TRAINING PRACTICES AND TASK PERFORMANCE OF PROFESSIONALS IN CONSTRUCTION FIRMS IN LAGOS AND ABUJA, NIGERIA

BY

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DEDICATION

This thesis is dedicated to GOD, my exceeding joy, the '*Onise iyanu'*, God of awesome wonders. Never could have made it without you.

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LIST OF ABBREVIATIONS AND ACRONYMS

ABS ERR	Absolute Error
AMOS	Analysis of Moment Structures
APE	Absolute Percentage Error
CA	Critical Ability
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CR	Critical Ratio
EFA	Exploratory Factor Analysis
GFI	Goodness of Fit Index
JKS	Job Knowledge and Skills
MAPE	Mean Percentage Error
PER ERR	Percentage Error
RMSEA	Root Mean Square Value
SE	Standard Error
SEM	Structural Equation Modelling
TaPe	Task Performance
TD	Training Delivery
TE	Training Evaluation and Transfer
TLI	Tucker-Lewis Index
TP	Task Proficiency
TrPr	Training Practices

ABSTRACT

Construction organisational and project performance are known to depend on the competencies and performance of professionals. Studies have established that the task performance of construction professionals is low due to inadequate or deficient training. However, issues regarding the relationship between training practices of construction firms and task performance of construction professionals are yet to be adequately explored. The aim of the study is to examine the relationship between training practices of construction firms and task performance of professionals engaged by the firms. The specific objective of the study are to: investigate the prevalent task characteristics among construction professionals, evaluate the effect of construction professionals' personal characteristics on task characteristics, determine the relationship between task characteristics of construction professionals and training practices of construction firms, determine the relationship between training practices of construction firms and task performance of construction professionals and develop a model for predicting the task performance of construction professionals from training practices of construction firms. The objectives were achieved by conducting a field survey involving a sample size of 171 construction professionals and 171 site managers located in Lagos and Abuja, Nigeria. The sample size was selected from a sample frame of 257 construction firms by stratified random sampling. Two research instruments namely: Construction Professionals' Questionnaire and Construction Professional Supervisors' Questionnaire were used to collect data for the study. The instruments were administered to construction professionals using trained research assistants. A total of 218 each of the research instruments returned were valid for analysis representing 85% response rate. Data collected were analysed using percentage, mean score, t-test, ANOVA, Pearson Moment Correlation test and Structural Equation Modeling. From the findings, the study revealed that 12 parameters of task performance and 11 parameters of training practice were significant and they relate positively with one another. The parameters were therefore termed as 12 key task performance indicators and 11 key training practice indicators. From the relationship existing between the two groups of indicators, a model was developed for predicting the task performance of construction professionals from training practices of construction firms. It was also discovered that the characteristics of the tasks performed by professionals engaged by construction firms have a significant relationship with the training practices of their employers. It was therefore concluded that training practices of construction firms influence task performance of construction professionals thus the performance of construction professionals can be assessed using the 12 key task performance indicators while training practices can be implemented in construction firms using the 11 key training practices indicators. It was also concluded that task characteristics of construction professionals affect the training practices of construction firms. Based on the findings, it was suggested that construction firms should use the task performance indicators discovered in the study when appraising the performance of professionals engaged by them and adopt the model developed in setting targets and managing their performance. It was also suggested that training programmes proposed for professionals engaged by construction firms should be based on the characteristics of the tasks performed by them.

KEYWORDS: Construction firms, Construction professionals, Task characteristics, Task performance, Training practices.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

Construction firms in Nigeria employ different professionals with the aim of achieving their specific goals and objectives in terms of cost, time, quality, client and user's satisfaction. Meeting these objectives depend on the performance of individual professional. Despite the importance of professionals in construction firms, Nigerian construction firms are faced with the challenge of low employee performance (Abdullah et al., 2012). The effect is seen in poor project performance which is evident in cost overrun and time overrun (Aibinu & Jaboro, 2002; Dakas, Achuenu & Datok, 2004). It is also evident in organisations' productivity, quality of work and firm's profit (Abdullah et al., 2012).

There has been series of complaints from clients and the populace on low performance of construction professionals. The incessant collapse of buildings and the low quality of work as a result of poor supervision are some of the reasons for concluding that the performance of professionals is low. Poor workmanship, inadequate project planning, wrong estimation, inadequate cost control, the inexperience of workers, inadequate quality control of materials are some of the evidence of low performance by construction professionals (Ayodele & Alabi, 2011).

Some researchers (Mathis 2004; Callistus, Felix, Ernest, Stephen & Andrew; 2014) attribute the low performance of professionals in the construction industry to inadequate training or lack of training. Buttressing further, Suleiman (2013) ascribes low performance of the employee in Nigeria to poor attitude to work which is the direct result of inadequate training and development. Fagbenle, Ogunde and Owolabi, (2011) discover that low performance of construction workers in Nigeria is due to lack of training and this leads to the inability of construction supervisors to plan work, communicate with workers and direct activities adequately on site.

Mwita (2000) describes performance as a multidimensional concept for achieving organisational goals which play an important role in the organisation. Performance has been measured from different perspectives such as subjective performance, objective performance or both. Employee performance (Zang & Morris, 2014), Job performance (Kahya, 2007; Onukwube & Iyagba, 2011), project performance (Aje, Odusami & Ogunsemi, 2009; Nagvi, Bokhari, Aziz & Kashif-ur-Rehman, 2011) and financial and non-financial performance (Mutua, Karanja & Namusonge, 2012) can be measured subjectively and objectively.

Job performance in construction firm comprises task performance, contextual performance and adaptive performance (Koopmans et al., 2011). According to Koopmans et al. (2011), task performance is the measure of competency of an employee in a given task. It is a dimension of job performance; it is also known as job-specific task performance, technical proficiency or in-role performance. Task performance is based on core job tasks and can be measured from the perspective of cognitive ability, job skills and knowledge task proficiency (Ling, 2002). Thus, the aim of these task performance measures is to increase the efficiency and effectiveness of the employee and subsequently, the organisation.

According to Farooq and Khan (2011), when an organisation realizes that its performance is inadequate, training is needed for greater productivity and quality. Siu and Lau (1998) describe training as a process of improving an employee or individual ability in carrying out a present job or organisation role. Training increases productivity and quality, less supervision and greater job satisfaction (Graham & Bennet, 1990). On the other hand, training practice is part of human resource management (HRM) practices. It is a function that requires acquiring knowledge and skills for improvement of performance (Itika, 2011).

The process of carrying out training include training needs assessment, training design, training delivery, training validation and training evaluation (Graham & Bennet, 1990; Armstrong, 2006; Itika, 2011). Previous studies identify training as essential for performance improvement in an organisation (Sultana, Irum, Ahmed, Mehmood, 2012; Abd Rahman, Imm Ng, Sambasivan, Wong, 2013). Huang (2001), Hansson (2007) and Soltani and Liao (2010) measure training variables as duration, employee coverage, delivery methods, intensity and incidence, absolute measures, proportional measures, content measures and emphasis measures. They suggested that when these training variables are implemented by an organisation, the performance of the employer and organisation could be enhanced.

Wexley and Lathham (2002) highlight the need to consider task characteristics in determining training method, thus task characteristics play an important role in training practices. Task characteristics are described as the attribute of the task that motivates an individual leading to the outcome (Indartono & Chen, 2010). Hackman and Oldham (1980) identify task characteristics as skill variety, task identity, task significance, autonomy and feedback. Accordingly, Morgeson, Dierdorff and Hmurovic, (2010) state that employee status determines the design of the job; that is, the personal characteristics of employee relate to their task characteristics. Ameh and Odusami (2014) identify personal characteristics of construction professionals as professional grouping, age, educational and professional qualification.

The importance of training is to increase the productivity of the employee and subsequently the performance of an organisation. A number of studies focus on training in the construction industry. For example, Wang, Goodman, Haas, Glover and Vazari (2010) studied training of craftsmen in US construction industry and concluded that craftsmen's training is economically attractive for the employer. Morgan, Raiden and Naylor (2008) researched on requirement for training and skills development in UK construction industry and concluded that the current construction skills framework fails to reflect the structure, skills and training priorities.

In the Nigerian construction industry, Dzasu and Ayegba (2010) reported that there is poor participation of construction firms in the provision of training programmes for their employees while Abdulazeez, Umar and Abdussalam (2015) discovered that craftsmen are not adequately trained. The focus of most studies on training has been on craftsmen and vocational training. For example, Aniekwu and Ozochi (2010) investigated the training of craftsmen and knowledge acquisition while Dantong, Lekjep and Dassan (2003) worked on the most effective training for construction craftsmen that will optimize productivity in the Nigerian construction industry. Contextually, research on training practices and task performance has shown a relationship (Liu, Gradon & Ash, 2009) but research on training practices in the Nigerian construction industry and their relationship with task performance is relatively scarce, therefore, it is paramount to investigate the relationship between training practices of construction firms in Nigeria and the task performance of construction professionals in construction firms.

1.2 STATEMENT OF RESEARCH PROBLEM

The task performance of professionals has been an issue of concern in the construction industry. Abdullah et al. (2012) opine that one of the challenges facing the construction industry in Nigeria is the low performance of the employee. The consequences of low construction professionals' performance include; poor site supervision and poor site management (Faridi & El-Sayegh, 2006), inadequate resource allocation, improper time management, low-quality management and improper safety management (Okoye, Ngwu & Ugochukwu, 2015).

To improve the task performance of construction professionals, Okoye et al. (2015) point out that improvement in technical skills (technological, problem solving, decision making) and managerial skills are very germane. Thus, to improve job skills, job knowledge and the ability of construction professionals, there is a need to train professionals (Amin et al., 2013). In an attempt to train construction professionals, there is also the need to consider the characteristics of their task and how it affects training practices (Wexley & Lathham; 2002) and the need to consider the personal characteristics of professionals and how it affects their task characteristics (Vicente, Machado & Laureano, 2016). In other words, construction professionals' personal characteristics affect task characteristics which subsequently affect training practices.

Previous studies (Williams & Luthans, 1992; Bonner & Sprinkle, 2002) on task performance focused on different task activities of employee and according to Borman and Motowildo (1997), task activities vary across different jobs. Previous investigations on task performance concentrated on discipline such as Management, Psychology and Medicine (Koopmans et al., 2011). The construction industry is quite different from other industries because of the unique nature of construction. The major difference is that site environments have a significant impact on production rate (Mustapha & Naoum, 1997); therefore, the findings from previous studies in other disciplines may not be applicable in construction. There is, therefore, a need to investigate task performance rate of employees in construction organisations.

The focus of a considerable amount of research has been on task performance as a measure of employee performance. While most research considered the direct relationship of different independent variables like incentive (Bonner & Sprinkle, 2002); choice of reward (Williams & Luthans, 1992), job characteristics (Onukwube & Iyagba, 2011) with task performance at individual and group level, some research introduced variables like task complexity, conscientiousness (McNellis, 2013) as moderating variables between different independent variable and task performance. However, there is a dearth of research on the relationship between training variable and task performance in the construction industry.

In construction, Ahadzie, Proverbs and Olomolaiye (2008a) studied the task performance behaviour of project managers; task performance behaviour which is the independent variable was measured as cognitive ability, job knowledge, task proficiency and experience while project outcome is the dependent variable. They discovered that a relationship exists between task performance behaviour and project outcome. The study did not consider training as having a relationship with task performance.

An attempt to examine the relationship between training practices and task performance was carried out by Liu et al. (2009) and George-Falvy, Mitchell and Daniels (2010). Lui et al. examined the relationship between an aspect of training practices namely, trainee reactions and task performance. Trainee reaction was measured as ease of learning and ease of use while task performance was measured as quality of trainee analysis in terms of objects, services, relationships and attributes. The study, therefore concluded that there is a relationship between ease of learning and task performance and there is no relationship between ease of use and task performance. However, the study did not consider personal characteristics and task characteristics along with training practices. Also, the study did not consider training in terms of training needs assessment, implementation, evaluation and transfer and task performance measure was in computing and not in construction.

George-Falvy, et al. (2010) also studied the relationship between training, self-efficacy, expectancies and performance. Self-efficacy and expectancies moderate the relationship between training and task performance. Training was measured as a behavioural model while task performance was measured as air traffic controller task. Although the study discovers that relationship exists between training, self-efficacy, expectation and task performance, the study did not consider personal characteristics and task characteristics in finding the relationship between training and task performance. Also, training was not measured in terms of training needs assessment, implementation, evaluation and transfer while task performance measure was based on air traffic controller task and not on construction related task. Thus, task performance measures in other industry cannot be applied to the construction industry.

Previous research on task performance (Bonner & Sprinkle, 2002; Ahadzie, et al., 2008a; Liu et al., 2009; McNellis, 2013) did not consider the relationship between personal characteristics, task characteristics, training practices and task performance. There is, therefore, the paucity of research on how personal characteristics affect task characteristics which in turn affect training practices and how training practices relate to task performance. Based on this, Viswesvaran (2001) stated that organisations require evidence to justify that training improves individual task performance. Consequently, this study is concerned with how construction professionals' personal characteristics affect task characteristics which in turn affect training practices and how training practices of construction firms relate to task performance of professionals engaged by construction firms. The study, therefore, seeks to fill the gap by examining the relationship between training practices (training needs assessment, training implementation, training evaluation and training transfer) of construction firms and task performance (Cognitive ability, skill knowledge, job knowledge and task proficiency) of construction professionals.

1.3 AIM AND OBJECTIVES OF THE STUDY

The aim of the study is to examine the relationship between training practices of construction firms and task performance of construction professionals with a view to improving the performance of professionals engaged by construction firms.

The specific objectives for achieving the aim of the study are to:

1. investigate the prevalent task characteristics of professionals engaged by construction firms.

2. evaluate the effect of construction professionals' personal characteristics on task characteristics.

3. determine the relationship between construction professionals' task characteristics and training practices of construction firms.

4. determine the relationship between training practices and task performance of professionals in construction firms.

5. develop a model for predicting task performance of construction professionals from training practices.

1.4 RESEARCH QUESTIONS

To solve the above research problem, this study provides answers to the following research questions:

1. what are the prevalent task characteristics of professionals in construction firms?

2. what are the effects of construction professionals' personal characteristics on task characteristics?

3. what is the relationship between task characteristics and training practices of professionals in construction firms?

4. what is the relationship between construction firms' training practices and task performance of professionals engaged by construction firms?

5. what models can be developed for predicting task performance of construction professionals from training practices?

1.5 HYPOTHESES OF THE STUDY

In accordance with the research questions and objectives, the following research hypotheses are formulated:

H_1: there is no significant difference in the prevalence of task characteristics among professionals in construction firms.

H_2: there is no significant difference in task characteristics based on construction professionals' personal characteristics

H_3: there is no significant relationship between task characteristics and training practices of construction professionals in construction firms.

H_4: there is no significant relationship between the training practices of construction firms and task performance of construction professionals.

1.6 SIGNIFICANCE OF THE STUDY

The low performance of construction professionals justifies the need for effective training practices in construction firms, therefore, the benefits of investigating training practices and professionals' task performance in construction organisations cannot be over emphasised. The findings of the study will be of great benefit to construction firms, construction professionals and the Government. The model developed will assist construction firms to predict the performance of professionals engaged by them. This will serve as early warning tools for the firms and so necessary precautions will be taken in terms of performance of their employee. It will also assist construction firms to set a target for their firms and professionals. The model will serve as a tool for task performance planning and control in that it will be used by construction firms to set defined task performance targets and provide the needed support training practices.

The findings of the study will assist construction firms to understand specific training practices indicators that will help to increase the performance of professionals in their firms. This will enhance the effectiveness and sustainability of construction contracting business in Nigeria through improvement in construction professionals' task performance. It will assist construction firms in proposing training programmes and in preparing training budget allocation. It will also assist construction firms to understand specific task performance indicators which can be used to manage and appraise the performance of construction professionals.

The knowledge of the relationship between training practices and task performance will also assist Government to come up with policies that will mandate construction firms to train their professionals. This will be of tremendous benefit to both construction professionals and construction firms as there will be an improvement in the performance of professionals through training and increase in profitability level of construction firms as a result of the better performance of professionals. This will lead to business growth thereby increasing the GDP in the construction industry and leading to growth in the nation's economy.

The study will expose the clients, governments, construction firms and professional bodies in the Nigerian construction industry to the level of implementation of training practices and increases the awareness level of the importance of construction professionals' training practices in construction firms. This will assist management of construction firms to design and put in place a formal system of implementing training practices in their firms through the use of training practice indicators. This will aid them to understand the training needs of their workers in order to improve their competency level.

The predominant task characteristics of construction professionals are identified in the study and the relationship between task characteristics and training practices. The knowledge of the nature of construction professionals' task will determine the training practices that will be adopted by construction firms. This will aid in motivating construction professionals to carry out their task and also expose their employer to the kind of training required for their job.

The study will establish the effect of construction professionals' personal characteristics on task characteristics. This will be of utmost benefit to construction firms when recruiting and assigning tasks to construction professionals. The knowledge of the professionals' personal characteristics like qualification, years of experience and gender which affect task characteristics is very germane as this will serve as criteria for assigning a task to their employee and criteria for selection during the employment process.

In academics, the study will also help to fill the gap in research relating to professionals' training and task performance. Most researches on training focused more on craftsman training and productivity. It will also provide additional insight into the challenges of future research in professionals' training and task performance.

1.7 SCOPE AND DELIMITATION OF STUDY

The focus of this study is on construction professionals' training practice and task performance in Lagos state and Abuja, Nigeria with particular reference to the relationship between construction professionals' training practices and task performance. The study adopts training needs assessment, training delivery, training evaluation and training transfer as training practices of construction firms. Also, task variety, task identity, task significance, autonomy, feedback, task analyzability, task difficulty, task routineness, task complexity and task structuredness are the task characteristics considered in the study. The study also focuses on cognitive ability, job skills, job knowledge and task proficiency as task performance variables. Other forms of training practices like training design, training objectives, and training records are not considered in this study. Also, task characteristics such as; task independence, task creativity and task conflict norms and task performance such as; experience, social identity and reciprocity are not considered in the study. This is because, it will be difficult to study all other variables of training practice, task characteristics and task performance within the time frame of the study.

The study adopts Architect, Builders, Quantity Surveyor, Civil Engineers and Project Managers as construction professionals engaged by construction firms. The study also adopts construction site related task as the task because task performance in construction organisations varies according to the different level of responsibilities; there is, therefore, a need to target specific groups with similar task responsibilities. This will facilitate commonality in training practices, task characteristics and task performance measures.

The construction firms considered in the study are firms with small, medium and long time experience. They are also involved in Building and Civil Engineering works.

The study covers Lagos state and Federal Capital Territory Abuja. Lagos state consists of 20 Local Governments. The study covers only 4 Local Governments areas namely, Lagos Island, Eti-Osa, Ikeja and Alimosho. Federal Capital Territory Abuja has four districts. The study covers only 2 districts namely, Central Business District and Garki districts. This is because major construction works take place in these Local Governments and Districts due to high population.

1.8 OPERATIONAL DEFINITION OF KEY TERMS

For this study, the following terms are operationalised as;

Construction Professionals: Construction professionals refer to professionals (Architects, Builders, Quantity Surveyors, Civil Engineers and Project Managers) that are engaged by contractors for site related task.

Personal characteristics: Personal characteristics mean the demographic details of construction professionals such as years of experience, qualification, professional background and gender.

Site Managers: These are professionals who are superior to construction professionals and head construction site.

Site Supervisors: These are different professionals who are subordinate to site managers and in charge of the different unit on a construction site.

Task Characteristics: Task characteristics refer to prominent attributes, nature or qualities of a given construction site supervisory task. They are task significance, task complexity, task analyzability, task difficulty, skill variety, task routineness, task structuredness, autonomy, task identity and skill variety.

Task Performance: Task performance is the proficiency at which a construction professional carries out the required site duties and responsibilities so as to achieve the firm's technical core. It is the behavioural measure of competency of a construction professional in a given site supervisory task.

Task performance measures: Task performance measures are variables of evaluating task proficiency and consistency of construction professionals in a given site supervisory task. It includes cognitive ability, job skills, job knowledge and task proficiency.

Training: Training is the process of acquiring construction skills, knowledge and capabilities by construction professionals in order to perform according to the job requirement.

Training Practices: Training practices refer to systematic procedures of carrying out training in construction organisations. The systematic procedures include training needs assessment, training implementation, training evaluation and training transfer.

CHAPTER TWO

LITERATURE REVIEW

2.1 PREAMBLE

This chapter presents the review of literature on the construction industry in Nigeria related to this study. It contains a review of literature on construction professional training, task characteristics, personal characteristics and task performance. Studies on the concept of training, training practices and task characteristics, the relationships between personal characteristics and task characteristics, and training practices and task performance are also covered.

2.2 AN OVERVIEW OF NIGERIAN CONSTRUCTION INDUSTRY

The Nigerian construction industry plays an important role in the economy of the nation. Although, Oluwakiyesi (2011) states that the sector account for 1.4% of the nation's GDP, enormous opportunities awaits to be unlocked in the sector. Adeagbo (2014) reviewed the performance of building and construction sector in the Nigerian economy between 2008 and third quarter of 2013. The building and construction sector accounted for 1.84% of GDP in 2008 and 2009 respectively ranking 8^{th} among other sectors. 1.56%, 1.61%, 1.68% and 1.80% in third quarters of 2010, 2011, 2012, and 2013 respectively. According to Oluwakiyesi (2011), the building sector has a growth rate of 12.09% in 2010 compared to 11.97% in 2009 while construction sector growth rate increases from 11.97% in 2009 to 12.24% in 2010.

The construction industry in Nigeria is majorly divided into Building division and Civil and Heavy Engineering Construction division (Mudi, Bioku & Kolawole, 2015). The industry consists of different players such as clients and contractors (Mudi et al., 2015). The major client for Civil and Heavy Engineering works is the Nigerian Government while the clients for Building works include individuals and various organisations. Isa, Jimoh and Achuenu (2013) identify the major participants in the Nigerian construction industry as Architects, Engineers, Management Consultant, General Contractors, Heavy construction contractors, special trade contractors or sub-contractors and construction workers along with owners, operators and users of the constructed facility. Others that are distinct from but provide ancillary functions include, Building finance and insurance agencies, Land developers, Real estate brokers and material and equipment suppliers and manufacturers.

Contractors otherwise regarded as construction firms are categorised as indigenous and multinational construction firms (Idoro, 2010). While there are large numbers of indigenous contractors with small jobs, the multinational contractors are few in numbers and execute most of the major works in the country. Mudi et al. (2015) point out that the Nigerian construction industry is highly fragmented with few multinational contractors and many indigenous contractors. The few multinational contractors employ hundreds of employee while the majority indigenous contractors employ less than ten employees. These employees include the professionals in the industry.

Mudi et al. (2015) describe professionals in the Nigerian construction industry as a group of individuals gathered together as temporary and functional groups for the purpose of meeting client's needs. They identify professionals in the construction industry as Architects, Engineers, Estate Surveyors and Quantity Surveyors. In line with Mudi et al. (2015), Oluwakiyesi (2011) explains that the construction industry involves the interplay of different professionals such as Engineers, Architect and Quantity Surveyors. While Oluwakiyesi, (2011) and Mudi et al. (2015) did not include Builders as professionals, Ameh and Odusami (2014) included Builders as professionals in the Nigerian construction industry. Furthermore, they specifically identified Engineer as Civil Engineer. Despite this, Mudi et al. (2015) state that the group of professionals in the Nigerian construction industry is expected to achieve the project goals through their possession of skills, knowledge, tools and techniques. However, Oluwakiyesi (2011) discovers that most construction firms in Nigeria rely on expatriates as local counterparts are mostly unskilled and inexperienced. Adeagbo (2014) states that, there is a need to enhance capacity building for professionals in the construction sector. Thus, there is a great need for construction firms to train their professionals in order to enhance capacity building of professionals through skills acquisition.

2.3 CONCEPT OF TRAINING

Organisation exists because its workforce exists and works towards the attainment of organisational goals and objectives. An efficient and dynamic workforce requires training to constantly improve its skill, capabilities and knowledge required for executing a task. The word ‘training’ has been defined in different ways by different authors (Loosemore, Dainty & Lingard, 2003; Armstrong, 2006; Mathis & Jackson, 2011).

Mathis and Jackson (2011) define training as a process of acquiring specific capabilities, skills and knowledge required for executing a task. This definition describes training as a process which implies that training involves a routine way of acquiring capabilities, skills and knowledge. The duo identifies three components in their concept of training; specific capabilities, skills and knowledge. Loosemore et al. (2003) describe training simply as a form of learning. Their concept of training emphasises just one component of learning. Explaining training from a behavioural perspective, Armstrong (2006) defines training as a planned and systematic modification to employee behaviour through learning which enables the employee to gain knowledge, skill and competence required for executing his or her task. Armstrong concept of training encompasses the three components of Mathis and Jackson and one component of Loosemore et al. Although, capabilities, skills, knowledge and learning are the words used by these authors to describe training, one important description coming from the perspective of human capital theory not considered by these authors is that training is an investment.

Ensour and Kharabsheh (2015) fault the above definitions. They define training in terms of ‘what’ rather than ‘when’ or ‘why’ it should be done. Also, training was defined in terms of deficiency of knowledge, skills and capabilities. The definition of training should go beyond what, it should include when and reasons and must not be limited to deficiency alone but rather an improvement in skills, knowledge and capabilities. In other words, training can be described as an investment in an organisation workforce through learning in order to gain or improve skill, capabilities and knowledge required for healthy and vibrant performance in a given task and subsequently in an organisation as a whole.

Training is seen as a form of learning (Loosemore et al., 2003) and an element of human resource development (Armstrong, 2006). It involves the use of a formal process to impact knowledge and skill that will enhance people in performing their task. Training according to Itika (2011) aims at producing an improvement in performance at work through addressing the weakness in knowledge, skills or attitudes. Training is believed to have many advantages for the organisation, department and individual. It provides a skilled pool of human resources with skills; improve existing skills, increases knowledge and experience of employees (Itika, 2011).

Mathis and Jackson (2011) identify two types of skills in organisation's training as hard skills and soft skills. Hard skills cover intranet training and income statement review training while soft skills include communication, mentoring, and managing meeting. In line with the soft skill of organisational training, Loosemore et al. (2003) emphasise that training should allow employee acquire job-related skills such as thinking and changing attitudes. While Loosemore et al. focus on one aspect of skill acquisition in the definition of training, Mathis and Jackson go further by focusing on two aspects of the skill. Given the fact that training is an investment and involves the acquisition of skills, the two aspects of hard and soft skills are of utmost importance to the employee in an organisation, particularly, professionals in construction firms.

Training as distinguished from development entails changing the work behaviour of an employee in order to improve the ability to perform present job while development encompasses organisation and employee's effort at increasing an employee abilities to perform a job in future (Siu & Liu, 1998). This explanation on training views training from the perspective of changing behaviour while development refers to future. Ensour and kharabsheh (2015) explanation of development goes beyond future and include entire career of a professional. In summary, training is task oriented or job specific while development is future oriented. Since the study focuses on skills required for the present job, future career development is not included; therefore the focal point of this study is training. In this study, training is conceptualised to mean the systematic way of improving skills, knowledge and abilities of a construction professional in present task or specific job.

2.4 TRAINING PRACTICES

Armstrong (2006) enunciates that training should be systematic so that it is specifically designed, planned and implemented to meet defined needs. Various authors identify different training practices (Huang, 2001; Loosemore et al., 2003; Edralin, 2004; Tabassi & Abu Bakar, 2009; Mathis & Jackson, 2010). Loosemore et al. (2003) identify five components of training practices in the construction sector as training policy definition, training needs identification, training programme, training delivery and training evaluation while Mathis and Jackson (2011) identify four training practices as training needs assessment, training design, training delivery and training evaluation. The training practices identified by Mathis and Jackson's study do not consider training policy but rather referred to training programme as training design. A broader classification by Huang (2001) considers training practices as training needs identification, annual training design, training objectives, training delivery, training implementation, training evaluation and training records. These training practices consist of seven components encompassing that of Loosemore et al. and Mathis and Jackson.

Edralin (2004) identifies four component of training practices as training needs; training design; training implementation and training evaluation while Tabassi and Abu Bakar (2009) identify training process as corporate strategy; training needs analysis; identification of learning requirement; training planning; training implementation and evaluation. This is quite different from other types of practices as it included corporate strategy, identification of learning requirement and training planning, although, identification of learning requirement could be classified as training needs identification (Edralin, 2004). In line with ADDIE model, (training needs analysis, design, development, implementation and evaluation) Tangoukian, Hamad and Mennssa (2016) opine that training practices comprise of five components namely, training needs analysis, training design, training development, training implementation and training evaluation. The training practice components are similar to the previous ones.

Despite the different training practices identified by Edralin (2004), Tabassi and Abu-Bakar (2009) and Tangoukian et al. (2016), none of them considered training transfer as a practice. Training transfer as a training practice is very important as it is expected that the skills and knowledge acquired in the course of training are transferred to the task

(Punia & Kant, 2013). Also, the training practices are similar and interwoven, therefore, the practices can be summed up into four; training needs assessment, training delivery, training evaluation and training transfer. The study, therefore, stands on the view that training practices can be summed up into four namely; training needs assessment, training delivery, training evaluation and training transfer.

2.4.1 Training Needs Assessment (TNA)

Itika (2011) and Loosemore et al. (2003) state that the first step in training is to recognise the need for training and the gaps in skills required for the job. However, the words training needs assessment and training needs analysis have been used to identify the first stage of training. While authors like Jamil and Som (2007) and Tangoukian et al. (2016) use the word 'training needs analysis', others like Gaspard and Yang (2016) and Abdel-Maksourd and Saknidy (2016) use training needs assessment. The two terms though used interchangeably differ considerably. Training needs analysis is a process whereby needs are identified and broken down into components to determine solution (Shrivastava & Pathak, 2016) while training needs assessment is an estimate to determine the nature, value and significance. Brown (2002) clarifies this difference by describing training needs assessment as an ongoing process or a process of gathering data to identify and determine the needs that exist in the organisation in order to find a solution. Training needs assessment goes beyond mere identification; it emphasises the need to determine the nature, value and significance of the needs of an organisation. In line with previous studies (Gaspard & Yang, 2016; Abdel-Maksourd & Saknidy, 2016), the study adopts Training Needs Assessment (TNA) as the first stage of training practices.

