overspecialization inherent in on-the-job training through standardization of curricula and examinations. While dual training exhibits several advantages from a societal and individual perspective, establishing an efficient dual apprenticeship system depends crucially on the willingness of firms to participate.

In more clear terms, a report of the ITSJ (2014) stated that in the dual training system,

> *"Apprenticeship normally last for three years but can be shortened to two years. At least one day a week must be spent in a vocational school where a federally agreed programme of general education and occupationally-relevant technical knowledge are taught. The organisation also provides work-place training following the outline of the training regulations for the appropriate trade. Apprenticeship organisations must show that they have equipment and facilities to provide the training and have a qualified person(s) to supervise the apprentice. Where the organisation lacks some*

equipment/facilities, these can be supplied at a Group Training Centre financed from private and public funds".

The target group is normally secondary school graduates. Those that never completed secondary education must do so before they can be admitted (Boehm, 1996; Syben, 2008; ITSJ, 2014).

2.12.2 The College-based Training System

There are different approaches to college-based training system, also refers to as School-based apprenticeships and traineeships (SATs). Generally, the system provide opportunity for young people (usually 11 and 12 years) to participate in training and work as paid employees while completing senior schooling (Australian School-Based Apprenticeship [ASBA], 2014). The system combines paid employment as an apprentice or trainee, off-the-job vocational training and senior secondary school studies. The unique feature of the system is the combination of the secondary education with vocational education that centers on acquisition of hands-on-industry experience.

The training delivered by a registered training organisation may be undertaken for a couple of hours every week or for a longer block of time, less frequently (ASBA, 2014). This will depend on the requirement of the registered training organisation and the vocational training course. The apprentice need to negotiate time-release from the school subjects to attend work and training, arranging to catch-up on any school material missed on a later date. The number of hours an apprentice needs to be employed per week differs. Some apprentice takes paid employment outside of school hours, such as weekends, others however; take time during school hours to work. This depends on the requirement of the employer.

The programme can take between one to four years, depending on the type of apprenticeship, the industry and the gratification envisaged. Depending on the type of apprenticeship, the training

and schooling can be completed at the same time. While others may require more time to finish after graduating from secondary school. The apprentices are employed under a federal or state award or agreement which sets out their wages and conditions of employment (ASBA, 2014).

Another option which provides an early start on construction career for young secondary school youths in Canada is also a mixture of school and on-the-job training which allows apprentice to earn credit towards both certification and high school diploma. There is provision of scholarship for eligible students in some of the programme which serves as incentive for attracting serious and intelligent young people to construction industry. Again, completion of grade 10 and attaining the age of 16 is a minimum requirement for qualification. Secondary School Apprenticeship Programme (SSAP) involves an agreement between apprentice, an employer and the school. The apprentice schedule will depend on the agreement but the following are various options available (CACC, 2014):

i. Working as an apprentice for one semester, and going to school the next semester
ii. Working half a day and going to school the other half
iii. Working during the summer, and on holidays and weekends, and attending school during the regular term
iv. Working one or two days a week and going to school the other days.

Several studies indicate the existence of variety of training systems across the world (Steedman, 1994; Bosch, 2006; Eichorst *et al.*, 2012; ITSJ, 2014). There are notable similarities as well as wide differences in the application of the systems. The training systems are therefore described country wise in order to enchase clarity and understanding.

2.12 Historical Development of Technical Education and Training in Nigeria

Oranu (2003) gave a brief description of the evolution of vocational and technical education in Nigeria. Based on Oranu's (2003) account, the Royal Society of Arts (RSA) and the City and Guilds of London Institute (CGLI) started the craft-level technical education through the conduct of examinations in commercial and technical subjects. Even with establishment of West African Examinations Council (WAEC) in 1952 the RSA and CGLI continued to regulate technical education. In 1960 WAEC started acting as agent for RSA and CGLI whose objectives were to certify students in technical institutions (formerly called trade centers, trade schools). The examinations were conducted to examine only the theoretical aspects of most of the trades offered. Furthermore, the trainees were given little or no general education to supplement their chosen trades.

The City and Guilds of London certificate was issued to trainees that successfully completed their study until the introduction of the Federal Craft Certificate in December 1972 after WAEC took over the conduct of examinations in some technical and commercial subjects from RSA and CGLI. Practical aspect of examination that was missing in the CGLI was incorporated in the Federal Craft Certificate trades examinations in 1978 as part of WAEC's new innovations. The problem of insufficient content in general education continues to persist and the graduates of technical colleges were unable to secure admission into tertiary institutions. For this reason, the image of technical education remained tarnished as a programme for academically weak students. In an effort to solve the problem of insufficient content of general education in technical programme, the National Council on Education approved the national curricula and module specifications evolved by the National Board for Technical Education for the National

Technical/Commercial Studies certificate programmes in technical colleges in 1985. The main features of the reform include:

i. General education courses in English language and communication, mathematics, integrated physical science and social studies became mandatory components of the technical curriculum;
ii. Industrial staff and itinerant mechanics can be enrolled at the technical college to take specific trade modules relevant to their needs;
iii. Trade theory and practice are integrated. Trade theory now included trade calculation and trade science; no separate classes were held.

Another reform came in 1995 with the introduction of the National Business and Technical Examination Board (NABTEB) replacing the WAEC reform of 1985. The reform came following the establishment of NABTEB in 1992 charged with the conduct of technical and business examinations in Nigeria. The basic characteristics of the reforms are that NABTEB based its examinations on two parallel syllabi-NBTE modular curricula and modified WAEC syllabi. The Board offers examinations in four trade areas: engineering trades, construction trades, miscellaneous trades and business studies. Below is the summary of both syllabi in Engineering and Construction trades only being the main area of concern for this study.

The key objectives of NABTEB include, making their certificate equivalent to a senior secondary school certificate. The aim was to ensure that graduates of technical college can obtain admission into relevant tertiary institutions (polytechnics and universities). This was in response to the low esteem accorded to the graduates of technical colleges who could not secure admission into higher institution with the previous technical certificates because of the inadequate content of general education. To this end, all general education subjects are made compulsory to all candidates and related trade subjects are chosen according to trades. The basic sciences were introduced as trade-related subjects. Practical aspects of every trade were emphasized and made part of the examinations. In order to sustain the reform, the Joint Admission and Matriculations Board (JAMB) accepted the NTC and NBC certificates as being

adequate for admission into institutions of higher learning. Further to that, all technical colleges were required to affiliate with NABTEB for their examinations. NABTEB thus embarks on accreditation exercise for the conduct of technical college examination.

To the extent that technical college graduates can now obtain admission into higher institutions of learning is good, but most technical colleges are having problems in balancing between the theory and practice resulting in most graduates becoming weak in trade practice in general and trade-related subjects at the detriment of the industries and national development (World Gist, 2013). To a greater extent, the existing technical programme has reduced the feelings of inferiority by technical college graduates to those in conventional secondary school since both certificates are acceptable for higher education. This achievement is rather viewed as detrimental to national economy since technical skills are required heavily to drive desired industrial revolution for national growth (Osalor, 2012; Enwegbara, 2014). Effort should have been on enlightenment and orientation on technical education rather than desiring to equate technical education with conventional education particularly at secondary school level. It is very necessary to clearly separate the career paths of the two systems because their aims are not the same and difference should in fact be emphasized to attain national industrial development. Furthermore, the current system emphasised single skills trade at the expense of multiple-skills which is highly favoured in modern vocational education due to technological advancement and the need to constantly engage craftsmen throughout their working career (Clark and Wall, 2000).

The available trades for training in a typical technical institution accredited by the NBTE are presented in Table 2.9 to 2.14.

Table 2.9: Construction Trades Based On NBTE Modular Curriculum Syllabi

i. Bricklaying, Blocklaying and Concrete Work.
ii. Carpentry and Joinery.
iii. Furniture making.
iv. Machine Woodworking.
v. Painting and Decorating.
vi. Plumbing and Pipe Fitting

Source: NBTE, 2012

Table 2.10: Engineering Trades Based On NBTE Modular Curriculum Syllabi

i. Agricultural Equipment and Implements Mechanics Work
ii. Motor Vehicle Mechanics Work
iii. Auto Electrical Work
iv. Electrical Installation and Maintenance Practice
v. Fabrication and Welding
vi. Mechanical Engineering Craft Practice
vii. Radio, TV and Electronic Work
viii. Refrigeration and Air-conditioning Practice
ix. Vehicle Body Building
x. Light Vehicle Body Repair Work
xi. Instrument Mechanics Work
xii. Appliance Maintenance

Source: NBTE, 2012

Table 2.11: Construction Trades Based Modified WAEC Technical and Business Syllabi

i. Furniture, Craft and Advanced Craft
ii. Concrete Practice
iii. Carpentry and Joinery, Craft and Advanced Craft
iv. Machine Woodworking, Craft and Advanced Craft
v. Painters' and Decorators' Work, Craft and Advanced Craft
vi. Machine Woodworking, Craft and Advanced Craft
vii. Concrete Technology and Construction
viii. Blocklaying and Concreting, Craft and Advanced Craft
ix. Plumbing, Craft and Advanced Craft

Source: NBTE, 2012

Table 2.12: Engineering Trades Based On Modified WAEC Technical and Business Syllabi

i. Mechanical Engineering Craft Practice Parts I and II
ii. Refrigeration and Air-conditioning Practice
iii. Welding Craft Practice, Parts I and II
iv. Fabrication Engineering Craft Practice, Parts I and II
v. Radio, Television and Electronics Servicing
vi. Electrical Installation Work, Courses B and C
vii. Telecommunication Technicians, Part I
viii. Telecommunication Technicians, Part II
ix. Motor Vehicle Mechanics Parts I and II
x. Vehicle Body Building
xi. Electrical Engineering Practice

Source: NBTE, 2012

Table 2.13: General Courses Based On Modified WAEC Technical and Business Syllabi

i. Biology
ii. Chemistry
iii. Entrepreneurship Education
iv. I.C.T
v. Mathematics
vi. Physics
vii. Economics
viii. Technical Drawing.
ix Biology

Source: NBTE, 2012

Also, the CITB occupation breakdown has the following trades that are specific to construction industry in the UK. The list of the trades is shown in Table 2.14:

Table 2.14: Construction industry occupational breakdown

1 Carpenters/joiners (sitework)
2 Carpenters/joiners
3 Shopfitters
4 Formworkers
5 Wood machinists
6 Bricklayers
7 Cavity wall tie installers
8 Façade maintenance/cleaning
9 Stone masons
10 Plasterers (fibrous)
11 Plasterers (solid)
12 Dry liners
14 Slaters/tilers
15 Built-up felt roofers
16 Sheeters/cladders
17 Single-ply roofers
19 Mastic asphalters
20 Painters/decorators
21 Glaziers
22 Wall/floor tilers
23 Floor coverers
24 Ceiling fixers
25 Demountable partition erectors
26 Demolition operatives
27 Steeplejacks/LC engineers
28 Scaffolders
29 Steel erectors/riggers
30 Structural steel workers
31 Plant mechanics
32 Electricians
33 Crane drivers
34 Plant operators
35 Road vehicle drivers
36 Asphalters
37 Bar benders/steel fixers
38 Public utilities distribution operatives
39 Mason paviors
40 Other CE operatives
41 Plumbers
42 Heating/vent engineers
43 Refrigeration/AC engineers
44 Thermal insulation engineers
45 General operatives
46 Maintenance operatives
47 Non-construction operatives
48 Office supervisors
49 Office clerical staff
50 Office sales staff
51 Management
52 Technical functions
53 Planning services
54 Architectural/design
55 Engineering/design
56 Surveying

Note: a. LC = lightning conductor; b. AC = air-conditioning; c. CE = civil engineering
Source: CITB Survey of Employment in the Construction Industry, 1998; SCPR Research

In comparison with the NBTE list of construction related trades available for training of craftsmen in Nigerian, there are several trades that are in demand in the construction industry in Nigeria but training is not available for them. For example, in both NBTE modular curriculum and modified WAEC technical and business syllabi, trades like scaffolders, form-workers, plant operators, plant mechanics, crane operators and many more are completely not available for training in Nigeria. This suggests that for those trades, either training is provided on-the-job or foreigners are employed to carry out the work.

2.13 Technical Training Regulatory Organisations

Presently the National Board for Technical Education (NBTE) is the sole regulatory body saddled with the responsibility of regulating the training of technical education in Nigeria. With over 132 technical and vocational colleges and several polytechnics across Nigeria to regulate, and each institution offering various programmes across several industries in Nigeria, the enormous responsibility on the board is undoubtedly huge. Unlike several other Nations (example UK, Germany, Netherlands, USA), Nigeria lacks Construction Industry Training Board (CITB) or Development board as it is variably called. As reported in Odusami and Ene (2011), in UK for example, the CITB partnered with the Construction Industry Council and formed "Construction Skills" which is the Sector Skills Council (SSC) for the industry in UK with the following goals:

i. *to reduce skills gaps and shortages,*
ii. *to improve productivity*
iii. *to boost the skills of the sector's workers*
iv. *to improve learning supply*

They further explained that the ConstructionSkills has the responsibility for arranging for the provision, approval and funding of the training of skilled workers in the UK construction industry. Training in UK is a collaborative effort between government and industry. Several developed and developing countries have adopted and in some cases developed new approaches for providing and funding training in order to provide efficient and effective training in the construction industry.

Although NBTE is the sole regulatory body for technical training in Nigeria, other stakeholders like the Ministries of Education, Science and Technology at States and Federal level play supervisory roles to ensure the provision of facilities, manpower, consumables and adherence to the NBTE guidelines. Odusami and Ene (2011) question the efficiency and effectiveness of the regulation of technical training and certification stating that the assessment of craftsmen are hardly ever carried out but certificates are obtained usually by filling forms and paying specified fees. They suggested that assessments should be standardised and regulated across Nigeria to ensure that workers employed on construction sites actually have the skills they are certified for. Furthermore, Odusami and Ene (2011) called for the establishment of a national regulatory body responsible for the training of construction skills in Nigeria. They argued that strategic training plans have to be formulated within a national training policy for the construction industry which needs to be industry wide and covers the whole country. In addition, they opined that because of the unique nature of the construction industry and its products, training of construction skilled workers should not be lumped together with every other vocational skill as it is presently done. They concluded that the combination of construction industry skilled workers training with other industries could have been the reason for the low patronage of construction training by job seekers in Nigeria and likely the poor quality of graduates of those institutions.

2.13.1 National Board for Technical Education

In 1972 government established the then National Science and Technology Development Agency (which later metamorphosed to Federal Ministry of Science and Technology) which set up a Working Committee on Scientific and Technical Manpower and Science Education. The Committee came up with a report on middle-level technical manpower and their training with the following recommendations:

i. *To have a nationally accepted standard in technical education, there should be a harmonization of the entry qualifications and diploma standards throughout the nation;*

ii. *To eliminate the non-uniformity in terminal diplomas issued by existing colleges of technology, there should be a national certificate in technical education;*

iii. *To attract the right kind of staff to the technical colleges (now polytechnics) there should be a harmonization of technical staff standards including staff structure, remuneration and conditions of service;*

iv. *In view of the fact that courses in many technical fields from which the Development Plans need to draw manpower at the middle-level are not provided for in our existing colleges, there should be expansion of the courses and facilities in these colleges; and new colleges should take into account the required courses in planning their programmes;*

v. *In view of the gaps in the admission capacity and actual enrolment for the existing courses in the technical colleges (now polytechnics) there should be full utilization of these facilities through a review of the admissions policy, including part-time admissions, and massive awards of technical scholarships;*

vi. *In order to encourage more enrolment in technical courses, more avenues for practical experience for newly qualified trainees, should be created; this can be achieved through immediate employment of the trainees in public and private industries using, if necessary, the facilities of the Industrial Training Fund.*

The Committee further recommended the creation of National Board for Technical Education which should be charged with the implementation of its recommendations. The result of this recommendation is the establishment of the National Board for Technical Education by Act 9 of

January 1977. Further to that, in August, 1985 and January 1993 respectively, the Federal Government enacted Act 16 (Education Act - National Minimum Standards and Establishment of Institutions) and Act 9 (Education Act - National Minimum Standards and Establishment of Institutions as Amendment). With these Acts, the functions of the Board were extended to include accreditation of academic programmes in all Technical and Vocational Education (TVE) institutions which is the purview of this study.

The National Board for Technical Education is established following several efforts of Nigerian government towards National Development. The Third National Development Plan, 1975-80 stated the following objectives for education:

i. *To expand facilities for education aimed at equalizing individual access to education throughout the country;*
ii. *To reform the content of general education to make it more responsive to the socio-economic needs of the country;*
iii. *To make an impact in the areas of technological education so as to meet the growing needs of the economy;*
iv. *To consolidate and develop the nation's system of higher education in response to the economy's manpower needs;*
v. *To streamline and strengthen the machinery for educational development in the country; and*
vi. *To rationalize the financing of education with a view to making the educational system more adequate and efficient.*

The acute shortage of technical manpower was identified as a major constraint to the successful achievement of the development plan.

At the moment there are 132 technical colleges under the purview of the Board with19 number Federal Government owned, 110 number State Government and 3 number owned by private organisations. Table 2.15 summarized the distribution:

Table 2.15: Technical Colleges in Nigeria

Institution	Ownership			Total
	Federal	State	Private	
Technical Colleges	19	110	3	132

Source: NBTE, 2011

Of the 132 technical colleges, only 79 offered construction related programmes and are accredited as at 2011. The only 3 accredited privately owned do not offer construction related programmes at the time of this study.

2.14 Organisations Providing Technical Training in Nigeria

There are basically four types of public owned training institutions and one privately owned institutions providing technical training in construction related discipline in Nigeria under the regulations of the NBTE. The public owned institutions are grouped as: Federal Science and Technical Colleges (FSTC); State Technical Colleges (STC) and Vocational Centers (VCs-BATC inclusive); Industrial Training Fund (ITF); National Directorate of Employment (NDE) and the privately owned training institution.

2.14.1 Federal Science and Technical Colleges (FSTCs)

These are technical colleges owned by the Federal Government of Nigeria (FGN). The schools operate as a science school at junior secondary school level while at senior secondary school stage; distinction is made between Science Secondary School and Technical College. Junior Secondary School Graduates of the institution are the potential candidates for both the Science Secondary School and the Technical College. There are 19 FSTCs located in 19 states across Nigeria. The details of the institutions are given in Appendix I.

2.14.2 State Technical Colleges (STCs) and Vocational Centers (including Business Apprenticeship Training Center (BATC)

These are technical colleges/vocational centers owned by State Governments. Technical training starts at Senior Secondary School in technical colleges while in BATC, technical training starts at Junior Secondary School (JSS). The technical colleges are supervised by either ministry of education or science and technology which depends on the state the college is located. There are 110 STCs spread across the 36 states of Nigeria. The BATC is very similar to the state technical colleges and in fact, is the first technical college in Northern Nigeria, established in 1965 to carter for the increasing need of middle level manpower in the growing number of industries in Kaduna (capital of northern region then). Till date, the BATC is still being utilised in Kaduna State to train craft skills manpower at equivalent of Junior Secondary School level. There are a total of 24 BATCs in Kaduna State, operating under the supervision of Kaduna State Technical School Management Board and the state Ministry of Science and Technology. Appendix II show the list of STCs and VCs in Nigeria.

2.14.3 Industrial Training Fund (ITF)

Resulting from the shortage of intermediate skilled manpower both in terms of number and practical competence to meet the requirement of national economy, the Industrial Training Fund was established by Decree No. 47 of 8th October, 1971 as a parastatal under the Federal Ministry of Commerce and Industry with the responsibility of manpower training and development through skills acquisition in the industry. The ITF is empowered to:

i. *Provide, promote and encourage the acquisition of skills in industry and commerce with a view to generating a pool of indigenous trained manpower to meet the needs of the National economy.*
ii. *Provide training for skills in management for technical and entrepreneurial development in public and private sectors of the National economy.*

iii. *Set training standards in all sectors of the economy and monitor adherence.*
iv. *Evaluate and certify vocational skills acquired by apprentices, craftsmen and technicians in collaboration with relevant organisations.*

In order to achieve the set objectives of ITF, the following sources of funds were prescribed:

i. *An annual subvention from the federal Government.*
ii. *1% of annual payroll of liable employers as statutory contribution (all employers that have up to 5 workers and above on their payroll are liable)*

The ITF is achieving its sets objectives through direct manpower training in five of its centers located in Jos, Lokoja, Lagos, Kano and Abuja. The fund is also responsible for the organisation, co-ordination, monitoring and funding of Student Industrial Work Experience (SIWES) designed to expose and prepare students of Polytechnic, University and Colleges of education to real work situation. It also provides short term training programmes to train and re-train employees in organisations. Through Productivity and Efficiency Improvement Training (PEIT), the Fund identifies system and process deficiencies and develops training intervention to address such inadequacies. Finally is the In-company apprenticeship refers to as the System Approach to Skills Training (SAST). It is designed to provide flexible system to the development and implementation of uniform National Apprentice Scheme. An apprentice training Manual was published and distributed to companies for adoption. The ITF propagates the Systematic Apprentice Scheme through:

i. *Appraising the potentials of a company to conduct Apprentice training in identified trade areas.*
ii. *Installation of Apprentice Scheme in companies.*
iii. *Assisting companies with development of curriculum, keeping training records and the training and testing of apprentices.*
iv. *Harmonising existing in-company apprenticeship in line with the ITF National Apprenticeship scheme.*

Through the Industrial Training Development Department, the Fund assists employers with appropriate training intervention to improve and expand in-company apprentice and skills

training, nationwide. The Fund does this by using the professional officers of the ITF who carry out the following activities:

i. *Study employers' occupational skills profile and determine skills deficiencies and identify trades for apprenticeship.*
ii. *Assist employers that have apprentice scheme and/or skills training potentials to streamline them with the ITF apprentice scheme.*
iii. *Conduct appraisal studies of companies that have potentials for apprenticeship and skills training.*
iv. *Collaborate with employers to install new Apprentice scheme and skills training, or to harmonise their apprenticeship/skills training efforts in line with ITF standard, as well as monitor the progress of installed/harmonised apprentice scheme.*

As at 2010, there are 262 companies participating in the in-company apprenticeship with majority of the companies from the manufacturing industry. In the communiqué of the Funds' 18th National Training Conference, the haphazard and non-systematic process of skills acquisition in Nigeria was acknowledged, observing that the agencies involved in skills acquisition operate in isolation, without collaboration between public and private sector to enhance and sustain training. It was further highlighted that the existing technical and vocational institutions do not produce adequately skilled workers majorly because of the poor condition of service for teachers in technical institutions coupled with lack of appropriate equipment and facilities due to poor funding (ITF, 2012). There is an agreement with Osam's (2013) position that the laudable aim of establishing ITF is yet to be achieved. It is therefore apparent the fund needs structural adjustments and reinforcements where necessary to achieve its sets goals.

2.14.4 National Directorate of Employment (NDE)

Following the recommendation of a committee set up by the Federal Government of Nigeria (FGN) in 1985 to design strategies of creating mass employment opportunity in Nigeria, the NDE was established by an Act CAP 250 in October, 1989. The main function of the Directorate

is to combat mass unemployment through skills acquisition, self-employment and a labour-intensive scheme (Ogunlela, 2012).

Furthermore, Ogunlela (2012) listed the following major programmes as means of achieving the objectives of the directorate:

i. *Vocational skills development programme which has schemes as- National Open Apprenticeship, School-on-Wheels, Waste-to-wealth, Resettlement and disabled persons scheme and so forth.*
ii. *Small-scale enterprise programme: The graduate and matured people scheme, one million jobs, start your own job, women training and so forth.*
iii. *Rural employment promotion programme: graduate agriculture self-employment programme.*
iv. *Special public works programme.*

According to Powell (2008), the National Open Apprenticeship Scheme involves the attachment of youths that were unable to find work to master craftsmen to enable them acquire vocational skills. The training period varies from six months to three years depending on the nature of the trade. This is one of the most popular schemes of the National Directorate for Employment (NDE). Although the idea of attaching youths to master craftsmen is to enable acquisition of practical skills with little or no emphasis on theory, this approach is however worrying especially with concerns on the disadvantages of acquiring such skills without knowing the theory behind the practice. Another skills acquisition programme that has connection with the construction industry is the school on wheel scheme. This involves master craftsmen going to a rural area with fully equipped mobile facilities to provide intensive training to interested persons for a period of 3 to six months. This approach only provide very little education, training and practice for the beneficiaries without opportunity for acquiring real work experience due to time constraint.

The objectives of the Directorate as stated in the NDE Act are:

i. Design and implement programmes to combat mass unemployment;
ii. Articulate policies aimed at developing work programmes with labour intensive potential;
iii. Obtain and maintain a data bank on employment and vacancies in the country, with a view to acting as a clearing house to link job seekers with vacancies, in collaboration with other government agencies; and
iv. Implement any other policy as may be laid down, from time to time, by the board established under section 3 of this Act.

To what extend this objectives have been achieved remains the concern of researches (Ogunlela, 2012; Powell, 2008).

Table 2.16 show the list of priority areas for skills development by the NDE (Powell, 2008). Obviously, only two broad occupations are indicated to be in demand in the construction industry, as such; emphasis is only on, Electrical installation, Brick (Block) making, Scaffolding, Welding, Brick (Block) laying and Carpentry trade. By implication, trades like formwork, plant mechanic, plant operation, plumbing installations, tilling and many more are not priority trades for training in the NDE. This is should be a concern for the construction industry because evidences show that beyond those trades listed in Table 2.16 under construction, there are several other trades like tilling, formwork, plant operation, ceiling finishing (particularly POP ceiling) that are in short supply in Nigeria (Simire, 2010).