When an organisation fails to conduct TNA, Brown (2002) identifies three possible risks the organisation will experience. These risks are overdoing training, doing too little training or missing the point completely. Carlisle, Bhanugopan and Fish (2011) also point out that once TNA is not carried out properly, training may not be in agreement with the needs of employee or organisation. Coming from the perspective of investment, Jamil and Som (2007) are of the opinion that conducting training without TNA is a poor investment in training. This is because money may be spent on needless wants rather than true needs. It is therefore important for an organisation to conduct TNA for accuracy in programme objective, method and evaluation (Siu & Lau, 1998).

Brown (2002) identifies four reasons for conducting TNA before proper training as; identification of specific problem areas in the organisation, obtaining management support, developing data for evaluation and determining cost and benefit of training. Mathis and Jackson (2011) explain that TNA involves analysing training needs and identifying training objectives and criteria. Studies (Mathis & Jackson, 2011; Jamil & Som, 2007; Shah & Gopal, 2012) identify three levels of training needs analysis namely organisational analysis, job analysis and individual analysis. Mathis and Jackson maintain that TNA levels include organisational analysis; job analysis and individual analysis while Jamil and Som (2007) opine that TNA levels of analysis are organisational analysis, operational analysis and individual analysis. Also, Firdousi (2011) identify TNA levels as organisational analysis, job characteristics analysis and individual analysis. Although, the three studies refer to the same level of TNA analysis, however, the choice of words at the second level is different. While job, task and operational were the choices of word, the meaning remains the same.

According to Altarawneh (2005), indicators for training needs assessment include lack of knowledge, lack of skills, poor performance, the introduction of new work methods, client dissatisfaction, poor service quality, low profitability, high turnover, low employees morale and high absenteeism. These can be carried out through job analysis, performance assessment and organisational analysis (Itika, 2011).

Altarawneh (2005) identifies six TNA methods as questionnaires, personal face to face interviews with employees, group interviews with managers and supervisors, direct observation, determination through specialist training committee, performance appraisal information or results and through a job description for individuals in an organisation. Abdel-Maksoun and Saknidy (2016) also identify six TNA methods namely; use of Computer, the Internet, E-mail, Word document, PowerPoint, making sites and use of Facebook. Although, the two studies adopted six TNA methods, Abdel-Maksoun and Saknidy's TNA methods are more of information technologies oriented while Altarawneh focuses more on personal contact. TNA methods used by Siu and Lau (1998) comprise eight components namely; job analysis, performance appraisal, reviews of problem areas, interviews, questionnaires, employee's requests, customer/client complaints and human resource planning. These TNA methods are more than Altarawneh, (2005) and Abdel-Maksoun and Saknidy (2016) TNA methods. They also consider client complaints as part of TNA methods.

Empirically, Siu and Lau (1998) discovered that task analysis, person analysis, organisational analysis and mandatory training are the common types of TNA in use. Also, job analysis, performance appraisal and human resource planning are among the most common methods used in analyzing training needs. Altarawneh (2005) found out that there is the absence of systematic training needs assessment in organisation while Arshad, Yusof, Mahmood, Ahmed and Akhar (2015) are of the contrary view. They concluded that organisations conduct proper training analysis before generating annual training plan. Muma, Iravo and Omondi (2014) examined the effect of training needs assessment on employee commitment and discovered that training needs assessment has an effect on employee commitment.

In construction, Adams (1998) found out that the training needs of indigenous construction contractors in Nigeria are in the areas of accounting and financial management, entrepreneurial studies and project management. Teixeira et al. (2006) identify the TNA of project managers as conception development/feasibility, planning and scheduling, project cost estimation and cost management, quality management, procurement and tendering procedures and health and safety management. These areas of TNA are majorly management related. Technical areas were not considered. In contrast, Hassan, Griffith and Stephenson (2005) discover that meeting the needs of the job and adhering to the requirements of the construction industry were considered as important training needs. These needs are general needs and not specific needs. However, the areas of TNA identified by Odusami, Oyediran and Oseni (2007) are more specific to construction and not limited to management. The areas include human and industrial relations, building production and project management, communication skills/computing. Others are resource management, quality control, project finance and cost control.

2.4.2 Training Delivery

Studies (Mathis & Jackson, 2011; Tangouklan, et al., 2016) that adopted ADDIE model of training practices separated training design from training delivery but Altarawneh, (2005) merged the two practices together. Training delivery is the act of executing the training designed or the act of delivering training to the trainees (Mathis & Jackson, 2011). This definition only explains what training delivery is all about but fails to explain when and how training is done. Sui and Lau (1998) gave more insight into training delivery by combining the two training practices namely: training design and training delivery together and describing them as a process of choosing the content of the training and training methods and delivering it to the right people with the right needs. In other words, training delivery is a process of conducting training after carefully designing the content.

Training delivery is usually a joint effort between the trainee and the trainer (Itika, 2011). Mathis and Jackson (2010) describe the stages in training delivery as scheduled training, conduct training and monitor training. Siu and Lau (1998) believe that choosing the right programme content and training methods have a great effect on training result. Mathis and Jackson (2010) identify factors to be considered when selecting training methods as nature of training, subject matter, the number of trainees, training resources/costs, E-learning versus traditional learning, geographical location, the time allotted and completion timeline.

A number of training approaches and methods are used to deliver training. Training can be internal also known as in-house or external which is known as outsourced or both which is regarded as combined training approaches (Mathis & Jackson, 2011). However, Huang (2001) identifies the approaches for training delivery services to include: on-the-job, on-site off-the-job and off-site off-the-job. These approaches are synonymous with construction organisation as against internal and external approaches which are used in Mathis and Jackson (2011). Siu and Lau (1998) identify nine methods of training delivery methods as coaching, apprenticeship, lecture, group discussion, role play, game, project and case study. Construction skills (2011) also identifies nine methods of training delivery in construction as further education college, higher education, national construction college, private training provider, manufacturer or supplier, other off-the-job (courses or formal institution), on-the-job learning or training delivered by the more experienced worker, self-learning and professional institution. However, these training delivery methods are more of facilities used for training rather than training delivery methods. Sui and Lau gave a clearer view by stating facilities used for training as within a company, Polytechnic/university, vocational-technical school, joint training scheme, consultant and local training centres. These methods are in line with construction skills delivery methods, therefore it can be concluded that the training delivery methods by construction skills are concerned with facilities used for training.

A more specific classification of training delivery methods as presented by Mathis and Jackson (2010) are (1) internal training methods which include; traditional classes, on-the-job training, self-guided training at company portal, mentoring, coaching, job shadowing, developing teachers internally, cross training and group based classroom. (2) External training methods which cover third-party delivered training, web conferences, training outside location, educational leave and teleconferencing. However, Huang (2001) specifically classifies training delivery methods into three namely: on-the-job training (job rotation, apprenticeship, assigning trainee), on-site off-job training (Lecture, group discussion, role playing, sensitivity training, video games, and simulations) and off-the-site training (part-time college courses and overseas workshops). Although, training delivery methods were categorised differently in previous studies (Mathis & Jackson, 2011; Hung, 2001), some studies (Siu & Lau, 1998) simply listed them as training delivery methods. The study, therefore, stands on the viewpoint that training delivery methods in the construction industry should be broadly categorised in accordance with the nature of the industry, that is, on-site and off-site training delivery methods.

A study conducted by Huang (2001) shows that firms with greater effectiveness in training tend to have more sophisticated training organisation and training systems than those with less effective training methods. In the Nigerian construction industry, Dzasu and Ayegba (2010) found out that management training is done when needed by construction firms while few number of construction firms carry out supervisory training yearly. Coaching was found to be one of the most popular training methods in use at supervising and managerial levels, while other methods used include lectures, group discussion and case study (Sui & Lau, 1998).

2.4.3 Training Evaluation

Al-Athari and Zairi (2002) describe training evaluation as an attempt to measure cost-benefit of training while Mathis and Jackson (2011) explain training evaluation to include a measure of training outcome and comparison of training outcome to training objectives and criteria. The description of training evaluation by Al-Athari and Zairi focuses on values and gains of training while that of Mathis and Jackson dwells more on a comparison of training outcome with training objectives. It can, therefore, be said that the two definitions of training evaluation focus on earlier and later part of training. Xiao, Ross and Liu (2011) divide training evaluation into two aspects; summative and formative. While the summative aspect assesses the outcomes of the training programme, the formative validates the programme.

Al-Athari and Zairi (2002) identify four models of training evaluation namely: Kirkpatrick model, CIRO (training context, training input, trainee's reaction and training outcomes), people standard and benchmarking. However, Altarawneh (2005) identifies three models of training evaluation namely: Kirkpatrick model, CIRO model and CIPP (training context, training input, training process and training products outcomes). Punia and Kant (2013) also identify three models of training evaluations namely: Kirkpatricks' four level models, Noe's model and Swanson and Sleezers three steps model. This type of training evaluation model is quite different from the previous two (Al-Athari & Zairi, 2002; Altarawneh, 2005) but similar in that Kirkpatricks' model was used by the three authors. A good reason for this is given by Aguinis and Kraiger (2009) in which Kirkpatrick model was identified as the most widely used training evaluation model by practitioners.

In Kirkpatrick's model, training is evaluated on four levels namely: reaction, learning, behaviour and result. Reaction level of trainees is evaluated by the organisation after training which can be through interview, questionnaire or survey among trainees to find out the value of training, style of instructions and usefulness of the training (Mathis & Jackson, 2010). Learning level entails tests on the training materials and it is based on facts, ideas, concepts, theories and attitudes. Behaviour level evaluation entails measuring the effect of training on job performance and finally, the result levels encompass employers evaluating trainees by measuring the effect of training on the achievement of organisational objectives. Results such as productivity, turnover, quality, time, sales and costs are used to compare initial results (Siu & Lau, 1998; Mathis & Jackson, 2010).

Al-Athari and Zairi (2002) opine that training evaluation purpose and strategy govern the appropriate evaluation instrument and methods to use. Xiao et al. (2011) opine that training evaluation methods consist of twelve types namely, pre and post training questionnaires, pre and post training tests, information collection of feedbacks by trainees, evaluation by instructors, pre-evaluation on instruction, post training report by the group. Others include, self-report by trainees, intermediate evaluation, a follow-up survey, use of performance appraisals, use of business records and lastly, comparison with a group of people who did not take training. Altarawneh (2005) identifies methods of training evaluation as interviews, questionnaires, pre and post training test, trainee's managers or supervisor's assessment, performance appraisal reports. Although these methods were mentioned in Xiao et al., they are not exclusive.

An empirical study by Al-Athari and Zairi (2002) on training evaluation in Kuwait shows that private organisations in Kuwait believe that training evaluation is more important compared with their government counterparts while the majority of both government and private firms sometimes evaluate their training programmes. The most frequently used evaluation tools and techniques is the questionnaire, while the most frequently used evaluation method is the Kirkpatrick model and finally, the most common training evaluation outcomes is trainee reaction. Xiao et al. (2011) also indicated that trainee reaction is mostly used as training evaluation outcomes while the evaluation methods mostly used is pre-and-post training questionnaire. Altarawneh (2005) discovered that there is the absence of effective procedures for evaluation while Yoon, Shin, Bouphavanah and Kang (2016) experimentally tested the effectiveness of training on some particular groups of professionals using Kirkpatrick model, they found out that training was effective. Zahro and Wu (2016) also tested Kirkpatrick model by conducting training evaluation on some groups of people, at all the four levels of the model, the trainees were found to perform better.

2.4.4 Training Transfer

Kirkpatrick and Kirkpatrick (2006) place training transfer under the third level of Kirkpatrick's model of training evaluation as a result, training transfer is not included in ADDIE model of training but rather classified under training evaluation. Bhatti, Battour, Sundram and Othman (2013) describe training transfer as an important element in training effectiveness criteria which assist employees and organisations to improve their performance. Punia and Kant (2013) also support the view of training transfer as the main part of training effectiveness programme. The ultimate aim of training is to transfer what is learnt to the job. Mathis and Jackson (2010) opine that transfer occurs when trainee actually applies the skill, capabilities and knowledge gained to the job. While these descriptions of training transfer only focus on the application of skills to the job, Baldwin and Ford (1998) explain training transfer based on generationalisation and maintenance of skills. The duo describes training transfer under two conditions (1) the generationalisation of skills and knowledge learned from training to the job (2) maintenance of the skills and knowledge over a period of time on the job. In essence, what matters most in training program are the transfer, application and maintenance of skills, capabilities and knowledge learned to the job context.

Different authors (Nikandrou, Brinia & Bereri, 2009; Tonhauser & Buker, 2016; Eid & Quinn, 2017) identify three categories of factors affecting training transfer based on Baldhim and Ford (1998) model namely: trainee characteristics, training design and work environments. Nikandrou et al. (2009) simply refer to the factors as trainee characteristics, training design and organisational characteristics while Eid and Quinn

(2017) state the factors as trainee characteristics, training course and work environment. Tonhauser and Buker (2016) explain the factors under three levels of training transfer namely: organisational level, learning field level and individual level. In summary, all the authors refer to the same factors, the differences lie in the use of words adopted by each of them.

Cheng and Ho (2001) identify the four stages of training transfer as pre-training motivation, learning, training performance and transfer outcome while Grossman and Salas (2011) present Baldwin and Ford model of transfer process as training inputs, training outputs and conditions of transfer. Training inputs affect the condition of transfer both directly and indirectly via their impacts on training outputs.

From the perspective of management, Gil, Molina and Ortega (2016) found out that training transfer is related to organisational environment while from the perspective of the employee; training transfer is related to motivation for training. Saks and Burke (2012) conclude that training evaluation frequency is positively related to training transfer. Specifically, they found out that the behaviour and result level of Kirkpatrick training evaluation model relates to higher rates of training transfer. This study, therefore, considered training transfer as a process of training.

2.5 TRAINING PRACTICE IN NIGERIA CONSTRUCTION FIRMS

The act and frequency of executing training will determine the implementation of training in construction firms. Dzasu and Ayegba (2010) investigate systematic training in Nigerian construction firms viz-a-viz; identification of needs, designing of training programmes, implementation of training programmes and evaluation of training results. The result shows that there is poor participation of construction firms in the provision of training programmes. Also, Ikediashi, Ogunlana, Awodele, and Okwuashi (2012) conclude that basic programmes of training as applicable in Nigerian construction companies are clearly inadequate. This implies that the extent to which construction firms implement training practices is low.

Bilau, Ajagbe, Sholanke and Sani (2015) identify poor employee's training as one of the factors causing poor turnover in small and medium construction firms while Olatunji, Ajibola and Coker (2000) found out that on-the-job training and practical demonstration are employed to a considerable extent in construction firms. This implies that training delivery is implemented in Nigerian construction firms to a considerable extent.

2.6 PERFORMANCE APPRAISAL MEASURE

A formal tool for evaluating employee performance is performance appraisal. Performance appraisal has been described with similar words like performance evaluation, performance measurement, performance review, employee evaluation, staff assessment, service rating and personnel review (Aggarwal & Thakur, 2013). According to Armstrong (2006), performance appraisal involves the formal assessment and rating of individuals by managers usually at an annual review meeting. Expanding on the definition, Ratzburg (2009) defines it as the formal scheme of measuring, evaluating and influencing employee job-related characteristics, behaviours and outcome. This definition explains performance appraisal better compare to Armstrong in that it goes beyond the assessment of employee by considering its influence on the behaviour of employee. In other words, performance appraisal is a means of assessing the nature, value, quality, ability and extent of employee task traits, behaviours and outcome.

Based on this definition, authors like Fagbohungbe (2009) and Mathis and Jackson (2010) classify the evaluation of an employee into three types; traits appraisal, behaviour appraisal and result appraisal The corresponding types of performance information based on the three types of performance evaluation is presented in Fig. 2.1. Atakpa, Ocheni and Nwanko (2013) classified it as trait appraisal, work activities appraisal and result appraisal. They explain further by citing examples of trait appraisal as Graphic rating scale, Essay appraisal, Process appraisal and Behaviour anchoring. Work activities appraisal includes Ranking appraisal, Force-choice appraisal, and Training Simulation appraisal. An example of result appraisal which is based on results is Management by Objectives (MBO).

Aggarwa and Thakur (2013) broadly classify performance appraisal measures as objective measures -which are directly quantifiable- and subjective measures. Objective measures can be observed and it focuses on results. It includes productivity and quality indices while subjective measures include judgment on the part of the evaluator and are more difficult to determine. Examples are supervisor’s ratings and self-ratings (Hofman, Nathan & Holden, 1991).

Types of performance information

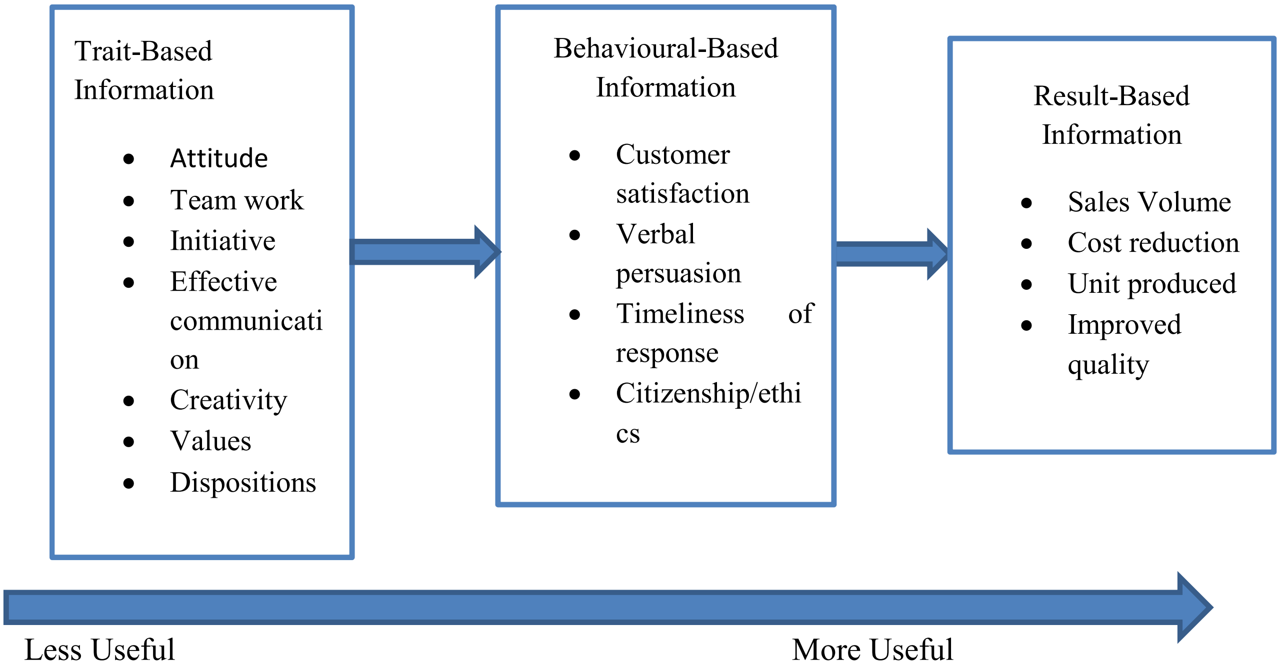

Fig 2.1 Types of performance information

Source: Mathis and Jackson (2011: pp. 325)

2.6 1. Trait-Based Appraisals

According to Mathis and Jackson (2011), a trait-based measure of performance identifies a character trait of an employee. It involves the use of personal characteristics of an employee to evaluate performance (Fagbohungbe, 2009). Such traits include; attitude, initiative or creativity. Mathis and Jackson explain that trait appraisal may or may not be job-related while Fagbohungbe (2009) is of the opinion that it is relevant to job performance. In other words, trait appraisal is not necessarily related to job performance.

According to Mathis and Jackson (2011), the trait-based appraisal cannot effectively appraise the performance of an employee because (1) it is ambiguous and bias. Therefore, court decisions generally have held that when making decisions such as promotions or terminations, trait-based performance are too vague to be used and (2) paying more attention to employee trait or characteristics can lead to superiors ignoring the important behaviours and outcome that assist organisations in achieving their objectives.

Fagbohungbe (2009) also identifies reasons why trait-based appraisal cannot effectively evaluate an employee. Firstly, the trait-based appraisal cannot evaluate the performance of an employee alone unless used in conjunction with another appraisal system. Secondly, research has not shown a significant high positive correlation between traits and job performance. Thirdly, performance appraisal is meant to provide information that will assist the employee to improve his/her performance. Relying solely on trait will not help to increase performance as a change in human characteristics is not spontaneous. Therefore, finding a correlation between traits and job performance will give the validity of using trait as a measure of job performance. Simply, traits cannot effectively measure the job performance.

Despite consensus in previous studies of a non-positive significant correlation between trait-based appraisal and job performance, Mellanby and Zimdars (2011) found a positive relationship between trait anxiety and high-level academic performance in women. This implies that trait can be used as a measure of job performance.

2.6.2 Behavioural-Based Appraisal

Fagbohungbe (2009: pp. 126) describes behaviour as "any measure or observable response of an organism to a stimulus". Based on this definition, Psychologists have used behaviour to appraise performance. A further explanation by Fagbohungbe (2009) indicates that behavioural appraisal measure what an individual is made up of is translated into action. It measures specific behaviour that leads to job success (Mathis & Jackson, 2011). In other words, behavioural appraisal measures behaviour of an individual as job performance.

Behavioural measures have been widely used to measure the performance of an individual in the different field, especially in Psychology. Most especially, behavioural measures are used to measure performance based on specific task (Fagbohungbe, 2009). Since task performance is a performance measure based on specific task, it can be concluded that it is a behavioural performance measure. Ahadzie et al. (2008a) buttress this by emphasising that task performance is behavioural measures with an evaluative component of cognitive ability, job knowledge, task proficiency and experience. They explain further that task performance behaviours are job specific which is manifested in construction project managers' demonstrable functions like organizing, planning, coordinating and controlling.

Previous studies measured professionals' performance based on behavioural appraisal. Ionescu (2013) measures teachers' professional performance using behavioural measures of knowledge in the specialized area, cognitive flexibility, communication skills, teaching skills, ethical conduct, relationship with students, emotional maturity and didactical technology. Cucu-Ciuhan (2014) developed an assessment scale with behavioural anchors of communication skills, team working skills, managerial abilities, ethical behaviour, academic and emotional intelligence, professional training and technical performance.

In construction, Ahadzie et al. (2008a), Ahadzie, Proverbs and Olomolaiye (2008b) measure task performance as behavioural measures. It includes measure such as cognitive ability, job knowledge, task proficiency and experience. Ling (2002) also measures the performance of Architect and Engineers as cognitive ability, job knowledge, task proficiency and job experience. These are in line with Indartono and Chen (2010) assertion that a range of knowledge, skills, abilities and other characteristics are needed individually to perform a task. Ratzburg (2009) also explains that appraising the performance of a subordinate by a supervisor entails the superior telling the subordinates how they are performing and suggesting needed changes in behaviours, attitudes, skills or job knowledge. Simply, it can be said that an employee behavioural performance is measured based on skills, abilities and job knowledge. Therefore, it is accepted in this study that task performance as a variance of job performance is behavioural appraisal and the following behavioural performance measures as task performance measures; cognitive ability, job knowledge, job skills and task proficiency are adopted.

2.6.3 Results-Based Appraisal

Result-based appraisal evaluates employee performance based on job outcome. It considers employee accomplishment (Mathis & Jackson, 2010). A result-based appraisal requires specific objectives in which an employee will need to achieve the stated objectives for accountability (Aguinis, 2009). Examples include quantity, quality, cost and time.

The nature of job determines the type of appraisal that counts (Fagbohungbe, 2009). While team performance or organisational performance is a result-based appraisal, an individual or member of a team performance is a behavioural-based appraisal. This is because individual uses his/her skills, abilities and knowledge to contribute to the overall result. Accordingly, a major shortcoming of result-based appraisal as identified by Aguinis (2009) is that it gives an incomplete picture of employee performance, therefore evaluating employee performance based on behaviour and result gives a better measure of performance.

2.7 JOB PERFORMANCE

Job performance is multi-dimensional and is defined as the observable activities under the control of individual that contribute to organisational goal (Campbell, McHenry & Wise, 1990). While job performance measures focus on behaviours, other performance measures focus on actions and behaviours (Rotunda & Rotman, 2002). Viswesvaran and Ones (2000) define job performance from the two perspectives of behavioural and outcome performance measures. They explain job performance as scalable actions, behaviour and outcome in which an employee is engaged which add to the organisational goals. Previous authors like Campbell et al. (1990) and Rotunda and Rotman (2002) argue that job performance should be measured as behaviour and not an action because outcome aspect of performance is affected by other determinant factors. Furthermore, Campbell et al. explain that the behaviours that makeup performance can be scaled in terms of the level of performance. Simply, job performance is assessed using behaviours of the employee rather than the outcome or result of assigned duties and is determined based on the level of performance.

Job performance is measured at the individual level and team level. According to Viswesvaran (2001), organisations require evidence to justify that training improve individual job performance. Borman and Motowildo in Motowildo and Van Scotter (1994), Mohammed, Mathieu and Bart'Bartlett, (2002) and Koopmans et al. (2011) explain individual job performance in terms of task performance, contextual performance, adaptive performance and counterproductive work behaviour. Viswesvaran (2002) adopts four indices to measure job performance namely; productivity, quality, interpersonal behaviours and effort. These indices were categorised as behavioural and result performance appraisal. While productivity and quality are more of result based performance measures and are from organisational records, interpersonal and efforts are typical behavioural performance measure from supervisory ratings. Based on this understanding, the study seeks to investigate one measure of individual performance – task performance- from the behavioural perspective.

2.8 TASK PERFORMANCE

Task performance is defined as the potency with which an employee perform activities that add to the organisation's technical core either directly by carrying out its technical process and indirectly by providing needed materials or services (Borman & Motowildo, in Motowildo & Van Scotter, 1994). The technical core in the definition refers to a core dimension of the work which is the elements of work relating to individual duties and tasks. Simply, task performance can be described as the proficiency at which an employee carries out his/her assigned duties in an organisation. It is a behavioural performance measure.

According to Motowildo and Van Scotter (1994), task performance is divided into two parts namely: indirect part consisting of activities that service and maintain the technical core of an organisation by supplying raw materials. The second part consists of activities that directly transform goods and services into the product. In other words, the direct part of the definition refers to the technical core process of work carried out while the indirect part refers to the provision of services for the work.

Task performance has been widely used to measure employee job performance (Kahya, 2007; Bacha, 2014). Kahya (2007) divides employee performance broadly into two namely; task performance and contextual performance while Koopmans et al. (2011) classified individual work performance into task performance, contextual performance, adaptive performance and counterproductive work behaviour. A review of literature by Koopmans et al. (2011) shows that different terms were used for describing task performance. Such terms include job-specific task proficiency, technical proficiency or in-role performance. The study, therefore, adopts the term ‘task performance’ as construction professional job performance.

Previous studies (Mohammed, Mathieu & Barlett, 2002; Ling, 2002; Porath & Erez, 2007; Ahadzie et al., 2008a & 2008b) on task performance used different indicators to measure task performance. An important thing to note is that each indicator of task performance depends on the type of task. According to Law, Wang and Hui (2010), task performance is specific to the task performed by an individual for a particular position of interest. While some task performances were measured experimentally (Mohammed, et al., 2002; Porath & Erez, 2007), others were measured empirically (Motowildo & Van Scotter, 1994; Bacha, 2014). Measures of task performance range from accounting measures (McNellis, 2013), academic ability measures (Mohammed et al., 2002), mechanical measures (Motowildo & Scotter, 1994) to construction measures (Ling, 2002; Ahadzie et al., 2008a & 2008b).

Mohammed et al. (2002) experimentally tested the relationship between technical-administrative task performance, leadership task performance and contextual performance and team-and task-related composition variables. One hundred and twenty students who were enrolled in an undergraduate hotel, restaurant and institutional management course were employed for the study. The purpose of the study was to find out how the mix of ability, experience and personality within a team impact both task and contextual performance. Task-related and team-related compositions were used to predict technical-administrative task performance, leadership performance and contextual performance.

Technical-administrative task performance was measured using computation of profit/loss statement, calculation on the final purchase order, cost out recipes, meal performance in terms of meeting deadlines, food quality and quantity, managing employees and customer service and provision of written evaluation of employees' and co-managers' performance. Leadership task performance was measured based on individual participants' decision making, professional appearance, attention to detail, training employees, meeting deadlines, quality and quantity of food preparation, amon others. They concluded that both task-and-team- related competencies accounted for significant variance in the task and contextual performance. The task measures used for this study is in line with the task assigned to the participant in the study, therefore task performance measures are job specific measures.

Another experimental study on task performance was conducted by Porath and Erez (2007). The study was to find out the effect of rudeness on task performance and helpfulness. Students were randomly assigned to one of the experimental conditions of rudeness and control. Rudeness was experimentally tested using students for the laboratory experiment while task performance was measured as the number of anagrams correctly solved in ten minutes and the number of bricks used to produced anagrams in five minutes. They conclude that rudeness is harmful to task performance. Although the performance measure in the study was not directly related to a specific job, yet it was a task assigned to the participant to determine their performance.

McNellis (2013) examined the impact of hardiness on accounting task performance with conscientiousness as a predictor of performance. Accounting task performance was classified into accounting task performance with an immediate deadline and non-immediate deadline. The study was an experimental one in which participants were asked to perform a task on the bank reconciliation. Task performance was measured based on the number of items correctly incorporated into reconciliation. The result shows that commitment dimension of hardiness has a positive relationship with immediate deadline task performance but do not have a relationship with non-immediate deadline performance. Again, the task performance measure used in this study is directly associated with the job, it is a job-role performance measure.

Motowildo and Van Scotter (1994) empirically tested the distinction between task performance and contextual performance by examining their relationship with an overall contribution to the organisation and individual differences in ability, personality, experience and training performance. Task performance was measured with 14 items based on mechanical task. Such measures include inspecting, testing and detecting problems with equipment; troubleshooting; and performing routine maintenance. They concluded that there is a clear distinction between task performance and contextual performance. Experience has a relationship with task performance while personality is related to contextual performance. Both task and contextual performance contribute to overall task performance. Measures of task performance adopted by Motowildo and Van Scotter (1994) show the definition of task performance as job specific performance.

In carrying out an empirical survey, Law et al. (2010) tested the relationship between currencies of exchange and global lead-member exchange (LMX) and their impact on employee task performance and extra-role performance. Supervisors of bank tellers were asked to measure the performance of the subordinates. Task performance was measured based on the task performed by the subordinates. It includes measures such as providing first-class services to customers, satisfies all customers' needs, avoidance of errors, provision of realistic suggestions for work improvements, the capability to adapt to different type of work, fulfillment of requirements of the position and the use of different ways to solve problems during work. They found out that global LMX was positively related to task performance. The performance measured here goes beyond specific task performance; it also encompasses extra-role performance.

In studying the relationship between transformational leadership, task performance and job characteristics, Bacha (2014) empirically tested the relationship using 12 items to measure task performance. The task performance measures are; adequately completes assigned duties, fulfills responsibilities specified in the job description, fails to perform essential duties, helps others who have been absent, and so forth. The study found out that transformational leadership was positively related to task performance. Unlike previous studies (Motowildo & Van Scotter, 1994; Mohammed et al., 2002; Porath & Erez, 2007; McNellis, 2013), Bacha (2014) task performance measures seem to be general rather than specific. A major reason could be the target population. The focus of Bacha encompasses eight different areas of interest in marketing, human resource management, finance, audit, communication, quality, sales and production.

In construction, Ling (2002) predicts task performance of Architects and Engineers using four measures of cognitive ability, job knowledge, task proficiency and job experience. Ahadzie et al. (2008a & 2008b) also broadly measure task performance behaviours of Project Managers using four measures of cognitive ability, job knowledge, task proficiency and experience. These measures are classified as behavioural performance measures. Although job experience was used as a measure of task performance, it could be viewed from the perspective of personal characteristics rather than task performance. Task performance measures used by Kahya (2007) differ from the measures used by Ling (2002) and Ahadzie et al. It comprises three measures; job measure, problem-solving and concentrating on duties. Abas-Mastura, Iman and Osman (2013) measure task performance with eight measures; dependability, job knowledge and skills, quality of work, quantity of work, cooperation, judgment, initiative and adaptability. These measures focus on both behavioural and result performance measure. Standing on the view that task performance should be behavioural performance measures, this study, therefore, measures task performance empirically and adopts cognitive ability, job skills, job knowledge and task proficiency as task performance measures of construction professionals.

2.8.1 Cognitive Ability

A construction professional is expected to be equipped with knowledge and skills necessary for critical thinking and complex problem-solving. Borman and Motowidlo (1997) prove that cognitive ability is a task performance dimension. Based on this, previous studies measure task performance of individual, for example, project manager as behavioural performance using cognitive ability (Ling, 2002; Ahadzie et al., 2008a & 2008b). Cognitive ability refers to 'qualifications or capacity with respect to metal task' (Sonnentag, Volmer & Spychala, 2008, pp. 432). Simply, cognitive ability is the quality of being able to perform in terms of critical thinking and complex problem-solving.

Huppert, Gardener and Mcwilliams (2004) measure cognitive ability using learning and memory, word finding ability, executive function and speed of processing, and basics skills of literacy and numeracy. Salthouse (2005) examined the relationship between cognitive abilities and measures of executive functioning; cognitive ability measures include reasoning and perceptual speed abilities. The result shows that there is a strong correlation between cognitive abilities and executive functioning. The measures of cognitive ability used by the authors were experimentally investigated.

Cognitive ability is empirically measured in construction (Ling, 2002; Ahadzie et al. 2008a, 2008b). Ling (2002) measures cognitive ability as creativity and innovativeness, and problem-solving ability and project approach while the measure used by Ahadzie et al. (2008a) are; the ability to envisage a problem, provide an alternate solution to problems, maintain emotional stability and recall progress of work. This study, therefore, adopts the measures of cognitive ability used by Ahadzie et al. for the latent construct of cognitive ability.

2.8.2 Job Skills

Job skills are another behavioural performance measure. Skill generally is defined as abilities that directly have an impact on the job outcome of an individual acquired through learning (Papulova & Mokros, 2007). In other words, it is the ability an individual acquires through learning and training that have a significant impact on the task.

Skills are broadly classified by nature as general (generic) and specific skills (Wye & Lim, 2014). General skills relate to general productive assets or ability required in carrying out a task while specific skills refer to core ability for the specific job. Skills are also classified as hard and soft skills (Langer, Slaughters & Mukhopadhyay, 2008). Hard skills are skills comprising technological, expertise and project management skills while soft skills are skills concerned with the management of people. Flectcher et al. (2004) classify job skills as technical and non-technical. A cogent point raised by Spenner (1990) distinguishes skill brought to jobs by people (talents, abilities and capacities) from the skills required for the job (task demands, role requirement, and so on). This means that each job requires certain job skills to be able to perform which are acquired through learning and training.

In measuring job skills, Spenner (1990) summarises the major approaches to measuring job skills as non-measures, indirect measures and direct measures. The measurement sources include external, expert judgments and self-report of people in jobs.

Fletcher et al. (2004) measure job skills as task management, team working, situation awareness and decision making. In construction, Windapo, odediran and Akintona (2015) measure Project Manager job skills as managerial skill, technical skills, personal skills and legal skills while Oladiran (2015) considers the scope of construction professionals' skills as budgeting and control, understanding of construction industry, organisation and planning and so on. Jaafar and Khalatbari (2013) measure technical skills of construction project manager under time and project phase, project organisation resources, communication, information and documentation, quality project structure, control and report, start-up and close out. Other measures used by the duo include project management success, scope and deliverables, procurement and objectives, interested parties, risk and opportunities, changes and lastly cost and finance.

Measures of job skills in construction used by Farooqui, Ahmed and Saqub (2010) include interpretation/blueprint reading/understanding construction and shop drawing, knowledge on construction operatives, general computer proficiency, proficiency in information technology/software, cost accounting and scheduling. Others include knowledge of construction materials, knowledge of construction equipment, economic and financial analysis, value engineering/constructability analysis/design review, knowledge of project closeout and handover procedures. These measures are job specific skills, that is, the skills the job required.

In accordance with Spenner (1990) skills distinction, Mustapha and Naoum (1998) measure the effectiveness of Site Manager using their job skills. The measures used include; liaison with sub-contractors over dates and attendance, controlling acceptable quality standard, overall responsibility for site safety and working conditions, ensuring smooth flow of resources and so on.

2.8.3 Job Knowledge

Job knowledge of construction professionals is of importance to the overall task performance in the long run. Schmidt and Hunter (1993) define job knowledge as the technical information, facts and procedure needed for a task. In other words, job knowledge can be said to be the factual information a construction professional possesses in carrying out a task.

Schmidt and Hunter (1993) identify four facts about job knowledge; firstly, job knowledge increases with experience on the task. Secondly, job knowledge has a high correlation with job performance. Thirdly, the major determinants of job knowledge are intelligence and length of job experience and fourthly, the higher the variance of job experience, the lower the correlation between job knowledge and intelligence. The duo state that job knowledge depends on the length of experience and not necessarily intelligence.

The measure of job knowledge used by Carretta and Doub (1998) measures of job knowledge include electronic information, mechanical comprehension and auto and shop information. These measures are not applicable in construction. In identifying job knowledge applicable in construction, the measure of job knowledge used by Ahadzie et al. (2008a) include knowledge in construction technology, cost saving techniques, labour market technique, programme for delivery construction works, site layout techniques, health and safety issues and so forth.

Ahadzie et al. (2008b) discovered that the most significant job knowledge measures are 'knowledge on appropriate site layout techniques for repetitive construction works' and knowledge of appropriate technology transfer for repetitive construction works. Palumbo, Miller, Shalin and Steele-Johnson (2005) reported that job knowledge is a better predictor of task performance compared to cognitive ability.

2.8.4 Task proficiency

Task proficiency is another measure of task performance and it is a behaviour that can be formalized which reflects the degree to which an employee meets the known expectations and requirement of a task (Griffin, Neal & Parker, 2007). Task performance measure entails the application of technical and functional skills required in a construction professional task in order to achieve the expected outputs. Emphasising the important words 'technical and functional', Ling (2002) as well as Ahadzie et al. (2008a & b) measure the task proficiency of construction professionals using proficiency in technical and quality.

Ling (2002) measures task proficiency of Architects as the technical quality of design, functional quality of design, the accuracy of design and overall workload. Ahadzie et al. (2008a) task proficiency measures include technical quality of programme for delivery, functional quality of programme for delivery, the technical quality of cash flow, functional quality of cash flow and so on.

2.9 TASK PERFORMANCE IN CONSTRUCTION INDUSTRY

The unique nature of construction makes the construction industry to differ from other industries. Therefore, task activities in construction are quite different from other industries. Task activities differ across different jobs (Borman & Motowildo, 1997) and task performance is specific to the task performed by an individual for a particular position of interest (Law et al., 2010). Based on this, the study, therefore, focuses on specific task performance of site supervisor in construction organisation. This implies that the measure of task performance is specific to the core job or task of construction site supervisor.

Previous studies like Pheng and Chuan (2006) measure work performance of professionals in construction industry based on cost, time and quality, but Dainty, Mei-Cheng and Moore (2003) fault this performance approach as they emphasise that these measures of performance are beyond the control of professionals and that other factors account for cost, time and quality. Dainty et al. suggests a refinement of the traditional parameter of performance measure and a consideration of knowledge, skills and behavioural inputs.

In assessing the performance of construction site managers through their effectiveness, Mustapha and Naoum (1998) measure the effectiveness of site managers objectively and subjectively. They objectively measured site managers' effectiveness using percentage increase or decrease in estimated time and cost of the construction project. This is based on the fact that it is required of a site manager to complete a project within the estimated cost and time.

Site managers' effectiveness was also measured subjectively through task specific measures like; liaise with sub-contractors over dates and attendance, control acceptable quality standards, overall responsibilities for site safety and working conditions, rearranging the works and programme to cater for changes and delays. These measures of task performance although behavioural, are restricted to job skills aspect of task performance. Other measures were not considered. The study, therefore, adopts the measures of site managers' effectiveness as the measure of site supervisor's job skills.

Goodwin (1993) examines the skills required of effective project managers. Project manager roles were majorly discussed under project integration and leading project team. Three critical tasks of project manager under project integration are; implementation of an effective planning and control system, the establishment of sound communication links between all subsystems of the project, ensuring that conflict situations are resolved before they begin to impact negatively on the triple constraints of performance specifications, schedule and budget. The tasks of a project manager under the leading project team include a representative role or ambassadorial role. Although the tasks identified by Goodwin are role prescribed, the tasks are restricted to job skill, other forms of task performance measures were not considered.

2.10 TASK CHARACTERISTICS

Task characteristics refer to specific attributes or nature that can be used to describe different tasks (Griffen, Weish & Moorhead, 1981). This was derived from job characteristics theory postulated by Hackman and Oldham (1980). It was developed to identify important dimensions of a task as it affects motivation (Cunningham, 2016). Kim and Soergel, (2005) and Indartono and Chen (2010) conceptualized job characteristics as task characteristics, work characteristics (Niessen, Weseler & Kostova, 2016) while Griffin et al. (1981) refer to work design as task design.

The attributes of task characteristics were derived from Hackman and Oldham job characteristics theory; skill variety, task identity, task significance, autonomy and feedback from the job. While several researchers (Indartono & Chen, 2010) use task characteristics and job characteristics interchangeably, authors like Ling and Loo (2013) distinguished the two. The duo divided job characteristics into two dimensions; core job dimensions (task dimension) and contextual dimension. Core job dimension was explained as the attributes of work relating to actual duties or task. This was based on Hackman and Oldham's theory of job characteristics while contextual dimension includes factors like satisfaction with salaries, job security, working hours, workload and workplace.

Task characteristics have also been researched from the perspective of intrinsic task characteristics and extrinsic task characteristic (Kim & Soergel, 2005). This was based on Hackman and Oldham's framework of task characteristics. Intrinsic task characteristics refer to the inherent nature of tasks independent from extrinsic circumstances while extrinsic task characteristics refer to nature of task from outside the task or environmental nature that affects the task (Kim & Soergel, 2005).

While some researchers use Hackman and Oldham's job characteristics dimensions of skill variety, task identity, task significance, autonomy and feedback (Onukwube & Iyagba, 2011; Mukul, Rayhan, Hoque & Islam, 2013; Ling & Loo, 2013), others add some dimensions like task stages, task complexity, task analyzability and task determinacy, task interdependency, task routineness, task difficulty and task scope (Kim & Soergel, 2005), role ambiguity, role conflict, role overload, role significance, job autonomy, monetary gain and career scope (Suman & Srivastava, 2009).

Task characteristics have a significant impact on the job performance of an employee. According to Suman and Srivastava (2009), well-designed jobs have a positive impact on work attitude and behaviours, that is, a job with good characteristics reduces stress, enhances motivation and improves the satisfaction of employees and their performance.

Grinfifin et al. (1981) identify three measures of task characteristics namely: Job Diagnostic Survey (JDS) develop by Hackman and Oldham (1976), Job Characteristics Inventory (JCI) developed by Sims, Szilagyi and Keller (1976) and Yale Job Inventory developed by (Hackman & Lawler, 1971). The most widely used is the JDS which measures task characteristics from the dimensions of skill variety, task identity, task significance, task identity, autonomy and feedback from the job.

Choudhary (2016), Kim and Lee (2016) and Park (2017) adopt Hackman and Oldham five dimensions of job characteristics while Niessen et al. (2016) adopt two dimensions of task characteristics namely: job autonomy and task independence. These dimensions focus on work outcome responsibility of job characteristics theory and neglected the other aspect of meaningfulness at work and knowledge of result. Also, Niessen, et al. (2016) task characteristics dimensions include task independence which was not part of Hackman and Oldham job characteristics theory.

Focusing on only two dimensions of task characteristics also, Kemboi, Biwoh, Chenuos and Rutto (2013) investigate task characteristics from the perspective of skill variety and feedback. They focus on the two psychological state of employee experiencing meaningfulness at work and having knowledge of result. Other dimensions were not considered which do not give a robust state of employees' task characteristics. Piccolo, Greenbaum, Hartog and Folger (2010) also focused on two dimensions of task characteristics namely: task significance and autonomy. These two dimensions focus on a certain aspect of employee task and do not consider comprehensive employees' task characteristics.

Langfred and Moye (2004) and Alvi, Haider and Ali (2013) consider only one dimension of task characteristics (job autonomy). This one dimension is deficient in that it will not give the true nature of employees' task as other dimensions were not considered. Shih and Chang (2013) consider four task characteristics dimensions. The measures used by the duo include task ambiguity, task conflict norms, task complexity and task creativity. Shih and Chang classify task characteristics into four dimensions which are totally different from Hackman and Oldham's dimensions. The duo believes that the nature of an employee's task goes beyond five dimensions; therefore they considered other aspects of task characteristics which are; absence of knowledge about the task and standards of appropriate behaviour within the work groups for resolving the conflict. Others include the manner in which task requirement is specified and the creativity of task.

In Nigeria, Obi-Nwosu, Chiamaka and Tochukwu (2013) study seven dimensions of task characteristics namely: skill variety, task identity, task significance, autonomy, feedback from the job, feedback from agents and dealing with others. These dimensions go beyond five dimensions of Hackman and Oldham by subdividing feedback into two namely: 'feedback from job' and 'feedback from agent'. This will allow another participant to give the employee report on their task which is quite different from having feedback from the job by superior or peer.

Although previous studies (Shih & Chang, 2013; Obi-Nwosu et al., 2013) attempt to go beyond Hackman and Oldham's five dimensions of task characteristics, this study adopts Hackman and Oldham five dimensions of task characteristics and included other five dimensions of task difficulty, task dependence, task analyzability, task complexity and task structuredness. This will entail a comprehensive study on task characteristics of employees and not limited to five task characteristics dimensions.

Empirically, Djastuti (2010) discovered that professionals in construction firms assessed their task to be assigned with a motivational approach using the five dimensions of skill variety, task identity, task significance, autonomy and feedback. Mukul et al. (2013) found out that the task of workers are characterised by task identity, task significance and feedback while their task is not characterised by autonomy and skill variety. Mohamed and Morsy (2016) concluded that workers feel satisfied with their task characteristics as they rate skill variety, task identity, task significance, autonomy and feedback from the job as high in their task.

Although, there has been a mixed report on the impact of task characteristics on employee performance (Grinffin et al., 1981), task characteristics dimensions are still generally found to have a significant impact on job outcomes of employees. For example, Ling and Loo (2013) found a relationship between job characteristics (core job characteristics) and performance outcome of project managers. Kassem and Sarhan (2013) tested the relationship between core dimensions of job characteristic model and affective responses of satisfaction and behavioural responses of performance. The result shows a significant relationship between core job dimension and satisfaction while there was no significant relationship between job dimension and performance.

In Nigeria, Onukwube and Iyagba (2011) reported a significant relationship between overall job characteristics and overall task performance, but a different relationship at the facet level. A stronger positive relationship exists between facets of job characteristics and subjective task performance than objective task performance. Also, Obi-Nwosu et al. (2013) predicted organisational commitment among employees using Hackman and Oldham's job characteristics dimensions. It was concluded that job characteristics partially predict organisational commitment because skill variety, task significance, autonomy and feedback did not predict organisational commitment. 'Dealing with others' and 'task identity' were the only dimensions that predicted organisational commitment.

2.11 TASK CHARACTERISTICS OF CONSTRUCTION PROFESSIONALS

Construction professionals' task characteristics can be defined as nature or attribute that can be used to describe construction professional task. The attributes include skill variety, task identity, task significance, autonomy and feedback, task complexity, task analyzability, task difficulty, task routineness and task structuredness. In construction, Ling and Loo (2013) use the five dimensions of Hackman and Oldham job characteristics to find the effect of job characteristics on job satisfaction and performance. They conclude that job characteristics affect both job satisfaction and performance. Onukwube and Iyagba (2011) examined the relationship between job characteristics and task performance using the five dimensions of Hackman and Oldham's job characteristics theory and a positive significant relationship was reported by them. Although these studies were conducted in the construction industry, task characteristics were limited to the five dimensions in Hackman and Oldham job characteristics. The other five dimensions were not considered. The study, therefore, adopts the following as task characteristics dimensions of construction professional, skill variety, task identity, task significance, autonomy, feedback, task analyzability, task difficulty, task routineness, task complexity and task structuredness.

Skill Variety: Hackman and Oldham (1980) describe skill variety as the degree to which a task requires a variety of different skills or activities to execute the task. It also involves the use of different skill and talent. Relating this definition to construction, when construction professionals find out that they need varieties of skills and talent to execute their task, then they will find the task exciting and meaningful. This will be easy to achieve in construction as each construction project is unique and requires different skills to execute them.

Task Identity: According to Hackman and Oldham (1980), task identity is the degree to which the job requires a completion of a whole and identifiable piece of work on the job from the beginning to the end with the visible outcome Relating it to construction implies that when a construction professional complete his/her task from the beginning to the end with the visible outcome (completed structure), then meaningfulness at work will be experienced by the professional.

Task Significance: Task significance is the degree to which the job has a substantial impact on the lives of people whether directly in the organisation or in external environment/world at large (Hackman & Oldham, 1980). In the construction industry, when a professional understands that the results of his task affect people and the environment significantly, then he/she will be motivated to perform that task and as such experience meaningfulness at work.

Autonomy: Autonomy is the degree to which a task provides substantial freedom, independence and discretion to an individual in scheduling work and determining the procedure for executing it (Hackman & Oldham, 1980). Construction professionals with autonomy in their task have the freedom to schedule work and discretion to determine the procedure of carrying out construction activities. This will make construction professionals experience responsibility for the outcome of the construction project.

Feedback: Hackman and Oldham (1980) define feedback as the degree to which an individual receives direct and clear information about the effectiveness of his/her performance after carrying out the task. Thus, Construction professional with knowledge of actual results of work activities will be motivated further to perform better than the present performance.

Task Analyzability: Task analyzability is the degree to which a task has a clearly defined sequence of steps with established procedures (Kim & Soergel, 2005). Construction project involves clearly defined steps with an established procedure to execute it, therefore there is a tendency for construction professional’s task to be characterised by task analyzability. Thus, construction professional will be satisfied with their task.

Task Difficulty: Task difficulty is the degree to which a task requires a great effort to accomplish it (Kim & Soergel, 2005). Construction project involves a great effort to accomplish it from inception to completion. Thus, construction professionals may find their tasks not exciting as it requires great efforts to execute them.

Task Routineness: Task routineness is the degree to which an individual requires a habitual method of carrying out the task (Kim & Soergel, 2005). When construction professionals use the same method to execute their task, then there may be the possibility of feeling that the task is boring. However, a construction project is dynamics, each project is unique, though it may require a routine method in some instances,.

Task Complexity: Task complexity is the degree to which the task is complex and complicated in structure (Kim & Soergel, 2005). It is also the degree to which a task has interrelated subtasks which can be expressed as psychological experience of task-doer and interaction between task and person characteristics (Shih & Chang, 2013). Construction projects involve different activities which are interrelated subtasks and as such could affect the psychological state of construction professionals.

Task Structuredness: Task structuredness is the degree to which a task involves the application of a limited number of rules and principles with a well-defined parameter. It is also the degree to which the task has multiple solutions (Kim & Soergel, 2005). Construction task involves the application of rules and principles with a well-defined parameter. This is seen in the application of building codes during construction.

2.12 PERSONAL CHARACTERISTICS OF CONSTRUCTION PROFESSIONALS

Franek and Vecera (2008) refer to personal characteristics as personal features of an individual. It is regarded as dispositional factors affecting job satisfaction of an individual. Construction professional personal characteristics can, therefore, be described as prominent attribute peculiar to construction professionals.

Generally, personal characteristics have been measured as age, gender, ethnicity, occupation, education level, socioeconomic status and biomedical status (Boyette et al., 2002). The personal characteristics identified by Franek and Vecera (2008) include gender, education, age and job level. In construction, Ameh and Odusami (2014) identify personal characteristics of professionals as professional grouping, age, educational and professional qualifications, industrial experience and personality.

Others like Chandrakumara and Senevirathne (2009) refer to personal characteristics as individual characteristics. This was measured using gender, age, education level, employment category, experience, etc. This study, therefore, adopts four parameters namely: professional background, educational qualification, experience, age and gender.

2.13 RELATIONSHIP BETWEEN TRAINING PRACTICES AND TASK PERFORMANCE

Substantial research has been done by the several researchers on different aspects of training and development in HRM. The relationship between training and subsequent task performance is of concern in the construction industry. In attempting to study the relationship between training and task performance, researchers have used different typology to describe task performance; employee performance (Imran & Tanveer, 2015), work performance (Ling & Loo, 2013), staff performance (Durgin, Mahoney, Cox, Weetjens & Poling; 2015). However, these typologies do not focus directly on performance in core activities. The study therefore stands on the point of view that task performance paradigm describes the core activities performance of an employee and thus, adopts it for examining the relationship between training and task performance.

In finding the relationship between training and performance; most studies adopt employee performance as a type of performance and discover a positive relationship between training and performance. Using the typology task performance, Abas-Mastura, Imam and Osman (2013) examine the relationship between employability skills and task performance. Task performance was measured as dependability, job knowledge and skills, quality of work, the quantity of work, cooperation, judgment, initiative and task adaptability. The study concludes that a relationship exists between employability skills and task performance. However, the relationship between training and task performance was not considered. Focusing on the relationship between training and task performance, Durgin et al. (2015) use the typology 'staff performance' to test the relationship between feedback training and staff performance. They concluded that feedback training improves staff performance.

From the perspective of employee performance, Hafeez and Akbar (2015) empirically investigated the impact of training on employee performance. Training was the independent variable while employee performance was the dependent variable. Employee performance was measured as demonstrating, teamwork, communication skill, customer service, interpersonal relationship and reduced absenteeism. Although the study found a positive relationship between training and employee performance, employee performance was not based on core activities performance. Sila (2014) also empirically investigated the relationship between training and employee performance and found a relationship between training and employee performance. Again, employee performance was not specific to the core activities.

Adopting a correlational research design, Dabale, Jagero and Nyauchi (2014) examined the relationship between training and employee performance. The study found a strong positive relationship between training and employee performance. Focusing on the specific aspect of training delivery 'on-the-job' training, Jagero, Komba and Mlingi (2012) tested the relationship between on-the-job training and employee performance. On-the-job training positively influences employee performance.

Based on the reviewed literature, a positive relationship exists between training and employee performance. It is on this view that this study seeks the relationship between training practices of construction firms and task performance of construction professionals.

2.14 THEORETICAL AND CONCEPTUAL FRAMEWORK

Gay and Weaver (2011) define theoretical framework as an interrelated logical set of ideas and models which are based on theory. This section discusses the theory underpinning the phenomenon of the relationship between training practices and task performance. It reviews other researchers' theoretical framework of training practices linked performance and explains the underlying theories behind the frameworks. Drawing from the theoretical framework reviewed, the conceptual framework of the study was developed.

2.15 HUMAN CAPITAL (HC) THEORY

Training link performance paradigm is based on various theories with individual authors adopting different theories in their study. Various theories relating human resource training as investment explains how investment in the human resource can increase the performance of the employee. The study adopts Human Capital theory as the underpinning theory.

Human capital theory was initially developed by Becker in 1964 (Itika, 2011) and was based on Schultz's research on investment. The main premise of human capital theory is that learning capacities of people are comparable to other natural resources involved in the production process. It corresponds to any stock of knowledge or characteristics the workers possessed- innate or acquired- which contributes to his or her productivity (Acemoglu & Autor, 2011). Invariably human capital theory emphasises that knowledge and skills are acquired from education, learning or training which have economic value to individual and firms (Snell & Dean, 1992). Itika (2011) succinctly opine that organisations develop resources internally only when investments in employee skills are justifiable in terms of future productivity. He explains further that education increases skills, skills increase productivity, and higher productivity leads to higher rewards.

According to Teixeira (2002), Schultz works on human capital focuses on educational costs as an investment while Becker considers human capital as investment in education and training which has a rate of return. He introduced the concept of human capital activities as general human capital (off-the-job-training) and specific human capital (on-the-job-training). The concept of human capital theory distinguishes between general purpose and specific human capital investment (Kessler & Lülfesmann, 2002). In general training, employers will not invest in employee training because of their inability to receive returns from such investments while in specific human capital training, employee and employer share the cost and return on investment.

Bowles and Gintis (1975) and Livingstone (1997) faulted human capital theory as a theory. The trio is of the opinion that an adequate theory of human resource must combine the theory of production and reproduction. They critique the theory based on the fact that it has partial production theory and no reproduction theory. Livingstone (1997) explains that human capital theory is based on the principle of increase in learning leads to increase in knowledge levels and therefore increase productivity. He explains further that reality shows that increase in learning (school enrollment) has resulted in stagnated income and increase in unemployment.

Ignoring the critique and linking human capital theory to Human Resource Management (HRM) practices and performance; Snell and Dean (1992) enunciate that the underlying assumption behind linking HRM and human capital theory is that HRM constitutes investments in human capital. They explain further that HRM has been applied to selection, training, compensation and HRM practices in general. Expanding on this assumption, three different scenarios where HRM practices were seen as an investment were cited based on the definition of Parnes.

Firstly, they explain that skills and knowledge are capital because they enhance productivity. People possess skills and knowledge and the extent to which people possess skills and knowledge, to that extent they add value to the firm and enhance productivity. In other words, possessing skills and knowledge invariably is through HRM practices of training which constitute an investment and enhances employee productivity.

Secondly, human capital is a result of hiring individual ‘on the market’ or developing them ‘in house’ which is investment via HRM (Snell & Dean, 1994). This investment is justified only when they produce future returns through productivity. Simply, hiring in open market constitute HRM practices of recruitment and selection, while developing in house constitute HRM practice of training and development. These are an investment in human capital theory that enhances productivity.

Lastly, human capital has the tendency to transfer to another firm or in cases where they stay with a firm; their contribution depends on their willingness to perform (Snell &

Dean, 1992). The cost of retaining or controlling employees is considered as an investment which is attributable to HRM practices of compensation and reward.

Jackson and Schuler (1995) explain that people constitute the organisations' human capital and the cost involved in eliciting productive capabilities from an employee is a human capital investment, therefore training practices can be used by organisations to increase their human capital. They cited two examples where HRM practices can be used to increase human capital. Firstly, organisations can buy human capital in the market by offering compensation packages. Secondly, organisations can make human capital internally by offering extensive training and development opportunities. They believed that the two examples are investments that are associated with costs and is only justifiable when organisations are able to use the accumulated capital. In other words, HRM practices such as training practices which serve as investments fall under a specific human capital theory which benefits the employer in terms of the rate of return.

Since training practices are seen as an investment in human capital which enhances productivity and increases performance, it is worthy to note that training practices are important in enhancing the performance of an individual and organisation. Therefore, using human capital theory to explain the relationship between training and task performance, the study posits that investment in human capital (construction professionals) through training correlates with human capital task performance in terms of knowledge, skills and ability relevant to the present job.