Table 2.16: Priority areas for skills development.

Growth Areas	Broad Occupations in demand	Specific occupations	Generic skills
Agricultural	Livestock rearing Crop rotation Animal husbandry	Poultry farming Dairy farming Aquaculture	Communication skills, Supervisory skills numeracy skills, work-related skills, literacy skills ICT skills Entrepreneurship

Manufacturing	Food Processing Light manufacturing	Food preparation Metal Fabrication Carpentry Furniture maker Structural Timber Boat maker
Services	Whole-sale and Retail ICT Vehicle repair	Garment/Tailoring Computer programming Auto mechanics Hairdressing Motor vehicle mechanic
Hotel and Restaurant	Catering Hotel Management Tourism	Cooks Supervisors Pottery making
Construction	Masonry Carpenters	Electrical installation Brick making Scaffolding Arc welding Brick layer, Carpenter

Source: Powell (2008)

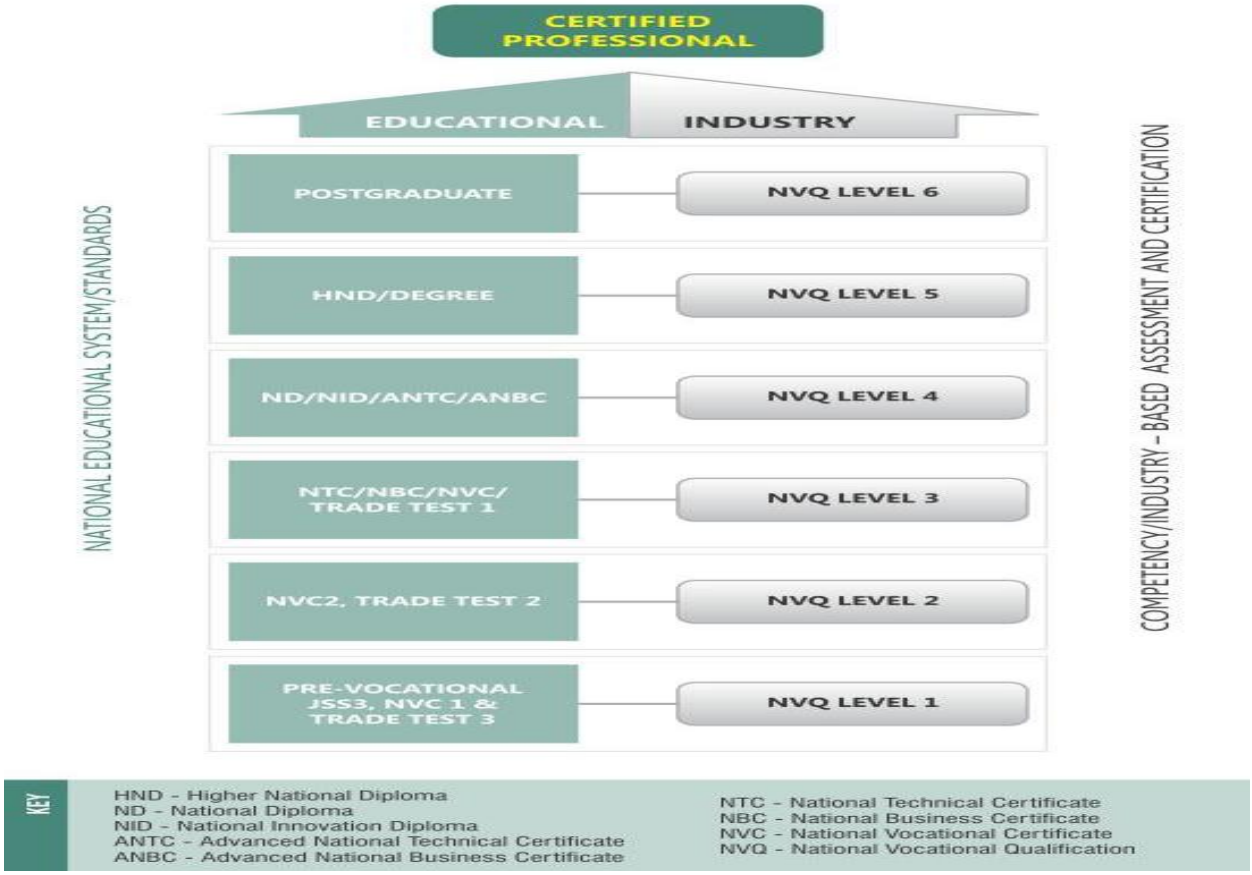
2.14.5 Privately Owned Training Institutions

Although the list of accredited technical institutions by NBTE shows that there are three (3) accredited technical institutions in Nigeria; however, none of them offers construction related programme. However, a privately non-governmental, non-profit technical institution named Institute for Industrial Training (IIT) was identified and found to offer training in construction related programme. IIT was established on 27th March, 2000 as a project of the African Development Foundation. Even though the institution is not accredited by NBTE, it is however approved as a technical institution by the Lagos state ministry of education. The institution is a single sex technical institution aimed at training young Senior Secondary School and tertiary institutions' graduates to acquire practical skills on desired trades and on the courses they studied in school.

2.15 Current Effort at Improving Technical Training and Qualification in Nigeria

Anecdotal evidence shows that in order to address issues relating to craft skills in Nigeria, the Federal Ministry of Science and Technology has made efforts at upgrading some Vocational Training Centers (VTC) across the country. Similarly, there were reports of the effort of stakeholders towards the development of a National Vocational Qualification Framework (NVQF), which is an instrument for the development, classification and recognition of skills, knowledge and competencies acquired through variety of ways by citizens of Nigeria irrespective of the method of training or skills acquisition (Aimola, 2010). Spearheading the development of the NVQF is The National Board for Technical Education (NBTE) being the agency responsible for the regulation of technical education in Nigeria. The NVQF is intended to achieve its desired objectives through Sector Skills Councils (SSCs), which is similar to what obtains in the UK (Mohamed *et al.,* 2008). The SSCs are sector specific bodies that are constituted with full industrial representation to regulate and generate standards for skills attainable for each level of competence for each trade or profession (Aimola, 2010). The NVQF has a six (6) level qualification and indicates the comparability of different qualifications and the progression level (NBTE, 2013). Figure 2.2 show the NVQF.

Figure 2.2: The National Vocational Qualification Framework (NVQF)



Source: NBTE, 2013

The grid levels as described in NBTE (2013) begins with level 1, which describes the competence for entry level worker through to level 6 which describes the characteristics of professional worker. The levels are briefly described below:

Level 1: Entry Level for unskilled employees

Level 2: Foundation or basic skilled employees

Level 3: Operators or semi-skilled employees

Level 4: Technicians, skilled and supervisory employees

Level 5: Technical and junior management positions

Level 6: Professional engineers and senior management positions

The NVQF levels are further described in Table 2.17.

Table 2.17: Level descriptors of the National Vocational Qualification Framework

NVQ Level	LEVEL DESCRIPTION	EDUCATION EQUIVALENTS	SKILLS EXPECTATIONS
1	Competence which involves application of knowledge, skills in the performance of a range of work activities or task most of which may be routine or predictable	Pre-vocational/JSS 3 and NVC 1 and Trade Test 3 Qualifications. Recall and Comprehend basic knowledge of the discipline	Use skill and key competencies to carry out tasks where actions is governed by rules defining routine and strategies
2	Competence which involves the application of knowledge/skills in a range of varied work activities or tasks i. Some of the activities are complex or non-routine ii. There is some degree of individual responsibility and autonomy iii. Team work may often be required	National Vocational Certificate2 (NVC2) and Trade Test 2	Use skills and key competencies to carry out tasks where action is governed by rules defining routine and strategies Select and apply basic methods, tools and materials
3	Competence which involves the application of knowledge and skills in a broad range of varied work activities i. Most of which are complex and non-routine ii. There is considerable responsibility and autonomy iii. Control or guidance of others is often required	National Technical Certificate(NTC), National Business Certificate (NBC), National Vocational Certificate 1(NVC1) and Trade Test 1	Use a range of specific skills to carry out tasks and show personal interpretation through selection and adjustments of methods, tools and materials
4	Competence which involves: i. the application of knowledge and skills in a broad range of complex, technical or professional work activities ii. Requires substantial degree of personal responsibility and autonomy iii. Responsibility for the work of others and the allocation of resources is often present	National Diploma (ND) National Innovation Diploma (NID), Advance National Technical Certificate (ANTC) and Advance National Business Certificate (ANBC)	Use a range of specific skills to carry out tasks and show personal interpretation through selection and adjustment of methods, tools and materials. Evaluate different approaches to tasks
5	Competence which involves: i. the application of skills in a range of fundamental principles across a wide and often unpredictable variety of contexts ii. Very substantial personal autonomy and often significant responsibility for the work of others iii. Allocation of substantial resources feature strongly iv. Personal accountability for analysis and diagnosis v. Design, plan, execute and evaluate outcomes	Higher National Diploma (HND), Degrees	Demonstration of high level knowledge of an area of work to use ideas and research in response to complex problems and situations

6	Competence which involves: i. the application of skills and a significant range of fundamental principles across a wide and often unpredictable variety of contexts ii. Very substantial personal autonomy and often significant responsibility for the work of others is required iii. Allocation of substantial resources feature strongly iv. Personal accountability for analysis and diagnosis v. Design, plan, execute and evaluate outcomes vi. Liaise with external regulatory agencies and professional organisations in the strategic planning	Post graduate qualifications	Demonstration of high level specialist professional competence. Development of new and creative approaches that extend or redefine existing knowledge or professional practice

Source: NBTE, 2013

From Table 2.17, levels 1 to 3 are categorised as the craft skills level and are the primary concern of this research. Although the UK's NVQ has five levels against six in the proposed Nigerian NVQF, the level descriptors are however somewhat similar as shown in Table 2.18.

Table 2.18: Definition of NVQ levels

Level	Definition
1	Competence in the performance of a range of varied work activities of which may be routine and predictable
2	Competence in a significant range of work activities, performed in a variety of contexts. Some of the activities are complex or non-routine and there is some responsibility or autonomy. Collaboration with others, perhaps through membership of a work group or team, many often be a requirement
3	Competence in a broad range of work activities performed in a wide variety of contexts and most of which are complex and non-routine. There is considerable responsibility and autonomy, and control or guidance of others is often required
4	Competence in a broad range of complex, technical or professional work activities performed in a variety of contexts and with a substantial degree of personal responsibility and autonomy. Responsibility for the work of others and the allocation of resources is often present
5	Competence which involves the application of fundamental principles and complex techniques. Very substantial personal autonomy and significant responsibility for the work of others and for allocation of substantial resources features strongly, as do personal accountabilities for the analysis and diagnosis, design, planning, execution and evaluation

Source: MSC/DES (1986); Agapiou (1998)

As in the case of NVQF in Table 2.12 above, the NVQ levels 1 to 3 are craft levels while NVQ levels 4 and 5 are supervisory and professional levels. According to Agapiou (1998), a level is defined as `a measure of an individual's competence to carry out a range of work to standards

agreed by industry. Agapiou (1998) further described that level 1 is a foundation qualification that may be offered to low achievers in secondary schools as part of a handyman's suite of qualifications. It is not a mandatory pre-qualification for progression to Levels 2 and 3. The principal qualification for a bricklayer for example is NVQ level 2. It requires proficiency in a range of bricklaying skills required in modern building construction. The bricklaying operatives must be capable of working alone under general direction and supervision. Level 3 however requires competence in more complex aspects of bricklaying including liaising with other supervisory staff in a construction project.

Comparing the Nigerian NVQF with the UK's NVQ, there is a suggestion on attempt to adopt UK's NVQ except for the introduction of level 6 in the Nigerian version. On the danger or benefit of adopting systems, concepts or technologies, Ibrahim (2007) cited several other authors and argued extensively for and against adoption of any system, technology and many other things that can be borrowed. The argument is: "*the underlying assumption being that borrowing something that has gained acceptance elsewhere, rather than inventing a new solution, is easier to exploit"* However: "*practices originating from other countries, industries or even other construction projects have been rejected on the basis of being inappropriate because the characteristics of construction and of each project are perceived as "unique" both in terms of discontinuities and the fragmentation of the teams into different professional disciplines*". Finally, Ibrahim (2007) concluded by citing Lillrank's (1995) suggestion that good practice adopted elsewhere can be exploited, provided that it is sufficiently adapted to the new situation.

Similarly, in studying the German dual system of initial vocational education and training and its potential for transfer to Asia, Hummelsheim and Baur (2014) argues that doing so will require far more than a simple process of copying. Instead, any transfer must reflect the existing

conditions in the country adopting the system, and must be adapted to its unique social, cultural, and economic objectives. This therefore suggests that it is important to consider local peculiarities such as the existing system of training in Nigeria in comparison with other developed nations such as UK and Germany before adopting the qualification framework. Even so, the UK's NVQs are not perfect, for example, although the NVQs are expected to solve the problem identified in training craft skills in UK, Agapiou (1998) citing Callender (1992) suggested that there is one serious disadvantage to codifying existing levels of competence, particularly in industries where skills are inadequate, an example is the case in the construction industry where inadequate skill levels are set out as standards to be aimed at, and are perpetuated rather than improved by NVQs. Furthermore, general job knowledge has been sacrificed at the expense of greater emphasis on job performance. According to Callender (1992) the narrowness of competence may encourage rigidity rather than the flexible application of skills it aimed to promote.

There are also concerns that the introduction of NVQs would not match the standards of those qualifications being phased out. For example, Smithers (1993) in Agapiou (1998) stated that: "*It is widely feared among electricians that the new NVQ level 2 will develop with nothing like the technical knowledge and installation skills provided by the previous training scheme. It is also feared that many employers will be reluctant to fund training beyond NVQ 2 . . . and that the skills base of electricians in UK will therefore be severely eroded"*. Further evidences from research (Agapiou, 1998; Challender, 1992) suggest that NVQs cannot replace training of craft skills, at best, they should be complementary. To further buttress that point, Agapiou (1998) cited Steedman and Hawkins (1994) and highlighted some of the weaknesses of the NVQs thus:

> "*it would be unsatisfactory if an experienced craftsman, able to demonstrate the practical competence required, failed to be awarded an NVQ Level 2 Certificate. However, the level of competence in mathematics, for example, may not go beyond the elementary. To ensure that experienced tradesmen do not fail their assessment through lack of mathematics, requirements have been pitched at the most basic and elementary levels. However, the desire that NVQs should be used by employers to certify their operatives' practical experience has resulted in a youth training programme that requires a demonstration of competence in only the most basic mathematical operations. Only around one-third of the mathematical topics included in the City and Guilds 588 Brickwork course syllabus, for example, are specified in the NVQ Level 2 (Bricklaying) assessment".*

This therefore suggests the need to reinforce training systems to improve quality of craft skills in the construction industry. In attempting to adopt the UK's NVQ, it is important to consider local peculiarities in Nigeria while finding ways of adopting the good practice inherent in NVQs with the view to solving craft skills challenges in Nigeria.

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

3.1 Research Methodology

3.1.1 Philosophical Position Adopted for this Research

The philosophical direction of any research is important as it helps to clarify designs and methods that is best suited for the piece of research and also helps the researcher to possibly create new designs that may be outside his experience. This dissertation holds the realist ontological position that views the external world as a concrete structure, perceives things as practical and not concerned with abstract or idealistic views. This is because there are evidences of adaption and utilization of good practice of successful training systems in different parts of the world. The various methodologies utilised in other organisations and countries can be investigated and adapted in practical and not abstract or idealistic fashion.

However, the interpretivist epistemological position is adopted for this research because the position seeks the understanding of phenomena through the meanings that people assign to them. This research believes that the organisations involve in this study operates at varying social and economic landscape and the positions and perceptions of the different stakeholders that participated in this research would reflect both their individual frames of mind and the values of the sectors they represent.

3.1.2 Research Approach Adopted for this Research

The nature of this research, requiring in depth information on the procedure of training craft workers informed the choice of qualitative research approach. Although qualitative research method has some weaknesses such as subjectivity of the data, however the advantage of

obtaining detailed understanding of concepts, steps, procure and methods in the training frameworks necessitates the adoption of this method. Since the study deals with people in a social setting, the use of qualitative approach provides avenue for probing further on issues that were not initially contemplated by the researcher.

3.2 Research Methods

There are several techniques or procedures of collecting data; the choice of any is determined by the nature of the research and the approach. For qualitative research, the common methods are interviews and focus group discussions (Gill *et al*., 2008).

3.2.1 Interview Design and Content

Often interviews are used where other research instruments seem inappropriate. An interview is literally an inter-change of views between two persons about theme of mutual interest. It could either be structured, semi-structured or unstructured (Fellows and Liu, 1997; Balnaves and Caputi, 2001; Wilkinson and Birmingham, 2003; Jonker and Pennink, 2010). The choice of any is determined by the degree of flexibility desired which is informed by the nature of the research (Stewart *et al*., 2008). Stewart *et al.,* (2008) explained that structured interviews are basically verbally administered questionnaire and because the questions are predetermined, there is no space for follow-up questions. In contrast, the unstructured interviews are relatively time consuming and do not have any predetermined list of questions. It is often used where very little is known about the subject matter thereby requiring in-depth study. Between structured and unstructured interviews lies the semi-structured interview. The idea is to combine the strengths of both instruments which in this case are the provision of some lead questions to stir the

interview while allowing the interviewer to diverge in order to pursue an idea or response in more detail. The semi-structured interview was therefore adopted for this research.

The interviews were done with three different groups. First are the institutions providing training, then the employers of the trained craftsmen and lastly the graduates of the training institutions. Appendix III, IV and V show samples of the guides used in conducting the interviews. It was ensured that all the questions were direct, unambiguous, specific and simple, leading questions or those that expressed emotions were avoided. To ensure that all issues in the research were adequately covered, the research listed all the questions against set objectives.

The consent of the interviewees were sought at the beginning of the interview before recording the conversation. In addition, notes were taken as double entry method to avoid missing any details in the event of interruptions and to ensure that the interviewee and the interviewer are both actively involved in the discussion. For the institutions and employer organisations respondent, the interviews were conducted in the offices of the respondents while for the craftsmen, the interviews were conducted either in their workshops or other places within the organisation that is quiet and conducive for interview. In general, the interviews were carried out face-to-face and one-on-one. It took different time periods to finish the interviews, while it took average of 90 minutes to interview a training institution respondent, the interviews with the employers of craftsmen and the craftsmen employed by the organisations lasted 50 minutes on average. The data obtained were transcribed to aid clarity and consistency for eventual analysis. The transcribed data were coded to ensure the results were easy to use and understand.

3.2.2 Focus Group Discussion

Following the development of a proposed training framework, a total of seven (7) focus group discussions were done with four different groups. First are the institutions providing training, then the employers of the trained craftsmen, the craft skills workers and lastly the training regulatory body. Three (3) participants were involve in each focus discussion. The aim of the focus group discussion was to validate the proposed framework in terms of its appropriateness and relevance to the target audience. The essence of validation of a framework is to determine that it accurately represents the social phenomena to which the research refers (Hammersley, 1990). Similarly, Lawrence (2003) asserts that validity means truthful, referring to the bridge between construct and the data. All the discussions were done under a workshop setting, starting with a short presentation on the background to the study and followed by presentation of the proposed framework. On average, each workshop lasted two hours. After the discussions, the participants were given questionnaire-type validation guide (see Appendix VI) to fill and return immediately. The results of the discussions were subsequently analysed using analytical techniques and the constant comparative technique and served as the basis for modifying the developed framework.

3.2.3 Sample Selection

Marshall (1996) asserts that *choosing a study sample is an important step in any research project since it is rarely practical, efficient or ethical to study whole population.* For this study the populations are formal technical training institutions offering construction related programmes in Nigeria, large construction organisations operating in Nigeria and craftsmen working in those organisations. For the technical training institutions, the frameworks of all the institutions offering training in construction related programmes were surveyed. From institutions that

utilised a common framework for training, the framework of only one institution is studied in detailed as a representation of other institutions using the same framework.

On selecting an appropriate sample for a research, Oppong (2013) explained that *sampling is a process of selecting subjects to take part in a research investigation on the ground that they provide information considered relevant to the research problem.* Generally sampling techniques are divided into probability sampling and non-probability sampling techniques. While it is convenient to use probability sampling techniques for quantitative studies, several studies discourage the use of probability sampling methods in qualitative research because of the chances of choosing unfit members of the research population in the research sample (Marshall, 1996; Coyne, 1997; Meyer, 2001; Wilmot, 2014). Similarly, Coyne (1997) added that qualitative research is concerned with getting a respondent who is articulate, reflective and willing to share information, therefore; qualitative research generally utilised purposive sampling which is acknowledge to have several variants. Many more researchers share the view that because qualitative research is concerned with appropriateness of sample rather than representativeness, as such; purposive sampling method is commonly adopted (Marshall, 1996; Coyne, 1997; Koerber and McMichael, 2008). Most of those researchers hinge their argument on the flexibility of purposive sampling in terms of determining the sample as well as the sample size. As regards sample size, although it is generally acknowledge that qualitative research does not depend on large samples because the aim is not to generalize but to draw meaning from the result, still, it is important to select sample size that is neither to large or small for the research (Onwuegbuze, 2007). The determination of the ideal sample size depends largely on the research question and the aim of the research (Marshall, 1996; Meyer, 2001; Onwuegbuze, 2007;

Oppong, 2013). Baxter and Jack (2008) noted the challenges of determining a unit of analysis to both novice and seasoned researchers.

In this research therefore, the unit of analysis is the framework (process) for technical training in the various institutions. For the respondents in the organisations employing craftsmen and the craftsmen respondents, purposive sampling is also used to select the sample and no emphasis was placed on number of respondents but on those adjudge with knowledge, capacity and willingness to participate on the research. Despite the choice of purposive sampling method, it was still difficult to select training institutions for the research because not all the institutions were captured in the list of accredited training institutions published by National Board for Technical Education (NBTE). However, the list was still used to first identify technical institutions that offer training in construction trades from which other institutions were identified. Two technical institutions owned by the Federal and State Government were selected. The institutions were selected based on their years of establishment and number of construction related programmes. Secondly, through discussions with stakeholders such as Science and Technical School Management Board, Kaduna state, National Directorate of Employment (NDE) and Industrial Training Fund (ITF), three other technical training institutions were identified. The Institute for Industrial Training (IIT) which is a Non-Governmental Organisation (NGO) was also identified through discussion with another stake holder. With all the selected and identified technical training institutions, a schedule of Interview was prepared jointly by the interviewer and the interviewee. In most cases the interviews held on the schedule date.

The second sets of interviews were with the construction organisations who are the employers of the graduates of the technical training institutions. It was necessary to obtain data from the employers in order to assess the performance of the products of the institutions under

investigation. Construction organisations were selected based on their willingness to participate in the research as earlier stated, of which nine large construction organisations were involved. From the Nine construction organisations that participated in the research, average of three trade men that were trained formally in a technical training institution were interviewed. The essence of the interview with the tradesmen is to obtain information on the relevance of the institution training in relation to the practice in the industry. For the focus group discussions, purposive sampling technique was also adopted. This is because of the desire to ensure that only organisations/institutions involved in the initial interview were involved in assessing the developed framework.

3.2.4 Research Methods Adopted in the Study

Because there are three sources of data for the study, the data collection was divided into two phases. Semi-structured interviews were adopted in both cases where firstly, senior officers in technical training institutions were interviewed followed by senior project officers in construction organisations who are directly involved in projects. For the technical institutions, it was ensured that the interviewees have experience and are knowledgeable in technical training. This is to further ensure the richness of the responses. On the part of the organisations, large construction organisations are selected because studies showed that they have the capacity to employ craftsmen on full time basis against labour-only subcontracting adopted by majority of medium and small organisations (Makenzie *et al.,* 2000; Muya *et al.,* 2006). While in the organisations (mostly projects sites), a sample of tradesmen were selected based on their characteristics, such as; years of experience and attendance of a formal technical training institution. It was necessary to purposefully select participants in the interview to avoid selecting a respondent that had no formal technical training or those that just got employed.

The reason for adopting semi-structured interviews was because of the nature of the study vis-a-vis research question and the objectives of the research. From the objectives of the study, there was a clear focus on what should be investigated which help in structuring interview guide for the study. Semi-structured interview allows for specific issues to be addressed whilst enjoying the flexibility of probing on issues emanating from the research that where probably not envisage as well as given the interviewees freedom to discuss and elaborate on areas they considered important.

3.3 Analytical Techniques and Strategies

3.3.1 Data Analysis Techniques

Tylor-Powell and Renner (2003) added that because qualitative data consist of words and observations, the analyses and interpretation of the data requires creativity, discipline and a systematic approach. The process will depend on:

i. *The questions the research wants to answer*
ii. *The needs of those who will use the information, and*
iii. *The researcher's resources.*

Merriam (1998) and Bernard (2000) listed several approaches to qualitative data analysis. The list is summarised in Table 3.1.

Table 3.1: Approaches to Qualitative Analysis

Author	Approaches
Merriam (1998)	Ethnographic Analysis, Narrative Analysis, Phenomenological Analysis and Constant Comparative analysis
Bernard (2000)	Hermeneutic/Interpretive Analysis, Narrative Analysis, Discourse Analysis, Grounded Theory Analysis, Contents Analysis and Cross-cultural Analysis

Source: Kawulich (2004)

3.3.2 Interviews Data Analysis

Interview was used to collect data for this study and content analysis as describe by Westbrook, (1994); Wilkinson and Birmingham (2003) and Tewksbury (2009) is used to analyse the data. In content analysis, emphasis is on drawing meaning from information generated and helps to identify patterns in the text. It allows researchers to understand social reality in a subjective but scientific manner (Zhang and Wildemuth, 2014). The principle of content analysis requires that the data are coded or grouped into categories which also need to be checked to be sure that the data accurately represent what was said. These codes include words, themes, phrases or whole sentences (Walliman, 2001; Taylor-Powell and Renner, 2003). After coding the data, it is then analysed and results generated. The focus is to make meaning from the text (Tewksbury, 2009). The two methods used are either conceptual analysis or relational analysis. Conceptual content analysis was adopted and this approach takes into account the appearance of a concept or the numbers of times (frequency) a particular concept appears in a text.

The stages in the conceptual content analysis given by Walliman (2001) include:

i. Decide on the unit/level of analysis: The choice is made of whether to use single words, phrases or whole sentences.

ii. Identify the concepts: these are the issues, themes or concerns to be gleaned from the data and decision will have to be made whether to have a rigid set of concepts or flexible lists that can be added unto later on as the work progresses.

iii. Define the concepts: Some words may have similar shades of meaning and these needs to be clearly defined to avoid ambiguity. Words with similar meanings could be coded together.

iv. Decide whether to code for incidence or frequency of concepts: The decision to code for the appearance of a word or the numbers of times it appears need to be taken. Incidence of a word may give a limited perspective than frequency which may be an indication of the relative importance of a concept.

v. Establish coding rules: At this stage the codes that have been clearly defined could be grouped or further categorised together and the rules will help to ensure that words are not wrongly placed in the various themes.

vi. Trawl through the information: A thorough examination of the text allows the researcher to identify and deal with words which may not 'fit' into the established codes. Decision is then made to either expand the codes (note 2 above) or discard the words.

vii. Code the information: This is the actual coding of the textual data which could be done manually or using available computer software packages.

viii. *Analyse the results: This final stage involves the presentation of the incidences and/or frequencies of words with a view to determining the meanings, associations and relationships to be derived from them.*

CHAPTER 4: DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1 Interviews with Construction Craft Skills Training Institutions' interviewees

4.1.1 Characteristics of the Interviewees and the Training Institutions

Interviews were conducted with senior members of staff in Six (6) training institutions. The institutions are: Federal Science and Technical Colleges (FSTC), State Technical College (STC), a Business and Apprenticeship Training Centre (BATC) because of the uniqueness of the BATC from other training institutions (Providing skills training for those that just completed primary education), a model skills centre owned by the Industrial Training Fund (ITF) and The National Directorate of Employment (NDE) training centre. Finally, the Institute for Industrial Training (IIT) is the sixth training institution. In terms of ownership, five of the six institutions investigated are owned by government while one, that is the IIT is a non-governmental and non-profit making institution.

Of the six institutions visited, one is over fifty (50) years in existence while the least in terms of year of establishment is between 0-10 years as shown in Table 4.1. One (1) of the respondents is the principal of the institution and two (2) are the heads of the technical unit of their institutions. The respondent from ITF-Model Skills Center and NDE skills training center are the center managers of the training centers. The respondent from the only non-public training institution is the head of the organisation. Most of the respondents have worked for over twenty-one (21) years as shown in Table 4.2. The years of work experience of the respondents suggests they have relevant knowledge and experience to give useful information for the study. One of the institutions is the first Technical College in Nigeria which started as Yaba Trade Center in 1948.

Also, the BATC is the first and oldest BATC in Northern Nigeria, established in 1965 to cater for the growing middle manpower need of newly established industries in Kaduna (capital of Northern region then) and the rest of Northern Nigeria.

Table 4.1: Age of the Institutions

Institution	Number of Years
Federal Science and Technical	Over 50 years
State Technical College	31- 40 years
NDE skills centre	20-30 Years
Institute For Industrial Training	10-20 Years
ITF Model Skills Centre	0-10 Years

Source: Field survey (2014)

Table 4.2 Years of Work Experience of the interviewees

Years	Number of interviewees
15-20 years	1
21-30 years	4
31-40 years	1

Source: Field survey (2014)

The interviews were all conducted as individual sessions and each lasted an average of 90 minutes. Notes were taken on a predesigned interviewee template to serve as a guide in steering the interview and also to capture relevant information from the interviews.

Construction Related Programmes in the Institutions

Table 4.3 shows the list of construction related programmes offered in the training institutions investigated. The interviews revealed that most of the programmes are not industry focused but delivered in a generic form therefore emphasis is not given to any particular industry. However, it was established that the IIT training programme is targeted at manufacturing industry, consequently training is tailored towards development of skills workers for the manufacturing industry. It was also found that several construction trades for example formwork, scaffolding, iron fixing, plant operation and maintenance are lacking in the training institutions primarily because the training is not industry focused. In addition, the interviews revealed that carpentry and joinery for example does not take into consideration the nature and complexity of formwork

in construction but rather views it from general perspective. The situation is similar for trades likes iron fixing which is embedded in other trades like welding and fabrication and block laying, bricklaying and concreting programme. Some of the respondents opined that scaffolding, plant operation and maintenance and iron fixing are not trades on their own.

Table 4.3: Construction Related Programmes in Training Institutions

Programme	FSTC	STC	BATC	ITF	NDE	IIT
Block laying, Bricklaying and Concreting	✓	✓	✓	✓	✓	✓
Carpentry and Joinery	✓	✓	✓		✓	✓
Plumbing and Pipe Fitting	✓	✓	✓	✓	✓	✓
Fabrication and Welding	✓	✓	✓		✓	✓
Electrical Installation and maintenance	✓	✓	✓	✓	✓	✓
Painting and Decorating	✓	✓			✓	

Source: Field Survey (2014)

4.1.2 Entry Requirements

The entry requirements for both FSTC and STC is the Junior Secondary School Certificate of Education (JSCE). While the FSTC has junior section which is for teaching and learning general education before selecting either science or technical education for the senior secondary level, it was established that the STC does not have junior section therefore graduate of junior secondary schools from elsewhere and those from BATC are the potential candidates for the STC. The minimum entry requirement in ITF skills centre is SSCE, however, in BATC, NDE and IIT the entry requirement is flexible depending on the level of competency the trainee is qualify for. There is provision for school dropouts in BATC and NDE who may only be trained in vocational skills and upon graduation, only testimonial is given to them but where the graduating trainee is literate, the trainee is usually prepared and encouraged to sit for trade test 3 examinations. Trade test 3 is the lowest qualification for skilled workers based on the current certification in Nigeria. In IIT however, there is provision for SSCE graduate and graduates of University and polytechnic to acquire technical skills.

The investigation revealed divergent views on the appropriateness of the entry requirement, while two (2) respondents feel the existing requirement is okay, the remaining four (4) respondents suggested the use of Senior Secondary Certificate of Education (SSCE) as minimum entry requirement for technical training. Majority of the interviewees argued that after JSCE most of the students are not in good position to decide on their future career, as a result, most technical college students give emphasis to acquisition of general education than skills acquisition. It was on that note that two respondents suggested that skills training starts after secondary school but the present skills training should be maintained as an introduction to technical and vocational education and spread across all secondary schools. This agrees with earlier suggestion that trainees be given opportunity to decide on taking a career in specific field even before acquiring the skills (CBC, 2002) as this will enhance their chances of making informed decision and possibly building a career in the chosen industry (Lowe, 2006).

4.1.2 Existing Training Frameworks

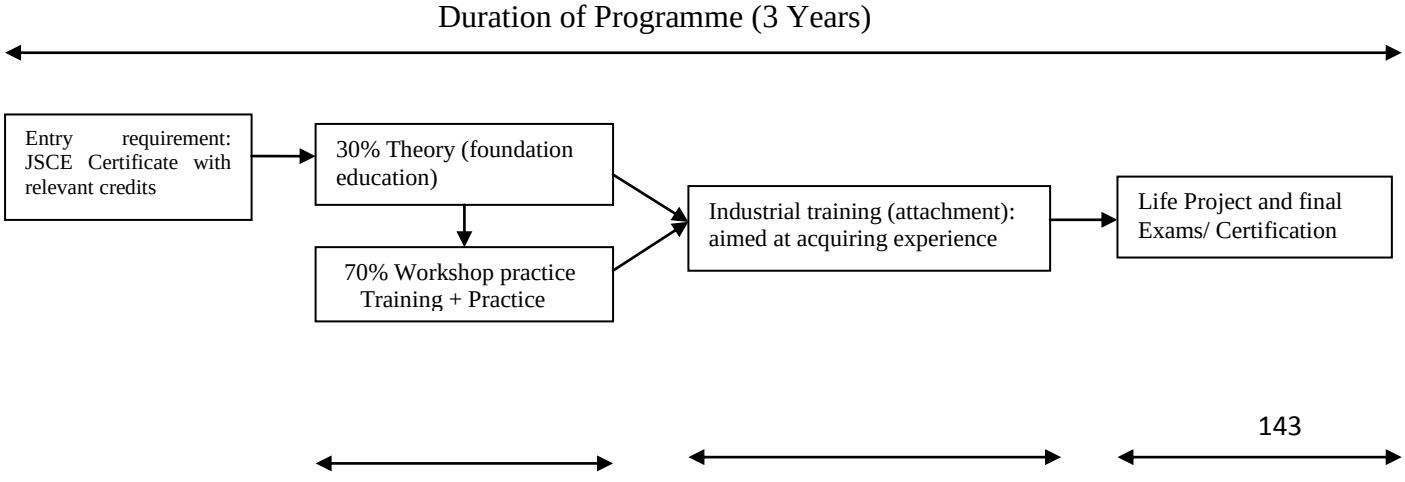
The results revealed lack of written framework for training in most of the institutions. There was a general lack of understanding of the term framework by most interviewees. In order to enhance clarity and understanding of the term, the interviewer used other terms and phrases such as; *procedure of training, structure of training programme, description of the method of training, System of training, Arrangement of training activities (programme), network of training activities (programme),training outline* to elicit the desired information. Five (5) respondents explained that the programme is delivered in four parts (components) while one (1) of the respondents explained that the programme is delivered in three parts. The missing component as described by one of the respondents is the industry training which the institution believed is not necessary since the programme is majorly practical based where the instructor (usually a master

craftsman) always involve the trainees in site jobs he is handling. The idea is for the trainees to learn on-the-job. The major components described by the respondents are interrelated but distinct from each other as described below:

i. Theory aspect (General education) - Which is delivered in the classroom for the Trainees to acquire general knowledge on the trade they are learning,
ii. Workshop practice (Training): Where instructors demonstrate and allow students to replicate,
iii. Projects and assignments (Practice): Trainees are given projects to do in their respective trades in order to ingrain the skills in them and,
iv. Industrial training (Experience) - Trainees are sent to industry to acquire experience while on training.

Only one institution had the structure of training in a schematic form. In the absence of a schematic framework in the remaining five institutions, the interviewer sketched the training framework as described and asked the interviewees to confirm if it represents their description. The interviewees confirmed the sketch as a representation of the framework for training in their institutions shown in figures 4.1 to 4.7.

i. Federal Science and Technical College



Initial 24 months college-based training 3 months vacation IT 12 months after IT

Figure 4.1: Structure of Training in Federal Science and Technical Colleges

The entire programme is three (3) years duration with theory and practical taught within nine (9) terms of three (3) months each in the institution and three (3) months vacation IT at the end of the second year of the training. While in the institution, trainees take subjects on general knowledge specific to their trades and attend workshop practice where the instructor demonstrate and guide them on steps to perform an activity and subsequently give them assignments to practice what was taught. Although the training is described as a combination of Institution and Industry training, the investigation found out that except for the IT component which is generally unstructured, the training is entirely college-based. The designed overall classroom to workshop practice ratio in the training programme is 30% to 70%. This desired target is almost always not achieved due to deliberate policies as earlier observed in Oranu (2003) to reduce the disparity between technical education and conventional secondary school education in the current technical training programmes. Regrettably, that has affected technical training which is required for the sustenance of industries and the economy in general. Also, because of the inadequacy of both training facilities and consumables, workshop practice within the institution has been greatly affected, students are therefore sent on IT to make up the shortfall in school learning against the designed objective of IT which is to bridge the gap between training and practice.

The investigation also revealed that IT is a new innovation to ensure students are exposed to practice while they are on training. The respondent claimed that during IT, trainees learn what they see their employers do and seek for opportunity to also do it. Regrettably, learning here is accidental, sometimes the organisation may be out of job, and thus the trainee may not learn anything. It was established that there is no restriction to where trainees go for IT. The respondent confirmed that it is the responsibility of trainee to source for IT placement while the

institution visits the trainee at least once during the IT. This questions the credibility of the IT on which the respondent agreed that the institution has little or no control of what the trainees' learn during IT even with the supervision which is also very irregular due to poor funding. The respondent suggested that a direct collaboration between the institution and industry on IT and an increase of the duration for IT from three months to a minimum of one (1) year duration to enable the trainees acquired relevant experience.

ii. State Technical College

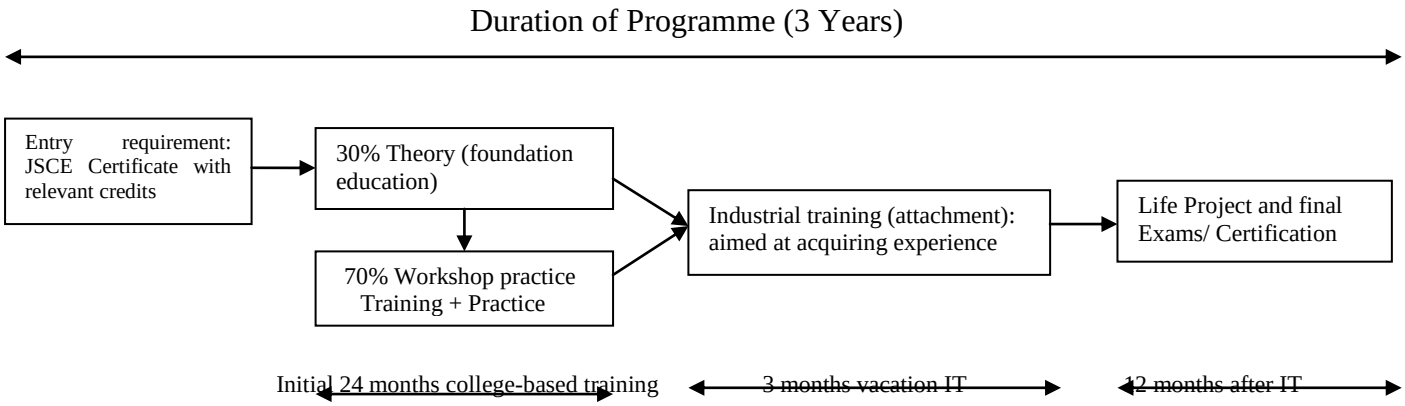


Figure 4.2: Structure of Training in State Technical Colleges

The training structure in the STCs is quite similar to that of the FSTC. The duration of the programme span three (3) years with theory and practical taught within nine (9) terms of three (3) months each in the institution and a three (3) months vacation IT at the end of the second year of the training. Although the training is entirely college based, there is however provision for Industry training which is also not structured. It is also revealed that the training programme has an overall classroom to workshop practice ratio of 30% to 70%. Again, the attainment of this ratio is contestable drawing from earlier efforts to equate technical education with conventional education (Oranu, 2003). Like the FSTC, the method of delivery is similar in the theory and practical aspects. The similarity of the training programmes in both institutions is not surprising since NBTE curriculum is use in both cases for training. It was also observed that facilities and

consumables are inadequate and in extreme cases are completely not available for training and practice. There is a general misconception about vocational and technical training even in the training institutions. There are complaints of overloading students with similar subjects to conventional secondary schools (e.g physics and chemistry, English language and general mathematics) instead of concentrating on trade specific courses like scaffolding and formwork for example. In many cases, trainees tend to focus on general subjects rather than those designed to build their skills.

The interviewee suggested that training institution should collaborate with industry in delivering training through a well-structured training arrangement were trainees are guaranteed placement for IT for a period of nine (9) to twelve (12) months before graduating. By this method, it is believed that trainees will acquire employability skills. On the aspect of the trainers, the respondent suggested their involvement in industry training particularly during long vacation break in order to also update their skills. As a measure to ensure informed decision in career choice, it was suggested that vocational and technical education should commence after secondary school education with stated minimum entry qualifications. This method will end the desire of technical institution to metamorphose into conventional secondary schools.

iii. Business Apprenticeship Training Centre

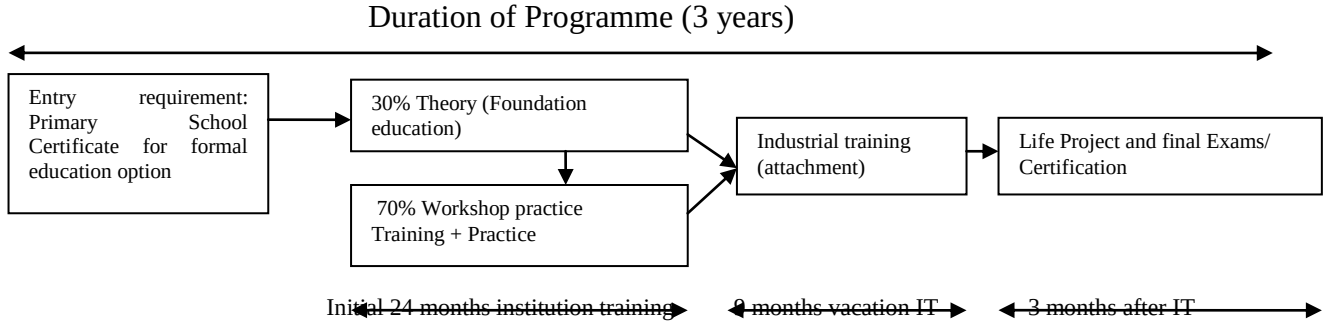


Figure 4.3: Structure of Training in Business Apprenticeship Training Center

The programme is three (3) years duration with foundation training given in the institution for a period of two (2) years. During the two (2) years in school, the trainees are giving a training roaster which alternate between theory and practical. Theoretical sessions are given for two days in a week while practical is three days. After the first two (2) years in school, the trainees are sent on a nine (9) months IT in the industry before returning to the school for final examination. The respondent described the training as a combination of Institution and Industry training but there is no direct collaboration on training between the institution and the industry. Overall ratio of classroom to workshop practice is 30% to 70%. It is the desire of the institution to deliver 70% of the training on practical basis but the investigation revealed that the insufficiency of facilities and consumables for workshop practice in the institution is a great hindrance to the achievement of this target to the extent that trainees are sent on IT to complement school learning which is at variance with the primary aim of IT.

Although it is not the primary aim of IT to complement institution learning as a result of insufficient facilities and consumable for practical, it has however, created avenue for the trainees to acquire experience as well as learn in the industry. The interview further revealed that trainees are giving Log books to record daily activities in the industry which the respondent claimed the institution supervised on monthly basis. The respondent agreed that despite the monthly visits by the institution, there is little or no control of what the trainees learn in the industry. It was also established that there is insufficient trainers in the institution on which the respondent suggested an improvement of salary to attract experience craftsmen from the industry.

iv. ITF-Training Centre

There are three ITF skills training centres which operate different training structures. Because of the similarity in the structure of training in two of the centres, the structure of one of those centres is presented here. The third centre with entirely different structure is also presented below.

a.ITF- Model Skills Training Centre (Abuja)

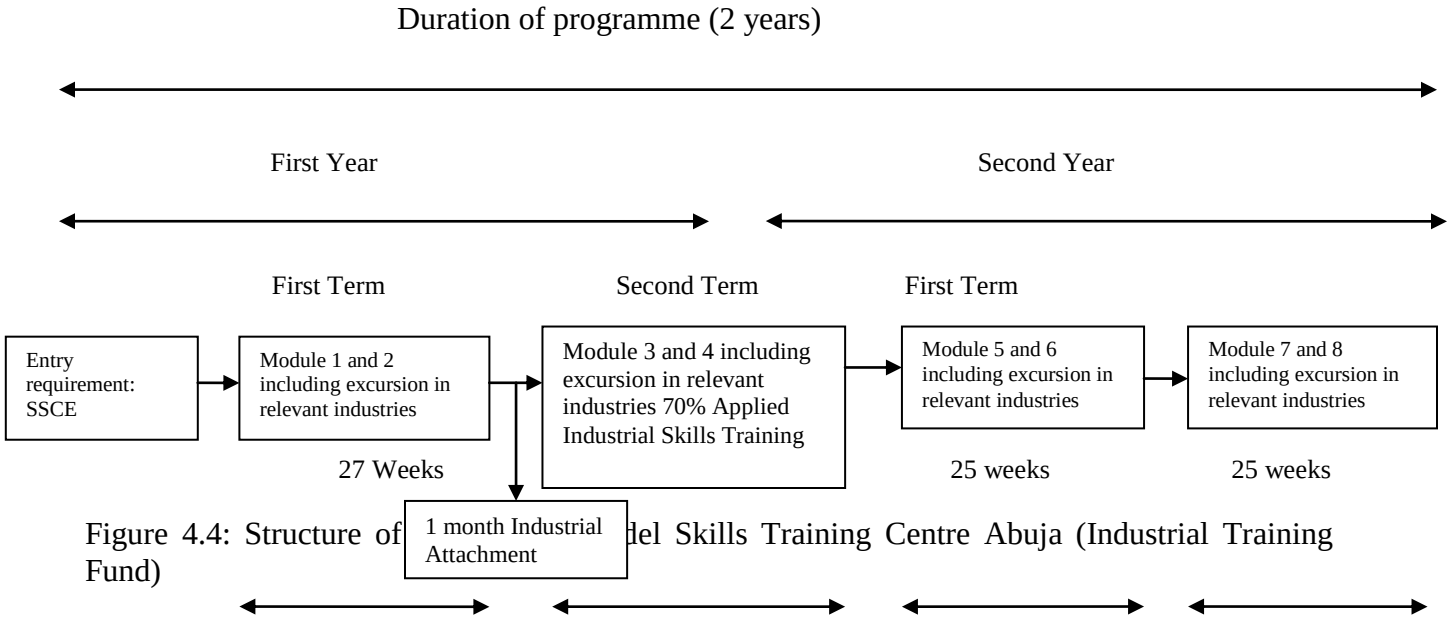


Figure 4.4: Structure of [illegible]del Skills Training Centre Abuja (Industrial Training Fund)

The training programme is designed to be delivered in two (2) years comprising of two terms in each year. Each term of training consist of two modules including excursion to relevant industries and a terminal examination. The training system is flexible and is structured such that credits are assigned to each module. Assessment of module is on terminal basis in addition to periodic continuous assessment. Once trainees have passed the module assessment, the achievement is credited to them. Upon the accumulation of required credits in modules relevant to the course of study, a trainee is deemed to have met the requirement of the course for graduation and will be awarded the Industrial Training Fund and National Institute for Technical

Education Certificate (ITF-NITEC) in his/her chosen trade. By implication, a trainee may end his/her study at the completion of any term and can resume at any convenient time.

The training programme emphasised practical skills such that ratio of theory to practical content is 30% to 70% which is delivered in the training centre with provision for excursion in relevant industries and a one month industrial attachment after the first term of the first year of training.