2.16 THEORETICAL FRAMEWORK

Six relevant frameworks are discussed in this sub-chapter which serve as the basis for the development of the conceptual framework. They are;

1. The framework of Liu et al. (2009) on relationship between trainee reactions and task performance
2. The framework of Imran and Tanveer (2015) on impact of training and development on employee's performance
3. The framework of Muzaffar, Salamat and Ali (2012) on the impact of training on employee outcome
4. The framework of Kim and Soergel (2005) on task characteristics, task information seeking and task performance.
5. The framework of Ling and Loo (2013) linking job and jobholders characteristics with job satisfaction and work performance
6. The model of Ahadzie et al. (2008a) for predicting the potential performance of project managers

2.16.1 The Framework of Lui et al. (2009)

Liu et al. (2009) framework on the relationship between trainee reactions and task performance as shown in Fig.2.2 was based on the premise that perceived ease of learning of object-oriented techniques positively influences perceived ease of use of techniques. Perceived ease of learning of object-oriented techniques positively influences the performance of using the techniques and finally perceived ease of use of object-oriented techniques positively influences the performance of using the techniques.

Trainee reaction which is one of the four levels of training evaluation under Kirkpatrick (1959) model of training evaluation was the independent variable. It was conceptualized as ease of learning and ease of use and was measured using six items. The dependent variable was task performance and was measured by the quality of trainee analysis model. Quality was conceptualized as the extent to which an analysis model capture all data and functional requirements as specified in the problem description and satisfied the goals of OO modeling, including behaviour allocation and code reuse. The indicators used for measuring the quality of models are objects, services, relationships and attributes.

The study revealed that there is a strong correlation between task performance and perceived ease of learning but no relationship between task performance and perceived ease of use. The model is limited because it only considered one aspect of training practices which is, training evaluation. Other training practices such as training needs assessment, training implementation and training transfer were not considered. Also, the task performance measure is based on the field of computing and therefore cannot be applied in the construction industry.

Although some shortcomings were identified, the study adopts training evaluation as part of training practices and also adopts the model to derive the conceptual model.

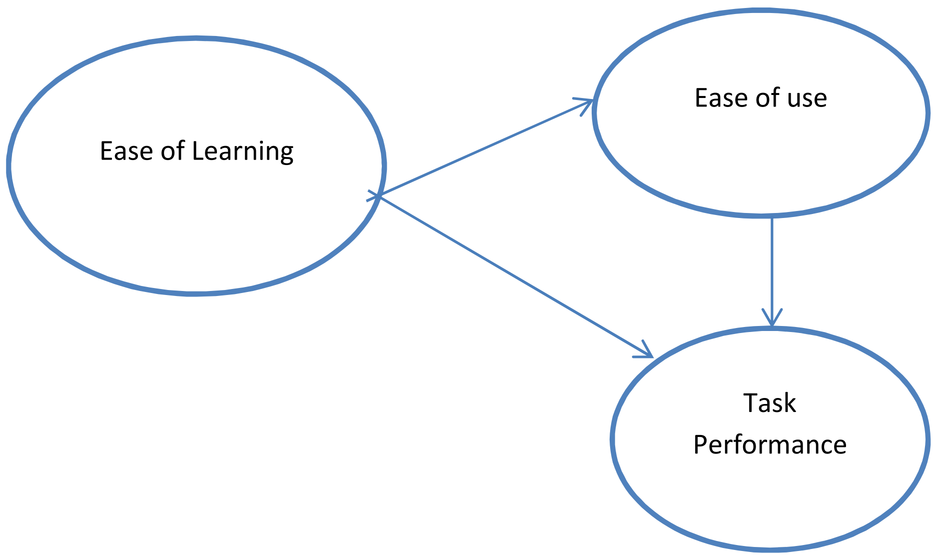

Fig. 2.2 Framework on relationship between trainee reactions and task performance
Source: Liu et al. (2009: pp.35)

2.16.2 The Framework of Imran and Tanveer (2015)

Imran and Tanveer (2015) theoretical framework on the impact of training and development on employee's performance is grounded in human capital theory and is based on the premise that there is a relationship between training and employee's performance. The independent variable is training and development while the dependent variable is employee's performance. Training and development were measured generally while employee performance was measured as technical skills, functional skills and others (Fig. 2.3). Furthermore, employee performance was studied from the perspective of task and contextual performance.

Although the relationship between the independent variables of training and development and the dependent variable of employee performance was established, the framework fails to specifically classify training as training needs assessment, training delivery, training evaluation and training transfer. Also, the framework fails to consider other aspects of task performance in terms of cognitive ability. Furthermore, the study classified job knowledge under technical skills and did not consider them separately since task performance is measured in terms of abilities, skills and knowledge.

Despite this limitation stated above, the study adopts the dependent variable of technical skills and functional skills in the model to come up with a conceptual model for measuring construction professionals' task performance measures.

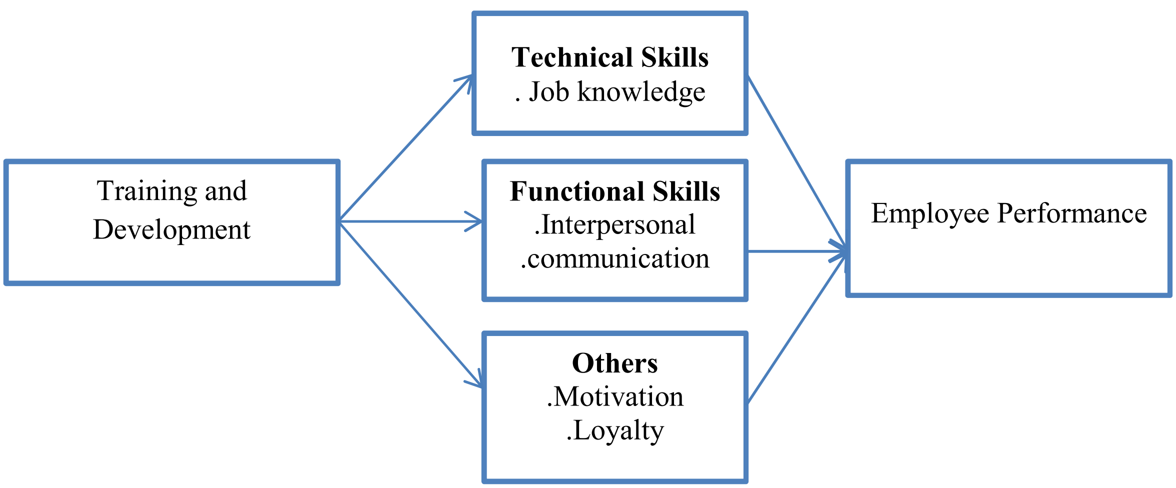

Fig. 2.3: Framework on the impact of training and development on employee's performance
Source: Imran and Tanveer (2015: pp.33)

2.16.3 The Framework of Muzzaffar et al. (2012)

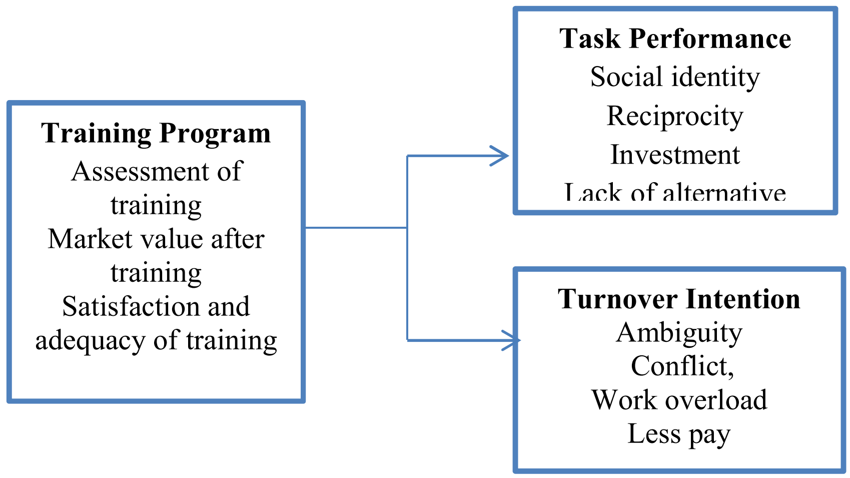

Fig. 2.4: Framework of training program, task performance and turnover intention

Source: Muzzaffar et al. (2012: pp.23)

The framework in Fig. 2.4 is based on the premise that training program has a relationship with task performance and turnover intention. The independent variable, training program was measured as an assessment of training, the market value of training and satisfaction and adequacy of training. These measures can be classified broadly under training evaluation. The dependent variable, task performance was measured as social identity, reciprocity, investment and lack of an alternative. The second dependent variable, turnover intention was measured as ambiguity, conflict, work overload and less pay.

The study concludes that training programs significantly and positively impact employee task performance while training programs have a negative impact on turnover intention. Although the study established a relationship between training and task performance, training was measured as training programs with particular attention to training evaluation and not training practices (training needs analysis, training delivery and training transfer). Also, the study fails to measure task performance in terms of cognitive ability, job knowledge, job skills and task proficiency. Despite this, the study adopts training evaluation as part of training practices.

2.16.4 The Framework of Kim and Soergel (2005)

Kim and Soergel (2005) task characteristics framework as shown in Fig. 2.5 is based on the effect of task characteristics on information seeking and task performance. The independent variable is task characteristics while the dependent variables are information seeking and task performance respectively. Information seeking also serves as an independent variable to task performance.

Building on Hackman (1969) work, a framework for classifying task characteristic was proposed. Task characteristics were classified into intrinsic task characteristics, extrinsic task characteristic, task performer and relationship between task and performer. Intrinsic task characteristics were classified into abstract task characteristics (task analyzability, task variety, task difficulty, task routineness, task complexity and task structuredness), task structure characteristics (Clarity of the given state, the existence of multiple solution paths, the certainty of the goals, subtask structure)

Intrinsic task characteristics were measured as task stages, task complexity, task analyzability and task determinacy (task variety), task interdependence and task scope.

Indicators of the dependent variable information behaviour are; types of source, relevance judgment, information search, strategies and vocabulary used, the number of sources, information types, the amount of communication within a group and information processing. Task performance indicators were not mentioned because they were more related to management studies.

Although the study is limited by the fact that the framework was not empirically tested and also based in the field of information technology, the study adopts task difficulty, task routineness, task complexity, task structuredness and task analyzability as part of task characteristics of the study.

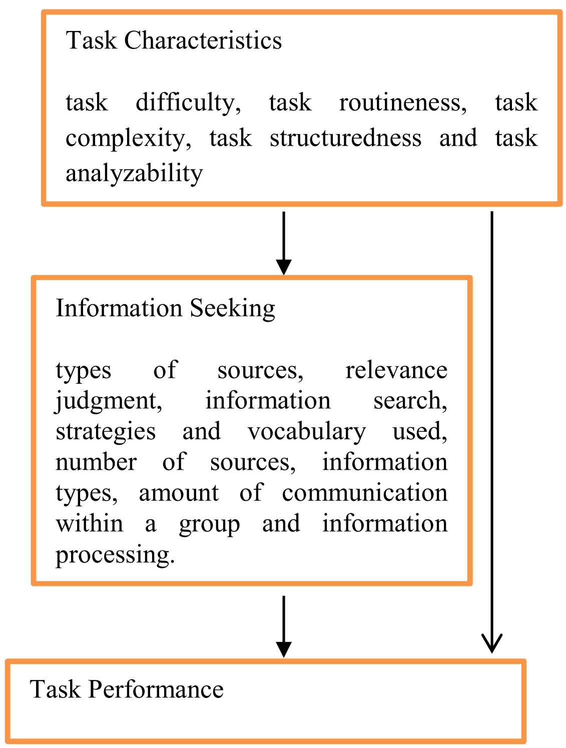

Fig 2.5: Effect of task characteristics on information seeking and task performance

Source: Kim and Soergel (2005: pp.7)

2.16.5 The Framework of Ling and Loo (2013)

Ling and Loo (2013) framework on jobs and jobholders characteristics and job satisfaction and workplace performance of project managers (PM) is based on Hackman and Oldham's (1980) job characteristics theory. The four major construct identified and used in the study are personal and work outcomes, job and jobholders characteristics.

The independent variables are jobs and jobholder characteristics. Job characteristics are based on Hackman and Oldham (1980) core job dimension namely: skill variety, task identity, task significance, autonomy and feedback from the job. The contextual dimensions of job characteristics are salaries, job security, working hours, workload, workplace, opportunity to make friends at work, the presence of friendly and helpful coworkers and competent coworkers and subordinates. The jobholders' characteristics were measured under knowledge and skills as: a skill to resolve conflict and get along well with other team members, promotion opportunities for self-development, personality fit with the job and whether their personal values were similar to their companies' values.

The dependent variables were job satisfaction and work performance. Work performance is measured as the conventional outcome of budget performance, schedule performance and client satisfaction. Job satisfaction which is personal outcome was measured based on PMs' level of satisfaction with the job.

The framework as shown in Fig. 2.6 is based on the following premise (i) that core job dimensions (skill variety, task identity, task significance, autonomy and feedback significantly affect PM's personal and work outcome, (ii) that work context dimensions significantly affect a PM's personal and work outcome and (iii) that PM's personal characteristics significantly affect their personal and work outcomes.

It was concluded that the five core job dimensions namely: skill variety, task identity, task significance, autonomy and feedback from job significantly affect PM's personal and work outcomes, work context dimension significantly affect PM's personal and work outcome and PM's personal characteristics significantly affect their personal and work outcome.

Although the study has established a relationship between job characteristics (job core dimensions) and PM performance outcome, the study did not consider training practice as having an effect on PM's performance in terms of personal and work outcome. Also, the PM's performance outcome is self-rated and therefore will not give the true picture of their performance. The study did not also consider core job dimension of task complexity, task analyzability, task interdependence, task routineness and task difficulty. Despite this, the study adopts core job dimension of job characteristics of skill variety, task identity, task significance, autonomy and feedback as task characteristics in the conceptual model.

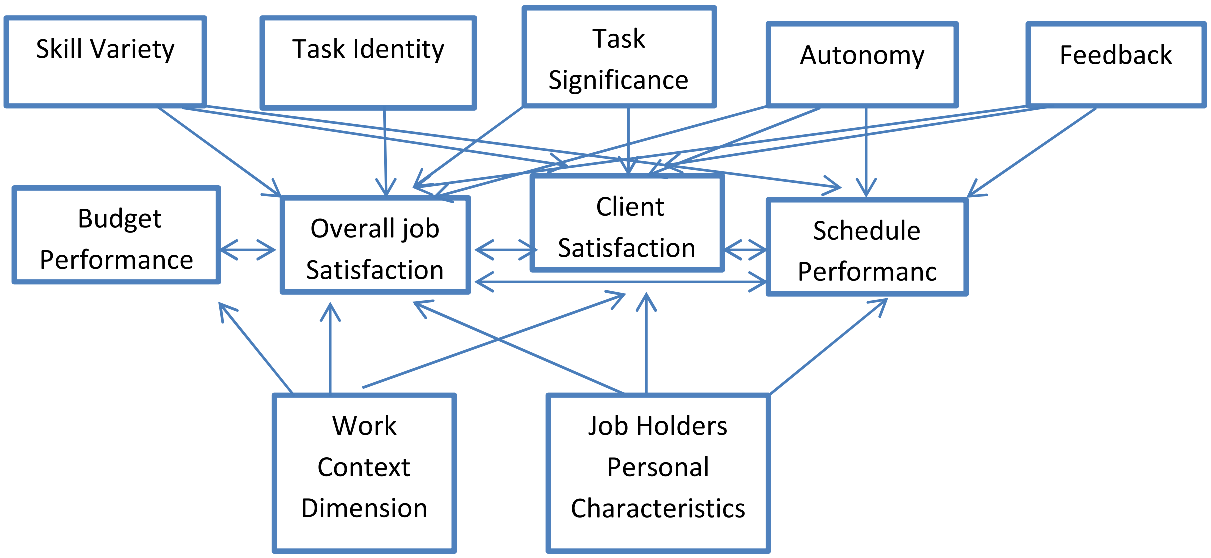

Fig 2.6: Antecedents to personal and work outcomes

Source: Ling & Loo (2013: pp.6)

2.16.6 The Model of Ahadzie et al. (2008a)

The framework measures the performance of PMs by establishing the behavioural attributes that best predict the PMs' performance outcome in Mass Housing Building Projects (MHBPs). The aim of the model is to elicit information on the perceived importance of using aspects of contextual and task performance to evaluate the performance of the PM. PM performance was operationalized to be in relation to variables that affect the outcome of projects but are within the control of construction project manager (CPMs). The performance was viewed as behaviour with an evaluative component and multidimensional.

The framework presented in Fig. 2.7 is of two fold, performance behaviours (task performance behaviour and contextual performance behaviour) which are the independent variables and performance outcome which is the dependent variable. The construct of task performance behaviours is cognitive ability, job knowledge, task proficiency and experience while constructs of contextual performance behaviours are job dedication and interpersonal facilitation. Job dedication was measured with six items while interpersonal facilitation was measured with eight items. Four operational measures were used to identify cognitive ability, twelve for job knowledge, twenty-eight for task proficiency and six for experience. The study concludes that the best predictors of CPMs performance in MHBPs include job knowledge in site layout, techniques for repetitive construction works and dedication in helping work contractors achieve works schedule.

Although the framework distinguished between task performance behaviours and contextual performance behaviours, the framework fails to considered job skill as part of task performance behaviours. The study therefore adopts task performance behaviours measures of cognitive ability, job knowledge and task proficiency as measures of task performance.

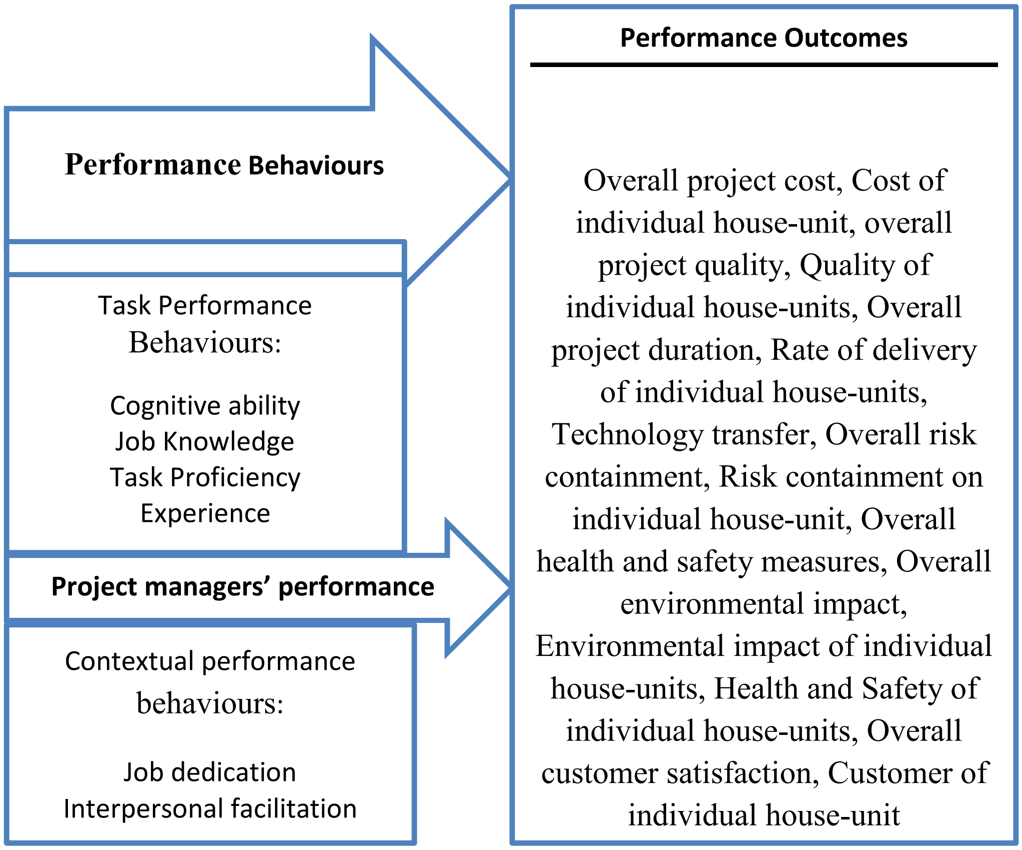

Fig 2.7 Theoretical model for predicting the performance of project managers in MHBPs
Source Ahadzie et al. (2008a: pp. 636)

2.17 CONCEPTUAL FRAMEWORK OF THE STUDY

Ogolo (1996) describes conceptual framework as the researchers' expression on the nature of relationships between the dependent and independent variables of the research which can be represented diagrammatically. The conceptual framework of the study was partly drawn from Liu et al. (2009), Muzaffar et al. (2002), Ling and Loo (2013), Kim and Soergel (2005) and Ahadzie et al. (2008a). The theory underpinning this conceptual framework was grounded in HC theory. It shows the importance of training to individual performance.

The task performance of construction professionals which is the dependent variable can be predicted from construction professionals' training practices. This concept is shown diagrammatically in Fig. 2.8. Construction professionals' characteristic which is measured by qualification, experience, age and gender is believed to influence task characteristics. Task characteristics, in turn, affect the training practices adopted by the organisation and finally training practices impact task performance of construction professionals.

Construction professionals' training practice which is the independent variable is measured by training practices. These training practices variables are defined as training needs assessment, training implementation or delivery, training evaluation and training transfer. These are conceptualized to predict the task performance of construction professionals.

Task characteristics variables are measured with task analyzability, task variety, task difficulty, task routineness, task complexity and task structuredness along with Hackman and Oldham (1980) job characteristics dimensions of skill variety, task identity, task significance, autonomy, and feedback from the job. These are proposed to have a relationship with training practices.

Task performance which is the dependent variable is divided into four perspectives of cognitive ability, job knowledge, job skill and task proficiency. This is in accordance with Ahadzie et al. (2008a) assertion that training and development are the frameworks for assisting employees to develop their interpersonal and organisational skills, knowledge and abilities.

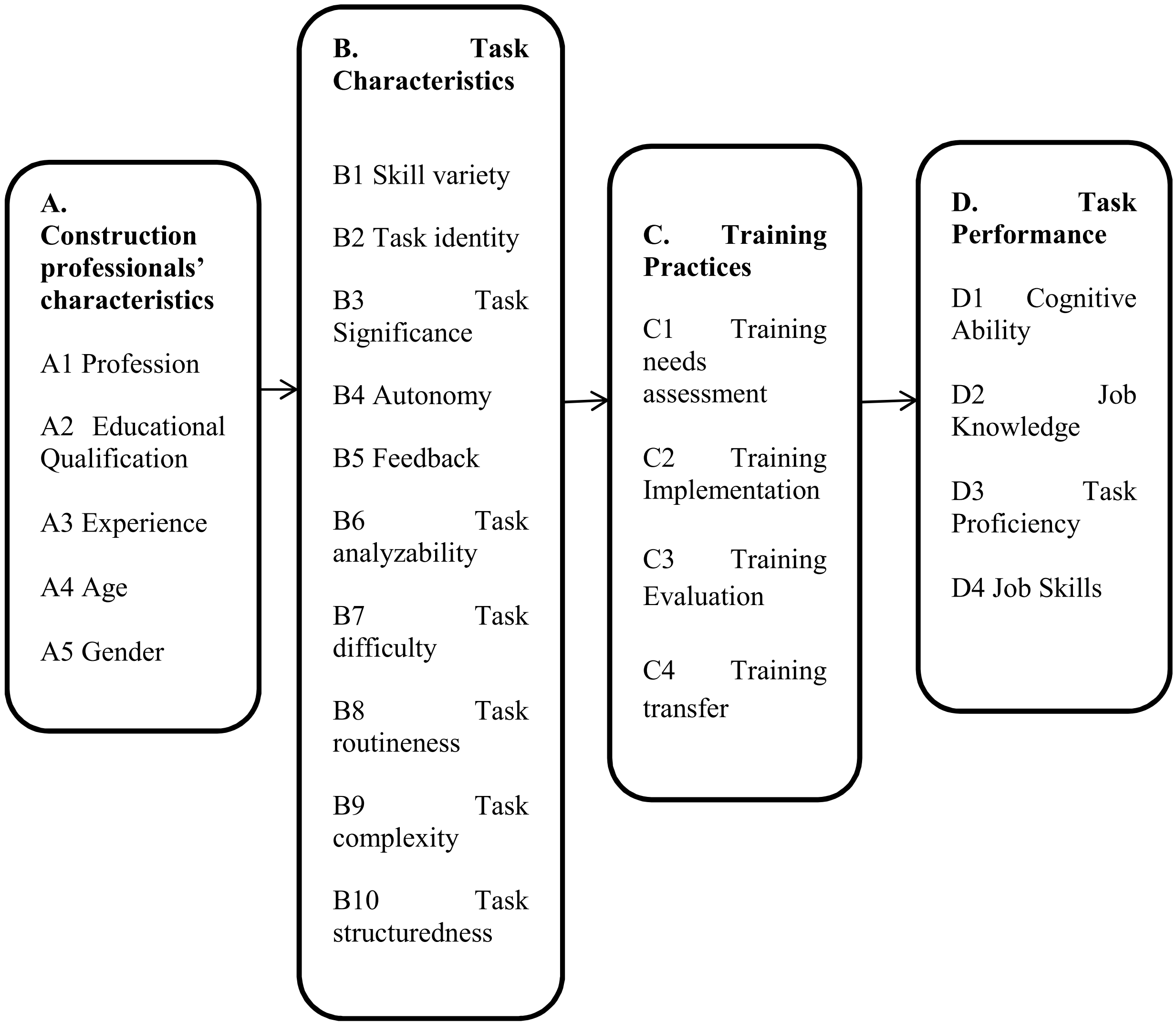

Fig. 2.8 Conceptual framework for evaluating the relationship between construction professionals' personal characteristics, task characteristics, training practices and task performance

Source: Author (2017)

CHAPTER THREE

RESEARCH METHODS

3.1 PREAMBLE

Research methods describe methods adopted in a study; it encompasses the rationale and philosophical assumptions underlying the study which in turn influence the method of analysis and interpretation. This chapter, therefore, describes the processes involved in conducting the research and the methodology required to solve the research problems and objectives. It explains the research design and philosophy, the research area, population of study, the sample and sampling techniques, data collection instrument and method of data analysis. This chapter also discusses the research variables and their measurements.

3.2 THE RESEARCH AREA

The study was conducted in Lagos and Abuja. Lagos is situated in South-West Nigeria, bordered on the South by the Atlantic Ocean, on the North and East by Ogun state and on the West by Benin Republic. Lagos state engulfed Ogun State through Badagry road, Agege Motor road, Epe and Ikorodu – Ibadan road. The population census figures of 2006 state that Lagos State has a population of 17.5 million persons and with a growth rate of 3.2%, Lagos state is believed to have a population of over 21 million (Lagos State Government, 2012). There are 20 Local Government Areas in Lagos state with a land mass area of 356,861 hectares of which about 75,755 hectares is wetland.

Lagos State is known as the commercial capital of Nigeria and is estimated to hit a population of 24.5 Million marks in 2015 by the UN study of 1999, and thus, be among the ten most populous cities in the world by the year 2015 (Lagos State Government, 2012). Recent census has not been conducted to confirm this.

Abuja is known as the Federal Capital Territory of Nigeria and is located in the Centre of the country. It has a land area of 1,728 km^2 and water cover 41 km^2. The population of Abuja as at 2011 estimate is 1,235,880. In 2006 census, the city of Abuja had a population of 776,298, growth rate of 139.7% between 2000 and 2010 making it the fastest growing city in the world (National Bureau of Statistics, 2012). Abuja has four districts, namely; Central Business District, Garki District, Wuse District and Maitama District. As at 2015, Abuja is still experiencing an annual growth rate of at least 35%, retaining its position as the fastest growing city on the Africa continent and one of the fastest growing city in the world.

Lagos is known as the commercial capital of Nigeria while Abuja is the nation's capital. Given the statistics above, Lagos and Abuja are well populated. As a result of high population, the volume of construction activities is high and most of the construction firms operating in Nigeria are located in these two territories. Construction works in Lagos and Abuja are quite representative of construction works in other states in the country.