Although it is the responsibility of trainees to secure placement for IT, the institution however guides trainees on potential organisations for industrial training and where necessary the institute do assist the trainee to secure placement. Learning in the industry is entirely left to chance as there is no pre-planned training guideline that is either solely prepared by the institution or jointly prepared by the institution and the industry. During the IT, trainees are assigned industry supervisor who is responsible for mentoring and coaching the trainee while in the industry as well as verifying the report of the trainee as recorded in a Log book. A representative of the institution visit trainees during IT and assessed the performance of the trainee after he/she has returned from IT. Unfortunately, the IT is only one month duration which is considered grossly inadequate.

b. ITF- Skills Training Centre (Lagos)

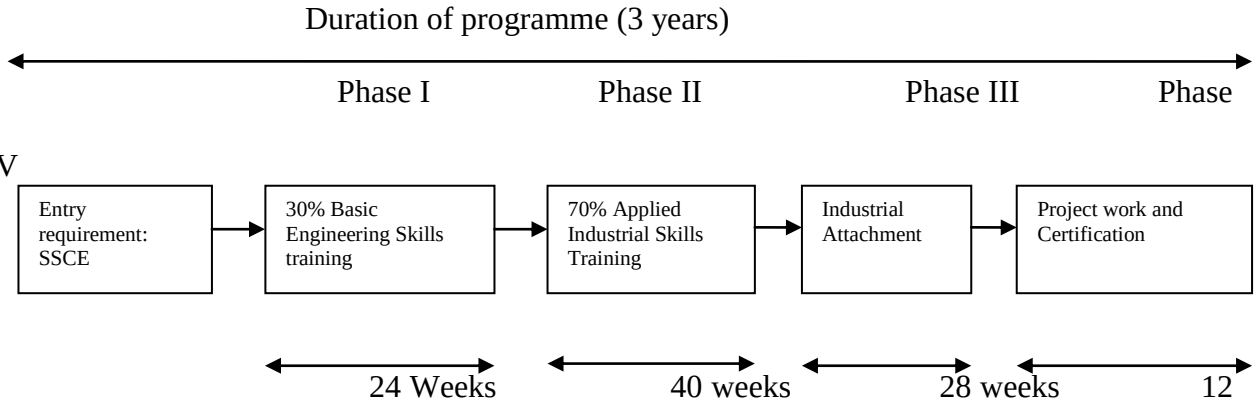


Figure 4.5: Structure of Training in Skills Training Centre Lagos (Industrial Training Fund)

The programme is design to be delivered in four phases within 3 years duration starting with 30% basic skills training followed by 70% Applied Industrial Skills Training. These aspects of training are given in the institution within a period of 64 weeks. After the training in the institution, the trainee proceeds to the industry for a 28 weeks industrial attachment before returning to the institution to be prepared for final assessment and certification.

v. National Directorate of Employment

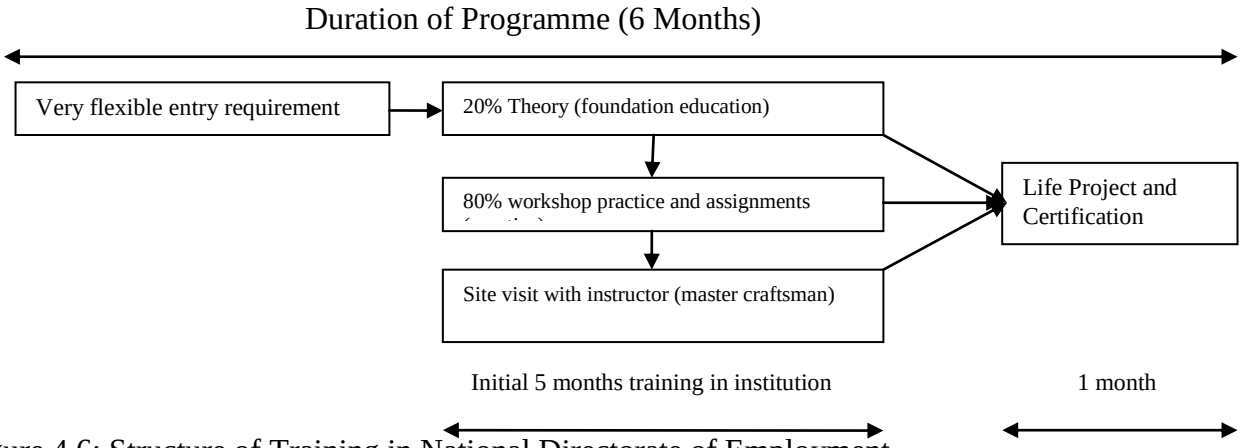


Figure 4.6: Structure of Training in National Directorate of Employment

The programme is for a period of six months with all aspect of training carried out within the training institution. The theory to practical content ratio is claimed to be 20 to 80% and is completely provided within the institution. The programme does not provide any opportunity for the trainees to acquire industry experience while on training. The investigation revealed that the institution encourage instructors who are usually master craftsmen to take trainees to any site they are personally working on. This is the only available opportunity for the trainee to acquire experience. The danger in this practice is that where the instructor is out of job, the trainees suffer since that is the only route for acquiring experience. Another shortcoming of the practice

is the possibility of the trainee to acquire both good and bad practice of the instructor since he is a sole instructor.

The interviewee further revealed that the training programme assumes that all skills can be acquired through education, training and practice and that there is no sufficient time for the trainee to go on IT. This is in contrast with the studies of Luissier and Shandrick, (2006) and IAFC (2003) in Botts (2008) which established that notwithstanding education, training and practice there are skills that cannot be acquired even with the use of high-fidelity simulations; only real work environment provides the atmosphere for learning those skills.

The investigation further revealed that at the end of the six months training, the trainee has the choice of sitting for trade test 3 examinations as final certification or be issued a testimonial as a certification of attendance. The interviewee further explained that formal education is de-emphasised in the training since the objective of the programme is to impart skills for self-reliance. As long as trainee can identify tools and understand safety procedure, that knowledge is perceived to be adequate, the respondent explained. The respondent however, agreed that some trades required some numerical measurements and calculations as such demand some level of formal education.

vi. Institute for Industrial Technology

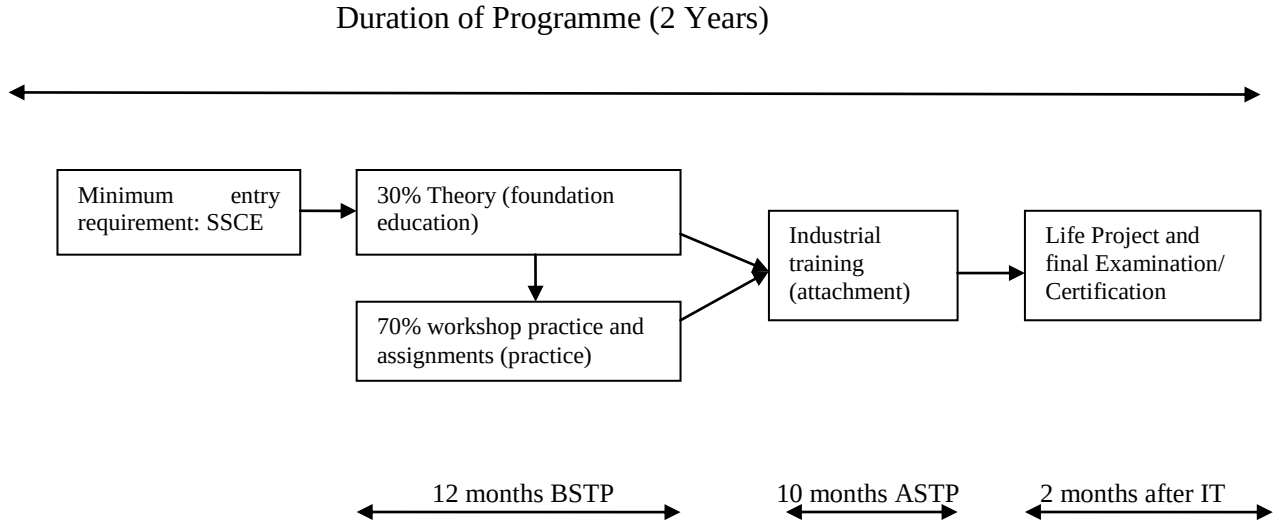


Figure 4.7: Structure of Training in Institute for Industrial Technology

The duration of the entire programme is two (2) years. The first year is spent in school going through theory and practical. The practical content is 70% where tools and equipment are provided to each trainee and also assigning mentor to each trainee with whom the trainee has mentoring sessions at determined intervals. In the second year, the trainee spends ten (10) months in a selected partner organisation for Advance Skills Training Programme (ASTP) following a dual training system (DTS) of vocational training. There is provision for the trainee to alternate between the institution and the industry every week. One day in a week is spent in the institution while four (4) days in a week is spent in the industry following a pre-planned training guideline. Training activities in the industry is recorded on a Log book which is reviewed by a delegated staff of the institution and forms an essential part of the final assessment of the trainee. At the end of the ten months ASTP, the trainee returns to the institution and within the last two months is prepared for final assessment and curriculum review workshop. Certification is done in two stages. The first certification is at the end of the first year of training

where trainees write the modular examination of NABTEB, while at the end of the second year, the trainee may be prepared to sit for the Diploma Examination of City and Guilds of London. The key features of the training are:

i. A training agreement between the institution, the partner organisation and the trainee

ii. Training plan which the trainee follows while in the company is jointly designed by the institution and the partner organisation.

iii. Industrial coordination by a staff of the institution to ensure smooth communication and cordial relationship between the institution and the partner organisation while supervising or monitoring the students in the organisation.

iv. Training stations (different departments within production and engineering) and

v. In-company trainer/supervisor.

The remaining results of the interviews are presented under four major components of training as identified by Luissier and Shandrick, 2006 and IAFC (2003) in Botts (2008).

4.1.3 Education of Construction Craft Skills

The views of those interviewed suggest that most of the programmes are over theorised. Against the desired 30 to 70 % and 20 to 80% ratio in favour of practical, most of the respondents argued that the reverse is the case. The major reason in the case of the FSTC and STC is attributed to the long desire of curriculum developers to bridge the gap between secondary schools and technical colleges (Oranu, 2003). This desire has undermined the aim of technical training which is different from that of conventional secondary school education. To a greater extent, the respondents believed that the theoretical content of the technical institutions is beyond what is normally required for technical and vocational skills development. A respondent explained that:

" *Technical school graduate feel inferior to secondary school graduates and the perception of the society has made policy makers to deliberately increase the educational contents without noting the effect on the technical contents"*.

The respondents agreed on the need for trainees to acquired considerable body of knowledge which undoubtedly aimed at building their reasoning ability, but it should not be at the detriment of acquiring technical skills. Most respondents suggested that technical and vocational skills should commence after Secondary School Education against the current practice where it is at par with conventional secondary education. Some of the respondents believed that secondary school graduates may make informed decision on career choices and build a career in construction industry than JSCE graduate who are the current target for technical training. In the report of CBC (2002) it is reported that youths are better informed to make career choice after secondary education. To increase chances of SSCE holders making a career choice on technical skills, an introductory course on technical education should be re-introduced in all secondary schools. The results suggest that training in IIT and ITF-model centre are better probably because the trainees have all finished secondary education therefore their attention is only on skills acquisition rather that acquiring secondary school education. Also, the interviewees explained that the theory in the institutions is on areas applicable to the trade and emphasis is given to technical issues and principles rather than general theory. In the case of NDE and BATC, little or no attention is given to general knowledge acquisition. The interviewee from BATC further explained that trainees are treated differently depending on the mode of entry. For those with foundation in formal education, the training combines both technical and conventional education because at the end of the programme the trainees sit for JSCE and trade test 3 examinations. While for the trainees without any formal education, the general knowledge is limited to identification of tools, health, safety and environmental issues. Conventional education is however de-emphasised in NDE training system. The argument is that the acquisition of skills is the aim of the training. It was however explained that some level of general knowledge also

limited to identification of tools, health, safety and environment issues is emphasised during the training.

4.1.4 Training and Practice for Construction Craft Skills

To achieve desired change in the behaviour of trainees, workshop practice is designed to achieve 70% practical content of technical education in all the institutions investigated. This is however difficult to achieve because the study revealed that most of the institutions lack sufficient quantity of materials for practical as well as insufficient and current equipment for conducting the practical. The major issues established from the interviews are:

i. Instructors (Trainers) Qualification and Experience: Most of the institutions lack sufficient skilled instructors. It was the desire of the institutions to employ products of technical college as instructors after acquiring relevant experience, the finding is that the National Policy on Education requires that only University or Polytechnic graduates be employed as instructors. Technical schools graduates with minimum of trade test certificate are however employed as workshop attendants. One of the respondents lamented on the gradual extinction of experience craftsmen in training institutions and asked:

"*In few years from now most of us here will retire. Who will replace us?"*

The general complaint is that most of the experienced trainers are about retiring and those employed cannot carry out a single practical because they lack technical skills.

"*You find university graduates coming to teach technical students, the institutions cannot reject those staff when sent by the ministry. You can only teach what you*

know. Emphasis for employment is now on certificate. In technical college skills should be the basis of employment",

The study revealed that the IIT utilised retired experienced tradesmen as trainers. The NDE however, depends on master craftsmen to deliver the training even when the master craftsman has very little or no formal education. Again the argument is that the desired objective is acquisition of skills for self-reliance. It was also observed that the BATC utilised master craftsmen for training even though the instructors are not adequate. In the ITF however, it is claimed that the instructors are trained in Singapore, UK and America and are in sufficient number with current skills comparable to those in the industry.

The minimum qualification of trainers in the case of the FSTC and TC as earlier mentioned is Polytechnic Higher National Diploma or University Degree. No emphasis is placed on practical knowledge and experience. "*Trainers should be very experienced in their trade"*, respondents suggested. It was established that experienced craftsmen are unwilling to take tenure appointments in training institutions because of poor remunerations paid. The interviewee explained that the income of experienced craftsmen when *"self-employed"* is better than instructor's salary, as such most of them are not willing to teach. However, the interviewees believed that with improved remuneration, experienced craftsmen will be attracted to join the institutions. One of the respondents suggested that retirement age of instructors could be de-emphasized for now in technical institutions; the respondent explained that:

"*Experienced craftsmen who retired from the field (construction organisations) will be willing to transfer their services to institutions as a way of retiring. This is better than retiring the experienced ones while employing inexperienced instructors, even our product, I don't have confidence in them because most of them graduate without acquiring the skills. So who will take over from us?"*

It was earlier reported that some of the institutions utilised retired experienced industry staff while others utilised master craftsmen for training in their respective institutions.

The minimum requirement of NBTE is three (3) number instructors per trade. It was revealed that sometimes National Youth Corp Members (University and polytechnic graduates on national youth service) are posted to the institutions to make up the staff shortfall. The situation is however different in one (1) of the institutions with eighteen (18) number trades and fifty (50) instructors and workshop attendants. There is a similar response from another institution with eight (8) number trades and twenty (27) instructors. Although a few of the respondents claimed they have sufficient number of instructors and workshop attendants, when asked on the quality in terms of experience of the staff, they responded that some of the staff do not have practical experience and a few are National Youth Corp Members with no work experience and requiring technical training themselves. However, the study established that those centers utilising master craftsmen for training argued that there is sufficient instructors but further revealed that each master craftsman utilised his staff to deliver training on days and time he is indisposed.

The views of the respondent vary on the quality of instructors, four (4) said the quality is decreasing rapidly while two (2) respondents initially said the quality is okay. But when the quality was related to the ability of the instructor to properly teach trainees practical aspect of work, all the respondents said the quality has dropped. One respondent cited cases where parents prefer their wards engaging in informal apprenticeship than attending technical college. The respondent argued that:

"*Most technical colleges are metamorphosing to conventional secondary schools"*.

Another respondent argued that the instructors are not the problem but lack of facilities and materials for practical training. The respondent however agreed that most of the instructors are deficient in current industry practice. The investigation further revealed that most of the institutions lack strategic plan for retraining. Conclusively, it was agreed that the industry has modern facilities which majority of the instructors have never seen or operated before, thus creating gap between institution and industry which need to be filled.

On training and re-training, the study revealed that the institutions do not have any specific training plan for the instructors, some of the respondents said they had never gone for any training since they were employed. Two (2) respondents said they went on training in 2012 sponsored by a Non-Governmental Organisation (NGO). The respondents however lamented that because of the absence of facilities, it will be difficult or impossible to teach students what they learnt. One of the respondents specifically complained of the obsolete equipment in the institutions' workshops against the current/up-to-date used during the training.

"*There was provision for training of instructors (especially those with deficiencies in practical knowledge and experience) during long vacations but now there is nothing like that"*, a respondent claimed.

Another respondent said instructors are encouraged by the school management to engage in long vacation industry training but the problem is that the same management expect the instructors to be regular in school and carryout assigned functions. The respondent finally suggests that:

"*Management should make a deliberate policy to send some staff on industry training at the end of each session and on return; such staff can train the remaining staff through a train the trainers' workshop in the school"*.

Interestingly, an interviewee argued that the instructors always develop themselves while two interviewees explained that their institutions have retraining plan where instructors are sent to the industry on regular bases and sometimes to other countries to update skills.

A respondent complained that:

"*We don't have any strategic retraining plan not to talk of frequency",*

There was a general consensus among the respondent that training is irregular. It only comes when the opportunity avails itself. However, a respondent said he went on training abroad recently and wished it will be made regular. Another respondent went on training organised by an NGO in Nigeria. Majority of the respondent did higher degree course in polytechnic because of their quest for additional knowledge and one is currently doing a Master of Science (M.Sc.) degree in construction management in

a University. All the respondents however said the training that is most desired is the practical training to bridge the gap between industry and institution.

ii. Training Facilities (equipment): Generally it was observed that facilities are inadequate and often obsolete. A respondent said:

"*This is our major problem,* a*ll the facilities here are obsolete and not functioning, this is a museum of obsolete equipment*".

The study revealed that while the industry is using current/up-to-date equipment, teaching in the institution is with obsolete ones. There is also concerns that even the obsolete equipment are mostly not functioning. A survey of the workshops confirmed the claim of the respondents (Plate 4.1).

"*Size of workshops is another challenge"* some of the interviewees said. Trainees need space to practice "*we have some workshops that the obsolete equipment alone have occupied the available space*" (Plate 4.2).

The availability of consumables for practical are a major constraint to training in all the institutions visited. Some of the interviewees suggested the transfer of government used items (such as ACs, Refrigerators etc.) to the institutions for trainees to use during practical. There is need to have modern facilities in institutions which are comparable to those in the industry. There are several suggestions on how to improve the problem of inadequate facilities including the establishment of equipment centre either within states or at regional level with modern facilities for training. The idea is to have a centre for intensive practical training with state of the art facilities where trainees will spend specified period going through practical sessions. The respondent argued that the cost of equipping individual training college is so much that government alone cannot afford to

continuously replace them, but it would be less expensive at state or regional level. Some of the respondent rather welcomed a direct collaboration between institutions and organisations such that trainees are sent directly to the organisations for practical training.



Plate I: Some obsolete equipment in a workshop of a technical training institution

Due to inadequate training facilities, trainees are often grouped to conduct workshop practice. Ideally, each trainee should have equipment to practice independently. This arrangement creates difficulty in assessing individual performance.



Plate II: Obsolete equipment in a workshop of a technical training institution

4.1.5 Acquisition of Experience

Experience is acquired through performance of task in real work environment because there are skills that cannot be acquired even with the use of high-fidelity simulations; only real work environment provides the atmosphere for learning those skills. With the exception of one

institution, all the institutions have provided avenue for acquiring experience while on training. Although the motive for IT in some of the institution is not in consonance with the aim of IT, it has however provided a means of bridging the gap between institution and industry with added opportunity for trainees to acquire employable skills. In describing the process of training in their respective institutions, majority of the respondents highlighted the following as means of acquiring experience while on training:

i. Method and Nature of training: Although most of the respondents said the training programme is entirely school based where both theory and practical are taught in school, there is however provision for IT. The IT provides trainees opportunity to bridge the gap between institution and industry practice and to also acquire industry experience while on training. The IT is an informal arrangement for training between the institutions and the industry. It is at the discretion of the organisations to accept or reject trainees' request for IT. This method may compromise standard because students may secure placement in an organisation that may not have the facilities and sufficient activities for the trainees to acquire the desired experience. The respondents however, suggested that the institution should have a direct collaborative training arrangement with relevant organisations in the industries to engage trainees for a minimum of one year IT. Interestingly, it was established that one of the institutions operates a dual system of training with direct partnership with the industry in which trainees are directly sent to partner organisations for a predesigned training. Regrettably, it was revealed that the only institution that operates dual training system is focusing on manufacturing industry only, suggesting the need to establish more for other industries.

ii. Reasons for combining Institution and Industry training: The respondents argued that the industry provides opportunity for the students to learn in a real work environment and gain experience while on training. For some of those interviewed, the reason for sending trainees to the industry is to make up the shortfall of the practical sessions in schools mainly due to lack of sufficient facilities and materials for workshop practice which has undermined the primary aim of industrial training. It was however established that a few institutions send trainees to the industry to acquire experience and further ingrain the skills they have acquired in the institutions. One of the interviewees believed that upon graduation, trainees should demonstrate good practical knowledge of the trade they learned. It was generally observed that training should be focused on skills that the industry needs and the only way of achieving that is through partnership between the institutions and the industry in providing training.

iii. Ratio of Institution to Industry training: In four of the institutions interviewed, the training is for a minimum of three years within which students go on mandatory industry training at the end of the second year of training**.** However, there is one institution with two years duration for training and another one with only six months duration for training. For the institutions with three years training duration and three months IT period, the ratio of school based training and IT is 89% to 11%. While those with three years training duration and nine months IT period is 65% to 35%. One of the institutions has no provision for IT, highlighting that the programme is only six (6) months duration and ratio of theory to practical is 20% to 80%. The interviewee believed the high practical content is sufficient for the trainee to acquire sufficient skills and also the programme is structured in a way that the instructor

(usually a master craftsman) involves his trainees in any site work he is handling. Interestingly, one of the institutions has two years duration for training with ten months IT period, making the institution to industry ratio 62% to 38%. This ratio conforms with 65% to 35% ratio commonly used in most training systems (Clark and Wall, 2000).

4.2 Discussion of Results of the Interviews in Construction Craft Skills Training Institutions

4.2.1 Characteristics of Existing Training Frameworks

The existing frameworks for technical training generally involve teaching of theory in classrooms and practical in workshops. Apart from one institution that provides opportunity for trainees to alternate training between institution and industry, most of the other frameworks have undermined the importance of IT. In some instances, only three months is provided while in others, no provision is made for IT. This approach is in contrast with technical skills training in countries with record of effective technical training system. For example, UK, Netherlands, Germany, Canada, Australia and US utilised institution and industry platforms to deliver technical training (Boehm, 1996; Syben 2008; WCA, 2012). These two platforms are used to ensure synergy between training and industry requirement and to avoid mismatch between industry's skill needs and training. Achieving this requires collaboration amongst stakeholders in the construction industry and the training institutions. Of the six institutions investigated, five don't have any collaborative arrangement between institutions and industry for training while the only one that have collaborative training arrangement does so with manufacturing industry only.

Collaboration between institution and industry in providing training has been established to ensure the provision of mixture of skills required by the industry (Hippach-Schneider *et. al.,*

2007; Eichorst *et al.*, 2012). Generally, dual training system is claimed to successfully integrate both classroom and industry training (ITSJ, 2014). Regrettably, only one institution adopts this system of training with the remaining five institutions providing technical training in the institution only. It is advisable therefore, for those institutions without training collaboration with the industry to do so in order to benefit from the strengths of both institution and industry to deliver effective skills training.

4.2.2 Education

Fryer (2004) describes education as the broad process in which an individual's whole outlook on life is shaped by a succession of varied experiences. However, of the six institutions investigated, four requires formal education as requisite requirement for entry while two desired candidates to have formal education but not as a basic entry requirement. Although the interviewees from the affected institutions argued that formal education was de-emphasised as a requisite entry requirement because of the low level of literacy in Nigeria and the need to eradicate poverty, earlier studies on training (Boehm, 1996; Luissier and Shandrick, 2006; Syben 2008; ITSJ, 2014) have argued on the importance of formal education in skills training programme. It was explained that education facilitates a well-grounded approach to practical problems and also provide a platform for skills upgrade. It is expected therefore that this issue be addressed to improve technical training.

Most of the training programmes are structured to have only 30% theory contents but the reverse is the case as some of the institutions emphasise theory rather than practical, examples are the FSTC and STC. The investigation revealed that the FSTC and the STC provides the majority of formal technical training in Nigeria (NBTE, 2011), but regrettably, it was found out that they are rather concentrating on bridging the gap between technical education and conventional education

primarily because they perceived it will improve the outlook of technical education which the society view as inferior (Oranu, 2003). There are concerns of too much work load on the trainees in the institutions that require JSCE for entry. The underlying argument is that the expectation that trainees should acquire craft skills as well as study to obtain SSCE is rather exerting tremendous pressure on the trainees than helping them especially in an ever changing technological world. Additionally, it was revealed that some of the institutions find it difficult to balance between technical education and conventional education, thereby confusing trainees as to the essence of technical education. It is therefore advised that technical training should start after secondary school but the present skills training at secondary school level should be maintained as an introduction to technical and vocational education and should spread across all secondary schools. Though there are evidences of technical training at secondary school in countries with comprehensive technical training system (example, Germany, UK, Canada , Netherlands etc), the common practice is for trainees to acquire conventional education before routing for technical training (Boehm, 1996; CBC, 2002, Syben 2008; CACC, 2014). Separating technical training from conventional education will create a clear and distinct career path and also attract intelligent youths to build career in the industry while eradicating the myth that technical trades is for academically weak persons. This agrees with earlier suggestions that technical training should start at secondary school level to serve as avenue for orientation of youths to the challenges and opportunities in skills trades career (CBC, 2002).

In addition, the approach to education is generic and not trade focused in some of the institutions. Emphasis is given to general subjects such as physics, chemistry, English language and general mathematics instead of trade specific courses. Because the training in some of the institutions is generic and lacks linkage with industry, the education does not take industries' peculiarities and

needs into consideration, therefore, there is no emphasis on issues and trades that are only common to specific industry. Examples are trades like scaffolding, iron fixing, plant operation and maintenance which have no provision for training in all the institutions. In this regards, some interviewees from organisations that employs craft skills workers suggests the establishment of construction industry training institutions where training will be provided on trades specific to construction industry. To ensure the provision of industry relevant skills training, sector-based skills development is the practice in most economies for example in UK, the ConstructionSkills ensure training is specific to construction industry through the approval of vocational qualifications offered by further education colleges (TSSR, 2011; ITSJ, 2014). This approach ensures that the entire industry is covered and all issues are addressed.