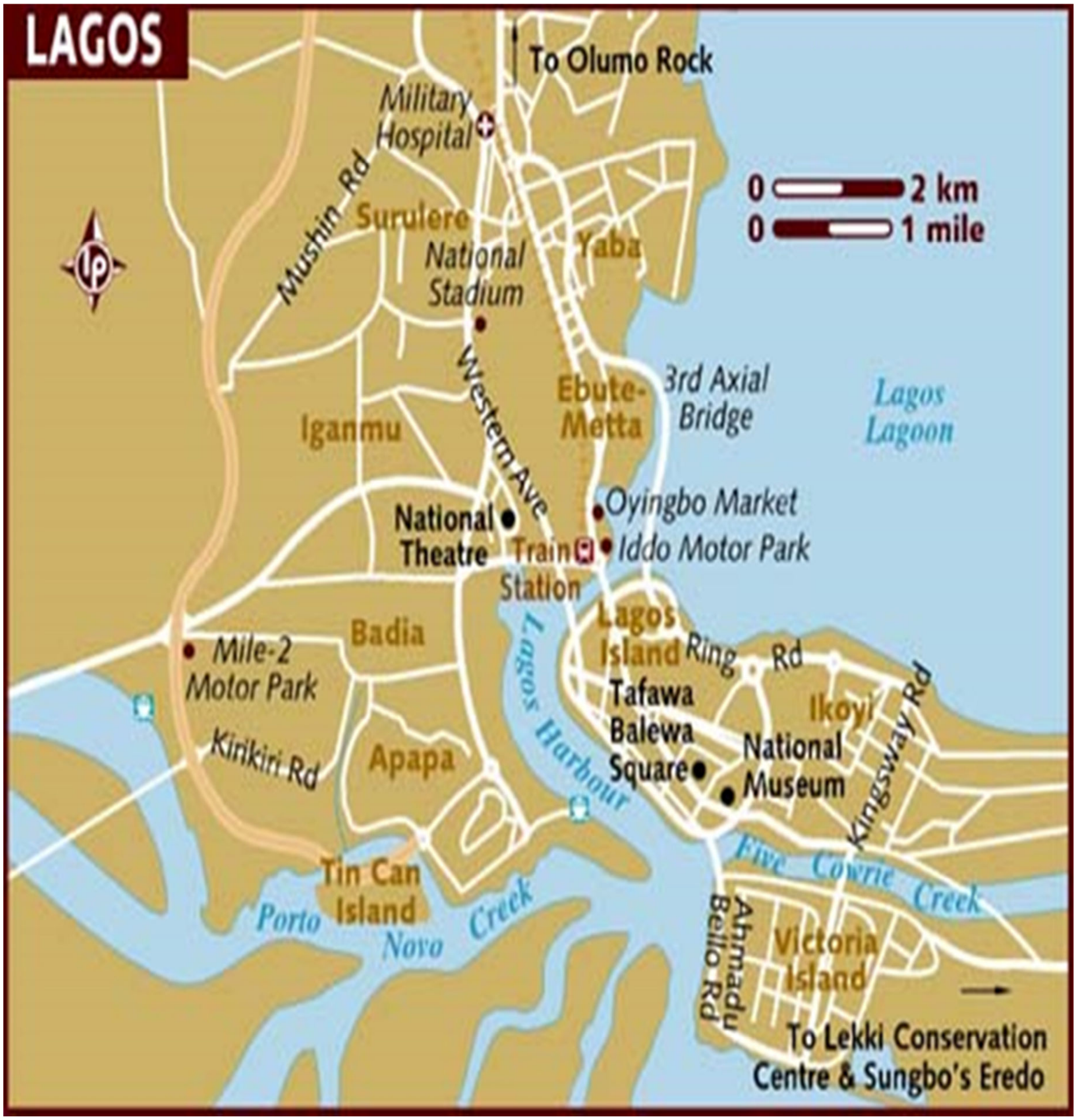

Fig 3.1: Map of Lagos State

Source: www.lonelyplanet.com/maps/africa/nigeria/lagos

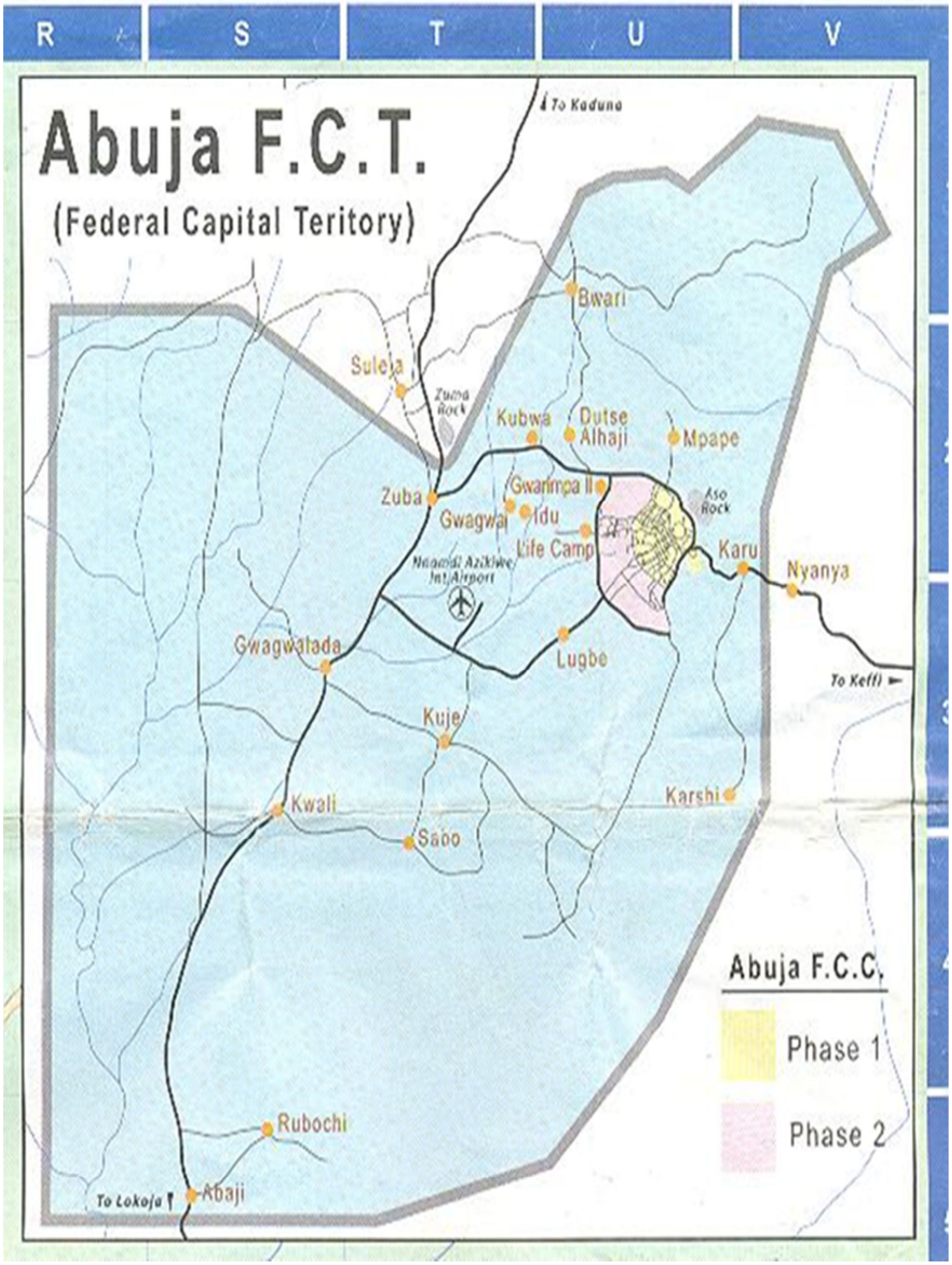

Fig 3.2: Map of FCT Abuja.

Source: www.lonelyplanet.com/maps/africa/nigeria/abuja

3.3 THE RESEARCH DESIGN

Research design as described by Gupta and Rangi (2011) is a map developed to guide a research. It is a grand plan of approach to a research. The research design is an outline that serves the purpose of guiding a researcher on how to generate data (Asika, 2009). In other words, research design is a systematic plan for carrying out a study.

The study adopted a cross-sectional survey research design specifically descriptive, which according to Asika (2009) involves one-time observation of independent and dependent variable. Specifically, data were collected once on independent variable (training practices) and the dependent variable (task performance). In developing a research design, it is important to consider the research philosophy and paradigm and the research approaches adopted in a research.

3.3.1 Research Philosophy and Approach

The first step in research design is to establish a philosophical position towards the study. Research philosophy or paradigm involves the researchers thought towards the development of knowledge which will affect the way the research is carried out (Saunders, 2003); the epistemology and ontological position adopted by the researcher (Dainty, 2008).

Epistemology is the study of knowledge and science (Girod-Seville & Perret, 2001). It is the science of knowing. It answers the questions about nature of knowledge to be generated through research, ways of generating scientific knowledge and the value and status of this knowledge (Girod-Seville & Perret, 2001). There are three paradigms that represent the epistemological streams, positivist, interpretivist and constructivist paradigms (Girod-Seville & Perret, 2001; Greener, 2008).

Greener (2008) explains positivism as a paradigm associated with the natural science research which involves empirical testing. It is deductive and inductive in nature. It allows ideas to be tested and then generate new theories by putting fact together to generate new laws or principles. Positivist research allows one reality. It is objective rather than subjective; an independent relationship exists between object and subject (Girod-Seville & Perret, 2001).

Ontology deals with nature of social entities (Greener, 2008). Dainty (2008:3) simply refers to ontology as “conceptions of reality”. Objectivist ontology views social entities as having an existence separate from social people in them. It is an entity independent of the people in the organisation (Greener, 2008) while constructivist ontology views social entities as having no independent reality. It is constructed in the mind of those who think about it.

According to Greener (2008), the epistemological and ontological view of the researcher will affect the methodology and specific methods for the study. Based on research philosophy, three approaches to research are mostly adopted in the literature (Creswell 2003; Greener, 2008; Dainty, 2008; Kumar, 2011); quantitative, qualitative and mixed methods approach.

3.3.2 Quantitative research approach

Quantitative research approach adopts quantitative methods which are rooted in positivist research paradigm (Dainty, 2008). It is mostly associated with the deductive approach to testing theory (Greener, 2008). It uses numbers or fact and views research objectively. Strategies associated with quantitative approach include experimental designs and non-experimental designs such as surveys (Creswell, 2003). Quantitative approach stems from academic tradition with an emphasis on numbers to represent opinions.

The strength of quantitative research according to (Amaratunga, Baldry, Sarshar & Newton, 2002) include; interdependence of the observer, allowance of comparison and replication, objective measurement of subject under investigation, need of hypothesis, objective determination of reliability and validity, large scale of data collection and finally it helps to search for causal explanations. The weakness of quantitative research is that it fails to look deeper into underlying meanings and assumptions about a subject.

In lieu of the explanation above, the study therefore adopted the positivist paradigm, which is objective approach because the study entails empirical testing of ideas. This implies that quantitative research approach is adopted for this study.

3.3.3 Rationale behind the Choice of Research Approach

Creswell (2003) explains three criteria for selecting a research approach; the research problem, the personal experience of the researcher and the people that will benefit from the research. Taking a look at the research problem, research questions and objectives, the study adopts positivist and quantitative approach.

The Justification for the choice of the research approach is stated as follows;

(1) It provides wide range coverage of the situation. (2) In cases where statistics are aggregated from large samples, they can be relevant to policy decisions (Amaratunga, et al., 2002). Based on the fact that the study needs a wide coverage of training practices in construction firms and because recommendations will be made so as to assist in policy making, the study, therefore, adopts the quantitative approach.

3.4 POPULATION OF THE STUDY

Singh (2006) defines population as the total observations from which samples are drawn. Asika (2009) explains population to be all conceivable element, subject or observation relating to a particular phenomenon of interest. The subject is the individual items that make up the population, therefore the target population of this study was divided into two groups namely: construction firms (the site manager represents the construction firms) and construction professionals working in construction firms. The most recent construction project by construction firms in the population was thus selected based on the fact that the site managers representing the firms will be able to rate the performance of construction professionals since the work is ongoing. Also, since the number of site supervisors is not equal on construction site, while some construction sites have more than one site supervisors, others have one and in order not to create bias; one site supervisor was selected per construction firm. Thus, the most experienced construction professionals working on a recent ongoing project of the firm was selected as respondents because they would have spent considerable time in the firm and so be able to give information on the training practices of the firm. The population frame which is the source materials from which sample is drawn comprises of 307 construction firms from Federation of Construction Industry (FOCI) list of contractors, Building price book, Lagos State Tenders Board list of registered construction contractors and Nigeria yellow book directory.

The respondents for this study are site managers (Architect, Builders, Quantity Surveyors, Civil Engineers and Project Managers) and construction professionals (Architect, Builders, Quantity Surveyors, Civil Engineers and Project Managers) engaged by construction firms and saddled with the responsibility of supervising construction site. They are often referred to as site supervisors.

3.5 SAMPLE, SAMPLE SIZE AND SAMPLING TECHNIQUE

The main purpose of every research is to find a solution to an existing problem with the aim of finding a principle that is universally applicable (Guupta & Rangi, 2011). Establishing a universally applicable principle requires a study of a targeted population. Singh (2006) defines population as the total observations from which samples are drawn. However, the coverage of the entire population is not feasible during research, therefore samples are chosen and conclusion made by generalising from samples.

Asika (2009) describes sample as a precise part of the population while Gupta and Rangi, (2011) describes sample unit as the unit containing the element and sample element as the object from which information is collected. The sample units for this study are construction firms while the sample elements are construction professionals working in sampled construction firms. This is because information is collected from construction professionals and the professionals are located in construction firms.

The sample size was calculated from the population frame of 307, using the formular in Equation 3.1 (Gupta & Rangi, 2011). A total of one hundred and seventy-one (171) samples were arrived at. Thereafter 50% of the sample obtained from the formular was added to carter for coverage error due to out of business or duplication rate and respondents who may for one reason or the other fail to complete or return the questionnaire, arriving at a calculated sample frame of 257. This implies that the total sample size for the study will not be less than 171, thus the minimum sample size for the study is 171.

$$\frac{Z^2 \times N \times \delta_P^2}{e^2(N-1)+Z^2 \times \delta_P^2} \text{ ……….. } \quad \text{Equation 3.1}$$

Where n = Sample size

N = Population frame (307)

e = Level of precision (5%)

Z = Value of standard normal variant at a given confidence level (1.96)

δ^2_p = Standard deviation of the population (0.5)

The sample frame for Lagos is 196 from the total sample frame of 257. To arrive at the sample size for Lagos, the formular in equation 3.2 was used to calculate the sample size.

The minimum sample size for Lagos was thus 130. Also, the sample frame for Abuja is 61. This is due to the fact that most construction firms have their location and headquarter in Lagos compared to Abuja. Therefore, there is more of Lagos based construction firms on the list compared to Abuja. To arrive at the sample size for Abuja, the formular in equation 3.3 was used to calculate the sample size. The minimum sample size for Abuja was thus 41.

Estimate of proportion for Lagos and Abuja

$$\frac{Total\ Lagos\ state\ sample\ frame}{Total\ sampling\ frame} \times Total\ sample\ size \ldots\ldots.. \qquad Equation\ 3.2$$

$$\frac{Total\ Abuja\ sample\ frame}{Total\ sampling\ frame} \times Total\ sample\ size \ldots\ldots\ldots\ldots.. \qquad Equation\ 3.3$$

Where Total (Lagos and Abuja) sample frame = 196 and 61 respectively

Total sampling frame = 257

Total sample size calculated = 171

To select the samples in this study, Stratified sampling technique was employed and then simple random sampling technique without replacement. Construction firms were divided into strata based on location; Abuja and Lagos and then simple random was done on each stratum. Every construction firm that constitutes the study population has equal and independent chance of being selected. This was done by writing all the names of construction firms on the sample frame on cards and shuffling the cards and picking one card each time the cards are shuffled until the required sample size is met. The sample frame was obtained from the list of construction firms adopted for this study and consists of Two hundred and fifty-seven (257) construction firms (61 and 196 construction firms in Abuja and Lagos respectively). This is due to the fact that most construction firms have their location and headquarter in Lagos compare to Abuja. Therefore, there is more of Lagos based construction firms on the list compared to Abuja. Lagos and Abuja were chosen as the study area because major construction works take place in these two locations as a result of high population.

3.6 TYPE OF DATA

Primary data were used in this study. Primary data were collected using questionnaires to elicit information in the research area. Questionnaires were administered to site supervisors and their site managers using trained research assistant.

3.7 RESEARCH INSTRUMENTS

Collection of data is very crucial in research. It is through the process of collecting data that the researchers gather empirical materials on which the research will be based (Thietart, 2001). Data collection instruments depend on the research approach adopted in a study, the research questions and research objectives. Based on the research approach of this study, the data collection instrument for this study is structured questionnaires.

After a careful literature review on training practices, task characteristics and task performance, two research instruments namely: Construction Professionals' Questionnaires (CPQ) and Construction Professionals' Supervisors' Questionnaire (CPSQ) were developed for the study. The two set of questionnaires were administered to site supervisors and site managers using 7 trained research assistants. The research assistants were trained for 2 days via lecturing and physical demonstration.

3.7.1 Construction Professionals' Questionnaire (CPQ)

The instrument was designed to obtain information on training practices and task characteristics of construction professionals in construction firms. CPQ is sub-divided into three parts, namely: section A, B and C as presented in Appendix A.

CPQ (Section A)

Section A deals with demographic details of the respondents. This is also sub-divided into two parts. Part A dwells on respondent's profile such as number of years in the company, academic qualification, professional background, professional membership grade, age, gender. Part B focused on respondents' organisations such as number of employees in the firm, years of operation in Nigeria and type of company.

CPQ (Section B)

The questionnaire was designed to answer part of research question three and part of research question four. It was also designed to be used as part of questions to test hypotheses three and four. The section sought to elicit information on the frequency of implementation of training practices in construction firms. It contains fifty items which were broadly classified into four groups namely; training needs assessment, training delivery, training evaluation and training transfer.

The respondents evaluated the frequency of implementation of training practices in their organisation on a scale of 1-5. The scales were selected from the work of Altarawneh (2005) and Rose (2005).

CPQ (Section C)

Section C sought to elicit information on the task characteristics of professionals. Task characteristics were divided into ten variables. Five of the variables were based on Hackman and Oldham's (1980) model on job characteristics. The other five variables were from Kim and Soergel (2005). In all, a total of 22 items from Kim & Soergel, 2005: (Ling & Loo, 2013) were used to measure the task characteristics of construction professionals. The information in this section answer research question one and part of two. It is also used to test hypotheses one, two and three.

3.7. 2 Construction Professionals' Supervisors Questionnaire (CPSQ)

The instrument was designed for construction professionals' supervisors in construction firms to evaluate the task performance of construction professionals under them. The CPSQ is divided into two sections:

CPSQ (Section A)

Section A is divided into two parts namely: respondent's profile and organisation's profile. Information requested on respondent's profile are years in the company, highest academic qualification, professional background, professional qualification, professional grade of membership, age and gender. The part two which contains information on organisation's profile contains information such as the name of the company, the total number of employees in the firm, years of operation of the company in Nigeria and form of ownership.

CPSQ (Section B)

Section B sought to elicit information on the performance of construction professionals. The information in this section provides answers to research question four. The data obtained in this section is needed to test hypothesis four. The section is further subdivided into four sub-sections namely: cognitive ability, job skills, job knowledge and task proficiency. A total of 48 items partly adapted from Mohammed and Naoum (1998) and Ahadzi et al. (2008) was covered in this section.

3.8 VALIDITY OF RESEARCH INSTRUMENT

The content validity of the research instruments was assessed by the thesis supervisors, panel of Experts in Department of Building, research Experts in the Department of Psychology and Department of Industrial Relations and Personnel Management. Areas or items needed to be reworded were identified for modification and re-structuring.

3.9 PILOT STUDY

A pilot study was conducted in Lagos State. Twenty-one construction professionals saddled with the responsibility of supervising construction sites and their bosses were purposely selected in Lagos Mainland area of Lagos state.

3.10 RELIABILITY OF THE RESEARCH INSTRUMENTS

Reliability is the degree of consistency or stability of measurement (Gupta & Rangi, 2011). Internal consistency reliability was used to assess the homogeneity or co-relation between a set of items in the research instruments. Cronbach's alpha is a reliability test technique that requires only a single test administration to provide the needed estimate of reliability for a given set of items (Gliem & Gliem, 2003). Based on this, Cronbach's alpha reliability test was used to test the item reliability because the research instruments consist of summated multi-item scale (Gliem & Gliem, 2003).

The reliability of the scale of the instruments was therefore determined by analysing the Cronbach Alpha Coefficients of the two instruments which were found to be 0.98, 0.86 and 0.98 for training practices, task characteristics and task performance respectively. The results showed that Cronbach Alpha Coefficient was higher than the minimum recommended (0.7), which indicate that the research instruments are highly reliable.

3.11 DEFINITION AND MEASUREMENT OF RESEARCH VARIABLES

The definition and measurement of variables used in the study are described below:

3.11.1 Respondents Profiles

Experience in Company: This variable represents the numbers of years construction professionals or supervisors have spent in the company. Those within 1-5 years termed 'short experience' are assigned 1, 6-10 years termed 'average experience' are assigned 2, and above 10 years, termed 'long experience' are assigned 3.

Academic Qualification: The variable academic qualification represents the highest academic qualification of construction professionals and their superiors. Those with OND were assigned 1 score, HND, 2 scores, B.Sc., 3 scores, PGD, 4 scores, M.Sc., 5 scores and finally Ph.D., 6 scores.

Professional Background: This variable indicates the professional background of construction professionals and their superiors. Those with a professional background in Architecture were assigned 1, Building, 2, Quantity surveying 3, Civil Engineering, 4 and Project Management, 5. This variable was used to test whether there are differences in the task characteristics between the professionals.

Professional Affiliation: This variable indicates the professional membership of construction professionals and their superiors. Those with NIA were assigned 1, NIOB were assigned 2, NIQS were assigned 3, NSE, were assigned 4 and others like IPMP were assigned 5.

Membership Grade: Membership grade represents the membership grade of construction professionals and their superiors in their various professional bodies. An associate member is assigned 1, Graduate member is assigned 2, Corporate is assigned 3 and Fellow is assigned 4.

Age: The variable age was meant to seek information on the age of construction professionals and their superior as at their last birthday. Those within ages 21-30 years are given 1 point, 31-40 years, 2 points, 41-50 years, 3 points, 51-60 years, 4 points and above 60 years, 5 points.

Gender: This variable indicates the gender of construction professionals and their supervisors which can either be male or female. Male is assigned 1 and female is assigned 2.

3.11.2 Organisation's Profiles

Number of Employees: This variable represents the size of the organisation in terms of the number of employees in the organisation. An organisation with 1-10 employees is given 1 score, 11-20 employees, 2 scores, 21-30 employees, 3 scores, 31-40 employees, 4 scores and finally over 40, 5 scores.

Company Experience: This variable represents the number of years the company has been in operation in Nigeria. The variable is categorised into four intervals namely: 1-10 years, 11-29 years, 30-39 years and 40 years and above. The intervals are assigned 1, 2, 3 and 4 respectively.

Type of company: This variable is used to determine the type of company which can either be indigenous and multinational. Indigenous firms were assigned 1, while multinational firms were assigned 2.

3.11.3. Training Practices Variables

Training Needs Assessment: This variable explains how organisation determines the training needs of construction professionals. The study sought to find the frequency of carrying out training needs assessment on construction professionals by their firms. The variable which is a latent variable is measured in Likert scale and contains 15 fifteen items such as approaches used for training needs assessment; training needs indicators and methods of training needs assessment. See Appendix A for the 15 items. Fifteen sentences were constructed and respondents were asked to tick the frequency at which their firms implement training needs assessment using 1 for '*Nil*', 2 for '*Low frequency*', 3 for '*Moderate frequency'*, 4 for '*High frequency'* and 5 for '*very high frequency'*.

Training Delivery: Information on training delivery to construction professionals was elicited with this latent variable. The observable variable contains 22 items (See Appendix A for details) measuring training delivery. It measures information on training methods, areas of training and form of training. 22 statements were constructed to elicit information on training delivery as experienced by construction professionals. They were requested to tick the frequency at which their company implements training delivery process with 1for '*Nil*', 2 for '*Low'*, 3 for '*Moderate*', 4 for *'High'* and 5 for '*very high'*.

Training Evaluation: This variable elicits information on the third stage of training practices in construction firms. The variable which is latent sought to find out the frequency at which construction firms evaluate the training received by construction professionals in their firms. The statement contains 8 items (See Appendix A for the 8 items) measured using 1 for *'Nil'*, 2 for '*Low'*, 3 for '*Moderate'*, 4 for '*High'* and 5 for '*very high'*.

Training Transfer: Transfer of training is an important stage in training practices. This latent variable sought to establish the frequency at which construction professional transfer what they learnt and gained from training received on their job. It contains 5 items which evaluate training transfer of construction professionals. These items were measured using 1 for *'Nil'*, 2 for '*Low'*, 3 for '*Moderate'*, 4 for '*High'* and 5 for '*very high*'. Appendix A gives the details on the 5 items.

3.11.4 Task Characteristics Variables

Skill Variety (B1): Is the degree to which a task requires a variety of different activities to carry out the work. It involves the use of a number of different skills and talents of the individual. The variable sought to find out if the tasks of construction professionals involve the use of a variety of skill to execute them and if they have a variety of tasks to perform. It consists of 2 items which were measured on a 5 point scale, where 1= '*Strongly disagree'*, 2= '*Disagree',* 3= '*moderately agree'*, 4= '*Agree'* and 5= '*Strongly agree'*.

Task Identity (B2): refers to the degree to which a task requires completion of a whole, identifiable process or piece of work by carrying it out from the beginning to the end with a visible outcome. The variable sought to find out if there is role clarity in construction professional tasks, that is, the work is arranged from the beginning to the end. Task identity variable consists of three items and a five-point Likert scale was used to measure the variable with 1 representing '*Strongly disagree'*, 2 representing '*Disagree'*, 3 representing '*Moderately agree'*, 4 representing '*Agree'* and 5 representing '*Strongly agree'*.

Task Significance (B3): Construction professionals are required to assess if their task is significant in terms of having a substantial impact on the lives of other people such as in their immediate organisation or the world at large. It consists of two items and these were measured on a five-point scale where 1= '*Strongly disagree'*, 2= '*Disagree'*, 3= '*Moderately agree'*, 4= '*Agree'* and 5= '*Strongly agree'*.

Autonomy (B4): Autonomy indicates the degree to which construction professionals' task provides substantial freedom, independence and discretion to execute their task assignment. It consists of two items which measured if construction professionals have an amount of authority to command others to execute work or if they have an amount of control to execute their task. This was measured using 1for '*Strongly disagree*', 2 for '*Disagree*', 3 for '*Moderately agree*', 4 for '*Agree'* and 5 for '*Strongly agree'*.

Feedback (B5): Feedback represents the knowledge of actual results of construction professional's task activities. The variable sought to find out if there is the availability of information to carry out the tasks and whether there is recognition for a task completed well. The variable was measured with two items on a five-point scale using 1for

‘*Strongly disagree’*, 2 for ‘*Disagree*’, 3 for ‘*Moderately agree*’, 4 for ‘*Agree*’ and 5 for ‘*Strongly agree’*.

Task Analyzability (B6): refers to the degree to which construction professional’s task involves a clearly defined sequence of steps and established procedures. The variable sought to find these out using an item measured on a five-point Likert scale using 1for ‘*Strongly disagree’*, 2 for ‘*Disagree*’, 3 for ‘*Moderately agree*’, 4 for ‘*Agree*’ and 5 for ‘*Strongly agree’*.

Task Difficulty (B7): Task difficulty refers to the degree to which a task requires great effort to accomplish it. The variable sought to find out the extent to which construction professionals find their work difficult. It consists of two items measured on a 5 point scale using 1for ‘*Strongly disagree’,* 2 for *‘Disagree’,* 3 for *‘Moderately’,* 4 for *‘Agree’ and* 5 for *‘Strongly agree’.*

Task Routineness (B8): This variable sought to find out the task characteristics of routineness in construction professionals’ task. It consists of two items which sought to find out if the task of construction professionals involves a habitual method or procedure of carrying it out. It was measured on a 5 point scale using 1for ‘*Strongly disagree’,* 2 for *‘Disagree’,* 3 for *‘Moderately agree’,* 4 for *‘Agree’ and* 5 for *‘Strongly agree’.*

Task Complexity (B9): Refers to the degree to which a task is complex and complicated in structure. The variable sought to find out whether construction professionals’ tasks are complex and complicated. This was measured with two items on a 5 point Likert scale using 1for '*Strongly disagree',* 2 for *'Disagree',* 3 for *'Moderately agree',* 4 for *'Agree' and* 5 for *'Strongly agree'.*

Task Structuredness (B10): Construction professionals' task structuredness refers to the degree to which their tasks involve the application of a limited number of rules and principles with well-defined parameter and also the degree to which their tasks possess multiple solutions. This was measured using two items on a 5 point Likert scale 1for '*Strongly disagree',* 2 for *'Disagree',* 3 for *'Moderately agree',* 4 for *'Agree' and* 5 for *'Strongly agree'.*

3.11.5 Task Performance Variables

Cognitive Ability (C1): This is one of the behavioural measures of construction professional's task performance. It measures problem-solving ability and thinking ability of construction professionals. It also measures construction professional's ability to envision problem ahead and think of a solution. This variable consists of five items which measure the performance of construction professionals on a 5 point scale using 1 for '*Very low'*, 2 for '*Low*', 3 for '*Moderate*', 4 for '*High*' and 5 for '*Very high'*.

Job Skills (C2): Job skills refer to the ability that has been acquired by training on a job. This was measured with 21 items indicating the behavioural measures of construction professional performance on-site activities task. Those construction professionals whose job skill performance is '*very low*' are scored 1 point, 2 points for '*low*', 3 points for '*moderate*', 4 point for '*high*' and 5 points for '*very high*'.

Job Knowledge (C3): This variable indicates the factual information a construction professional has in carrying out his/her tasks. It consists of 10 items. Those construction professionals rated '*very low*' are scored 1 point, 2 points for '*low*', 3 points for '*moderate*', 4 points for '*high*' and 5 points for '*very high*'.

Task Proficiency (C4): This variable measures professional's competence and technique in executing his/her task. The variable sought to measure the task proficiency of construction professionals with 12 items. The performance of construction professionals was rated on a scale of five points with those scored as '*very low*' having 1 point, '*low*' having 2 points, '*moderate*' having 3 points, '*high*' having 4 points and '*very high*' having 5 points.

3.12 METHODS OF DATA ANALYSIS

Data for this study were processed using the Statistical Package for Social Sciences (SPSS) and Analysis of Moment Structures (AMOS) program. Descriptive and inferential statistics were used in analyzing data. Descriptive statistics used were percentage and mean while inferential statistics used were ANOVA, t test, Pearson Product Moment Correlation, and Structural Equation Model. Table 3.1 shows the method of data analysis for each objective and hypothesis.

Table 3.1 Methods of Data Analysis

Aim	Research Questions	Objectives	Hypothesis	Techniques of data analysis
The aim of the study is to examine the relationship between training practices of construction firms and task performance of construction professionals with a view to improving the performance of professionals engaged by construction firms.	What are the prevalent task characteristics of professionals in construction firms?	To investigate the prevalent task characteristics of professionals engaged by construction firms	There is no significant difference in the prevalence of task characteristics among professionals in construction firms.	Mean, ANOVA
	What are the effects of construction professionals' personal characteristics on task characteristics?	To evaluate the effect of construction professionals' personal characteristics on task characteristics.	There is no significant difference in task characteristics based on construction professionals' personal characteristics	ANOVA, t-test
	What is the relationship between task characteristics and training practices of professionals in construction firms?	To determine the relationship between construction professionals' task characteristics and training practices of construction firms.	There is no significant relationship between task characteristics and training practices of construction professionals in construction firms.	Pearson Moment Product Correlation
	What is the relationship between construction firms' training practices and task performance of professionals engaged by	To determine the relationship between training practices and task performance of professionals in	There is no significant relationship between training practices and task performance of professionals in	Pearson Moment Product Correlation

Aim	Research Questions	Objectives	Hypothesis	Techniques of data analysis
	construction firms?	construction firms.	construction firms.	
	What models can be developed for predicting task performance of construction professionals from training practices?	To develop a model for predicting task performance of construction professionals from training practices.		Structural Equation Modeling

3.13 STRUCTURAL EQUATION MODELING (SEM)

In analyzing the data for the study and in developing a model, SEM was employed. SEM is a statistical methodology that uses hypothesis testing approach to analyse a structural theory based on some phenomenon (Byrne, 2010). It is a statistical model used to evaluate the validity of substantive theory with empirical data (Lei & Wu, 2007) and represent an extension of General Linear Modeling (GLM) procedures such as ANOVA and Multiple Regression Analysis (MRA) (Kline, 2011).

Suhr (2006) describes SEM as a multivariate technique encompassing measure variables and latent construct with measurement error, one of the advantages it has over GLM. Byrne (2010) differentiate SEM from older generation multivariate procedures like MRA as follows (1) It takes a confirmatory approach to data analysis rather than an exploratory approach in that it lends itself to the analysis of data for inferential purpose, and so hypothesis can be tested rather than other Exploratory Factor Analysis (EFA) which uses a descriptive approach to analyse data and so will be difficult to test the hypothesis. (2) SEM corrects for measurement error, unlike GLM or regression that assume that errors in the independent variables varnishes, which may lead to serious inaccuracies. (3) Data analysis using GLM or MRA is based on observed measurements only; SEM incorporates latent and observed variables. (4) Previous methods like GLM cannot model multivariate relations or estimate points or interval indirect effects but SEM does that.

Suhr (2006) explains that the purpose of SEM is to account for variation and covariance of the measured variables. SEM is used when there is knowledge about the underlying latent variable structure based on theory, empirical research or both. A relationship between the observed measures and the underlying factor is postulated and the hypothesis is tested statistically.

In SEM, observed variables (measured variables) are represented with rectangles, while the latent variable is represented by a circle (Ullam, 2006; Lei & Wu, 2007; Byrne, 2010). The measurement model defines relations between the observed and unobserved variables, that is, the link between the observed indicator variables and the underlying construct they are meant to measure (Byrne, 2010). For example, training needs assessment is an underlying construct while the various items used to measure it are the observed variables. The measurement model represents the CFA model while the structural model defines the relationship between unobserved variables. It shows the way in which particular latent variables directly or indirectly cause changes in the value of certain other latent variables in the model (Byrne, 2010). For example, the relationships between training practices and task performance.

Ullman (2006) lists the process of modeling into model specification, model estimation, model evaluation and model modification. Model specification involves specifying a variable in the model, latent or measured which can either be dependent and independent variable (Ullam, 2006). In other words, it has to do with specifying the model to be estimated.

The next stage is the model identification and it dwells on the possibility of a unique set of parameters consistent with the data (Byrne, 2010). A model could be just-identified, over-identified or unidentified. According to Byrne (2010), the aim of SEM is to meet the criterion of over identification. A situation where there is a positive degree rendering it of scientific use.

Model estimation aims at minimizing the difference between structured and unstructured estimated population covariance matrices (Ullman, 2006). There are different estimation techniques in SEM, Maximum Likelihood (ML) being the default model in most SEM programs (Ullman, 2006). ML is used because it yields the most precise (smallest variance) estimates when data are normal (Kline, 2011). When estimate procedure has converged on a solution, a single number which summarizes the degree of correspondence between implied and the observed covariance matrix is produced (Yakubu, 2011). A model is said to fit when it meets the index of fit. Some index of goodness of fit test includes Chi-square, Comparative fit index (CFI), Goodness of fit (GFI), Adjusted goodness of fit (AGFI), and Root mean square error of approximation (RMSEA).

Table 3.2: Threshold for the different goodness of fit measures

Measure	Threshold
Chi-Square/df (Cmin/df)	<3 good; <5 sometimes permissible
P-value for the model	>.05
CFI	>.95 great; >.90 traditional; >.80 sometimes permissible
GFI	>.95
AGFI	>.80
SRMR	<.09
RMSEA	<.05 good; .05-.10 moderate; >.10 bad
PCLOSE	>.05

Source: Gaskin (2012) Confirmatory Factor Analysis Statwiki
Note: Comparative fit index (CFI), Goodness of fit (GFI), Adjusted goodness of fit (AGFI), Root mean square error of approximation (RMSEA).

Cmin means minimum discrepancy. It represents the discrepancy between unrestricted sample covariance matrix and the restricted covariance matrix, also referred to as Chi-Square. The study adopts ML as estimation method with standard goodness of fit as the bases for model fit.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

4.1 RESPONSE TO QUESTIONNAIRES

The structured questionnaires were distributed to respondents in selected construction firms. Table 4.1 presents the number of questionnaires distributed and retrieved.

Table 4.1: Response to questionnaires administered

Questionnaire	CPQ	%	CPSQ	%
Questionnaire distributed	257		257	
Questionnaire Returned	225		220	
No. of valid responses used	218	85	218	85

Note: CPQ- Construction professional questionnaires, CPSQ- Construction professional supervisors' questionnaires

A total of 514 questionnaires consisting of construction professionals' questionnaires and construction professional supervisors' questionnaires were administered to site supervisors and site manager, that is, 257 respectively. 218 questionnaires in pairs were retrieved and valid for analysis representing 85 % response rate. Table 4.1 presents the total number of questionnaires retrieved. This is quite high in view of the difficulty in retrieving questionnaire. Consequently, there would not be non-response bias.

4.2 RESULT OF ANALYSIS OF DEMOGRAPHIC DETAILS

The population for the study consists of professionals cut across randomly selected construction firms. Tables 4.2 and 4.3 present the result of the analysis of data on the characteristics profile of the respondents in this study.

4.2.1 Characteristics of Construction professionals

The characteristics of construction professionals were analysed using percentage. Table 4.2 depicts the characteristics of construction professionals which are years of experience in the company, highest academic qualification, professional background, professional qualification, grade of membership, age and gender.

Table 4.2: Characteristics of Construction Professionals

Respondents' Characteristics	Frequency	Percentage
Years of experience		
1-5 years	79	36.2
6-10 years	108	49.5
Above 10 years	31	14.2
Total	**218**	**100**
Highest Academic Qualification		
OND	15	6.9
HND	68	31.2
B.Sc.	86	39.4
PGD	25	11.5
M.Sc.	24	11.0
Total	**218**	**100**
Professional Background		
Architecture	23	10.6
Building	96	44.0
Quantity Surveying	25	11.5
Civil Engineering	67	30.7
Project Management	7	3.2
Total	**218**	**100**
Professional Affiliation		
NIA	22	10.1
NIOB	96	44.0
NIQS	25	11.5
NSE	66	30.3
Others	9	4.1
Total	**218**	**100**
Grade of membership		
Associate	19	8.8
Graduate	107	49.3
Corporate	89	41.0
Fellow	2	0.9
Total	218	100
Age in years		
21-30	79	36.2
31-40	118	54.1
41-50	18	8.3
51-60	3	1.4
Total	**218**	**100**
Gender		
Male	204	93.6
Female	14	6.4
Total	**218**	**100**

Table 4.2 shows that Site supervisors with medium experience (6-10 years) constitute the highest percentage (49.5%) of the professional sampled while professionals with long

experience (above 10 years) constitute the least percentage (14.2%). The reason may not be far-fetched from the fact that site supervisory role falls within middle management; hence the majority of the respondents possess 6-10 years' experience. The higher the number of years spent in the industry, the higher is the tendency to be promoted and move to top management level. This implies that respondents can give reliable information about training in their organisation because they have spent a considerable number of years in the company. The result shows that professionals with short, medium and long experience are covered in the study.

On academic qualifications of the professionals sampled, Table 4.2 shows that 39.4% have B.Sc. as their highest academic qualification while a minority (6.9%) has OND as their highest academic qualification. The results show that 93.4% of the professionals sampled had HND as the least academic qualifications. The finding indicates that majority of the professionals sampled are graduates, therefore, they possess the required academic qualification to provide the correct information required for the study. This implies that respondents are academically qualified to give valid responses about the nature of their task and the training practices of their organisation.

On professional qualification, Table 4.2 shows that Builders constitute the highest percentage (44.0%) of the professionals sampled while Civil Engineers constitute the second highest percentage (30.7%). Table 4.2 further shows that Quantity Surveyors and Architect constitute 11.5% and 10.6% of the professionals' sampled while the Project Managers constitute 3.2%. The results indicate that the five prominent construction professionals are engaged in site supervision but Builders and Civil Engineers are more engaged in site supervision than the others. The result shows that all the five prominent professionals in the study are covered in the study. The Grade of membership with the highest percentage is Graduate with 49.1%, followed by 'Corporate membership' (40.8%). On professionals affiliation, Table 4.2 shows that professional affiliated to Nigeria Institute of Building constitute the highest percentage (44%), followed by professionals affiliated to Nigeria Society of Engineers. This shows that respondents are not only professionally qualified, they are also affiliated with their professional bodies. This will give more credence to the reliability of their answers as they are professionally involved in the construction industry.

On the age of respondents, the majority of the respondents fall within the age bracket of 21-50 years. The results of the study imply that the respondents of the study are mainly young adult. On gender, 93.6% of respondents are male while 6.4% are female. The results imply that the majority of the respondents are men while women are a minority.

4.2.2 Characteristics of Site Managers

The characteristics of site managers were analysed using percentage. Table 4.3 depicts the characteristics of site managers which are years of experience in the company, highest academic qualification, professional background, professional qualification, grade of membership, age and gender.

Table 4.3: Site Managers' Characteristics

Respondents' Characteristics	Frequency	Percentage
Years in the company		
1-5 years	58	26.6
6-10 years	88	40.4
above 10 years	72	33
Total	**218**	**100**
Highest academic qualification		
OND	5	2.3
HND	47	21.6
B.Sc	104	47.7
PGD	28	12.8
M.Sc	31	14.2
PhD.	3	1.4
Total	**218**	**100**
Professional background		
Architecture	20	9.2
Building	83	38.1
Quantity Surveying	18	8.3
Civil Engineering	90	41.3
Project Management	7	3.2
Total	**218**	**100**
Professional affiliation		
NIA	20	9.2
NIOB	82	37.6
NIQS	17	7.8
NSE	90	41.3
Others	9	4.1
Total	**218**	**100**
Grade of membership		
Associate	101	46.5
Graduate	105	48.4
Corporate	11	5.1
Total	**217**	**100**
Age bracket		
21-30 years	52	23.9
31-40 years	119	54.6
41-50 years	42	19.3
51-60 years	5	2.3

Respondents' Characteristics	Frequency	Percentage
Total	**218**	**100**
Gender		
Male	205	94
Female	13	6
Total	**218**	**100**

Table 4.3 shows that Site Managers with medium experience (6-10 years) constitute the highest percentage (40.4%) of the professional sampled while site managers with short experience (1-5 years) constitute the least percentage (26.6%). This may be due to the fact that site managers' role falls within middle management; hence the majority of the respondents possess 6-10 years' experience. The higher the number of years spent in the industry, the higher is the tendency to be promoted and move to top management level. This implies that respondents can give reliable information about the performance of their subordinates. The result shows that site managers with short, medium and long experience are covered in the study.

On academic qualifications of the site managers sampled, Table 4.3 shows that 47.7% have B.Sc. as their highest academic qualification while a minority (1.4%) has Ph.D. as their highest academic qualification. The finding indicates that majority of the site managers sampled are graduates, therefore, they possess the required academic qualification to provide the correct information required for the study.

On professional qualification, Table 4.3 shows that Civil Engineers constitute the highest percentage (41.3%) of the professionals sampled while Builders constitute the second highest percentage (38.1%). Architect and Quantity Surveyors constitute 9.2% and 8.3%

of the site manager sampled while the Project Managers constitute 3.2%. The results indicate that the five prominent construction professionals are engaged in site managerial task. The result also shows that all the five prominent professionals in the study are covered in the study. The Grade of membership with the highest percentage is Graduate with 48.4%, followed by 'Associate membership' (46.5%). On professionals' affiliation, Table 4.3 shows that professional affiliated to Nigeria Society of Engineers constitute the highest percentage (41.3%), followed by professionals affiliated to Nigeria Institute of Building (37.6%). This shows that respondents are professionally qualified and also affiliated with their professional bodies.

On the age of respondents, the majority of the respondents fall within the age bracket of 21-50 years. The results of the study imply that the respondents of the study are mainly young adult. On gender, 94% of respondents are male while 6% are female. The results imply that the majority of the respondents are men while women are a minority.

4.2.3 Characteristics of Respondents' Organisations

The characteristics of respondents' organisations namely years of operation of the company and type of company were analysed using percentage. The results are presented in Table 4.4.

Table 4.4: Characteristics of Respondents' Organisations

Organisational Characteristics	Frequency	Percentage
No of Employee		
1-10	26	11.9
11-20	53	24.3
21-30	43	19.7
31-40	34	15.6
Over 40	62	28.4
Total	**218**	**100**
Years of Operation		
Less than 10	67	30.7
10-29	113	51.8
30-39	23	10.6
40 years above	15	6.9
Total	**218**	**100**
Types of company		
Indigenous	170	78.0
Multinational	48	22.0
Total	**218**	**100**
Location of firms		
Lagos	170	78
Abuja	48	22
Total	**218**	**100**

Table 4.4 shows that majority of workers employed in sampled firms are over 40 (28.4%) while minority of workers employed are between the numbers 1-10 (11.9%). The percentage of firms with 11-20 workers is 24.3% while those with 21-30 and 31-40 years are 19.7% and 15.6% respectively. The results show that the respondents were sampled from medium and large-scale firms.

Table 4.4 shows that majority (51.8%) of the firms have operated for 10-20 years while the minority operated for above 40 years. The percentage of the firms that operated for 1-10 years is 30.7 while the percentage of those that operated for 30-39 years is 10.6. The results show that respondents were sampled from firms with short, medium and long experience.

On firm type, Table 4.4 shows that indigenous firms constituted the majority (78%) while multinational firms constituted the minority (22%). The results show that the respondents of the study were selected from both indigenous and multinational firms. On the location of firms, 78% of construction firms are based in Lagos and 22% in Abuja. The results show that respondents were sampled from firms located in Lagos and Abuja.

4.3 TASK CHARACTERISTICS OF CONSTRUCTION PROFESSIONALS

To investigate the prevalent task characteristics of professionals in construction firms, task characteristics identified in the literature were investigated. The ten task characteristics were expressed in statement forms and respondents were requested to rate their level of agreement using five points Likert scale namely; '*strongly disagree*', '*disagree*', '*moderately agree*', '*agree*' and '*strongly agree*'. The scales were weighted as follows: 1 equals *strongly disagree*, 2 *equals disagree*, 3 equals *moderately agree*, 4 equals *agree* and 5 equals *strongly agree*. Each task characteristics is a latent variable and are described with two or more statements. The mean score of each latent variable was calculated. The results are presented in Table 4.5. The mean values were interpreted using the following scales, 1.00-1.49 for *strongly disagree*; 1.50-2.49 for *disagree*; 2.50-3.49 for *moderately agree*; 3.50-4.49 for *Agree* and 4.50-5.00 for *strongly agree*.

Table 4.5: Task characteristics of construction professionals

Task Characteristics	1	2	3	4	5	MS	Rank	Decisions
Task Significance	1	6	24	94	92	4.24	1	Agree
Skill Variety	11	7	20	100	87	4.17	2	Agree
Autonomy	1	4	25	113	73	4.17	2	Agree
Task Identity	3	11	28	94	82	4.11	4	Agree
Feedback	5	7	27	107	71	4.07	5	Agree
Task Analyzability	3	8	33	116	60	4.03	6	Agree
Task Difficulty	4	24	36	79	75	3.91	7	Agree
Task Structuredness	5	17	39	103	55	3.85	8	Agree
Task Complexity	7	26	37	88	61	3.78	9	Agree
Task Routineness	10	25	50	88	47	3.63	10	Agree
Overall Task Characteristics	**5**	**13**	**32**	**98**	**70**	**4.02**		**Agree**

MS- Mean Score

Table 4.5 shows the prevalent task characteristics of construction professionals. The results show that generally, construction professionals agree that the ten characteristics are prevalent in their task. This implies that the task of construction professionals are characterised by skill variety, task identity, task significance, autonomy, feedback, task analyzability, task difficulty, task routineness, task complexity and task structuredness.

The most prevalent task characteristic is task significance with a mean score of 4.24. This indicates that construction professionals agreed that the most prevalent nature of their task is task significance. The implication is that construction professionals' tasks frequently have a substantial impact on the lives of people such as in their immediate environment or the world at large. Given the fact that the end product of construction is significant in the lives of people, therefore a large number of construction professionals agree that their tasks impact on the lives of people in the immediate environment and the world at large.

Table 4.5 shows that construction professionals perceive skill variety as the second most prevalent characteristics of their tasks with a mean score of 4.17. The implication is that construction professionals frequently use a variety of skills or talents to execute construction project. This is because construction projects require technical and managerial skills to execute them.

Also construction professional agree that autonomy is also the second most prevalent characteristics in their task with a mean value of 4.17. This implies that construction professionals execute their task more frequently by (1) using their discretion and (2) having substantial freedom and independence. The results indicate that when executing tasks, construction professionals have the freedom to make decisions on their task. Autonomy is important characteristics because construction tasks require different method/techniques and several skills to carry out and construction professionals needed to have freedom or autonomy to choose an appropriate method/techniques and skills to adopt to ensure that tasks are completed on time.

Table 4.5 shows that construction professionals agree that the fourth, fifth, sixth and seventh most prevalent characteristics in their tasks are task identity, feedback, task analyzability and task difficulty with mean scores of 4.11, 4.07, 4.03 and 3.91 respectively. The implication of task identity is that construction professionals' task frequently requires a completion of the task from the beginning to the end. This is important because it is expected that site supervisors should start and complete a construction project and not abandon the project. The implication of feedback is that (1) construction professionals frequently require information to carry out their task (2) construction professionals' bosses frequently discuss their task performance with them and (3) construction professionals are frequently recognized for a task completed well. This is also very important as construction professionals require information and motivation to perform their tasks. Task analyzability means that construction professionals' tasks involve a clearly defined sequence of steps and established procedures. The implication is that the supervisory tasks of construction professionals are clearly defined with a sequence of steps and established procedures. The implication of task difficulty is that the tasks of construction professionals mostly require great effort to accomplish and great mental effort to comprehend. This is because construction processes involve a lot of activities and as such construction professionals will require great effort and great mental effort to accomplish them.

The least prevalent characteristics of Construction professionals' tasks are structuredness, complexity and routineness with a mean score of 3.85, 3.78 and 3.63 respectively. The implication of task structuredness is that the tasks of construction professionals frequently involve (1) the application of rules and principles with a well-defined parameter for convergent and (2) multiple solutions to a challenge. This is because most construction process entails established standard, therefore construction tasks are structured task. The implication of task complexity is that the tasks of construction professionals are complicated in structure. This is as a result of the complex nature of the construction industry and usually site supervisory tasks entail different activities which make them complex and complicated. The implication of task routineness is that construction professionals' tasks frequently (1) involve a habitual method of carrying them out and (2) involve unvarying procedure of carrying them out. This is because construction task requires a structured procedure of carrying it out and as such, it becomes habitual and routine in nature.

From the result in Table 4.5, it can be inferred that skill variety, task identity, task significance, autonomy, feedback, task analyzability, task difficulty, task routineness, task complexity and task structuredness are prevalent in construction professionals' tasks. Based on Hackman and Oldham's job characteristics theory, which state that once employees have these characteristics in their task, they experience meaningfulness at work. The implication of the prevalence of these task characteristics is that construction professionals will experience meaningfulness at work and job satisfaction.

4.3.1 Comparison of Task Characteristics of construction professionals in Lagos and Abuja

The study area of this research consists of two geographical areas namely: Lagos and Abuja. Further analysis of the task characteristics of construction professionals was carried out by comparing the prevalence of task characteristics between professionals in Lagos and Abuja. The results of the mean score of task characteristics of construction professionals in Lagos and Abuja are presented in Table 4.6.

Table 4.6: Comparison of task characteristics among construction professionals in Lagos and Abuja

Task Characteristics	Total		Lagos		Abuja	
	MS	Rank	MS	Rank	MS	Rank
Task Significance	4.24	1	4.24	1	4.25	1
Skill Variety	4.17	2	4.16	3	4.22	2
Autonomy	4.16	3	4.17	2	4.15	3
Task Identity	4.11	4	4.09	4	4.15	3
Feedback	4.07	5	4.05	6	4.10	5
Task Analyzability	4.03	6	4.06	5	3.93	6
Task Difficulty	3.91	7	4.01	7	3.53	10
Task Structuredness	3.85	8	3.91	8	3.66	7
Task Complexity	3.78	9	3.82	9	3.61	8
Task routineness	3.63	10	3.64	10	3.60	9
Overall Task Characteristics	**4.02**		**4.04**		**3.96**	

MS- Mean score, N- Number of respondents

Table 4.6 shows the comparison of prevalent task characteristics among construction professionals in Lagos and Abuja. Generally, construction professionals in Lagos and Abuja agreed that the ten characteristics are prevalent in their task. Table 4.6 shows that the mean scores of the prevalence of four task characteristics namely: skill variety, feedback, task significance and identity are more prevalent among construction professionals in Abuja than their counterparts in Lagos while six tasks characteristics namely: autonomy, task analyzability, task difficulty, task structuredness, task complexity and task routineness are least prevalent.

Table 4.6 further shows that the most prevalent task characteristic among professionals in Lagos and Abuja is the same (task significance), however, the least prevalent task characteristics among construction professionals in the two locations are different. While task routineness is the least prevalent characteristics among those in Lagos, task difficulty is the least in Abuja.

4.3.2 Differences in task characteristics among construction professionals in Lagos and Abuja

To further test the differences in task characteristics among construction professionals in Lagos and Abuja, t-test was employed.

Table 4.7: t-test for difference in task characteristics based on location of construction firms

Task Characteristics	N	MS	SD	dfa	dfna	t	P value	Sig	Remark
Skill variety									
Lagos	170	4.16	0.74	216	84.81	0.60	0.275	NS	Accept
Abuja	48	4.22	0.65						
Task Identity									
Lagos	170	4.09	0.77	216	89.00	0.67	0.226	NS	Accept
Abuja	48	4.15	0.64						
Task Significance									
Lagos	170	4.24	0.71	216	95.54	0.90	0.043	SS	Reject
Abuja	48	4.25	0.55						
Autonomy									
Lagos	170	4.17	0.66	216	88.67	0.89	0.233	NS	Accept
Abuja	48	4.15	0.55						
Feedback									
Lagos	170	4.05	0.70	216	89.61	0.89	0.033	SS	Reject
Abuja	48	4.10	0.58						
Task Analyzability									
Lagos	169	4.06	0.75	215	92.85	0.26	0.122	NS	Accept
Abuja	48	3.93	0.60						
Task Difficulty									
Lagos	168	4.01	0.90	214	76.17	0.00	0.699	NS	Accept
Abuja	48	3.53	0.90						
Task Routineness									
Lagos	170	3.64	0.95	216	89.47	0.82	0.216	NS	Accept
Abuja	48	3.60	0.79						
Task complexity									
Lagos	170	3.82	1.02	216	94.81	0.19	0.158	NS	Accept
Abuja	48	3.61	0.79						
Task Structuredness									
Lagos	170	3.91	0.80	216	78.24	0.05	0.837	NS	Accept

Task Characteristics	N	MS	SD	dfa	dfna	t	P value	Sig	Remark
Abuja	48	3.66	0.77						
Overall Task Characteristics									
Lagos	170	4.04	0.56	216	83.30	0.40	0.672	NS	Accept
Abuja	48	3.96	0.50						

Significant at $p \leq 0.05$
NS- Not Significant, SS- Significant, N-Number, MS- Mean Score, SD- Standard Deviation, df_a- Equal variance assumed, df_{na}- Equal variance not assumed

The difference in task characteristics among construction professionals was not significant for all the task characteristics except task significance and feedback. The results in Table 4.7 show that there are no significant differences in the prevalence of eight task characteristics among construction professionals in the two locations. The implication of the results is that the location of construction professionals does not contribute to differences in the prevalence of task characteristics among construction professionals.

4.3.3 Differences in the task characteristics of construction professionals

It is recognized that construction professionals belong to several professions. For this study, five different professionals namely: Architects, Builders, Civil Engineers, Quantity Surveyors and Project Managers were sampled. Further analysis was carried out to determine whether or not differences exist in the prevalence of task characteristics among the five types of construction professionals. The first hypothesis was formulated for the purpose of the analysis. The hypothesis states that there is no significant difference in the prevalence of task characteristics among construction professionals. Analysis of variance (ANOVA) was employed to test the differences in the task characteristics among Architect, Builder, Quantity Surveyor, Civil Engineer and Project

Manager. ANOVA is used when there is need to test for differences among more than two variables and when the data is parametric. When there are series of Likert items that sum up to a composite variable, then the variable can be referred to as interval scale (Boone & Boone, 2012; Warmbrod, 2014) and thus be analysed using the parametric method. Based on this, each task characteristics is a composite variable and therefore can be referred to as interval scale.

The criterion for acceptance or rejection of the research hypothesis was based on the rule that when p-value ≤ 0.05, then it is statistically significant and thus the research hypothesis is rejected. When p-value > 0.05, then it is statistically insignificant, therefore the research hypothesis is accepted. The results of the test of the hypothesis are presented in Table 4.8.

Table 4.8: ANOVA test for difference in task characteristics among professionals

Parameters	N	Mean	S.D	dfb	F	P-value	Sig	Decision
Skill Variety								
Civil Engineer	67	4.27	0.74	4	1.507	0.201	NS	Accept
Builder	96	4.21	0.69					
Quantity Surveyor	25	4.02	0.77					
Architect	23	3.96	0.69					
Project Manager	7	3.86	0.90					
Total	**218**	**4.17**	**0.72**					
Task Identity								
Builder	96	4.20	0.70	4	1.71	0.149	NS	Accept
Architect	23	4.16	0.81					
Civil Engineer	67	4.08	0.73					
Project Manager	7	3.95	0.76					
Quantity Surveyor	25	3.79	0.85					
Total	**218**	**4.11**	**0.75**					
Task Significance								
Civil Engineer	67	4.37	0.61	4	1.86	0.119	NS	Accept
Architect	23	4.28	0.71					
Builder	96	4.22	0.68					
Quantity Surveyor	25	4.08	0.74					
Project Manager	7	3.76	0.85					
Total	**218**	**4.24**	**0.69**					
Autonomy								
Civil Engineer	67	4.22	0.64	4	0.446	0.775	NS	Accept
Builder	96	4.17	0.63					
Architect	23	4.17	0.49					
Project Manager	7	4.05	0.45					
Quantity Surveyor	25	4.03	0.79					
Total	**218**	**4.16**	**0.63**					
Feedback								
Architect	23	4.20	0.55	4	2.014	0.094	NS	Accept
Builder	96	4.16	0.64					
Civil Engineer	67	3.97	0.71					
Quantity Surveyor	25	3.95	0.71					
Project Manager	7	3.62	0.87					

Parameters	N	Mean	S.D	dfb	F	P-value	Sig	Decision
Total	**218**	**4.07**	**0.68**					
Task Analyzability								
Builder	95	4.12	0.71	4	1.447	0.220	NS	Accept
Architect	23	4.07	0.63					
Civil Engineer	67	4.02	0.75					
Quantity Surveyor	25	3.78	0.78					
Project Manager	7	3.71	0.64					
Total	**217**	**4.03**	**0.72**					
Task Difficulty								
Civil Engineer	67	4.06	0.97	4	2.251	0.065	NS	Accept
Builder	94	3.97	0.84					
Project Manager	7	3.86	0.90					
Architect	23	3.70	0.99					
Quantity Survey	25	3.48	0.96					
Total	**216**	**3.91**	**0.92**					
Task Routineness								
Builder	96	3.73	0.81	4	0.807	0.522	NS	Accept
Architect	23	3.65	1.02					
Civil Engineer	67	3.57	1.02					
Project Manager	7	3.50	1.00					
Quantity Surveyor	25	3.40	0.87					
Total	**218**	**3.63**	**0.91**					
Task Complexity								
Civil Engineer	67	3.91	1.00	4	2.604	0.037	SS	Reject
Builder	96	3.87	0.85					
Quantity Surveyor	25	3.58	0.90					
Architect	23	3.46	1.13					
Project Manager	7	3.00	1.50					
Total	**218**	**3.78**	**0.97**					
Task Structuredness								
Civil Engineer	67	3.98	0.84	4	1.84	0.122	NS	Accept
Builder	96	3.89	0.70					
Architect	23	3.80	0.88					
Quantity Surveyor	25	3.56	0.87					
Project Manager	7	3.43	0.93					
Total	**218**	**3.85**	**0.80**					

Parameters	N	Mean	S.D	dfb	F	P-value	Sig	Decision
Overall Task Characteristics								
Builder	96	4.08	0.51	4	2.07	0.086	NS	Accept
Civil Engineer	67	4.07	0.53					
Architect	23	3.99	0.52					
Quantity Surveyor	25	3.80	0.65					
Project Manager	7	3.70	0.59					
Total	**218**	**4.02**	**0.54**					

Significant at p<0.05
NS- Not Significant, SS- Significant, N-Number, MS- Mean Score, SD- Standard Deviation, df_b- Between group difference, df_w- Within group difference

The result in Table 4.8 shows a non-significant difference among construction professionals in skill variety, task identity, task significance, autonomy, feedback, task analyzability, task difficulty, task routineness and task structuredness and overall task characteristics with p-values of 0.201, 0.149, 0.119, 0.775, 0.094, 0.220, 0.065, 0.522, 0.122, and 0.086 respectively and a significant difference in task complexity 0.04. Thus the research hypothesis which states that there is no significant difference in the prevalence of task characteristics among construction professional is accepted for skill variety, task identity, task significance, autonomy, feedback, task analyzability, task difficulty, task routineness and task structuredness but rejected for task complexity. This shows that level at which skill variety, task identity, task significance, autonomy, feedback, task analyzability, task difficulty, task routineness and task structuredness are prevalent in construction professionals' tasks is the same for all professionals but the level at which task complexity is prevalent in construction professionals' task differs.