4.2.3 Training and Practice

Training and practice are two significant components in gaining proficiency with very close similarities such that the two are often used interchangeably. The two activities usually involve task performance under real or simulated conditions (Luissier and Shandrack, 2006). To ensure the achievement of proficiency in a training programme, training frameworks are designed to provide opportunity for trainees to perform training and practice activities usually in workshops. Of the six frameworks investigated only five are designed to provide training and practice within the training institution. However, the provision of this aspects of training in the institutions have been criticised to be ineffective and unproductive. In contrast, one of the six institutions uses the dual training framework, which is formulated and sustained through partnership of various stakeholders of the industry (the training institution, the industry and government) the industry in this case is the construction industry. This system has the advantage of sharing the burden of training amongst the various partners in training and ensures continuous training and practice by

using the facilities, equipment and projects being handled by the organisations to train. Previous studies have shown the adoption and success of this system in Germany for example (Boehm, 1996 and Hippach-Schneider, et al. 2007). Although the only institution utilising this system only partners with manufacturing industry to train because of the benefits inherent in the system, it will therefore be beneficial to expand and extend it use to construction industry.

The 70% practical content in most frameworks is hardly achieved because most institutions do not have adequate facilities or sometimes the facilities are obsolete. Even were the equipment are available, the consumables and skills of the trainers are usually a hindrance because the skills of the trainers are reported to be outdated. This makes acquisition of desired skills difficult and in extreme cases impossible since it is through training and practice that learner's behaviour is changed and performance of task becomes automatic (Luissier and Shandrick, 2006). ITSJ (2014) reported that good teachers are the most important school-based factor in academic achievement and the success of vocational education is dependent on good trainers in both the on- the-job and off- the job environments. It is therefore needful to ensure that the knowledge of the trainers is regularly updated while facilities and consumables are provided to ensure success of the training programme.

Additionally, the majority of the institutions do not have any strategy for retraining trainers. However, a few of the institutions have provided for trainers' to update their skills through IT both in Nigeria and outside Nigeria at regular intervals. The idea is to expose trainers to current industry facilities and methods. It is believed that with a structured arrangement for regular training for trainers in the industry, the skills of the trainers will be regularly updated. This is consistent with the German training system (Boehm, 1994; Steedman, 2010) that provided for the training and retraining of trainers in their system of training primarily to ensure regular

upgrade of trainers' skills. Also because the institutions are faced with the challenges of employing experienced trainers, it is advised that institutions utilise the services of experienced retired industry staff to make up the shortfall in the short run.

4.2.4 Experience

In skills training, experience is regarded as a basic requirement because some skills cannot be sufficiently simulated even with the use of high technology except in real world of work (Luissier and Shandrick, 2006). As a result, majority of the frameworks provided for trainees to acquire experience in the industry via IT. However, five of the six frameworks investigated failed to provide opportunity for trainees to secure direct placement for IT through partnership with construction organisations but the dual training framework which is a framework in use by one of the institutions arrange for direct industry placement for trainees for a period of nine months. This approach ensures that the institution assess capability of partner organisations in terms of facilities and manpower to provide training. The ITSJ (2014) highlighted the system of pre-assessing training facilities and manpower in the dual system of training is advantageous. Additionally, the dual training framework provides a link between the industry and the institution through weekly visits by the trainee to the institution at least once a week where assigned institution's staff and the trainee review the performance of the trainee via filled log book. This practice should be encouraged because of the immense benefits derivable from the integration of institution and industry learning. The system also encourages the learning of theory at school and facilitates a well-grounded approach to practical problems in the workplace (Oulton and Steedman, 1994; Hippach-Schneider, *et. al.*, 2007; ITSJ, 2014).

On the aspect of partnership of the institution and the industry to produce a pre-planned IT guideline; previous researches have argued that the joint production of the guideline ensures the delivery of the right mixture of training during IT (WCA, 2012; ITSJ, 2014). It is also believed that it ensured the acquisition of relevant skills that are required in the industry because the institutions get immediate feedback from the industry and adjustment of curriculum is almost automatic (ITSJ, 2014). Furthermore, because the training is jointly delivered by the industry and the institution, trainees acquire appreciable experience that gives them confidence and are competent to face and work in the industry as skills workmen. Regrettably, in the other five frameworks the IT is generally haphazard, without any pre-assessment of potential organisations for IT, no pre-planned guideline and mentorship arrangement for industry training, supervision of trainees on IT is mostly not done and where it is carried out, it is usually not taking serious. To a greater extend, trainees are left to learn by chance and not because any effort was put in place to determine what they learn. Unlike in the dual training framework, the framework in five institutions does not provide trainees with direct placement in the industry for IT; instead, the trainees seek for IT placement themselves. On the duration of the IT, three months was considered inadequate for trainees to acquire meaningful experience in a highly mobile industry characterize with seasonal workload pressure. The general opinion is to increase the duration to an average of nine month. Interestingly, the average period of training in most frameworks is ratio 1:4 in favour of the industry (Sockice, 1994; Oulton and Steedman, 1994; Boehm, 1996; ITSJ, 2014). It will be useful to increase the duration of the IT and also provide direct access to industry placement by trainees.

4.3 Interviews in Construction Organisations

The interview with management staff and craftsmen was done in order to assess the performance of the craftsmen in the industry.

4.3.1 Characteristics of the Construction Organisations and the Interviewees

A total of nine (9) top rated construction organisations in Nigeria were visited and interviews conducted with management staff of the organisations and an average of three (3) craftsmen that had technical training background before joining the organisation. Amongst the interviewees are a Director of Administration, two (2) Project Coordinators, five (5) Project Managers and a Construction/Project Manager. For the craftsmen, a total of twenty (27) craftsmen were interviewed, their details are shown in Tables 4.6 and 4.7. Although all the organisations are in the private sector of the economy, two (2) are Public Liability Companies (PLC) while seven (7) are Limited Liability Companies (LLC). One of the organisations was established in 1937 in Lagos and arguably the oldest in Nigeria which has now become a PLC. Most of the organisations have worked in Nigeria for over 30 years; Tables 4.4 and 4.5 show the distribution of the age of the organisations. Similarly, the interviewees that are management staff have averagely worked in the construction industry in Nigeria for 20 years. The years of experience of both the organisations and the management respondents suggests that the respondents have acquired relevant experience to contribute meaningfully in the research. On the specific area of business, four (4) organisations indicated that they execute both civil and building construction projects while four (4) indicated general civil engineering construction projects. Only one organisation limited its business to building construction projects. The area of business of an organisation determines the mixture of skills workers in the organisations, this therefore suggests that the organisations have good mixture of craft skills and are knowledgeable in the study area.

Amongst the craftsmen interviewed were five (5) senior foremen, four (4) junior foremen, six (6) supervisors and twelve (12) headmen.

Table 4.4 Age of Construction Organisations

Years of Organisation	Number of Organisation
11-20	2
21-30	1
31-40	4
41- 50	1
Over 50	1

Source: Field survey (2014)

Table 4.5 Interviewees' years of Work Experience

Years of Experience	Number of Interviewees
11-20	4
21-30	4
31-40	1

Source: Field survey (2014)

The interviews were all conducted as individual sessions and each lasted an average of 50 minutes. Notes were taken on a predesigned interviewee list of questions to serve as a guide in steering the interview and also to capture relevant information from the interviews.

4.3.2 Education

The experiences of the organisations investigated generally indicates that Nigerian trained craftsmen are adequate in theory even though additional training is always given on the aspect of Health, Safety and Environment which is further explained to be a general practice by construction organisations. Sometimes, additional training is also given on areas of company's specific construction method and materials. However, this is often done when new materials are introduced. Although the interviewees observed that Nigerian trained craftsmen are adequate in theory, they however complained that theory is generic rather than trade focused. Often the

newly employed craftsmen rely on older craftsmen to acquire both skills and trade theory on-the-job.

Apart from lack of trade focused education, majority of the respondents reported the complete absence of some trades in Nigerian Technical training institutions. For example, an interviewee observed that on several occasions his organisation had to train craftsmen on trades like scaffolding, formwork, plant operation, iron bending and tiling either on-the-job or in foreign countries.

4.3.3 Training and Practice

On training and practice, the results revealed that craftsmen trained in Nigeria are proficient in practice. However, this view was held by only one (1) interviewee. The rest of the interviewees shared a different view that newly employed Nigerian trained craftsmen always lack requisite experience to practice unless trained on-the-job and supervised by a more experience skilled worker and that it often takes relatively long time to train them on-the-job compared to other craftsmen trained outside Nigeria.

Majority of those interviewed highlighted that the cost of providing on-the-job training is very expensive and time consuming. Some of the respondents queried whether the training institutions exposed trainees to practice before graduation. However, there were few instances where the newly employed craftsmen learnt within a short time. A respondent believed that with good exposure to industry practice, majority of the Nigerian trained craftsmen will be very useful. Most of those interviewed suggested collaboration between training institutions and the industry for better training.

On the availability of training facilities in construction organisations, the study found that majority of the organisations have training facilities which are used to deliver in-house training

especially when new equipment or materials are introduced. The study also revealed a general concern on the gradual ageing of craftsmen without sufficient reliable replacement. At the moment, most of the organisations reported that they had to renegotiate employment terms with older craftsmen at least to meet their workforce requirement.

Generally, organisations would preferred employing new workers who possess some experience and further train them on-the-job than the existing situation where they had to provide the training often from the scratch. It was further observed that because projects are always required to finish within schedule, there is no time to train new workers. For example, an interviewee said:

"We really don't have all the time to train them afresh here, we will prefer those with some field experience then we can build from there".

The observation is the same in majority of the organisations.

4.3.4 Experience

There was a consensus among employers that suggest a general lack of experience by majority of the training institutions' graduates. On this, all the interviewees complained on the inability of the newly employed craft workers to carry out site work and operate equipment. However, there were reported cases of a few newly employed craftsmen meeting organisations expectations which on further discussion, the respondents explained that those employees had done IT with them. The study revealed that requisite experience is important and always required for the employment of craftsmen. The experience of most of the organisations is that sometimes host communities forced them to engage Nigerian trained craft graduates even without relevant experience. However, with some exposure to modern facilities and real work environment, some of those craftsmen eventually picked up. From one organisation to another, the complaint of

inadequate requisite experience kept reoccurring, suggesting a general dissatisfaction on the quality of training delivered by training institutions in Nigeria. The respondents explained that they always insist on engaging experienced craftsmen because of the time required to train new ones on-the-job coupled with the pressure to deliver projects on schedule.

On the question of the performance of Nigerian trained craftsmen in comparison to those trained in foreign countries, all the interviewees explained that when compared with newly employed craftsmen, those trained in foreign countries are better. This is probably because they had better training environment and exposure where they were trained. However, there is agreement that often performance of Nigerian trained craftsmen improved after they were exposed to equipment and real work environment. Most of the interviewees are therefore optimistic that if Nigerian trainees are exposed to site work and better training facilities, the problem of requisite experience will be solved. The study further revealed few cases of preference of Nigerians to expatriates often on economic bases, citing that it is cheaper to employ craftsmen in Nigeria than expatriates. The underlying reason for employing expatriates is lack of experienced craftsmen in Nigeria. Interestingly, some of the interviewees highlighted that most expatriates see their Nigerian counterparts as potential threat to their job and will ordinarily not want to teach Nigerians, thereby hindering technology transfer.

4.3.5 Craft Skills Certificates Preferred by Employers

The study revealed the existence of different certificates in use in the industry. It was found that the City and Guilds of London certificate is most preferred by the interviewees, however, there are very few craft skills in possession of such certificate at the moment and majority of them are at the verge of retirement. In the absence of skilled workers with city and guilds of London

certificate, the Federal trade test certificate is also indicated as an alternative. The interviewees however complained that possession of the federal trade test certificate is no longer a guarantee that the holder has the skills and experience the certificate signified. The holders of such certificate, most of whom are technical school graduates, are now subjected to further field training under the supervision of a competent craftsman before they are fully employed. The major weakness of the holders of trade test certificate is field experience highlighted by most of the interviewees. The interviews revealed that with adequate exposure of trainees to industry work while undergoing training, better trained and experience skilled workers will be produced.

4.4 Interviews with Craftsmen in Construction Organisations

Table 4.6: Construction Craftsmen years of Work Experience

Years of Experience	Number of Craftsmen
01-05	9
06-10	11
11-15	4
16-20	2
Over 20	1

Source: Field Survey 2014

Table 4.7: Interviewees specific trade

Trades	Number of Interviewees
Masonry, including Tiling	7
Carpentry and Joinery, Including roofing and wooden scaffolding	6
Plumbing	4
Iron fitting (Iron bending)	3
Mechanical Installation	3
Electrical Installation	3
Painting and Decorating	1

Source: Field Survey 2014

The interviews were all conducted as individual sessions and each lasted an average of 50 minutes. Notes were taken on a predesigned interviewee list of questions to serve as a guide in steering the interview and also to capture relevant information from the interviews.

4.4.1 Certificate Obtained upon Graduation

The study sought to find the certificates the craftsmen obtained when they graduated, of which four (4) indicated they graduated with City and Guilds of London certificate which is the most preferred certificate by construction organisations. Majority (23) graduated with a combination of WAEC Technical now NABTEC which replaced City and Guilds of London, labour trade test grade II and Federal craft certificates for both state and federal technical college graduates while labour trade test grade III is for BATC graduates. The reliability of the certificates apart from city and guilds of London institute certificate is questioned particularly in terms of knowledge and experience expected from holders of the certificate. Consequently, employers generally disregards these certificates arguing that the holders often require more practical training when first employed.

4.4.2 Relative Ease of Securing Employment upon Graduation

It is expected that with reported cases of skilled workers shortages (Agapiou et al., 1995; Clarke and Wall, 1998; Gann and Senker, 1998; Makenzie et al., 2000; Datoegoem 2006 and Muya et al. 2006), graduates of technical institutions should have a wide option of choice of organisation to work with, but the reverse is the case as established by this study.

It was found that upon graduation, those craftsmen with over 20 years work experience got employed easily compared with those having less than 20 years in the industry. Several reasons may account for this, for example, the deliberate attempt to bridge the gap between technical schools curriculum with that of conventional secondary schools (Oranu, 2002), lack of materials

and facilities for workshop practice as indicated by majority of the institutions respondents and inadequate trainers with latest knowledge and skills. The probable reason for the difficulty in securing employment is because the employers became less confident in the ability of the younger graduates to perform site work satisfactorily. Respondents observed that the younger graduates lacked requisite experience to work in the industry without strict supervision. The craftsmen with less than twenty (20) years experience generally reported that employers placed them on probation for longer period under strict supervision compared to older craftsmen who reported that they spend few months and sometimes one year on probation. There were reported cases of disengagement of some craftsmen after the probation period primarily due to poor performance. Although this may not be entirely attributed to poor training, it may however suggest inadequacy in existing training system. Ideally, a craft trainee should graduate with some requisite skills and experiences from the training institution, which can then be built upon in the industry. The study further revealed that often organisations disregard certificates in favour of experience since certificate holders were often not able to demonstrate the skills they claimed to have. Alternatively, construction organisations resort to using other methods such as task performance to test skills instead of relying on certificate.

4.4.3 Education

Although majority of the craftsmen interviewed acknowledge the relevance of the education they received while in training school, however, the education of craftsmen is generally characterised with generic education and is reported to be deficient in trade focused theory. Majority of the respondents said it was difficult for them to cope with the specific nature of construction trade theory especially on the aspects of relating their skills with drawings and real site situations. An

interviewee cited an experience as a carpenter where he was required to read drawings and construct formwork which he was never taught in school. The interviewee highlighted that:

"While on training we were not taught most of the things we met here. I was trained as furniture carpenter, but here, the carpentry department deals with formwork for structures that are entirely different from what we learnt in school".

Several similar observations on the inadequacy of trade focused theory abound. There were cases of mismatch between institutions training and real practice both in terms of theory and trade. For example, while the institutions do not recognise scaffold as trade, the industry does and expected specific training be provided for it. Similar observations were made for trades like plant operation, plant mechanic, iron bending and even tiling etc.

4.4.4 Training and Practice

In describing training received by craftsmen while in training institution, all the interviewees described the training as mostly classroom teaching of basic construction education with demonstration in the class followed by workshop demonstration and opportunity to practice in the workshop. However, the interviews revealed that apart from the older graduates, those with over sixteen (16) years experience, the younger ones had little opportunity to perform workshop practice while on training. The interviewees generally claimed that inadequate consumables for practical and equipment were the major hindrances to performance of workshop practice. The alternative in several cases was for the teachers to perform simple demonstration in the workshop with little or no opportunity for the trainees to replicate what they were taught. This was found to adversely affect the trainees' ability to practice.

A few interviewees cited their experiences a few times they went on training outside Nigeria. They claimed serious attention was given to skills acquisition with modern equipment, and sufficient consumables were given for training and practice, while in Nigeria, the training often ends with demonstration only. A respondent shared his experience while on training outside Nigeria that at the beginning models were used for demonstration but real work situation is simulated to provide real opportunity to learn. The interviewees claimed that after practicing repeatedly, the skills is usually acquired which can be replicated immediately with ease.

Additionally, the study revealed a unanimous respond by the younger craftsmen that their organisations provided additional training when they were first employed. Although the organisation mostly provided additional training to newly employed craftsmen on practical areas, sometimes training is also provided on Health, Safety and Environment issues. Generally, on-the–job training is provided on practical aspects of site work usually under strict supervision by experienced craftsmen. The predominant complaint of respondents is that Nigerian trained craftsmen lacked the minimum skills expected of a crafts school graduate, arguing that they were not properly exposed to site work during their training. The investigation also found that majority of the respondents experience great challenge coping with industry work especially relating to site work. This suggests that the craftsmen did not have adequate opportunity to acquire work experience before graduating.

4.4.5 Experience

Majority of the respondents observed that they acquire experience through industrial training (IT). However, getting placement for IT in the industry was very difficult. Some of the interviewees had to seek the help of people they knew in the organisations to secure placement especially in large construction organisations which they claimed have the facilities and ability to

provide effective industrial training. Majority of the interviewees suggested that government can make the engagement of trainees compulsory especially by large organisations since government is their major client.

Regrettably, most of the interviewees revealed that other than lack of assistance in securing good organisation for IT, supervision was poor, learning was accidental not systematic because there was no structure of learning in the industry. Often it is at the discretion of the industry supervisor to teach or when there is much work trainees are attached to experienced craftsman to teach them. Most of the respondents complained that some supervisors see trainees as threat to their job and so will deliberately refuse to teach some aspects of the trade, claiming that it is not relevant. Respondents opined that with proper industrial training structure the organisations will ensure that trainees are taught properly.

The experiences of the interviewees revealed initial difficulty in carrying out work with more advanced equipment and tools in the industry. This suggests lack of proper synergy between institution and industry training. Most of the interviewees wished they had opportunity of using those equipment and tools while on training and claimed it would have eased the difficulty they experienced before securing jobs. Experience is generally rated as the most deficient component in Nigerian trained craftsmen. In contrast, some of those interviewed said they had opportunity to work in the industry before graduating and that opportunity greatly enhanced their skills and made it easier to transit from training institution to the industry. This further confirmed that with proper synergy between the training institutions and the industry on training, technical training delivery may improve.

In comparing the performance of craftsmen trained in Nigeria with those trained in other countries, there was a common agreement amongst respondents that expatriates are better

initially but after some years of exposure and industry experience, the Nigerian trained craftsmen usually pick-up. The initial poor performance of Nigerian trained craftsmen was generally attributed to lack of emphasis on acquisition of experience and structured industrial training while craftsmen are on training. The interviews revealed that most of the current graduates of technical institutions don't have the minimum skills required to work in construction sites, citing that most of them never had the opportunity of learning in organisations with adequate facilities and manpower to train.

Additionally, in an effort to investigate the level of acceptance of certificates issued by technical training institutions in Nigeria, diverse views were reported by interviewees. While some argued that the employers preferred trade test certificate in the absence of city and guilds of London certificate, most of the respondents reported that the employers mostly lay emphasis on skills rather than certificate.

4.5 Discussion of Results of the Interviews with Construction Organisations' Respondents

4.5.1 Education

In terms of general education, most of the organisations found the craftsmen relatively adequate except in trade focused theory. Responses received suggest that craftsmen received broad training in terms of general education but not specific in terms of trade. A craftsman reported the difficulty he experienced in understanding drawings on site even though he was taught carpentry in school. The responses of some of the interviewees corroborated the observations of employers that newly employed craftsmen are relatively okay in general theory but deficient in trade

focused theory. The focus of the training from general education to specific trade education needs to be addressed.

As opposed to general practice in most developed countries, technical training begins at senior secondary school level which is the stage that young people acquire general education before deciding on career path. As a result, balancing between trades focused theory and generic theory becomes extremely difficult. Mixing technical education with conventional education may have resulted in lack of clarity of the essence of technical education particularly on the part of the trainees who may be confused and distracted from skills acquisition since the general desire of the young people is to proceed to Universities rather than develop trade skills. The common approach in countries with comprehensive system of technical training is for technical and vocational training to begin after secondary school (Boehm, 1996; Housing Research, 1996; Hippach-Schneider, et al. 2007; ACC, 2014; Bosch and Charest, 2006). This ensured that trainees had acquired sufficient general education before making informed decision on career path and the acquired general education also serves as foundation for delivering trade focused theory.

4.5.2 Training and Practice

Training and practice are amongst the four important components of effective training programme which is usually achieved in college workshops and sometimes on-the-job. To ensure that trainees perform this very essential activities, current and adequate training facilities are provided in training institutions. However, most of the organisations showed overwelming dissatisfaction with the perfomance of craftsmen trained in Nigeria. Many of them complained of the inability of Nigerian trained craftsmen to carry out simple practical work on site. This

comfirms earlier studies that facilities in most training institutions are generally inadequate, obsolete and sometimes in poor condition (Okoye and Chijioke, 2013).

Most craftmen intervieweed corroborated the responses of their employers that it was difficult for them to cope with site work when they were newly employed. A lot of the craftsmen complained that the training they got was generally not industry tailored but generic, as such; it was difficult to apply the skills to construction industry particularly. Since the training is not industry focused, specific industry issues and peculiarities were not addressed. The TSSR (2011) reported that delivering training in partnership amongst stakeholders in the industry ensures that training covers the whole issues on training in the industry. The situation is further compounded by the system of training (Institution-based training) in use by most of the institutions. As opposed to learning in the institution only, other systems of training for example, incorporated learning in the industry as an essential component of technical training (Boehm, 1996; Sharpe and Gibson, 2005; Hippach-Schneider *et. al.* 2007; Syben 2008; Apprenticeship in Canada, 2014; ACC, 2014). This is achieved through alternating training in the industry and in vocational and technical institution at predetermined interval.

For those who did IT with their current employers, transition from training institution to the industry was less difficult since they were already exposed to the facilities and site operation. Given the performance of those that did, it suggests that with direct collaborative training amongst industry's stakeholders, technical training delivery will improve. Also, to ensure that training covers relevant areas of industry needs, an integrative training approach is encouraged where the institutions and the industry collaboratively particicpate in determining what should be learnt, where and how, through the development of training guidelines particularly to be used when receiving training in the industry by trainees. Previous studies on showed that alternating

training between the industry and training institutions where pre-planned training guidelines developed through the combine effort of the institution and the industry helps in delivering effective craft skills training (Oulton and Steedman, 1994; Clark and Wall, 2000; CBC, 2002; Review of Changes in Apprenticeship Training [RCAT], 2005; Hippach-Schneider, *et. al*, 2007; Bosch and Charest, 2006). This approach ensured that training is provided in areas relevant and useful to the industry, while industry's facilities are used to augment the facilities in the institutions.

4.5.3 Experience

It was established that Nigerian trained craftsmen are generally inexperienced in handling construction equipment and performance of site work and so employers prefer to poach or import craftsmen instead of employing local ones. The probable reason for this inadequacy may be the absence of, or poor intergration of, institutional and industry training. Earlier interviews with training institutions on the existing frameworks in use indicates that IT which should serve as means of acquiring experience both in of use of facilities and nature of the work is found to be unstructured, poorly organised, without adequate system of quality control and lacks commitment on the part of training institutions and IT regulatory body. Regrettably, it has been well established that experience can only be acquired in real work situation (Clarke and Wall, 2000; Luissier and Shandrack, 2006). It was therefore evident that without a meaningful and properly structured IT, trainees may not acquire requisite experience before graduating from training institution. The duration of IT which is predominantly three months a little more than

the minimum 5% in NBTE curricullum (NBTE,2012) is found to be inadequate as suggested by the investigation. An increase of the duration to one year on average is generally recommended.

Interestingly, some of the interviewees observed that a few of the trainees that did IT with their organisations are better both in site operation and use of facilities. This suggests that with adequate and better structured IT, requisite experience will be acquired. In this regards, majority of the respondents suggested collaboration between industry and training institutions to provide training. Regrettably, there was general observation that obtaining placement for IT especially in large construction organisations was very difficult, hence denying majority of trainees the opportunity to learn while on training. Most of the craftsmen interviewed reported that it was entirely their responsibility to secure IT placement and many said their institutions never visited them while they were on IT. This has confirmed earlier observations that the current IT is highly unstructured, without any direct collaboration amongst industry stakeholders, supervision of trainees is generally unorganised, institutions purely depend on Log book to assess trainee's performance and the duration of the training is inadequate (Okoye and Chijioke, 2013). To solve these challenges, one of the institutions partnered with some organisations to train. This is similar with what obtains in most training frameworks adjudged to provide effective technical training. (Boehm, 1996 and Hippach-Schneider, *et al*. 2007).