The implication of the results for skill variety is that the profession of construction professionals does not affect the prevalence of skill variety. Thus, profession does not affect the prevalence of diverse skills and talent in the execution of task by construction professionals. The implication of the results for task identity is that profession does not affect the prevalence of task identity in construction professionals' task. Thus, profession does not affect the prevalence of construction professionals' task requiring completion of the whole task from beginning to end. For task significance, the implication of the results is that profession does not affect the prevalence of task significance. This means that profession does not affect the prevalence at which the tasks of construction professionals' have an impact on the lives of people in the immediate environment and the world at large. Also, the implication of the results for autonomy is that profession does not affect the prevalence of autonomy. Thus, profession does not affect the prevalence of which professionals have the freedom to use their discretion and make a decision when executing their task.

The implication of the results for feedback is that profession does not affect the prevalence of feedback. This means that profession does not affect the prevalence at which professionals require information to execute tasks and also receive recognition for a task well completed. For task analyzability, profession does not affect the prevalence of task analyzability. Thus, profession does not affect the prevalence at which the supervisory tasks of construction professionals are clearly defined with a sequence of steps and established procedures. The implication of the results for task difficulty is that profession does not affect the prevalence of task difficulty. This means that profession does not affect the prevalence at which tasks of professionals require great physical effort to accomplish and great mental effort to comprehend. Furthermore, the implication of the result for task routineness is that profession does not affect the prevalence of task routineness. This means that profession does not affect the prevalence at which the tasks of construction professionals involve a habitual method and unvarying procedure of executing the tasks. Lastly, the implication of the result for task structuredness is that profession does not affect the prevalence of task structuredness. This also implies that profession does not affect the prevalence at which construction professionals' task requires an application of rules and principles with a well-defined parameter for convergent when executing them.

The difference in means of construction profession was significant for task complexity, F (4, 213), 2.604, $p = 0.037$. Project Managers ($M = 3.00$, $SD = 1.50$), Quantity Surveyors ($M= 3.46$, $SD = 1.13$) reported significantly less prevalence of task complexity in their task than did Architects (M= 3.58, SD = 0.90), Builders ($M= 3.89$, $SD = 0.85$) and Civil Engineers ($M = 3.91$, $SD = 1.00$). The implication is that profession affects the prevalence of task complexity, thus, profession affects the prevalence at which construction professionals' task is complicated in nature.

4.4 EFFECT OF CONSTRUCTION PROFESSIONALS' PERSONAL CHARACTERISTICS ON TASK CHARACTERISTICS

The second objective is to evaluate the effect of construction professionals' personal characteristics on the prevalence of task characteristics. To achieve the objective, the second research hypothesis was formulated. The hypothesis states that ‘there is no significant difference in the prevalence of task characteristics based on construction professionals’ personal characteristics. Four personal characteristics of construction professional namely: professional experience, qualification, age and gender were selected. The means of the prevalence of task characteristics of the four personal characteristics of construction professionals were analysed. The test of significant difference in the prevalence of task characteristics based on the three personal characteristics of construction professionals namely: professional experience, qualification and age were tested using Analysis of Variance (ANOVA) while that of gender was tested using t-test.

The criterion for accepting the hypothesis was based on the rule that when the p value ≤ 0.05, then it is statistically significant therefore the test reject the hypothesis but when the p value is > 0.05, then it is not significant, therefore, the hypothesis is accepted. Table 4.8 presents the results of the test of the hypothesis.

Table 4.9: ANOVA and t test for difference in task characteristics based on construction professionals' personal characteristics

Parameters	N	Mean	S.D	dfb	dfw	Test Statistics	P value	Sig.	Decision
Years of Experience									
above 10 years	31	4.16	0.48	2	215	4.69	0.01*	SS	Reject
6-10 years	108	4.08	0.51						
1-5 years	79	3.88	0.59						
Total	**218**	**4.02**	**0.54**						
Qualifications									
PGD	25	4.37	0.36	4	213	6.61	0.001*	SS	Reject
B.Sc	86	4.07	0.49						
HND	68	3.99	0.56						
M.Sc	24	3.79	0.65						
OND	15	3.61	0.42						
Total	**218**	**4.02**	**0.54**						
Age									
21-30 years	79	3.90	0.58	3	214	2.324	0.076	NS	Accept
31-40 years	118	4.10	0.51						
41-50 years	18	4.00	0.50						
51-60 years	3	3.83	0.42						
Total	**218**	**4.02**	**0.54**						
Parameters	**N**	**MS**	**SD**	**dfa**	**dfna**	**t-test**	**p value**	**Sig.**	**Decision**
Gender									
Male	204	4.04	0.54	216	15.50	2.04	0.043*	SS	Reject
Female	14	3.74	0.47						
Total	**218**	**3.89**	**0.54**						

Significant at $p \leq 0.05$
NS- Not Significant, SS- Significant, N-Number, MS- Mean Score, SD- Standard Deviation, df_b- Between group difference, df_w- Within group difference, df_a- Equal variance assumed, df_{na}- Equal variance not assumed.

Table 4.9 shows that the difference in the prevalence of task characteristics based on construction professionals' experience was significant *F* (2, 215), 4.290, *p* = 0.010. Thus, the hypothesis which states that 'there is no significant difference in task characteristics due to construction professionals' experience' was rejected at p-value ≤ 0.05. Professionals with 1-5 year experience (*M*= 3.88, *SD* = 0.59) reported significantly less prevalence of task characteristics in their task than professionals with 10 years above (*M* = 4.16, *SD* = 0.48), and 6-10 years (*M*= 4.08, *SD* = 0.51). The implication is that construction professionals' experience has an effect on task characteristics. Construction professionals under the three groups of years of experience differ on the prevalence of task characteristics in their task. This means that the level at which construction professionals' task is described by specific attributes such as skill variety, task identity, task significance, autonomy, feedback, task analyzability, task difficulty, task routineness, task complexity and task structuredness is not the same for all professionals under the different year of experience.

The differences in the prevalence of task characteristics based on construction professionals' qualification were significant, F (4, 213) = 6.610, p = 0.001. Therefore, the hypothesis which states that 'there is no significant difference in task characteristics based on construction professionals' qualification was rejected at p-value $\leq$ 0.05. Professionals with PGD (*M* = 4.37, *SD* = 0.36), B.Sc. (*M* = 34.07, *SD* = 0.56) and HND (*M* = 3.99, *SD* = 0.56) reported significantly high prevalence of task characteristics in their task than professionals with M.Sc. (*M* = 3.79, *SD* = 0.65) and OND (*M* = 3.61, *SD* = 0.42). The implication is that construction professionals' qualifications do have an effect on task characteristics. Thus, the level at which task characteristics is prevalent in construction professionals' tasks differ. This means that the prevalence at which construction professionals' task is described by specific attributes such as skill variety, task identity, task significance, autonomy, feedback, task analyzability, task difficulty, task routineness, task complexity and task structuredness is affected by their qualification.

The difference in the prevalence of task characteristics based on construction professionals' age was not significant, F (3, 214) = 2.32, p= 0.076. This was based on the hypothesis which states 'there is no significant difference in task characteristics based on construction professionals' age'. The hypothesis was thus accepted at p-value ≤ 0.05. This implies that construction professionals' age does not affect the prevalence of task characteristics. Construction professionals within the different age group did not differ on the level of prevalence of task characteristics in their task. Thus, the level of prevalence of skill variety, task identity, task significance, autonomy, feedback, task analyzability, task difficulty, task routineness, task complexity and task structuredness in construction professionals' task is not affected by the age of construction professionals. This could be as a result of construction industry encompassing both the young and old, as entry age and exit age is not germane.

Tables 4.9 shows that the t-test results for the difference in the prevalence of task characteristics based on construction professionals' gender were significant, t (216) = 2.040, p = 0.043. Thus, the hypothesis which states that 'there is no significant difference in task characteristics based on the gender of construction professionals was therefore rejected at p-value ≤ 0.05. Male construction professional (M = 4.04, SD = 0.54) reported significantly high prevalence task characteristics than female (M = 3.74, SD = 0.47). The implication is that construction professionals' genders have an effect on task characteristics. The level of prevalence of task characteristics for Male and female construction professionals differs. Thus the level at which construction professionals' task is described by specific attributes such as skill variety, task identity, task significance, autonomy, feedback, task analyzability, task difficulty, task routineness, task complexity and task structuredness is affected by construction professionals' gender. The reasons may be due to the nature of construction task which requires more of energy and time.

4.4.1 Difference in task characteristics based on construction professionals' experience in the company

To investigate the differences in task characteristics based on construction professionals' experience. Construction professionals' experience was categorised into three namely: 1-5 years, 6-10 years and above 10 years. Task characteristics consist of ten variables. The differences in task characteristics of construction professional based on the three categories of experience was carried out using ANOVA. The result is presented in Table 4.10.

Table 4.10: ANOVA test for difference in task characteristics based on construction professionals' experience in the company

Parameters	N	Mean	S.D	dfb	dfw	F	P value	Sig.	Decision
Skill Variety									
above 10 years	31	4.27	0.73	2	215	0.716	0.490	NS	Accept
6-10 years	108	4.19	0.69						
1-5 years	79	4.10	0.77						
Total	**218**	**4.17**	**0.72**						
Task Identity									
6-10 years	108	4.20	0.70	2	215	2.397	0.093	NS	Accept
above 10 years	31	4.14	0.76						
1-5 years	79	3.96	0.79						
Total	**218**	**4.11**	**0.75**						
Task Significance									
6-10 years	108	4.35	0.62	2	215	4.222	0.016*	SS	Reject
above 10 years	31	4.31	0.53						
1-5 years	79	4.07	0.77						
Total	**218**	**4.24**	**0.68**						
Autonomy									
above 10 years	31	4.35	0.56	2	215	3.079	0.048*	SS	Reject
6-10 years	108	4.20	0.61						
1-5 years	79	4.04	0.68						
Total	**218**	**4.16**	**0.63**						
Feedback									
above 10 years	31	4.26	0.51	2	215	2.913	0.056	NS	Accept
6-10 years	108	4.10	0.63						
1-5 years	79	3.94	0.77						
Total	**218**	**4.07**	**0.68**						
Analyzability									
above 10 years	31	4.19	0.56	2	214	1.511	0.223	NS	Accept
6-10 years	108	4.05	0.70						
1-5 years	78	3.94	0.80						
Total	**217**	**4.03**	**0.72**						
Difficulty									
above 10 years	31	4.02	0.93	2	13	0.952	0.388	NS	Accept
6-10 years	107	3.96	0.93						
1-5 years	78	3.79	0.91						
Total	**216**	**3.91**	**0.92**						
Task Routineness									

Parameters	N	Mean	S.D	dfb	dfw	F	P value	Sig.	Decision
above 10 years	31	3.85	1.03	2	215	4.117	0.018*	SS	Reject
6-10 years	108	3.73	0.83						
1-5 years	79	3.41	0.94						
Total	**218**	**3.63**	**0.91**						
Task Complexity									
above 10 years	31	4.00	0.83	2	215	4.222	0.016*	SS	Reject
6-10 years	108	3.89	0.98						
1-5 years	79	3.53	0.98						
Total	**218**	**3.78**	**0.97**						
Task Structuredness									
above 10 years	31	4.02	0.79	2	215	1.811	0.166	NS	Accept
6-10 years	108	3.90	0.76						
1-5 years	79	3.73	0.84						
Total	**218**	**3.85**	**0.80**						

Significant at $p<0.05$

NS- Not Significant, SS- Significant, N-Number, MS- Mean Score, SD- Standard Deviation, df_b- Between group difference, df_w- Within group difference

Table 4.10 shows the result of ANOVA for the differences in mean of task characteristics based on construction professionals' experience. The study tested the research hypothesis 'there is no significant differences in task characteristics based on construction professionals' experience. The results show a non-significant difference in skill variety, task identity, task analyzability, feedback, task difficulty and task structuredness based on construction professional experience with p-value of 0.490, 0.093, 0.056, 0.223, 0.388, and 0.166 respectively. Thus, the research hypothesis was accepted at p-values ≤ 0.05.

The implication is that the experience does not affect the prevalence of skill variety in construction professional task characteristics, thus, the level of prevalence of skill variety in construction professionals' task is the same for all professionals with varying experience. This means that experience does not affect the prevalent use of variety of skills and talents by construction professionals. For task identity, the implication is that experience does not affect the prevalence of task identity. This means that experience does not affect the prevalence at which the task of construction professional requires a completion of a whole from the beginning to the end. The implication for task analyzability is that experience does not affect the prevalence of task analyzability in construction professionals' task. This means that experience does not affect the prevalence at which the supervisory tasks of construction professionals are clearly defined with a sequence of steps and established procedures.

The implication is that experience does not affect the prevalence of task difficulty in construction professionals' task. This means that the level of prevalence at which the task of construction professionals requires great physical effort to accomplish and great mental effort to comprehend is not affected by experience. This is because site supervisory task involves different activities, thus requires energy and good thinking skills to accomplish. For feedback, the implication is that experience does not affect the prevalence of feedback. This means that experience does not affect the prevalent level at which the task of construction professionals require information and recognition for a task well completed. Lastly, it implies that experience does not affect the prevalence of task structuredness, thus experience does not affect the prevalent level at which construction professionals' task has an application of rules and principles with a well-defined parameter for convergent.

The results in Table 4.10 also show a significant difference in task significance, autonomy, task routineness and task complexity based on the experience of construction professionals. Thus, the research hypothesis was rejected.

Table 4.10 shows that the difference in task significance based on construction professionals' experience was significant**,** F (2, 215) = 4.222, p = 0.016. Thus, the research hypothesis which states that 'there is no significant difference in prevalence of task significance due to construction professionals' experience' was rejected at p-value ≤ 0.05. Professionals with above 10 years (*M* = 4.35, *SD* = 0.62) and 6-10 years (*M*= 4.31, *SD* = 1.13) reported significantly high prevalence of task significance in their task than did 1-5 years (*M*= 4.07, *SD* = 0.77). The implication is that experience affects the prevalence of task significance. This means that experience affects the prevalence at which professionals' task has an impact on the lives of people in the immediate environment and world at large. The professional with longer years of experience will view their task as more significance compared to those with shorter years of experience.

The result in Table 4.10 also shows that the difference in the prevalence of autonomy based on construction professionals' experience was significant, *F* (2, 215) = 3.079, *p* = 0.048. Thus, the hypothesis which states that 'there is no significant difference in the prevalence of autonomy due to construction professionals' experience' was rejected at p-value ≤ 0.05. Professionals with above 10 years (*M* = 4.35, *SD* = 0.56), 6-10 years (*M*= 4.20, *SD* = 0.61) reported significantly high prevalence of autonomy in their task than did 1-5 years (*M*= 4.04, *SD* = 0.68). This indicates that construction professionals differ on the prevalence of autonomy in their task. The implication is that construction professionals' experience affects the prevalence of autonomy. This means that the experience of professionals' affect the prevalence at which they have freedom to use discretion and make decisions when executing task. This is because the more the years a professional spent in the firm, the more confidence his/her superior has in him/her to make a decision.

The difference in the prevalence of task routineness based on construction professionals experience was significant, F (2, 215) = 4.117, p = 0.018. Thus, the hypothesis which states that 'there is no significant difference in prevalence of task routineness due to construction professionals' experience' was rejected at p-value $\leq$ 0.05. Professionals who with 1-5 years' experience (*M*= 3.41, *SD* = 0.94) reported significantly less prevalence of task routineness in their task than professionals with above 10 years' experience (*M* = 3.85, *SD* = 1.03), 6-10 years' experience (*M*= 3.73, *SD* = 0.83). The implication is that construction professionals' experience affects the prevalence of task routineness. This means that experience affects the prevalence at which construction professionals' task requires a habitual process of executing. Professionals who have worked for a longer time in the company have the tendency to view the process of carrying out their task as routine.

The difference in the prevalence of task complexity based on construction professionals experience was significant, F (2, 215), 4.222, p = 0.02. Thus, the hypothesis which states that 'there is no significant difference in prevalent task complexity due to construction professionals' experience' was rejected at p-value ≤ 0.05. Professionals with 1-5 years (*M*= 3.53, *SD* = 0.98) reported significantly less prevalence of task complexity in their task than professionals who have spent above 10 years (*M* = 3.89, *SD* = 0.98), 6-10 years (*M*= 4.00, *SD* = 0.83). The implication is that construction professionals' experience has an effect on prevalence of task complexity. It also implies that construction professionals with varying experience differ on the prevalence of task complexity in their task. This means that experience affects the prevalence at which construction professionals' task is complicated in nature is. This is because the level of task complexity depends on individual professionals; thus responses differ. The longer the years they spent in the company, the more prevalent is task complexity in their task.

4.4.2 Difference in task characteristics based on construction professionals' qualification

To investigate the differences in task characteristics based on construction professionals' qualification. Five academic qualifications of construction professionals were used namely: M.Sc., PGD, B.Sc., HND and OND. The means of the prevalence of task characteristics of construction professionals who possessed each of the five academic qualifications were analysed. The test of difference based on the five qualifications was carried out using ANOVA. The results are presented in Table 4.11.

Table 4.11: ANOVA test for difference in task characteristics based on construction professionals' qualification

Parameters	N	Mean	S.D	dfb	dfw	F	P value	Sig.	Decisions
Skill Variety									
PGD	25	4.46	0.75	4	213	1.973	0.100	NS	Accept
B.Sc	86	4.21	0.75						
HND	68	4.13	0.69						
OND	15	4.00	0.57						
M.Sc	24	3.94	0.71						
Total	**218**	**4.17**	**0.72**						
Task Identity									
PGD	25	4.55	0.54	4	213	3.525	0.008*	SS	Reject
B.Sc	86	4.14	0.77						
HND	68	4.02	0.67						
M.Sc	24	3.94	0.85						
OND	15	3.80	0.78						
Total	**218**	**4.11**	**0.75**						
Task Significance									
PGD	25	4.60	0.44	4	213	2.929	0.022*	SS	Reject
B.Sc	86	4.27	0.70						
M.Sc	24	4.24	0.73						
HND	68	4.13	0.67						
OND	15	3.98	0.68						
Total	**218**	**4.24**	**0.68**						
Autonomy									
PGD	25	4.49	0.46	4	213	5.488	0.001*	SS	Reject
B.Sc	86	4.22	0.56						
HND	68	4.16	0.64						
M.Sc	24	3.97	0.78						
OND	15	3.62	0.65						
Total	**218**	**4.16**	**0.63**						
Feedback									
PGD	25	4.33	0.73	4	213	1.935	0.106	NS	Accept
HND	68	4.12	0.58						
B.Sc	86	4.02	0.69						
M.Sc	24	3.93	0.82						
OND	15	3.82	0.60						
Total	**218**	**4.07**	**0.68**						
Task Analyzability									

Parameters	N	Mean	S.D	dfb	dfw	F	P value	Sig.	Decisions
PGD	25	4.36	0.64	4	212	3.848	0.005*	SS	Reject
B.Sc	86	4.12	0.70						
HND	68	3.97	0.72						
M.Sc	23	3.74	0.77						
OND	15	3.67	0.67						
Total	**217**	**4.03**	**0.72**						
Task Difficulty									
PGD	25	4.46	0.61	4	211	5.014	0.001*	SS	Reject
B.Sc	85	3.98	0.88						
HND	68	3.86	0.88						
M.Sc	23	3.50	1.15						
OND	15	3.40	0.95						
Total	**216**	**3.91**	**0.92**						
Task Routineness									
PGD	25	3.84	0.90	4	213	2.698	0.032*	SS	Reject
HND	68	3.72	0.82						
B.Sc	86	3.67	0.95						
M.Sc	24	3.38	1.02						
OND	15	3.03	0.74						
Total	**218**	**3.63**	**0.91**						
Task Complexity									
PGD	25	4.12	0.67	4	213	4.431	0.002*	SS	Reject
B.Sc	86	3.95	0.86						
HND	68	3.73	1.02						
M.Sc	24	3.31	1.25						
OND	15	3.20	0.84						
Total	**218**	**3.78**	**0.97**						
Task Structuredness					213	6.625	0.001*	SS	Reject
PGD	25	4.26	0.56						
B.Sc	86	3.96	0.73						
HND	68	3.85	0.81						
M.Sc	24	3.46	0.85						
OND	15	3.20	0.84						
Total	**218**	**3.85**	**0.80**						

Significant at $p<0.05$

NS- Not Significant, SS- Significant, N-Number, MS- Mean Score, SD- Standard Deviation, df_b- Between group difference, df_w- Within group difference

Table 4.11 shows the result of ANOVA for the test of differences in the mean of the prevalence of task characteristics based on construction professionals' qualification. The hypothesis which states that there is no significant difference in the prevalence of task characteristics based on construction professionals' qualification was tested using ANOVA. The rule for the rejection of the hypothesis is that when p-value ≤ 0.05, then it is significant, reject the hypothesis and when greater it is non-significant, accept the hypothesis. Skill variety $F(4,213) = 1.97$, $p = 0.100$ and feedback $F(4, 213) = 1.935$, $p = 0.106$, were found not to be significant, therefore the hypothesis was accepted. Task identity, task significance, autonomy, task analyzability, task difficulty, task routineness, task complexity, task structuredness were found to be significant, thus the hypothesis was rejected.

For skill variety, the implication is that construction professional' qualification does not affect the level of prevalence of skill variety. This means that the prevalent level of use of diverse skills and talents to execute task by construction professional is not affected by his/her qualification. For feedback, the implication is that the qualification of construction profession does not affect the prevalence of feedback in construction professionals' task. This means that the prevalent level at which the task of construction professionals require information and recognition for a task well completed is not affected by qualification.

The difference in the prevalence of task identity due to construction professional's qualification was significant, $F(4, 213) = 3.525$, $p = 0.008$. Thus, the hypothesis which states that 'there is no significant difference in the prevalence of task identity due to construction professionals' qualification was rejected at p-value ≤ 0.05. Professionals with PDG (*M* = 4.55, *SD* = 0.54), B.Sc. (*M*= 4.14, *SD* = 0.77) and HND (*M* = 4.02, *SD* = 0.67) reported significantly high prevalence of task identity in their task than did M.Sc. (*M*= 3.94, *SD* = 0.85) and OND (*M*= 3.80, *SD* = 0.78). This implies that construction professionals differ on the prevalence of task identity in their task, thus, construction professionals' qualifications have an effect on task identity. This means that the prevalent level at which their task requires a completion of a whole from the beginning to the end is affected by qualification.

The difference in the prevalence of task significance based on construction professionals' qualification was significant, F (4, 213) = 2.929, p = 0.022. Thus, the hypothesis which states that 'there is no significant difference in the prevalence of task significance due to construction professionals' qualification was rejected at p-value ≤ 0.05. Professionals with OND (*M*= 3.98, *SD* = 0.68) reported significantly less prevalence of task significance in their task than professionals with PGD (*M* = 4.60, *SD* = 0.44), B.Sc. (*M*= 4.27, *SD* = 0.70), M.Sc. (*M* = 4.24, *SD* = 0.73) and HND (*M* = 4.13, *SD* = 0.67). This means that the level at which professionals perceived their task as having an impact in peoples' lives both in the immediate environment and world at large differs. The implication is that construction professionals' qualifications affect the prevalence of task significance. This is because professional with higher qualification view their task as significance compares to those with lower qualification.

The ANOVA result in Table 4.11 shows that the difference in the prevalence of autonomy was significant, F (4, 213) = 5.488, $p \leq 0.05$. Thus, the hypothesis which states that 'there is no significant difference in the prevalence of autonomy due to construction professionals' qualification was rejected at p-value ≤ 0.05. Professionals with PGD (*M* = 4.49, *SD* = 0.46), B.Sc. (*M*= 4.22, *SD* = 0.56), HND (*M* = 4.16, *SD* = 0.64) reported significantly high prevalence of task significance in their task than did those with M.Sc. (*M*= 3.97, *SD* = 0.78) and OND (*M*= 3.62, *SD* = 0.65). This implies that construction professionals' qualifications have an effect on autonomy since they differ on the prevalence of autonomy in their task. This means that the level at which professionals has the freedom to use their discretion and make a decision when executing their task is affected by the prevalent of autonomy. This shows that construction professionals with higher qualification are given more freedom to make decisions compare to those with lower qualification.

Table 4.11 shows that the ANOVA result for the test of difference in the prevalence of task analyzability due to construction professional's qualification is significant F (4, 212) = 3.848, $p < 0.05$. Therefore, the hypothesis which states that there is no significant difference in the prevalence of task analyzability based on construction professionals' qualification is rejected at p-value ≤ 0.05. Professionals with HND (*M* = 3.97, *SD* = 0.72), M.Sc. (*M* = 3.74, *SD* = 0.77) and OND (*M* = 3.67, *SD* = 0.67) reported significantly less prevalence of task analyzability in their task than did those with PGD (*M* = 4.36, *SD* = 0.64), B.Sc. (*M*= 4.12, *SD* = 0.70). This means that construction professionals differ on the level of prevalence of task analyzability in their task, thus the qualification of construction professional affects the prevalence of task analyzability. This means that the prevalent level at which construction professionals' tasks are clearly defined with a sequence of steps and established procedures is affected by construction professional's qualification.

The difference in the prevalence of task difficulty based on construction professionals' qualifications was significant, F (4, 211) = 5.014, $p < 0.05$, therefore, the hypothesis which states that there is no significant difference in the prevalence of task difficulty based on professional qualification was rejected at p-value ≤ 0.05. Professionals with OND (*M* = 3.40, *SD* = 0.95) and M.Sc. (*M* = 3.50, *SD* = 1.15) reported significantly less prevalence of task difficulty in their task than did those with PGD (*M* = 4.46, *SD* = 0.61), B.Sc. (*M* = 3.98, *SD* = 0.88) and HND (*M* = 3.86, *SD* = 0.88). The implication is that construction professionals' qualifications have an effect on task difficulty. This implies that the level of prevalence of task difficulty in construction professionals' task differs for all professionals. This means that the level at which their task requires great physical effort to accomplish and great mental effort to comprehend is affected by construction professionals' qualification.

The difference in the prevalence of task routineness based on construction professionals' qualification was significant, F (4, 213) = 2.698, $p = 0.032$, therefore the hypothesis which states that there is no significant difference in the prevalence of task routineness based on construction professionals' qualification was rejected at p-value ≤ 0.05. Professionals with M.Sc. (*M* = 3.50, *SD* = 1.02) and OND (*M* = 3.40, *SD* = 0.95) reported significantly less prevalence of task routineness in their task than professionals with PGD (*M* = 3.84, *SD* = 0.90), HND (*M* = 3.72, *SD* = 0.82) and B.Sc. (*M* = 3.67, *SD* = 0.95). The implication is that construction professionals' qualifications affect the prevalence of task routineness. This shows that construction professionals differ on the level of prevalence of task routineness, therefore, the level at which construction professionals' task requires a habitual process of executing it is not the same. Professionals who have higher qualifications perceived that the process of carrying out their task is routine.

The difference in the prevalence of task complexity based on construction professionals' qualification was significant, F (4, 213), 4.431, p = 0.002. Therefore, the hypothesis which states there is no significant difference in the prevalence of task complexity based on construction professionals' qualifications was rejected at p-value ≤ 0.05. This was based on the rule when p-value ≤ 0.05 reject the hypothesis. Professionals with PGD (*M* = 4.12, *SD* = 0.67), B.Sc. (*M* = 3.95, *SD* = 0.86) and HND (*M* = 3.73, *SD* = 1.02) reported significantly high prevalence of task complexity in their task than professionals with M.Sc. (*M* = 3.31, *SD* = 1.25) and OND (*M* = 3.20, *SD* = 0.84). The implication is that construction professionals' qualifications have an effect on the prevalence of task complexity. This is an indication that the level at which task complexity is prevalent in construction professionals' tasks differ. This means that the level at which construction professionals' task is complicated in nature is not the same for all professionals.

The difference in the prevalence of task structuredness based on construction professionals' qualification was significant $F(4, 213) = 6.625$, $p < 0.05$. Therefore, the hypothesis which states that there is no significance difference in the prevalence of task structuredness based on construction professionals' qualification was rejected p-value ≤ 0.05. Professionals with PGD ($M = 4.26$, $SD = 0.56$), B.Sc. ($M = 3.96$, $SD = 0.73$) and HND ($M = 3.85$, $SD = 0.81$) reported significantly high prevalence of task structuredness in their task than professionals with M.Sc. ($M = 3.46$, $SD = 0.85$) and OND ($M = 3.20$, $SD = 0.84$). This implies that construction professionals' qualification affects the prevalence of task structuredness. This also shows that professionals differ on the prevalence level of task structuredness in their task. This means that the level at which construction professionals' task has an application of rules and principles with a well-defined parameter for convergent when executing it is not the same for all professionals.

4.4.3 Difference in task characteristics based on construction professionals' age

To investigate the differences in task characteristics based on construction professionals' age, construction professionals were grouped into four age groups namely: 21-30 years, 31-40 years, 41-50 years, and 51-60 years. The means of the prevalence of task characteristics possessed by construction professionals who fall under the four age groups were analysed. The test of difference in the prevalence of task characteristics based on the four age groups was carried out using ANOVA. The results are presented in Table 4.12.