To ensure effective partnership amongst stakeholders in training delivery, the involvement of all parties at the onset of training is important. For example, in the dual training framework, a collective agreement on training must be reach before training can commence in an organisation. To ease the difficulty of finding an employer willing to provide training, a list of potential offers for training is published for interested participants to apply (Sharpe and Gibson, 2005). Another variant of the dual framework in use by one of the institutions earlier investigated provides a list

of partner organisations where trainees are directly sent from the training institution for industrial training. These options reduce the difficulty of securing placement for IT by the trainee and also ensure that the trainees are sent to organisations adjudged competent to deliver industry training. Additionally, the interviews revealed that most of the holders of NTC were given further training on-the-job before they were fully employed. This agrees with the findings of Okoye and Chijioke (2013) that most holders of technical skills certificate appear naive at practical expressions. Employers prefer to conduct practical assessment and would rather employ those without certificate but with relevant skills than those with certificate but without relevant skills. This questioned the relevance of training in the institutions. It also suggests mismatch between training delivery in the institutions and industry since effective technical training system is expected to address the problem of mismatch between school-based training and industry requirement (Bosch and Charest, 2006). Again, collaborative training is encouraged because of the desire to ensure the delivery of the right training in the right format for employers and individuals in the industry so that the present and future skills needs of the industry are met (TSSR, 2011). It results revealed that the City and Guilds certificates is still a prefered techincal certificate amongst the organisations examined. The reason for the general preference of City and Guilds of London Certificate is hinged on the ability of the holders of such certificate to demostrate the skills the certificate indicates they have.

4.6 Similarities, Differences, Strengths and Weaknesses of the Training Frameworks

From the six frameworks shown in figures 4.1 to 4.7, the following similarities, differences, strengths and weaknesses were drawn.

4.6.1 Similarities of the Training Frameworks

i. The training programme in majority of the institution is college-based with provision for IT which varies from one institution to another. However, one institution has partnership arrangement with organisations to deliver training.
ii. In principle, theory constitutes thirty percent (30%) of the programme in majority of the institutions while practice is seventy percent (70%).
iii. The primary source of training and practice is the institutions' workshops; there is general lack of sufficient and modern facilities for training in majority of the institutions compared with those in the industry.
iv. There is provision for students to acquire experience in real work environment in all the institutions even though the methodology varies.
v. All the institutions lacks sufficient provision for construction skills trade, although one of the institutions provides training in all trades on special request.
vi. Training is provided across industries, although one of the institutions to focuses on manufacturing industry.

4.6.2 Differences, Strengths and Weaknesses of the Existing Frameworks

The differences, strengths and weaknesses of the existing frameworks are arranged according to institution of training in a tabular form presented in appendices III, IV and V.

CHAPTER 5: PRESENTATION AND VALIDATION OF THE FRAMEWORK

5.1 The Proposed Framework

The proposed framework emphasized the use of both technical training institution and industry as platforms to deliver training. The framework can be adopted or adapted by stakeholders in the construction industry as a whole and technical training policy making bodies in Nigeria.

The harmonised framework is presented in Figures 5.1 and 5.2:

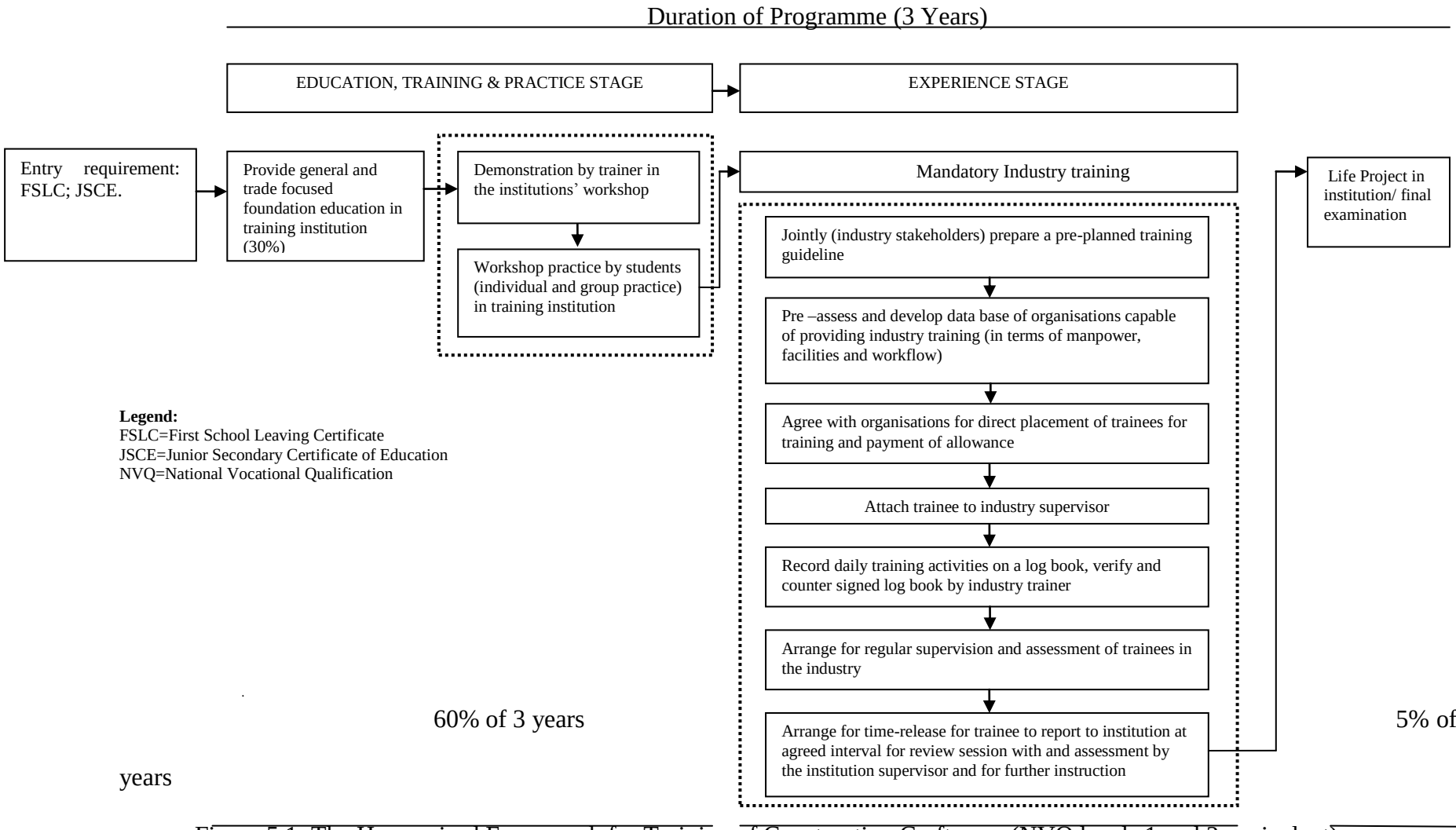
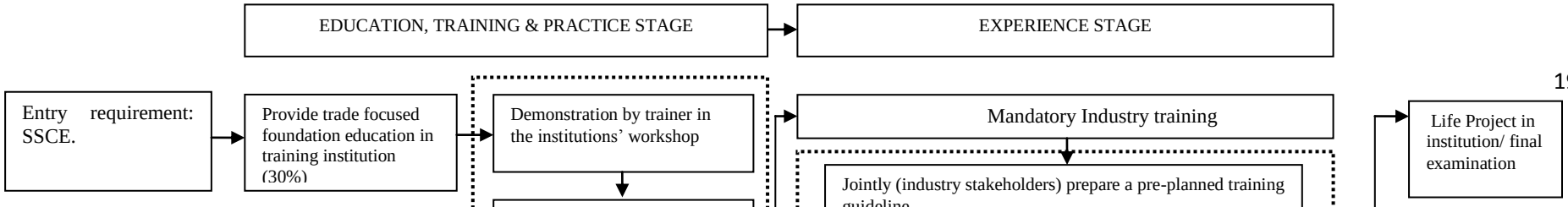


Figure 5.1: The Harmonised Framework for Training of Construction Craftsmen (NVQ levels 1 and 2 equivalent)



Legend:
SSCE=Senior Secondary Certificate of Education
NVQ=National Vocational Qualification

50% of 2 years 45% of 2 years

5% of 2 years

Figure 5.2: The Harmonised Framework for Training of Construction Craftsmen (NVQ level 3 equivalent)

5.1.1 Duration of Programme

The duration of the programme largely depends on the qualification level desired. There are different qualification levels that the institutions and the industry are expected to provide training at craft skills level. The recently approved NVQF identified NVQ1, 2, and 3 as levels within the craft skills category (NBTE, 2011; NBTE, 2013), this is the concern of this framework and therefore suggests that for NVQ1 training, the duration may be three years but the underlying philosophy is that the training should comprise of all the components and in accordance to the ratio provided in the framework for effective skills acquisition. This also applies to NVQs 2 and 3 which may have lower or higher training duration.

5.1.2 Entry Requirement

The entry requirement also depends on the qualification desired. At the craft skills level, NVQ1 is the lowest level and requires primary school education as entry requirement at the least. Candidates without formal education should be encouraged or prepared to obtain such qualification before admitted for the training. Fryer (2004) had earlier explained that education builds the capacity and ability of one to reason and judge objectively; therefore candidates should be encouraged to acquire it for skills acquisition training. For intermediate and advanced level qualifications such as NVQs 2 and 3, the requirement range from JSCE to SSCE. NVQ1 is a foundation learning tier which qualifies a graduate to pursue qualification at NVQ2 level or work in the industry as trainee (labourer) under supervision of a highly skilled worker for a considerable period of time. Majority of the task he is expected to perform are regular, repetitive and those that demands less calculations and reasoning.

5.1.3 Education, Training and Practice Stage

i. Education

It was explained that education facilitates a well-grounded approach to practical problems and also provides a platform for skills upgrade (Syben 2008; ITSJ, 2014). Apart from general education, trade focused education is required in skills training to ensure that industry's peculiarities and needs are taken into consideration. Less emphasis should be given to general courses like Physics, Chemistry, and Biology while emphasis should be given to trade theories such as materials, principles and methods in trades like carpentry, formwork, scaffolding, masonry and so on. This will provide well-grounded approach to practical problems and serve as foundation for skills upgrade.

ii. Training and Practice

This stage aim at changing the behaviour of the trainee. The primary purpose is to ensure that task is performed in a correct or effective manner. Trainee is engaged in activities designed to accomplish some significant change in the way tasked is performed. The training session should essentially be practical in nature, about work methods, skills and procedures within a trade. It should begin with simple demonstration by the trainers in the institutions' workshop to be followed immediately with opportunity for trainees to carry out individual and group practice. During the training session, the trainer takes time to demonstrate in bits and in slow sessions for the trainees to understand and learn the steps in the skills they are trained for. This should be done under the observation of a trainer at slow pace to ensure that task is performed correctly. At practice stage, trainees make conscious effort to replicate what the trainer demonstrated. It should aim at ensuring that task is performed in a variety of ways almost effortlessly and

repeatedly in order to ingrain the task in the mind of the trainee. These two activities require facilities which must be current and at par with what obtains in the industry and sufficient materials should also be provided for the trainees to practice on their own. Since it is difficult to assess trainee's performance in group work, there is need to ensure that individual practice is encouraged where practicable. The simulated environment in which the training is delivered should be as close to real life situation to ensure that all aspects of skills are acquired.

5.1.4 Experience Stage

Although the entire training programme requires collaboration between the industry and training institutions, the experience stage however requires direct collaboration since training at this stage shifts completely to the industry platform. At this stage, the trainee is exposed to doing task in real work situation under the observation of industry trainer. The key steps to follow in ensuring that relevant experience are acquired by trainees includes: preparation of pre-planned training guidelines jointly prepared by the industry and the training bodies (NBTE, SSCs, Institutions); assessment, identification and registration of organisations capable of providing industry training in terms of relevant facilities, manpower and workflow ahead of the training; It is necessary for the institution to enter direct agreement with those organisations in terms of number of trainees to be sent directly to organisation for training and also in terms of allowance and time-release required by the trainee to attend review sessions in the institution; to ensure training in the industry follows the pre-planned guideline, trainees are assigned to industry trainers who must guide and supervised the activities of the trainee in the industry. The assigned industry supervisor is saddled with the responsibility of ensuring trainee records daily activities which he must verify and counter sign. To ensure involvement of all stakeholders, the Sector Skills Councils should facilitate the entire training process. Due to the unique nature of construction

industry where projects are carried out in a nomadic fashion, it is useful for the industry training to be done within a block period of time (example: after session of institution training or complete terms of training). Within the period of training in the industry, trainees are required to report to the institutions for review sessions, assessments and further instructions by an assigned institution supervisor.

Table 5.1: Details of the Harmonised Framework for Training at JSS and SSS equivalents (NVQ1 and 2 qualifications)

Main Step	**Brief Description**	**Key Activities**	**Responsible Role**	**Outcome**
1.Education	This step combines both general and trade focused education, it is entirely delivered in the training institution. It aims at preparing the trainee for a career in craft as well as providing the opportunity to acquire general education for future upgrade. The trainee undergoes classroom teaching of theory which covers: 1. General education as specified in current curriculum for general education in technical institutions. 2. Trade specific education that takes into consideration industry's peculiarities	1. Identity institutions with requisite facilities and manpower to deliver the training. 2. Identify relevant general education subjects that will build the trainees understanding of trade focused theory. 3 Develop trade focused theory curriculum jointly with industry to ensure that industries peculiarities are covered.	Regulatory organisations, Training institution	The trainee should acquire considerable knowledge sufficient to sit and pass: 1. Junior secondary certificate examination and NVQ1; 2. Senior secondary certificate examination and NVQ2. 3. The trainee should know and understand materials, methods and principles in a specific trade.

	and needs.			
2. Training	This step is aimed at shaping the behaviour of the trainee from un-skilled to skilled behaviour	1. Explicitly describe a task and procedure of performing the task. 2. Break tasks into smaller segments. 3. Demonstrate using models and where practicable, use real materials and components. 4. Repeat difficult and high risk task at slow tempo to ensure understanding. 5. Give trainee opportunity to replicate short segments of tasks immediately and repetitively. 6. Obtain immediate feedback and give correction.	Training Institution	The trainee should carry out simple procedure in a trade using materials, methods and principles in the specific trade. (Emphasis is on ability to follow correct procedure or steps in executing a task).
3. Practice	This step is aimed at ensuring the performance of skilled behaviour is automatic and effective. Sometimes the activities during practice go on concurrently with those of training.	1. Expressly describe a task and ask trainee to perform complete (full) task. 2. Perform task in realistic situation. 3. Repeat complete task with realistic tempo 4. Obtain feedback and give correction.	Training institution	The trainee should carry out complete (full) task with minimal or no coaching. Use of trainees' judgment is encourage. Assessment is on final outcome (end result)
4.Experience	This step aimed at providing opportunity for trainee to work in the industry learning and developing skills (especially those that cannot be acquired in a simulated environment) from	1. Establish SSC to prepare pre-planned training guideline. 2. Pre-assess organisations for industry training. 3. Enter formal training agreement with organisation ahead of training period. 4. Directly attach trainee to organisation.	Institution, Industry, regulatory organisation, trade union.	The trainee should be fully engaged to work in an organisation learning and working as a temporary staff but working full time under realistic working condition.

		real work situation.	5. Attach trainee to industry supervisor. 6. Ensure daily training activity is recorded in a log book and verified by industry supervisor. 7. Arrange for regular supervision from institution to ensure trainee is actively participating in field work. 8. Arrange for time-release for trainee to report to institution for a review session with and assessment by the institution supervisor and for further instruction to be given.		
5.	Life project/Final Examination	This step requires that trainee executes an approved life project after completing industry training. At the same time, the trainee is preparing for final examination for certification and graduation.	1. The trainee is allowed to propose a life project which must be approved by the institution. 2. Upon completion of the project, the entire project is assessed and the result forms a part of continuous assessment.	Institution	Trainee is allowed to express his/her skills freely without instruction or direct guidance from trainers.

In the outcome column in Table 5.1, *NVQ Level 1* refers to competence in the performance of a range of varied work activities, most of which may be routine and predictable. For example: a student enrolled for NVQ Level 1 Wood Occupations (Construction) would study how to assemble joints, using hand tools, drawings, calculations, timber adhesives and fixing devices. For NVQ Level 1 Trowel Occupations (Construction), the student is introduced to tool handling skills and the preparation and use of materials of the trade. NVQ Level 1 Decorative Occupations covers tools and equipment and surface preparation and decoration.

At NVQ Level 2, the competence is in a significant range of varied work activities, performed in a variety of contexts. Some of the activities are complex or non-routine, and there is some individual responsibility or autonomy. Collaboration with others, perhaps through membership of a work group or team, may often be a requirement For example: topics covered under NVQ Level 2 Carpentry & Joinery (Construction) would include how to assemble joints, door frames, linings, using power hand tools, trussed roofing, site work and joinery. NVQ Level 2 Brickwork covers construction methods and wall-building techniques. Painters and decorators move on to preparing work/areas/surfaces and learning about paint and wallpaper application techniques, including stencilling and marbling.

Table 5.2: Details of the Harmonised Framework for Training of Senior Secondary School Graduates (NVQ3 qualification)

Main Step	**Brief Description**	**Key Activities**	**Responsible Role**	**Outcome**
1.Education	This step emphasized trade focused education; it is entirely delivered in the training institution. It aims at preparing the trainee for a career in craft. The trainee undergoes classroom teaching of theory which covers: Trade specific education that takes into consideration industry's peculiarities and needs.	1. Identity institutions with requisite facilities and manpower to deliver the training. 2. Identify relevant general education subjects that will build the trainees understanding of trade focused theory. 3 Institution and Industry to jointly develop trade focused theory curriculum to ensure that industries peculiarities are covered.	Regulatory organisations, Training institution	The trainee should acquire considerable knowledge sufficient to sit and pass: 1. NVQ3 Qualification examination. 2. The trainee should know and understand materials, methods and principles in a specific trade.

2. Training	This step is aimed at shaping the behaviour of the trainee from un-skilled to skilled behaviour	1. Explicitly describe a task and procedure of performing the task. 2. Break tasks into smaller segments. 3. Demonstrate using models and where practicable, use real materials and components. 4.Repeat difficult and high risk task at slow tempo to ensure understanding. 5. Give trainee opportunity to replicate short segment of task immediately and repetitively. 6. Obtain immediate feedback and give correction.	Training Institution	The trainee should carry out simple procedure in a trade using materials, methods and principles in the specific trade. (Emphasis is on ability to follow correct procedure or steps in executing a task).
3. Practice	This step is aimed at ensuring the performance of skilled behaviour is automatic and effective. Sometimes the activities during practice go on concurrently with those of training.	1. Expressly describe a task and ask trainee to perform complete (full) task. 2. Perform task in realistic situation. 3. Repeat complete task with realistic tempo 4. Obtain feedback and give correction.	Training institution	The trainee should carry out complete (full) task with minimal or no coaching. Use of trainees' judgment is encourage. Assessment is on final outcome (end result)
4.Experience	This step aimed at providing opportunity for trainee to work in the industry learning and developing skills (especially those that cannot be acquired in a simulated environment) from real work situation.	1. Establish SSC to prepare pre-planned training guideline. 2. Pre-assess organisations for industry training. 3. Enter formal training agreement with organisation ahead of training period. 4. Directly attach trainee to organisation. 5. Attach trainee to industry supervisor. 6. Ensure daily training activity is	Institution, Industry, regulatory organisation, trade union.	The trainee should be fully engaged to work in an organisation learning and working as a temporary staff but working full time under realistic working condition.

		recorded in a log book and verified by industry supervisor. 7. Arrange for regular supervision from institution to ensure trainee is actively participating in field work. 8. Arrange for time-release for trainee to report to institution for a review session with and assessment by the institution supervisor and for further instruction to be given.		
5.Life project/Final Examination	This step requires that trainee execute an approved life project after completing industry training. At the same time, the trainee is preparing for final examination for certification and graduation.	1. The trainee is allowed to propose a life project which must be approved by the institution. 2. Upon completion of the project, the entire project is assessed and the result forms a part of continuous assessment.	Institution	Trainee is allowed to express his/her skills freely without instruction or direct guidance from trainers.

Similar to Table 5.1, in the outcome column in Table 5.2, Level 3 refers to competence in a broad range of varied work activities performed in a wide variety of contexts most of which are complex and non-routine. There is considerable responsibility and autonomy, and control or guidance of others is often required. For example: NVQ Level 3 Carpentry & Joinery (Construction) should extend the student's knowledge to cut roofing and wood machining. For bricklayers, complex setting out and walling details are covered. Painters and decorators address specialist surface finishes.

5.2 Validation of the Harmonised Framework: Approach and Objectives

After the development of the proposed framework, seven (7) focus group discussions were conducted with participants from four stakeholder groups (the employers of craft skills workers, the training institutions, the craft skills workers and the training regulatory body). The aim of the focus group discussion was to validate the proposed framework in terms of its appropriateness and relevance to the target audience. The essence of validation of a framework is to determine that it accurately represents the social phenomena to which the research refers (Hammersley, 1990). Similarly, Lawrence (2003) asserts that validity means truthful, referring to the bridge between construct and the data. In addition, Bryman (2008) sees validity as the integrity of the conclusions that are generated from a piece of research. Consequently, Ibrahim (2007) citing Smith (1993) asserts that complex and non-quantitative models could be validated using qualitative approaches by way of interviews and survey techniques. In a similar vein, Adogbo, (2013) concludes that when it is demonstrated that a proposed framework has relevance and it has more strengths and/or fewer weaknesses than some other existing frameworks, then the validation function has been met. This research therefore uses focus group discussions to validate the proposed framework. All the discussions were done under a workshop setting, starting with a short presentation on the background to the study and followed by presentation of the proposed framework. On average, each workshop lasted two hours. After the discussions, the participants were given questionnaire-type validation guide (see Appendix VI) to fill and return immediately.

Specific objectives of the validation were as follows:

i. Assessing the adequacy and relevance of the components of the proposed frameworks;
ii. Assessing the underlying logic in the causal relationships between the different components of the frameworks;

iii. Assessing the usefulness, practicality and applicability of the proposed frameworks in the construction industry; and

iv. Assessing the strengths and weaknesses of the proposed frameworks;

From the outcome of the discussions and the questionnaire-type evaluation, the data were analysed using the conceptual content technique and presented below.

5.2.1 Characteristics of the Participants

A total of twenty seven (27) participants from seven (7) different organisations were involved in the focus group discussions. Of the seven focus groups, three (3) are construction organisations; one is a technical and vocational training regulatory organisation while the remaining three are vocational and technical training institutions. The number of participants in each focus group varies. In the construction organisations, five participants were involved in each focus group discussion; three participants are within the management/senior staff level while two participants are within the middle manpower level (the craft workers). In the remaining organisations, three participants were involved in each discussion. The summary of the participants is shown in figure 5.3.

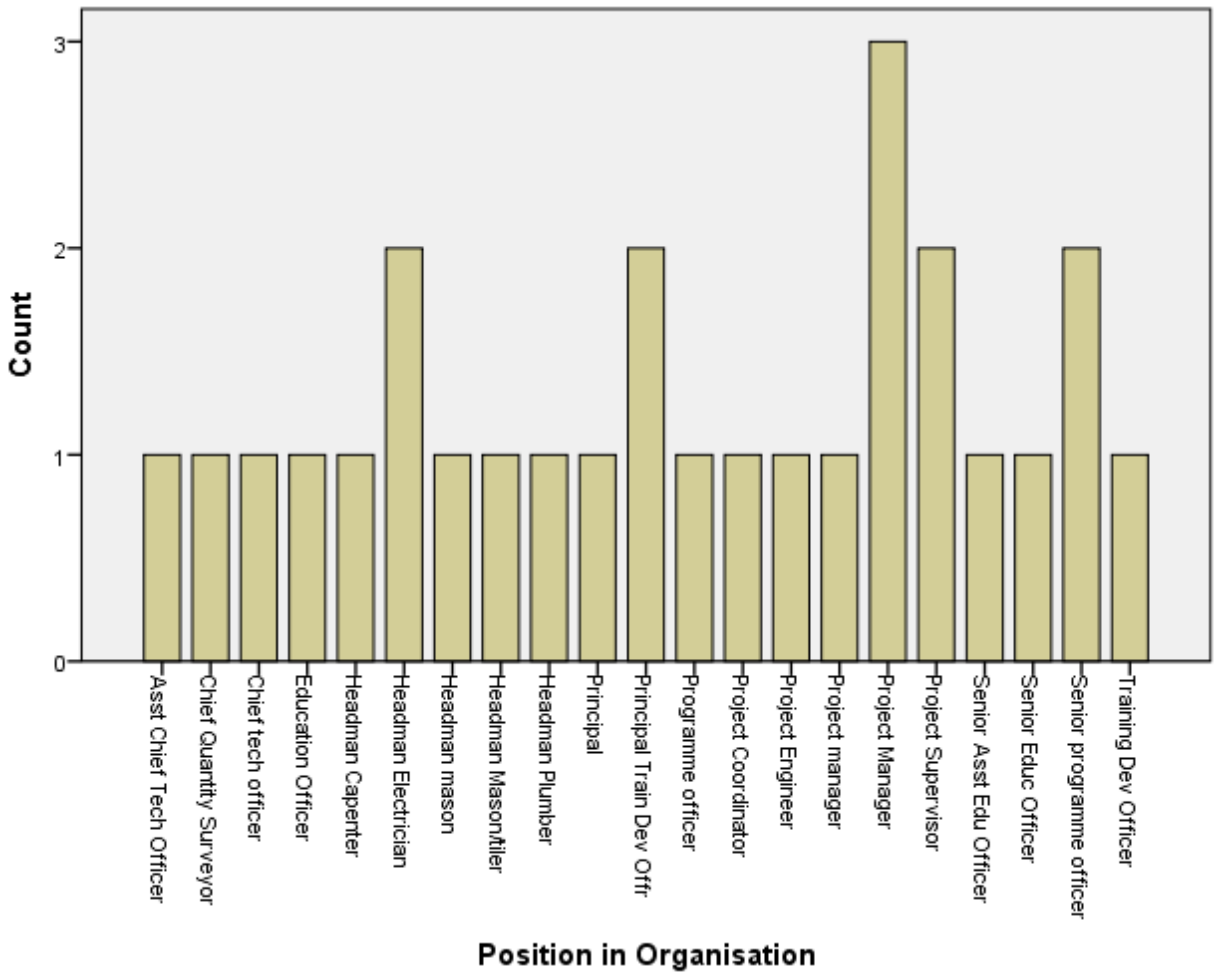


Figure 5.3: Status of Discussants

5.2.3 Analysis and Discussions of the Focus Groups

In analysing the focus group discussions using the principles of constant comparative analysis, the opinions of the participants have been homogenized but where necessary, the opinion of a specific group of discussants are highlighted. In complying with the confidentiality requirements, the researcher has kept the identities of the discussants anonymous.

5.2.4 The Adequacy and Relevance of the Various Components of the Framework

The proposed framework consists of four components but for the purpose of clarity and ease of understating, two components are combined together because the operations are carried out almost simultaneously. The participants in the focus group discussions were requested to assess the adequacy of the various components on a scale of 1 to 5: where 1= very low; 2= low; 3= moderate; 4= high and 5= very high. The distribution of the mean scores of the twenty seven (27) discussants on the adequacy of the components shows that all the components are adequate given that the discussants rated all the components above high. The summary of the result is shown in Table 5.3:

Table 5.3: Adequacy of components of the frameworks

Components	N	Mean	Std. Deviation
Experience	27	4.15	.864
Education	27	3.81	.681
Training and Practice	27	3.67	1.109

Source: Field Survey (2014)

On the relevance of the components of the framework, the response also shows a high rating as presented in Table 5.4:

Table 5.4: Relevance of the Components of the Frameworks

Components	N	Mean	Std. Deviation
Experience	27	4.81	.483
Education	27	4.52	.643
Training and Practice	27	4.48	.509

Source: Field Survey (2014)

The high mean scores presented in Table 5.4 indicate that the discussants considered all the components of the frameworks highly relevant in training construction craftsmen in Nigeria. This corroborated the assertions of Lussier and Shandrick (2006) and IAFC (2003) that Education, Training, Practice and Experience (Self Development) are the components of effective skills training.

5.2.5 The Adequacy of the Recommended Ratio of the Institution to Industry Training

Table 5.5: Adequacy of Recommended Ratio of Institution to Industry Training

Recommended Ratio	N	Mean	Std. Deviation
Institution training 60%	27	3.37	.792
Industry Training 35%	27	4.00	1.000
Life project in institution/final examination 5%	27	3.63	1.149

Source: Field Survey (2014)

The result of the assessment by the discussants on the adequacy of the recommended ratio of training in the institution and the industry is shown in Table 5.5. The mean ratios obtained in the result indicate that the discussants considered the ratios adequate for both the three and two years programme. Some of the respondents opined that it is possible to finish institution training in two years for the three years programme and one year for the two years programme and dedicate an average of one year for industry training. The discussants are of the view that this arrangement will enhance understanding and development of skills while on training. In addition, it was explained that the experience acquired may increase the chances of the trainees obtaining employment in the industry and increasing the chances of building a career in the industry.

On the relevance of the recommended ratio, Table 5.6 indicates a high mean ratio across the discussants. This shows that the discussants attach relevance to the recommended ratios for both

the institution and industry training. The discussants view a mixture of training in the institution and the industry as appropriate drawing from the arguments the existence of mismatch between current training in the institutions and the existing requirement of the industry. In addition, some discussants opined that utilizing the facilities of the industry will guarantee learning with current equipment, since the industry is ahead of the industry in obtaining modern equipment; hence eradicating complaints by employers that newly employed craftsmen lack skills in using modern equipment.

Table 5.6 Relevance of Recommended Ratio of Institution to Industry Training

Recommended Ratio	N	Mean	Std. Deviation
Industry training 35%	27	4.67	.555
Institution training 60%	27	4.41	.694
Life project in institution/final examination 5%	27	4.37	1.079

Source: Field Survey (2014)

5.2.6 The Underlying Logic between the Components of the Framework

The framework comprises of four related components with a proposed recommended ratio for achieving the components. The discussants were requested to assess the necessity and relevance of the underlying logic between the components on a scale of 1 to 5: where 1= very low, 2 = low, 3 = moderate, 4 = high and 5 = very high. The results of the evaluations are shown in Tables 5.7 and 5.8.

Table 5.7: The Necessity of Underlying Logic between Components of the Framework

Causal Relationship	N	Mean	Std. Deviation
Education	27	4.22	.801
Training	27	4.26	.712
Practice	27	4.59	.636
Experience	27	4.41	.844

Source: Field Survey (2014)

Agreeing with the results in Tables 5.5 and 5.6, the discussants considered the relationship between the components of the framework as suitable and highly necessary. All the components are rated high with overall mean score above 4.0 indicating that it is compulsory and needful to deliver all the components of the framework for effective skills training. In terms of logic, the discussants hold the view that it is logical to deliver the training as proposed in the framework. It was highlighted that skills development follows a sequence and the framework has properly captured it. Some discussants reiterate that if the proposed framework is followed, quality of craftsmen will improve thereby improving quality of workmanship, productivity and cost savings by eliminating unnecessary rework. A few discussants however still hold the view that regardless of education, some people can still acquire and apply skills effectively. Eventually, most of those few discussants changed their opinion on the argument that education most not necessary be conventional education.

Table 5.8: The Relevance of Underlying Logic between Components of the Frameworks

Causal Relationship	N	Mean	Std. Deviation
Education	27	4.44	.801
Training	27	4.44	.641
Practice	27	4.59	.694
Experience	27	4.33	.961

Source: Field Survey (2014)

On the appropriateness of the underlying logic between the components of the framework, the discussants rated the proposed framework high with a minimum mean value of 4.33. This suggests that the discussants agree that the relationship between the components of the framework is suitable.

5.2.7 The Usefulness, Practicality and Applicability of the Proposed Framework

The results of the assessment of the efficacy of the frameworks in terms of their usefulness, practicality and applicability in achieving their primary objectives as tools for training craftsmen in the construction industry is presented below. The evaluations were based on a scale of 1 to 5 where 1 means not useful, not practicable and not applicable, while 5 means very useful, very practicable and very applicable. Table 5.9 presents the summary of the assessment indicating that the discussants perceived the frameworks to be useful, applicable and practicable. Some of the discussants believed that the frameworks if implemented will bridged the gap between institutions' training and industry requirement. The general concern of the discussants is that, most construction organisations may not be willing to participate except where new jobs are guaranteed as incentive. Another concern is how the stakeholders will become aware of the framework. Diverse opinions were held on this, while some discussants advised that the frameworks be published, others feel they should be made available to regulators of technical training who should initiate the establishment of the stakeholder group for implementation. Following the large response received in favour of the frameworks, the frameworks were thus adopted in their present form.

Table 5.9: Overall Efficacy of the Frameworks

	N	Mean	Std. Deviation
Usefulness	27	4.33	.961
Practicality	27	3.96	.808
Applicability	27	3.93	.874

Source: Field Survey (2014)

5.2.8 Strengths and Weaknesses of the Framework

The strengths of the harmonised framework noted by the discussants include:

i. The system has provided means of complementing institution and industry training through partnership in training.
ii. The framework provided a systematic process of training skills workmen in Nigeria.
iii. The system has ensured trainees learn useful skills since guidelines will state specific skills to acquire in the industry.
iv. The system has provided avenue for collaboration between industry and institution.
v. The system has bridged the gap between training and practice.
vi. The system has eliminated the rejection of trainees by organisations.
vii. The system has provided avenue for learning on the job.
viii. The framework has made provision for compulsory field work, which is very important in skills training.
ix. The system has provided for placement of trainees in organisations for field training, which is a problem in existing training system.
x. The proposed system will motivate trainees to remain in skills trades since employment is guaranteed.

xi. The system will reduce disparity between industry requirement and training in the institution

xii. The framework will provide avenue for trainees to learn to the job which is lacking in the current system

xiii. The system will help develop and replace ageing middle-level manpower of the construction industry.

xiv. The system will help prevent unemployment since graduate of technical institutions will be employable in the industry.

xv. The framework has captured both general and trade focused education.

xvi. The framework has provided an excellent means of ensuring trainees get quality field experience by ensuring the organisations they are sent is already approved.

xvii. It creates a good relationship between the schools, industries, NBTE, and the private sector.

xviii. The framework emphasised practical training in the institution and the industry, which is good and necessary in skills training.

xix. The inclusion of mandatory industry training in very good and will enhance skilled acquisition.

xx. The system has streamlined technical skills training in the construction industry.

xxi. The framework is an avenue for cross-fertilisation of ideas and experience.

xxii. The framework has provided avenue for standardization of training

xxiii. The system has made provision for improvement of workmanship, productivity and quality of technical school graduate in Nigeria.

The Weaknesses of the harmonised frameworks noted by the discussants includes:

i. For proper implementation of the framework, manpower must be provided.
ii. Smaller organisations who are the majority in Nigeria may not be able to engage trainees due to fear of cost.
iii. Organisations may shy away from participating due to fear of additional cost.
iv. The system will require more funds from industry and institution to succeed.
v. Employers may find it difficult to cope with additional cost in terms of payment of stipend to trainees
vi. It may be difficult to bring stakeholders together to develop guideline for training especially in the industry.
vii. The Nigerian 6-3-3-4 system may have to be adjusted to accommodate this system.
viii. The framework may suffer problem of implementation, especially because employers are very concerned about cost of training and possibility of employees leaving after receiving training.
ix. The organisations may not have enough time to train since most organisations are concerned about profit only, so will concentrate on productivity rather than training.
x. Lack of cooperation from industry in absorbing trainees for practical training may pose a challenge.
xi. There may not be sufficient organisations to absorb trainees.

CHAPTER 6: SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Summary of Findings

i. Acquisition of education either before training or during training will enhance training delivery, as such, the developed framework has provided for trainees to acquire education before or during the training.

ii. The framework has de-emphasized theory and emphasized practical content in training craft skills. This will enhance skills acquisition during training.

iii. Focus on trade education as opposed to conventional education does not assist trainees in acquiring trade focused theories during training. The developed framework has therefore emphasized trade education to enhance understanding of theory in the trades while skills are acquired.

iv. The developed framework has eliminated mismatch between training and industry needs by utilizing institution and industry as platform for training.

v. The 5% ratio for IT in most frameworks is inadequate as such the developed framework has increased it to 35% at the least to enhance acquisition of experience.

vi. Pre-assessment of companies, direct placement of trainees in organizations and development of pre-planned guideline for IT is essential for effective crafts skills training. The developed framework has therefore provided for companies to be assessed before trainees are sent for IT.

vii. Delivery of training on industry basis will ensure that issues peculiar to specific industry are addressed as such, the developed framework has provided for training to be delivered on industry basis.

6.2 Conclusion

This research evaluates existing frameworks for training craft skills in Nigeria and found that different methodologies are used by technical institutions to train technical workers, there is generally no collaboration between industry and institutions to train craftsmen which has resulted in mismatch between industry need and the training delivered in institutions. The study further assessed the performance of craftsmen in the industry and found that craftsmen are largely lacking in practical skills but have adequate general education. Employers of craft skills suggested that emphasis should be on acquisition of hands-on skills and trade focused theory instead of general education. Finally the study concludes that technical training should be delivered in a collaborative manner, utilizing the strengths of one party to complement the weaknesses of the other in order to address the mismatch that existed between industry need and institution's training. Based on the identified strengths and weaknesses of the existing frameworks and the suggestions of stakeholders, a unified framework for training construction craft skills was developed and evaluated.

6.3 Recommendations

i. In order to address issues that are peculiar to construction industry, a sector specific technical training institutions that will emphasise training of skills workmen should be established.
ii. The proposed framework for training of construction craftsmen should be adopted and policy drafted for its implementation in Nigeria.
iii. To address the problem of mismatch between training in technical institutions and requirements of industry, there is need to deliver technical training in a collaborative

manner through the establishment of stakeholder group such as Sector Skills Council (SSC) in UK and the sector skills councils in the recently approved NVQF.

iv. List of construction trades in technical institutions should be updated to capture more trades like scaffolding, formwork, plant operation and maintenance.

v. Arrangement should be made for trainers in technical institutions to regularly update their skills in the industry.

vi. Industrial training aspect of technical training should be emphasised and strengthened through collaboration between institutions and industry for identification, assessment, listing and direct placement of trainees in organisations to acquire industry experience.

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APPENDICES

APPENDIX I: List of Federal Science and Technical Colleges in Nigeria

Institution	State
FSTC Ohanso	Abia State
FSTC Uyo	Akwa Ibom State
FSTC Otukpo	Benue State
FSTC Lassa	Borno State
FSTC Kafanchan	Kaduna State
FSTC Zuru	Kebbi State
FSTC Yaba	Lagos State
FSTC Kuta	Niger State
FSTC Ijebu Mushin	Ogun State
FSTC Ilesha	Osun State
FSTC Jalingo	Taraba State
FSTC Orozo	Abuja FCT
FSTC Tungbo	Bayelsa State
FSTC Ikare Akoko	Ondo State
FSTC Uromi	Edo State
FSTC Michika	Adamawa State
FSTC Usi	Ekiti State
FSTC Awka	Anambra State
FSTC Ahoada	Rivers State

Source: NBTE, 2011

APPENDIX II: List of State Technical Colleges and Vocational Centers in Nigeria

Institution	Town	State
Aba Boys' Technical College	Aba	Abia State
Aba Girls' Tech. College Ania	Ohafia	Abia State
Government Technical College	Yola	Adamawa State
Government Technical College	Ikot Ada Idem	Akwa Ibom State
Community Technical College	Ikot Akata	Akwa Ibom State
Government Technical College	Abak	Akwa Ibom State
Union Technical College	Ikpa Eket	Akwa Ibom State
Government Technical College	Onitsha	Anambra
Government Technical College	Gadau	Bauchi State
Government Technical College	Gumau	Bauchi State
Government Technical College	Ekowe	Bayelsa State
Government Technical College	Makurdi	Benue State
Government Technical College	Bama	Borno State

Government Girls' Technical College	Damboa	Borno State
Community Technical College	Ikot Effanga Mkpa	Cross River State
Government Technical College	Ogoja	Cross River State
St. Patrick's Technical College	Ugep	Cross River State
Bendi Technical College	Bendi	Cross River State
Government Technical College	Issele-Uku	Delta State
Government Technical College	Otogor Ughelli	Delta State
Government Technical College	Ozoro	Delta State
Utagbe-Ogbe Technical College	Kwale	Delta State
Government Technical College	Agbor	Delta State
Government Technical College	Sapele	Delta State
Government Technical College	Abakaliki	Ebonyi State
Government Technical College	Afikpo	Ebonyi State
Government Technical College	Afuze	Edo State
Government Technical College	Benin-City	Edo State
Government Technical College	Igarra	Edo State
Government Technical College	Enugu	Enugu State
Government Technical College	Nsukka	Enugu State
Government Technical College	Ado-Ekiti	Ekiti State
Government Technical College	Otun Ekiti	Ekiti State
Government Technical College	Ijero	Ekiti State
Government Technical College	Ikole	Ekiti State
Government Technical College	Kumo	Gombe State
Ahiara Technical College	Ahiazu	Imo State
Osu Technical College	Okohia Mbano	Imo State
Okporo Technical College	Orlu	Imo State
Government Technical College	Owerri	Imo State
Government Technical College	Malali	Kaduna
Government Technical College	Kano	Kano State
Government Technical College	Wudil	Kano State
Government Technical College	Bagauda	Kano State
Government Technical College	Ungogo	Kano State
Government Commercial College	Mai Adua	Katsina State
Government Technical College	Charanchi	Katsina State
Government Technical College	Funtua	Katsina State
Government Technical College	Ingawa	Katsina State
Government Technical College	Mashi	Katsina State
Government Technical College	Bunza	Kebbi State
Government Technical College	Zuru	Kebbi State
Government Technical College	Mopa	Kogi State
Government Technical College	Oboroke	Kogi State
Government Technical College	Ankpa	Kogi State

Government Technical College	Odu	Dekina
Government Technical College	Idah	Kogi State
Government Technical College	Esie-Illudun	Kwara State
Government Technical College	Ilorin	Kwara State
Government Technical College	Patigi	Kwara State
Government Technical College	Erin-Ile	Kwara State
Amodu Osungbolu Technical College	Kwara State	
Government Technical College	Ado-Soba	Lagos State
Government Technical College	Ikorodu	Lagos State
Industrial Manpower Dev. CentreOdomola	Ekpe	Lagos State
Government Technical College	Ikotun	Lagos State
Government Technical College	Mushin	Lagos State
Government Technical College	Minna	Niger State
Government Technical College	Iyagi	Bida
Government Technical College	New Bussa	Niger State
Government Technical College	Kontagoro	Niger State
Suleiman Barau Technical College	Suleja	Niger State
Government Technical College	Asakio	Nassarawa State
Government Technical College	Okitipupa	Ondo State
Government Technical College	Owo	Ondo State
Government Technical College	Iwaro-Oka	Ondo State
Government Technical College	Idi Aba	Abeokuta
Government Technical College	Ijebu-Ode	Ogun State
Government Technical College	Igbesa	Ogun State
Government Technical College	Ajegunle	Ogun State
Government Technical College	Ijebu-Igbo	Ogun State
Government Technical College	Ilara-Remo	Ogun State
Government Technical College	Ayetoro	Ogun State
Government Technical College	Ile-Ife	Osun State
Government Technical College	Oshogbo	Osun State
Government Technical College	Ilesha	Osun State
Government Technical College	Oyo	Oyo State
Government Technical College	Ogbomosho	Oyo State
Government Technical College	Igbo-Ora	Oyo State
Government Technical College	Saki	Oyo State
Government Technical College	Agodi	Ibadan
Prospect Continuing Education Centre	Ibadan	Oyo State
Government Technical College	Bukuru	Plateau State
Government Technical College	Port-Harcourt	Rivers State
Government Technical College	Ahoad	Ele-Ogu
Government Technical College	Tombia	Rivers State
Government Technical College	Farfaru	Sokoto State
Government Technical College	Runjin	Sokoto State

	Sambo	
Government Technical College	Binji	Sokoto State
Government Technical College	Geidam	Yobe State
Government Technical College	Kaura Namoda	Zamfara State
Government Technical College	Mubi	Adamawa State
Government Technical College	Numan	Adamawa State
Government Technical College	Soba	Kaduna State
Government Technical College	Kajuru	Kaduna State
Government Commercial College	Zaria	Kaduna State
Government Commercial College	Makarfi	Kaduna State
Government Technical College	Gembu	Taraba State
Government Technical College	Bali	Taraba State
Government Technical College	Takum	Taraba State

Source: NBTE, 2011

APPENDIX III: Differences in the Existing Training Frameworks

Themes/Institutions	FSTC	STC	BATC	ITF	NDE	IIT
Education/Entry requirement	i.Theory is generic including courses like chemistry, mathematics and physics.	i.Theory is generic including courses like chemistry, mathematics and physics.	i.Theory is generic including courses at Junior Secondary School like English language, mathematics, Integrated science etc.	i.Foundation theory is trade specific.	i.No emphasis on theory.	i.Foundation theory is trade specific.
	ii.Formal education is a basic entry requirement for admission.	ii.Formal education is a basic entry requirement for admission.	ii.Formal education is not a basic entry requirement except for trainees who desired to continue with formal education.	ii. Formal education is a basic requirement for admission.	ii.Formal education is desirable but not a basic entry requirement for admission.	ii.Formal education is a basic requirement for admission.
	iii.Institution has both junior and senior secondary schools.	iii.Technical college starts at senior school level only.	iii.Training is at Junior secondary school level which can best be described as introductory school.	iii.Training is for SSCE graduates and Graduates of Universities and Polytechnic.	iii.Training is for both educated and uneducated adults.	iii.Training is for Graduates of University, Polytechnic and SSCE.
	iv.Entry requirement is JSCE with minimum of four credits including English and mathematics.	iv.Entry is JSCE with minimum of four credits with English and mathematics and graduates of BATC with NABTEB modular certificate.	iv.Entry requirement is primary school certificate with provision for people without formal education.	iv.Entry requirement is evidence of completion of University or Polytechnic and SSCE with credits in relevant courses.	iv.Formal education is not required for admission, candidate should just attain the age of 18 years or more and have interest in acquiring skills.	iv.Entry requirement is evidence of completion of University or Polytechnic and SSCE with credits in relevant courses. Candidate must be male and 17 years minimum.

Training/Practice	i.The only means of training and practice is in classroom and workshop. ii.Burden of training is on government only	i.The only means of training and practice is in classroom and workshop. ii.Burden of training is on government only	i.The only means of training and practice is in classroom and workshop. ii.Burden of training is on government only	i.The only means of training and practice is in classroom and workshop. ii. Burden of training is shared between government and trainees.	i.Training and practice is in workshop only through demonstration by the Instructor, theory is de-emphasised. ii.Burden of training is on government only.	i.Training is done both in classroom and workshop through demonstration by the Instructor ii.Burden of training is shared amongst training partners.
Experience	i.IT is the only means of acquiring experience. ii.IT is for a period of three (3) months during long vocation of second year of training iii.It is entirely the responsibility of the trainee to source for IT placement. iv.There is no pre-planned training guidelines for use in the industry during IT.	i. IT is the only means of acquiring experience ii.IT is for a period of three (3) months during long vocation of second year of training iii.It is entirely the responsibility of the trainee to source for IT placement. iv.There is no pre-planned training guidelines for use in the industry during IT.	i. IT is the only means of acquiring experience ii.IT is for a period of Nine (9) months Starting from end of third term of second year of training iii.It is entirely the responsibility of the trainee to source for IT placement. iv.There is no pre-planned training guidelines for use in the industry during IT.	i. IT is the only means of acquiring experience ii.IT is for a period of one (1) month at the end 1st and 2nd Module of training. iii.Trainees are encouraged and guided to source IT placement. iv. The institution planned what trainee should learn during IT and is monitored through visits by a supervisor from the institution who assessed the trainee's signed log book.	i.Experience is acquired through site work as opportunity warrant.	i.Experience is acquired through direct attachment to organisation. ii.Attachment is for a period of nine months starting from end of first year of training. iii.Attachment is arranged by the training institution and partner organisations. iv.The institution and the partner organisation jointly prepared training guidelines for use while on attachement. v.Trainees are jointly assessed by institution and industry supervisors.

APPENDIX IV: Strengths of the Existing Training Frameworks

Institutions/Themes	FSTC	STC	BATC	ITF	NDE	IIT
Education/ Entry requirement.				i.Foundation theory is trade focused.		i.The System provides a mechanism for screening candidates who must possess a specified number of credits in relevant subjects and must pass an entry examination before admitted.
				ii.SSCE being the minimum entry requirement placed candidates on a better platform to decide on future career.		ii.Foundation theory is trade focused.
						iii.SSCE being the minimum entry requirement placed candidates on a better platform to decide on future career.
Training/Practice				i.Facilities for training are relatively adequate and modern. Training consumables are provided for each trainee.		i.The use of experience retired and currently serving industry workers as instructors provides stream of instructors with up to date knowledge and skills.
				ii.Trainers are frequently re-trained both within and outside Nigeria. Trainers also go on IT to ensure they are current with industry practice and requirements.		ii.Use of modern facilities for demonstration during training in the institution eased understanding and provide good basis for familiarisation with industry facilities.

		iii.The familiarity of the instructors with current facilities and practice in the industry ensure proper coaching is giving to trainees during practice. iv. Trainees carry out individual workshop practice and ensure instructors have sufficient time to monitor what students are learning.
Experience	i. Trainees have Nine (9) months duration for IT which is viewed as reasonable.	i.The system provides nine (9) months period for industry training which is about 38% of the entire duration of the training. ii.The system provides a mechanism for securing placement for IT directly by the institution through partnership with the industry. iii. The system provides mechanism for assessing the capability of the partner organisations in terms of facilities and availability/qualification of industry trainer to provide desired IT.

iv.The joint preparation of training guidelines by the training institution and the partner organisation ensures the acquisition of relevant and employable skills while in the industry.

v.Each trainee is attached to industry instructor whose capacity to provide industry training was assessed.

vi.System of training provides for close monitoring of trainee even while in the industry through weekly visit to the institution by the trainee for review of performance and further instruction.

vii.The system has close partnership with the industry in providing training. It has a list of partner organisations that have agreed to provide opportunity for industry training.

APPENDIX V: Weaknesses of the Existing Training Frameworks

Institutions/Themes	FSTC	STC	BATC	ITF	NDE	IIT
Available programmes	i.The system treats trades on general level, no emphasis on industry.	i. .The system treats trades on general level, no emphasis on industry.	i.Attempts to provide industry specific training but only on few trades.	i.The system emphasised manufacturing and production industry, only few trades are relevant to construction industry.	i.Attempts to provide industry specific training on several trades, but still, there is no provision for some trades likes scaffolding and construction plant operation and maintenance.	i.The system emphasised manufacturing and production industry, only few trades are relevant to construction industry.
	ii.Several construction trades are either not available completely or embedded in other trades e.g. scaffolding, construction plant operation and maintenance, iron fitting (bending), formwork, roofing etc.	ii.Several construction trades are either not available completely or embedded in other trades e.g. scaffolding, construction plant operation and maintenance, iron fitting (bending), formwork, roofing etc	ii.Several construction trades are either not available completely or embedded in other trades e.g. scaffolding, construction plant operation and maintenance, iron fitting (bending), formwork, roofing etc	ii. Several construction trades are either not available completely or embedded in other trades e.g. scaffolding, construction plant operation and maintenance, iron fitting (bending), formwork, roofing etc.		ii. Several construction trades are either not available completely or embedded in other trades e.g. scaffolding, construction plant operation and maintenance, iron fitting (bending), formwork, roofing etc.
Education/ Entry requirement.	i.The content of most subjects is not trade focused but general (e.g Physics, Mathematics and Chemistry). Often, students find it difficult to cope with the need to concentrate on passing general examinations and acquiring skills on specific trade. ii. JSCE being the requirement for entry makes it difficult for students to appreciate their role upon completion of training, as a result, majority struggle to pass general level of examination at the detriment of acquiring trade skills.	i.The content of most subjects is not trade focused but general (e.g Physics, Mathematics and Chemistry). Often, students find it difficult to cope with the need to concentrate on passing general examinations and acquiring skills on specific trade. ii. JSCE being the requirement for entry makes it difficult for students to appreciate their role upon completion of training, as a result, majority struggle to pass general level of examination at the detriment of acquiring trade skills.	i.The content of most subjects is not trade focused but general (e.g English, Mathematics, and integrated science). Often, students find it difficult to cope with the need to concentrate on passing general examinations and acquiring skills on specific trade. ii. Primary school leaving certificate as entry requirement makes it difficult for trainees to appreciate their role upon completion of training, as a result, majority struggle to pass general education examination at the detriment of acquiring trade skills.		i.The system undermines the importance of foundation theory on specific trades.	i.The system provides training opportunity for males only. Females are denied the opportunity to acquire technical skills.

Training/Practice	i.Difficulty in balancing between conventional education and technical skills training has made the achievement of 70% practical-based learning content impossible. ii.Most of the trainers have lost touch with practice, thus, they lack the requisite skills to demonstrate and supervise workshop practice especially on current industry practice.	i. Difficulty in balancing between conventional education and technical skills training has made the achievement of 70% practical-based learning content impossible. ii. Most of the trainers have lost touch with practice, thus, they lack the requisite skills to demonstrate and supervise workshop practice especially on current industry practice.	i. Difficulty in balancing between conventional education and technical skills training has made the achievement of 70% practical-based learning content impossible. ii. Most of the trainers have lost touch with practice, thus, they lack the requisite skills to demonstrate and supervise workshop practice especially on current industry practice.		i.The system rely on craft masters as trainers, thus, exposing trainees to learning the good and bad skills of the trainer as well as not knowing the principle underlying the trade since the literacy level of some of the craft masters is low.	
Experience	i.The system provides only three months for IT which is less than 10% of the entire duration of the training. ii.The system left the trainee to secure placement for IT at the mercy of the industry.	i.The system provides only three months for IT which is less than 10% of the entire duration of the training. ii. The system left the trainee to secure placement for IT at the mercy of the industry	i.Trainees are left alone to secure placement for IT. No system is in place to pre assessed the organisations providing IT. ii. The system left the trainee to secure placement for IT **at** the mercy of the industry	i.Only one month is provided for IT, this is viewed to be in adequate for acquisition of any reasonable skills and experience in the industry.	i.The system completely undermine the importance of industry training, believing that the trainee can acquire experience from the sole craft master. ii.The assumption that the craft master will always have site to take trainees to acquire field experience may not always be true since the flow of work in the industry is not always regular. The duration of the training is only six (6) months, as such, some sets of trainees may graduate without any field experience.	i.The requirement for trainees to report to their institution ones in a week may not be feasible in construction industry due to the nomadic nature of the industry.

iii.The system lacks pre-planned industry training guide, thus industry training is left to chance.	iii. The system lacks pre-planned industry training guide, thus industry training is left to chance.	iii. The system lacks pre-planned industry training guide, thus industry training is left to chance.	iii.The system undermines the danger of acquiring experience from one master, thus trainees are exposed to acquiring bad skills since it is the craft master that provide both institution and industry training.
iv.The system has a very weak industry supervision mechanism which most times trainees finished IT without anyone institution supervision due to lack of funds.	iv. The system has a very weak industry supervision mechanism which most times trainees finished IT without anyone institution supervision due to lack of funds.	iv. The system has a very weak industry supervision mechanism which most times trainees finished IT without anyone institution supervision due to lack of funds.	iv.The craft master may not have sufficient and current training facilities, therefore, trainees may learn only what the craft master knows.
v.The system lacks mechanism for assessing the capability of the trainees' proposed organisations in terms of facilities and availability/qualification of industry trainer to provide desired IT.	v. The system lacks mechanism for assessing the capability of the trainees' proposed organisations in terms of facilities and availability/qualification of industry trainer to provide desired IT.	v. The system lacks mechanism for assessing the capability of the trainees' proposed organisations in terms of facilities and availability/qualification of industry trainer to provide desired IT.	v. The system lacks pre-planned field experience guide for training since it is the craft master that determines how the field training should go.

APPENDIX VI: Guide to Interview with Craft Skills Workers

CRAFT SKILLS WORKER INTERVIEW QUESTIONS

Interview on the perception of construction craft skills workers on the quality of training in Nigeria

Introduction

This interview is designed to solicit information from you on the quality of training you received while in training institution in Nigeria. The study is part of an ongoing PhD research work in the department of Quantity Surveying, ABU, Zaria, Nigeria. The aim of the study is to develop a unified framework for delivering harmonised training of craft skills manpower of construction industry in Nigeria. All responses will be treated confidentially and strictly for academic purpose. Your contribution is therefore highly appreciated and will add value to this research.
Thank you.

SECTION A:

Background Information

1. Name of respondent...……..
2. Name of respondent's employer……
3. Ownership of respondent's employer organisation ☐Public Sector ☐Private Sector ☐jointly owned
4. Which institution did you obtain your initial training?.....
5. When did you obtain this training?
.....
6. Age of Organisation ☐0 -10 Years ☐11 – 20 Years ☐21 – 30 Years ☐ 31 – 40 Years ☐41 – 50 Years ☐Over 50 Years.
7. Position of respondent in the organisation……..
8. Respondent's years of experience ☐0 -5 Years ☐ 6-10years ☐11 – 15 Years ☐16 – 20 Years ☐ Over 20 Years

9. What is/are the specific areas of your work? ☐Masonry ☐Carpentry ☐Tiling ☐ Roofing ☐Electrical Installation ☐ Mechanical Installations ☐Scaffolding ☐Felting, ☐ Glazing ☐Other (specify please)…….....
.....

SECTION B:

10. What certificate did you obtain upon graduation from craft skills institution?
11. How easy was it for you to be employed upon graduation from craft skills institution?
……..

12. Describe the type of training you got as a student?.....
13. How and where did you acquire experience during your training…….
14. Compare the relevance of the training you got with industry requirement?
.....
15. Did your first employer provide additional training to you when you got employed?.....
16. Which of the two aspect of construction (theory or practice) does your organisation always have to provide additional training on Nigerian trained craft skills graduate upon employment?
17. Where does your organisation obtained additional training for Nigerian trained craft skills graduate upon first employment?
18. On average, compare the performance of Nigerian trained craft skills graduate in terms of quality of workmanship with craft skills workers trained in other countries.
19. Which Nigerian issued craft skills certificate does your organisation finds most acceptable?
20. What difficulty did you experience in the industry upon first employment?
21. What are your suggestions on the way to improve craft skills training in Nigeria.....
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.....……..

Thank you for your time and valuable contribution to this research.

APPENDIX VII: Guide to Interview in Craft Skills Training Institutions

CRAFT SKILLS TRAINING INSTITUTION INTERVIEW QUESTIONS

Interview questions for the development of a unified framework for delivering harmonised training of construction craft skills manpower in Nigeria

Introduction

This interview questions are designed to solicit information from you for the development of a unified framework for delivering harmonised training of construction industry craft skills manpower in Nigeria. The study is part of an ongoing PhD research work in the department of Quantity Surveying, ABU, Zaria, Nigeria. The aim of the study is to examine the existing framework for training craft skills manpower of construction industry in Nigeria. All responses will be treated confidentially and strictly for academic purpose. Your contribution is therefore highly appreciated and will add value to this research.

Thank you.

SECTION A:

Background Information

1. Name of Institution……
……
2. Location of Institution……
……..
3. Ownership of Institution ☐Public Sector ☐Private Sector ☐jointly owned
4. Age of Institution ☐0 -10 Years ☐11 – 20 Years ☐21 – 30 Years ☐ 31 – 40 Years ☐41 – 50 Years ☐Over 50 Years.
5. Which of these areas of craft skills training does your organisation provide (tick as many as apply)? ☐Masonry ☐Carpentry ☐Tiling ☐Roofing ☐Electrical Installation ☐ Mechanical Installations ☐Scaffolding ☐Other (specify please)…….....
6. What is the entry requirement in your training institution?
☐Primary School Certificate ☐Junior Secondary School Certificate ☐ Senior Secondary Certificate of Education ☐No formal education required ☐ Other (specify please)…….

SECTION B:

7. Describe the training framework your institution is using. (Framework- Refers to a written or visual presentation that explains either graphically, or in narrative form, the main things to be studied, the key factors, concepts or variables and the presumed relationship among them).
8. Do you have this framework in written form? (Ask for a copy if available).
9. Describe the nature of training provided by your institution.
10. Would you describe the nature of training provided by your institution as institution based only or Industry based only or a combination of both?
11. What is the average student population in your institution?
12.What is the average student population in each trade?
13. If response in "10" above is industry based or combination of institution and industry, why is your institution using this method?
14. If response in "10" above is industry based or combination of institution and industry, what is the ratio of industry to college training in-use in your training institution?
15. At what period of training does your institution sends trainees to industry and why?
16. What is the duration of training in your institution?
17. Which category of craft skills does your institution provides training for?
18. Does your institution have any training provision for craft skills workers seeking skills upgrade?
19. What is the nature of training delivered in your institution? (Single Skilled focused, Multi-skilled focused etc.)
20. Where does your institution source for trainers? (Industry, Technical College graduates, Polytechnic graduate, University graduate etc.)
21. What is the minimum qualification/experience for trainers?
22. On average how many trainers does your institution have?
23. What is your opinion on the quality of your trainers?
24. How often does your organisation re-train trainers?
25. How often does your organisation make provision for re-training of trainers and where? (Industry in Nigeria or outside Nigeria, College in Nigeria or outside Nigeria)
26. Describe how your institution asses trainee's.
27. Where does your institution source for trainee's assessors?
28. How would you describe the facilities of training in your organisation? (Request to sight them)

29. Describe the adequacy of the facilities in your organisation:
30. What certificate does your institution issue at the end of craft skills training?
31. What is the average class enrolment and what is the designed class size?
32. Kindly suggest ways of improving craft skills training in
Nigeria…….....……
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….....……
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…….…

Thank you for your time and valuable contribution to this research.

APPENDIX VIII: Guide to Interview with Employer of Craft Skills Workers

EMPLOYER OF CRAFT SKILLS LABOUR INTERVIEW QUESTIONS

Interview on the assessment of the quality of Nigerian Trained construction craft skills manpower.

Introduction

This interview is designed to solicit information from you on the quality of Nigerian trained construction industry craft skills manpower. The study is part of an ongoing PhD research work in the department of Quantity Surveying, ABU, Zaria, Nigeria. The aim of the study is to develop a unified framework for delivering harmonised training of craft skills manpower of construction industry in Nigeria. All responses will be treated confidentially and strictly for academic purpose. Your contribution is therefore highly appreciated and will add value to this research.

Thank you.

SECTION A:

Background Information

1. Name of Organisation……

2. Location of Organisation……

3. Ownership of Organisation ☐Public Sector ☐Private Sector ☐jointly owned

4. Age of Organisation ☐0 -10 Years ☐11 – 20 Years ☐21 – 30 Years ☐ 31 – 40 Years ☐41 – 50 Years ☐Over 50 Years.

5. Position of respondent in the organisation……

6.Years of experience in the organisation ☐0 -10 Years ☐11 – 20 Years ☐21 – 30 Years ☐ 31 – 40 Years

7. What are the specific areas of business (work) of your organisation? ☐Masonry ☐ Carpentry ☐Tiling ☐Roofing ☐Electrical Installation ☐ Mechanical Installations ☐Scaffolding ☐General Building Construction ☐ General Civil Engineering Construction ☐ Both Civil and Building Construction ☐ Maintenance work only ☐Other (specify please)…….....

SECTION B:

6. Does your organisation employ Nigerian trained craft skills graduates?

7. Why is your organisation employing/not employing Nigerian trained craft skills workers (if response in "6" is no, change questions)……..

8. Does your organisation finds Nigerian trained craft skills graduate proficient in theory and practice in construction?

9. Which of the two aspect of construction (theory or practice) does your organisation always have to provide additional training on Nigerian trained craft skills graduate upon employment?

10. Where does your organisation obtained additional training for Nigerian trained craft skills graduate upon first employment?

11. On average, compare the performance of Nigerian trained craft skills graduate in terms of quality of
Workmanship with craft skills workers trained in other countries.
12. Which Nigerian issued craft skills certificate does your organisation finds most acceptable?
13. What are your suggestions on the way to improve craft skills training in Nigeria…….....……
……..……
…….....

Thank you for your time and valuable contribution to this research.

APPENDIX IX: Guide to Validation of the Framework

Background to the study

The importance of training construction industry craft skills workers in Nigeria has been emphasized in several researches (Bamisile, 2004; Datoegoem, 2006; Abdullahi, 2010; Odusami and Ene, 2011; Okoye and Chijioke, 2013). Most of the studies suggested the absence of structured and unified framework for training. Specifically some studies complaint that existing training frameworks are unstructured, haphazard and not unified (Datoegoem, 2006; Abdullahi, 2010; Okoye and Chijioke, 2013). This has resulted in shortages of skilled craftsmen and mismatch between training and industry needs (Okoye and Chijioke, 2013). This study therefore aims at developing a harmonised framework for training of construction craft skills workers in Nigeria with the view to providing efficient craft skills manpower for the construction industry.

Attached are the proposed harmonised frameworks that summarises the findings of this research. As part of the requirements for completion of the research, kindly answer the following questions:

a. Position of respondent in the organisation .....……

b. Profession of the respondent……..……

c. Assess the adequacy and relevance of the various components of the proposed framework for training of construction craftsmen in Nigeria. Please add any other component you consider necessary and rate their adequacy and relevance.

Components	Adequacy		Relevance

	Very low	Low	Moderate	High	Very high	Very low	Low	Moderate	High	Very high
Education in the institution										
Training and Practice in the institution										
Experience in the industry										

d. Assess the adequacy and relevance of the recommended ratio of institution to industry training. Please recommend any other ratio you consider appropriate and rate their adequacy and relevance.

Recommended ratio	**Adequacy**						**Relevance**			
	Very low	Low	Moderate	High	Very high	Very low	Low	Moderate	High	Very high
Institution training 50%										
Industry Training 45%										
Life project in institution /final examination 5%										

e. Evaluate the underlying logic in the causal relations between the different components of the structure. Please add any other relations you consider necessary and rate their necessity and relevant

Causal Relationship	**Necessity**						**Relevance**			
	Very low	Low	Moderate	High	Very high	Very low	Low	Moderate	High	Very high
Education										

Training										
Practice										
Experience										

f. Evaluate the usefulness, practicality and applicability of the framework in the construction industry and provide any additional comments you have for improving its effectiveness.

Functions of Components	Very low	Low	Moderate	High	Very high
Usefulness of the framework					
Practicality of the framework					
Applicability of the framework					

g. What are the perceived strengths and weaknesses of the proposed harmonised framework?

Strengths:

i……

ii……

iii……

iv……

v……

Weaknesses:

i……

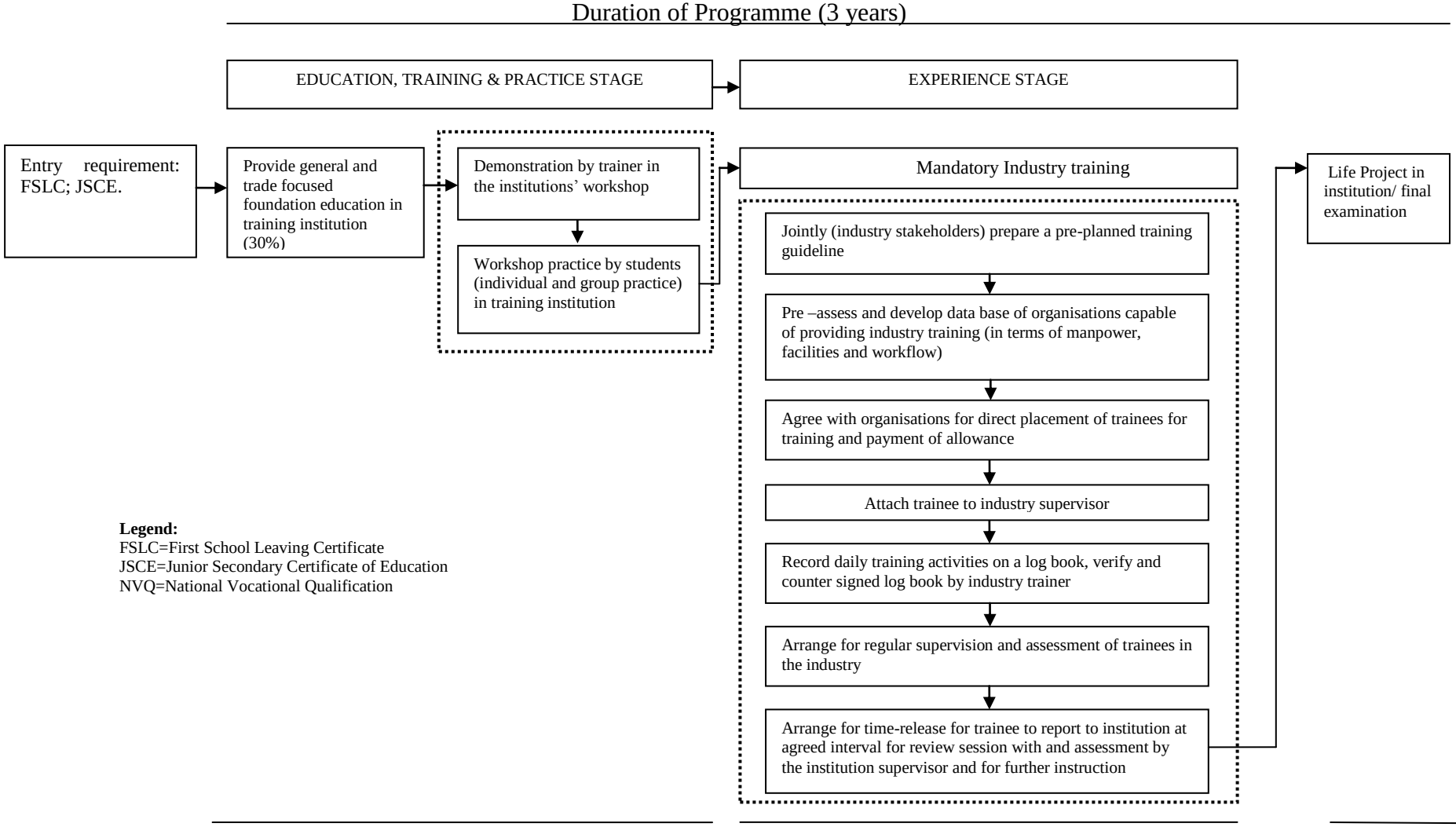
ii……

iii……

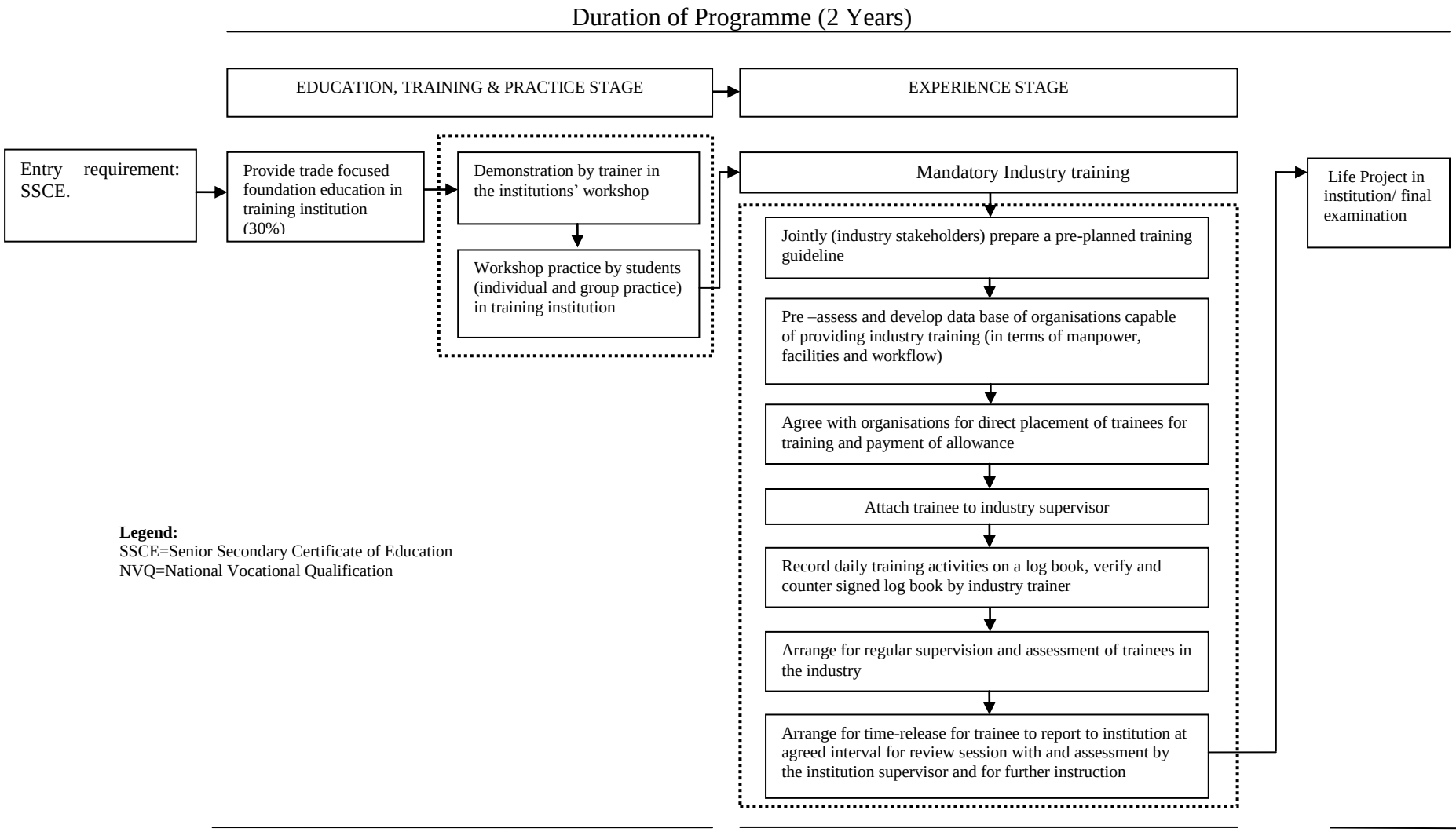
iv……

v……

Suggest ways to improve the framework:


Duration of Programme (3 years)
EDUCATION, TRAINING & PRACTICE STAGE
EXPERIENCE STAGE
Entry requirement: FSLC; JSCE.
Provide general and trade focused foundation education in training institution (30%)
Demonstration by trainer in the institutions' workshop
Workshop practice by students (individual and group practice) in training institution
Mandatory Industry training
Jointly (industry stakeholders) prepare a pre-planned training guideline
Pre –assess and develop data base of organisations capable of providing industry training (in terms of manpower, facilities and workflow)
Agree with organisations for direct placement of trainees for training and payment of allowance
Attach trainee to industry supervisor
Record daily training activities on a log book, verify and counter signed log book by industry trainer
Arrange for regular supervision and assessment of trainees in the industry
Arrange for time-release for trainee to report to institution at agreed interval for review session with and assessment by the institution supervisor and for further instruction
Life Project in institution/ final examination
Legend:
FSLC=First School Leaving Certificate
JSCE=Junior Secondary Certificate of Education
NVQ=National Vocational Qualification
60% of 3 years
35% of 3 years
5% of 3 years

The proposed harmonised framework for training of construction craftsmen (NVQ levels 1 and 2 equivalent)



Legend:
SSCE=Senior Secondary Certificate of Education
NVQ=National Vocational Qualification

50% of 2 years	45% of 2 years	5% of 2 years

The proposed harmonised framework for training of construction craftsmen (NVQ level 3 equivalent)