Table 4.12: ANOVA test for difference in task characteristics based on construction professionals' age

Parameters	N	Mean	S.D	dfb	dfw	F	P-value	sig.	Decisions
Skill Variety									
21-30 years	79	4.11	0.77	3	214	0.666	0.574	NS	Accept
31-40 years	118	4.18	0.72						
41-50 years	18	4.36	0.56						
51-60 years	3	4.33	0.58						
Total	**218**	**4.17**	**0.72**						
Task Identity									
21-30 years	79	3.94	0.73	3	214	3.090	0.028*	SS	Reject
31-40 years	118	4.23	0.73						
41-50 years	18	3.94	0.81						
51-60 years	3	4.44	0.51						
Total	**218**	**4.11**	**0.75**						
Task Significance									
21-30 years	79	4.04	0.70	3	214	4.008	0.008*	SS	Reject
31-40 years	118	4.36	0.65						
41-50 years	18	4.33	0.64						
51-60 years	3	4.00	0.67						
Total	**218**	**4.24**	**0.68**						
Autonomy									
21-30 years	79	4.05	0.69	3	214	2.338	0.075	NS	Accept
31-40 years	118	4.23	0.59						
41-50 years	18	4.32	0.62						
51-60 years	3	3.67	0.58						
Total	**218**	**4.16**	**0.63**						
Feedback									
21-30 years	79	3.98	0.72	3	214	0.838	0.474	NS	Accept
31-40 years	118	4.10	0.67						
41-50 years	18	4.21	0.47						
51-60 years	3	4.00	0.88						
Total	218	4.07	**0.68**						
Task Analyzability									
21-30 years	79	3.91	0.80	3	213	1.296	0.277	NS	Accept
31-40 years	117	4.11	0.67						
41-50 years	18	4.06	0.59						
51-60 years	3	4.00	1.00						
Total	**217**	**4.03**	**0.72**						

Parameters	N	Mean	S.D	dfb	dfw	F	P-value	sig.	Decisions
Task Difficulty									
21-30 years	79	3.80	0.85	3	212	1.534	0.207	NS	Accept
31-40 years	116	4.02	0.96						
41-50 years	18	3.75	0.93						
51-60 years	3	3.33	1.26						
Total	216	3.91	**0.92**						
Task Routineness									
21-30 years	79	3.56	0.88	3	214	2.254	0.083	NS	Accept
31-40 years	118	3.75	0.89						
41-50 years	18	3.28	1.13						
51-60 years	3	3.00	1.00						
Total	**218**	**3.63**	**0.91**						
Task Complexity									
21-30 years	79	3.73	0.94	3	214	0.589	0.623	NS	Accept
31-40 years	118	3.85	0.97						
41-50 years	18	3.58	1.22						
51-60 years	3	3.50	0.50						
Total	**218**	**3.78**	**0.97**						
Task Structuredness									
21-30 years	79	3.75	0.86	3	214	1.148	0.331	NS	Accept
31-40 years	118	3.94	0.73						
41-50 years	18	3.75	0.90						
51-60 years	3	3.67	1.15						
Total	218	3.85	**0.80**						

Significant at $p<0.05$
NS- Not Significant, SS- Significant, N-Number, MS- Mean Score, SD- Standard Deviation, df_b - Between group difference, df_w- Within group difference

Table 4.12 shows the result of ANOVA for the differences in the prevalence of task characteristics based on construction professionals' age. The hypothesis which states that 'there is no significant difference in the prevalence of task characteristics based on construction professionals' age' was tested using ANOVA. The rule for rejection of the hypothesis is that that when $p \leq 0.05$, then the difference is significant, thus the hypothesis is rejected and when greater than 0.05, accept the hypothesis. A significant difference was found for task identity and task significance and a non-significant difference for skill variety, autonomy, feedback, task analyzability, task difficulty, task routineness, task complexity and task structuredness with p-value of 0.574, 0.075, 0.474, 0.277, 0.207, 0.083, 0.623, 0.331 respectively. The hypothesis was therefore rejected for task identity and task significance and accepted for skill variety, autonomy, feedback, task analyzability, task difficulty, task routineness, task complexity and task structuredness.

For skill variety, construction professionals within the different age group did not differ on the level of prevalence of skill variety in their task, thus, construction professionals' age do not affect the prevalence of skill variety in construction professionals' task. This means that construction professional's age does not affect the prevalence at which the task of site supervision involves the diverse use of skills and talent. For autonomy, construction professionals within the different age groups did not differ on the reported level of prevalence of autonomy in their task. The implication is that the age of construction professional does not affect the prevalence of autonomy. Thus, the level of prevalence of autonomy in construction professionals' task is the same for all professionals. This means that construction professional's age does not affect the prevalence at which professionals have the freedom to use their discretion and make a decision when executing their task.

Also, Construction professionals within the different age groups did not differ on the reported level of prevalence of feedback. The implication is that construction professional's age does not affect the prevalence of feedback. This means that construction professional's age does not affect the prevalence at which their task required information and recognition for a task well completed. Furthermore, Construction professionals within the different age groups did not differ on the reported level of prevalence of task analyzability in their task. The implication is that construction professional's age does not affect the prevalence of task analyzability. This means that construction professional's age does not affect the prevalence at which the supervisory tasks of construction professionals are clearly defined with a sequence of steps and established procedures. For task difficulty, construction professionals within the different age groups did not differ on the reported level of prevalence of task difficulty. This implies that construction professional's age does not affect the prevalence of task difficulty in construction professionals' task. This means that construction professional's age does not affect the prevalence at which the task of professional requires great physical effort to accomplish and great mental effort to comprehend.

Professionals reported the same level of prevalence for task routineness. The implication is that construction professional's age does not affect the prevalence of task routineness. This also means that the level of prevalence at which the task of construction professional involve a habitual method and unvarying procedure of carrying it out is not affected by the age of construction professional. Based on task complexity, the implication is that the age of construction professional does not affect the prevalence of task complexity. Construction professionals within the different age groups did not differ on the reported level of prevalence of task autonomy in their task. This means that the age of construction professional does not affect the prevalence at which construction professionals' task is complicated in nature. Lastly, the implication is that the age of construction professional does not affect the prevalence of task structuredness. This indicates that construction professionals within the different age groups did not differ on the reported level of prevalence of task structuredness in their task. This means that the construction professional's age does not affect the prevalence at which construction professionals' task has an application of rules and principles with a well-defined parameter for convergent when executing task.

The difference in the prevalence of task identity based on the age of construction professional was significant F (3,214) = 3.090, p = 0.03. Thus, the hypothesis which states that 'there is no significant difference in the prevalence of task identity due to construction professionals' age was rejected at p-value ≤ 0.05. Construction professionals within the age group of 51-60 (M = 4.44, SD = 0.51) and age group of 31-40 (M = 4.23, SD = 0.73) reported significantly higher prevalence of task identity than those within the age group of 21-30 (M = 3.94, SD = 0.73) and 41-50 (M = 3.94, SD = 0.51). This implies that construction professionals differ on the prevalence of task identity in their task, thus, construction professionals' age has an effect on the prevalence of task identity. This means that the level of prevalence at which their task requires a completion of a whole from the beginning to the end is affected by construction professional's age.

The difference in the prevalence of task significance based on construction professionals' age was significant, F (3, 214) = 4.008, p = 0.01. Thus, the hypothesis which states that 'there is no significant difference in task significance due to construction professionals' qualification was rejected at p-value ≤ 0.05. Professionals within the age group of 51-60 (*M*= 4.00, *SD* = 0.67) and 21-30 (*M*= 4.04, *SD* = 0.70) reported significantly less prevalence of task significance in their task than professionals within the age group of 31-40 (*M* = 4.35, *SD* = 0.65) and 41-50 (*M* = 4.33, *SD* = 0.64). The implication is that construction professionals' age affects the prevalence of task significance. This means that the level of prevalence at which professionals perceived their task as having an impact in peoples' lives in their immediate environment and world at large differs, thus is affected by construction professionals' age. Younger and older construction professionals perceived their task less significant compare to professionals in the mid-age.

4.4.4 Difference in task characteristics based on construction professionals' gender

To investigate the differences in task characteristics based on construction professionals' gender, construction professionals were grouped into two namely: male and female. The means of the prevalence of task characteristics of the two genders of construction professionals were analysed. The test of difference in the prevalence of task characteristics based on the two gender groups was carried out using t-test. The results are presented in Table 4.13.

Table 4.13: t-test for difference in task characteristics based on construction professionals' gender

Task Characteristics	N	MS	SD	dfa	dfna	t	p value	Sig.	Decision
Skill variety									
Male	204	4.19	0.72	216	15.07	1.48	0.139	NS	Accept
Female	14	3.89	0.68						
Task Identity									
Male	204	4.12	0.73	216	14.17	0.92	0.361	NS	Accept
Female	14	3.93	0.92						
Task Significance									
Male	204	4.25	0.66	216	13.92	0.96	0.340	NS	Accept
Female	14	4.07	0.93						
Autonomy									
Male	204	4.18	0.64	216	15.91	1.15	0.252	NS	Accept
Female	14	3.98	0.51						
Feedback									
Male	204	4.09	0.67	216	14.48	1.88	0.061	NS	Accept
Female	14	3.74	0.74						
Task Analyzability									
Male	204	4.05	0.72	215	15.37	1.51	0.134	NS	Accept
Female	14	3.75	0.64						
Task Difficulty									
Male	204	3.93	0.93	214	15.26	1.56	0.120	NS	Accept
Female	14	3.54	0.84						
Task Routineness									
Male	204	3.66	0.91	216	15.43	1.93	0.055	NS	Accept
Female	14	3.18	0.80						
Task Complexity									
Male	204	3.80	0.98	216	15.55	1.53	0.127	NS	Accept
Female	14	3.39	0.84						
Task Structuredness									
Male	204	3.88	0.80	216	15.18	1.72	0.086	NS	Accept
Female	14	3.50	0.73						

Significant at $p<0.05$

NS- Not Significant, SS- Significant, N-Number, MS- Mean Score, SD- Standard Deviation, df_a- Equal variance assumed, df_{na}- Equal variance not assumed.

Table 4.13 shows the differences in the prevalence of task characteristics based on construction professionals' gender. The hypothesis which states that 'there is no significance difference in the prevalence of task characteristics based on construction professionals' gender was tested using t test. The rule for the rejection of the hypothesis is that when p-value is ≤ 0.05, then it is significant, reject the hypothesis and when greater than 0.05, then it is non-significant, accept the hypothesis. The hypothesis was thus accepted for all the task characteristics parameters; skill variety ($p = 0.139$), task identity ($p = 0.361$), task significance ($p = 0.340$), autonomy ($p = 0.252$), feedback ($p = 0.061$), task analyzability ($p = 0.134$), task difficulty ($p = 0.120$), task routineness ($p = 0.055$), task complexity ($p = 0.127$) and task structuredness ($p = 0.086$).

The implication for skill variety is that construction professional's gender does not affect the prevalence of skill variety. This is an indication that male and female construction professionals did not differ on the level of prevalence of skill variety in their task. For task identity, it shows that Male and female construction professionals did not differ on the level of prevalence of task identity. The implication is that construction professional's gender does not affect the prevalence of task identity. Therefore, construction professional's gender does not affect the prevalence at which their task requires a completion of a whole from the beginning to the end. Also, for task significance, the implication is that gender of construction professional does not affect the prevalence of task significance. This means that gender does not affect the prevalence at which the task of construction professionals' impact people's lives in the immediate environment and the world at large.

The implication for autonomy is that the gender of construction professional does not affect the prevalence of autonomy. This means that gender of construction professionals does not affect the prevalence at which professionals have the freedom to use their discretion and make a decision when executing their task. Furthermore, the implication is that the gender of construction professional does not affect the prevalence of feedback in construction professionals' task. Therefore, construction professional's gender does not affect the prevalence at which their task required information and recognition for a task completed well. For task analyzability, the implication is that the gender of construction professional does not affect the prevalence of task analyzability. Thus, the prevalence at which the supervisory tasks of construction professionals are clearly defined with a sequence of steps and established procedures is not affected by gender of the professionals.

The implication is that the gender of construction professional does not affect the prevalence of task difficulty in construction professionals' task. This means that gender of construction professional does not affect the prevalence at which their task requires great physical effort to accomplish and great mental effort to comprehend. Male and female construction professionals reported the same level of prevalence for task routineness. This implies that the gender of construction professionals does not affect the prevalence of task routineness. This also means that construction professional's gender does not affect the prevalence at which the tasks of construction professional involve a habitual method and unvarying procedure of carrying out. The implication of the result for task complexity is that construction professional's gender does not affect the prevalence of task complexity. This means that construction professional's gender does not affect the prevalence at which construction professionals' task is complicated in nature.

The t test results in Table 4.13 also show that male and female construction professionals did not differ on the reported level of prevalence of task structuredness in their task. The implication is that construction professional's gender does not affect the prevalence of task structuredness. This means that construction professional's gender does not affect the prevalence at which construction professionals' task has an application of rules and principles with a well-defined parameter for convergent when executing it.

4.5 RELATIONSHIP BETWEEN TASK CHARACTERISTICS AND TRAINING PRACTICES OF CONSTRUCTION PROFESSIONALS

To determine the relationship between task characteristics and training practices, it is expedient to investigate the task characteristics of construction professionals (See 4.3 for the task characteristics) and the frequency of implementation of training practices.

4.5.1 Frequency of training practices implementation in construction firms

To investigate the frequency of implementing training practices in construction firms, training practices was categorised into four segments namely; training needs assessment, training delivery, training evaluation and training transfer. Statements were prepared to indicate training practices and respondents were requested to rate the frequency at which training practices was implemented using (1 for *nil*, 2 for *low frequency*, 3 for *moderate* *frequency*, 4 for *high frequency* and 5 for *very high frequency*). The mean of the frequency of implementing each training practice was thus analysed and used for determining the frequency of training practices implementation among professionals in construction firms. The results are presented in Table 4.14.

Table 4.14: Frequency of Training practices Implementation in construction firms

Variables	1	2	3	4	5	MS	SD	Rank	Frequency
Training Transfer	7	21	82	80	26	3.45	0.80	1	Moderate
Training Delivery	15	28	71	78	25	3.32	0.70	2	Moderate
Training needs assessment	17	32	72	70	26	3.25	0.69	3	Moderate
Training Evaluation	14	26	88	73	18	3.25	0.79	3	Moderate
Overall Training Practices	**13**	**27**	**78**	**75**	**24**	**3.30**	**0.66**		Moderate

Note: 1.00-1.49 for 1, Nil; 1.50-2.49 for 2, low; 2.50-3.49 for 3, moderate; 3.50-4.49 for 4, high and 4.50-5.00 for 5, very high.

Table 4.14 shows the frequency of implementation of training practices of construction firms. The result shows that the frequency of implementing training practices is generally moderate with training transfer constituting the most frequently implemented training practice. Training delivery is the second most frequently implemented practice while training needs assessment is the third most frequently implemented practice. Training evaluation is the least frequently implemented practices.

This implies that the frequency at which construction firms train professionals engaged by them is moderate. This indicates that the extent to which construction professionals systematically acquire specific skills, capabilities and knowledge for their present task through their organisation is moderate.

4.5.2 Comparison of Training practices Implementation in Lagos and Abuja

The frequency of implementation of training practices in construction firm was compared between construction firms in Lagos and Abuja. Table 4.15 shows the mean scores of training practices implementation in Lagos and Abuja and the overall mean.

Table 4.15: Comparison of training practices implementation in construction firms in Lagos and Abuja

Training Practices	Total MS	Lagos Mean	Rank	Abuja Mean	Rank
Training Transfer	3.45	3.41	2	3.62	1
Training Delivery	3.32	3.27	2	3.47	1
Training Evaluation	3.25	3.22	2	3.37	1
Training needs assessment	3.25	3.22	2	3.35	1
Overall Training Practices	**3.30**	**3.26**	**2**	**3.43**	**1**

MS- Mean score, N- Number of respondents

Table 4.15 shows the comparison of training practices implementation in construction firms in Lagos and Abuja. Overall, the levels of implementation of training practices in construction firms in Lagos and Abuja were moderate. However, Table 4.15 shows that the level of implementation of the four segments of training practices was higher in construction firms in Abuja than their counterparts in Lagos.

This implies that the frequency at which construction firms systematically train construction professionals are moderate in Lagos and Abuja. It also implies that the location of construction firms may contribute to the level of implementation of training practices.

4.5.3 Relationship between Task characteristics of construction professionals and Training practices of construction firms

To determine the relationship between construction professionals' task characteristics and training practices, the hypothesis which states that 'there is no significant relationship between task characteristics and training practices' was tested using Pearson Product moment correlation. This was employed because each task characteristic and training practice variable consists of items which were averaged into a composite score, 'Likert scale data'.

The decision rule for the rejection of the hypothesis was that it is statistically significant when p-value ≤ 0.05, and when p-value is greater than 0.05, then it not significant; thus accept the hypothesis. The results of the test of the hypothesis are presented in Table 4.16.

Table 4.16: Correlation of construction professionals' task characteristics and training practices

Variables correlated	N	MS	SD	r-value	p-value	Sig	Decision
Skill variety	**218**	**4.17**	**0.72**				
Training Needs Assessment	218	3.25	0.70	0.377**	0.001	SS	Reject
Training Delivery	218	3.32	0.70	0.168*	0.013	SS	Reject
Training Evaluation	218	3.25	0.79	0.173*	0.010	SS	Reject
Training Transfer	218	3.45	0.81	.288**	0.001	SS	Reject
Task identity	**218**	**4.11**	**0.75**				
Training Needs Assessment	218	3.25	0.70	0.292**	0.001	SS	Reject
Training Delivery	218	3.32	0.70	0.209**	0.002	SS	Reject
Training Evaluation	218	3.25	0.79	0.246**	0.001	SS	Reject
Training Transfer	218	3.45	0.81	.235**	0.001	SS	Reject
Task significance	**218**	**4.24**	**0.68**				
Training Needs Assessment	218	3.25	0.70	0.149*	0.027	SS	Reject
Training Delivery	218	3.32	0.70	0.160*	0.018	SS	Reject
Training Evaluation	218	3.25	0.79	0.168*	0.013	SS	Reject
Training Transfer	218	3.45	0.81	0.253**	0.001		Reject
Autonomy	**218**	**4.16**	**0.63**				
Training Needs Assessment	218	3.25	0.70	0.269**	0.001	SS	Reject
Training Delivery	218	3.32	0.70	0.199**	0.003	SS	Reject
Training Evaluation	218	3.25	0.79	0.208**	0.002	SS	Reject
Training Transfer	218	3.45	0.81	0.245**	0.001		Reject
Feedback	**218**	**4.07**	**0.68**				
Training Needs Assessment	218	3.25	0.70	0.450**	0.001	SS	Reject
Training Delivery	218	3.32	0.70	0.363**	0.001	SS	Reject
Training Evaluation	218	3.25	0.79	0.412**	0.001	SS	Reject
Training Transfer	218	3.45	0.81	0.447**	0.001	SS	Reject
Task analyzability	**217**	**4.03**	**0.72**				
Training Needs Assessment	217	3.25	0.70	0.253**	0.001	SS	Reject
Training Delivery	217	3.32	0.70	0.195**	0.004	SS	Reject
Training Evaluation	217	3.25	0.79	0.235**	0.001	SS	Reject
Training Transfer	217	3.45	0.81	0.289**	0.001	SS	Reject
Task difficulty	**216**	**3.91**	**0.92**				
Training Needs Assessment	216	3.25	0.70	0.217**	0.001	SS	Reject
Training Delivery	216	3.32	0.70	0.060	0.379	NS	Accept
Training Evaluation	216	3.25	0.79	0.110	0.107	NS	Accept
Training Transfer	216	3.45	0.81	0.075	0.274	NS	Accept

Task routineness	**218**	**3.63**	**0.91**				
Training Needs Assessment	218	3.25	0.70	0.394**	0.001	SS	Reject
Training Delivery	218	3.32	0.70	0.231**	0.001	SS	Reject
Training Evaluation	218	3.25	0.79	0.237**	0.001	SS	Reject
Training Transfer	218	3.45	0.81	0.186**	0.006	SS	Reject
Task complexity	**218**	**3.78**	**0.97**				
Training Needs Assessment	218	3.25	0.70	0.262**	0.001	SS	Reject
Training Delivery	218	3.32	0.70	0.161*	0.017	SS	Reject
Training Evaluation	218	3.25	0.79	0.181**	0.007	SS	Reject
Training Transfer	218	3.45	0.81	0.148*	0.029	SS	Reject
Task structuredness	**218**	**3.85**	**0.80**				
Training Needs Assessment	218	3.25	0.70	0.271**	0.001	SS	Reject
Training Delivery	218	3.32	0.70	0.156*	0.021	SS	Reject
Training Evaluation	218	3.25	0.79	0.175**	0.010	SS	Reject
Training Transfer	218	3.45	0.81	0.171*	0.011	SS	Reject
Overall Task Characteristics	**218**	**4.02**	**0.54**				
Training Needs Assessment	218	3.25	0.70	.411**	0.001	SS	Reject
Training Delivery	218	3.32	0.70	.271**	0.001	SS	Reject
Training Evaluation	218	3.25	0.79	.306**	0.001	SS	Reject
Training Transfer	218	3.45	0.81	.329**	0.001	SS	Reject

** Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)
Note: NS- Not Significant, SS- Significant, N-Number, MS- Mean Score, SD- Standard Deviation, r-value- Correlation value, p-value- Critical value

Table 4.16 reveals that the p-value (0.001) for the test of the relationship between skill variety and training needs assessment is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between skill variety and training needs assessment. The implication of the result is that skill variety contributes or influences training needs assessment. Since the Pearson value (0.366) is positive, the result indicates that the higher the prevalence of skill variety, the higher the level of training needs assessment. This means that the higher the prevalence of a variety of skills to execute tasks by construction professionals, the higher the construction firms identify the training needs of construction professionals.

The p-value (0.013) for the test of the relationship between skill variety and training delivery is less than the critical value of (0.05), thus the hypothesis which states that 'there is no significant relationship between skill variety and training delivery was rejected. The implication is that skill variety influences training delivery. Since the Pearson value (0.168) is positive, the result indicates that the higher the prevalence of skill variety, the higher the level of training delivery. This means that the higher the prevalence of diverse skills by professionals in executing their task, the higher the construction firms deliver training to the professionals.

The result in Table 4.16 also shows that the p-value (0.010) for the test of the relationship between skill variety and training evaluation is less than the critical p-value (0.05); therefore the decision is to reject the hypothesis which states that there is no significant relationship between skill variety and training evaluation. The implication is that skill variety contributes to training evaluation. Since the Pearson correlation is positive (0.173), the results show that the higher the level of prevalence of skill variety, the higher the training evaluation in construction firms. This means that the higher the prevalence of a variety of skills by professionals in executing a task, the higher the construction firms measure training outcome.

The p-value (0.001) for the test of the relationship between skill variety and training transfer is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between skill variety and training transfer. The implication of the result is that skill variety influences training transfer. Since the Pearson value (0.288) is positive, the result indicates that the higher the prevalence of skill variety in construction professionals' task, the higher the level of training transfer. This means that the higher the prevalence of a variety of skills to execute tasks by construction professionals, the higher the construction professionals' transfer what has been learnt.

Table 4.16 reveals that the p-value (0.001) for the test of the relationship between task identity and training needs assessment is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between task identity and training needs assessment. The implication of the result is that task identity influences training needs assessment. Since the Pearson value (0.292) is positive, the result indicates that the higher the prevalence of task identity, the higher the level of training needs assessment. This means that the higher the prevalence of construction professionals' task requiring a completion of a whole from the beginning to the end, the higher the level at which construction firm identifies the training needs of the professionals.

The p-value (0.002) for the test of the relationship between task identity and training delivery is less than the critical p-value (0.05), thus the hypothesis which states that 'there is no significant relationship between task identity and training delivery was rejected. The implication is that task identity influences training delivery. Since the Pearson value is positive (0.209), the result indicates that the higher the prevalence of task identity, the higher the level of training delivery. This means that the higher the prevalence of construction professionals' task requiring a completion of a whole from the beginning to the end, the higher the level at which construction firms deliver training to professionals.

The result in Table 4.16 shows that the p-value (0.001) for the test of the relationship between task identity and training evaluation is less than the critical value of 0.05; therefore the decision is to reject the hypothesis which states that there is no significant relationship between task identity and training evaluation. The implication is that task identity contributes to training evaluation. Since the Pearson value is positive (0.246), the results indicate that the higher the level of prevalence of task identity, the higher the training evaluation in construction firms. This means that the higher the prevalence of construction professionals' task is requiring a completion of a whole from the beginning to the end, the higher the level at which construction firms measure training outcome of the professionals.

The p-value (0.001) for the test of the relationship between task identity and training transfer is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between task identity and training transfer. The implication of the result is that task identity influences training transfer. Since the Pearson value (0.235) is positive, the result indicates that the higher the prevalence of task identity in construction professionals' task, the higher the level of training transfer. This means that the higher the prevalence of construction professionals' task is requiring a completion of a whole from the beginning to the end, the higher the level at which construction professionals' transfer what has been learnt.

The p-value (0.027) for the test of the relationship between task significance and training needs assessment is less than the critical p-value (0.05), thus the hypothesis which states that 'there is no significant relationship between task significance and training needs assessment is rejected. The implication is that task significance influences training needs assessment. Since the Pearson value is positive (0.149), the results show that the higher the prevalence of task significance, the higher the training needs assessment. This means that the higher the prevalence of construction professionals' task is having an impact on the project and on people's lives, the higher the level at which construction firm identifies the training needs of the professionals.

The p-value (0.018) for the test of the relationship between task significance and training delivery is less than the critical p-value (0.05), thus the hypothesis which states that 'there is no significant relationship between task significance and training needs assessment is rejected. The implication is that task significance influences training delivery. Since the Pearson correlation value is positive (0.160), the results show that the higher the prevalence of task significance, the higher the training delivery. This means that the higher the prevalence of construction professionals' task is having an impact on the project and on people's lives, the higher the level at which construction firms deliver training to their professionals.

The p-value (0.013) for the test of the relationship between task significance and training evaluation is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between task significance and training evaluation. The implication of the result is that task significance contributes or influences training evaluation. Since the Pearson value (0.168) is positive, the result indicates that the higher the prevalence of task significance, the higher the level of training evaluation. This means that the higher the prevalence of construction professionals' task is having an impact on the project and on people's lives, the higher the level at which construction firms measures training outcome of the professionals.

The p-value (0.001) for the test of the relationship between task significance and training transfer is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between task significance and training transfer. The implication of the result is that skill variety influences training transfer. Since the Pearson value (0.253) is positive, the result indicates that the higher the prevalence of task significance in construction professionals' task, the higher the level of training transfer. This means that the higher the prevalence of construction professionals' task is having an impact on the project and on people's lives, the higher the level at which construction professionals' transfer what has been learnt.

The p-value (0.001) for the test of the relationship between autonomy and training needs assessment is less than the critical p-value of 0.05, therefore, the decision is to reject the hypothesis which states that there is no significant relationship between autonomy and training needs assessment. This implies that autonomy influences training needs assessment. Since, the Pearson value is positive (0.269), the result indicates that the higher the prevalence of autonomy in construction professionals' task, the higher the training needs assessment. This means that the higher the prevalence of construction professional's task is requiring discretion in performing the task, the higher the level at which construction firms identifies areas of training or training needs of the professional.

The p-value (0.003) for the test of the relationship between autonomy and training delivery is less than the critical p-value of 0.05; therefore, the decision is to reject the hypothesis which states that there is no significant relationship between autonomy and training delivery. The implication is that autonomy contributes to training delivery. Since, the Pearson value is positive (0.199), the result indicates that the higher the prevalence of autonomy in construction professionals' task, the higher the training delivery. This means that the higher the prevalence of construction professional's task is requiring discretion in performing the task, the higher the level at which construction firms deliver training to the professionals.

The result in Table 4.16 shows that the p-value (0.002) for the test of the relationship between autonomy and training evaluation is less than the critical p-value (0.05); therefore the decision is to reject the hypothesis which states that there is no significant relationship between autonomy and training evaluation. The implication is that autonomy contributes to training evaluation. Since the Pearson value is positive (0.028), the results show that the higher the prevalence of autonomy in construction professionals' task, the higher the training evaluation in construction firms. This means that the higher the prevalence of construction professionals' task is requiring discretion in performing the task, the higher the level at which construction firms measures training outcome of the professionals.

The p-value (0.001) for the test of the relationship between autonomy and training transfer is less than the critical p-value of 0.05; therefore, the decision is to reject the hypothesis which states that there is no significant relationship between autonomy and training transfer. The implication is that autonomy contributes to training transfer. Since the Pearson correlation value (0.245) is positive, the result indicates that the higher the prevalence of autonomy in construction professionals' task, the higher the level of training transfer. This means that the higher the prevalence of construction professionals' task is requiring discretion in performing the task, the higher the level at which the professionals apply what was learnt to the task.

Table 4.16 reveals that the p-value (0.001) for the test of the relationship between feedback and training needs assessment is less than the critical p-value (0.05), therefore the decision is to reject the hypothesis which states that there is no significant relationship between feedback and training needs assessment. The implication of the result is that feedback contributes or influences training needs assessment. Since the Pearson value (0.450) is positive, the result indicates that the higher the prevalence of feedback in construction professionals' task, the higher the level of training needs assessment. This means that the higher the prevalence of construction professionals' task is requiring information and recognition for a task well completed, the higher the level at which construction firms identify the training needs of construction professionals.

The p-value (0.001) result for the relationship between Feedback and training delivery is less than the critical p-value of 0.05, thus the hypothesis which states that ‘there is no significant relationship between feedback and training delivery is rejected. The implication is that feedback influences or contributes to training delivery. Since the Pearson value is positive (0.363), the result indicates that the higher the prevalence of feedback in construction professionals’ task, the higher the level of training delivery. This means that the higher the prevalence of construction professionals’ task is requiring information and recognition for a task well completed, the higher the level at which construction firms deliver training to the professionals.

The result in Table 4.16 reveals that the p-value (0.001) for the test of the relationship between feedback and training evaluation is less than the critical p-value (0.05); therefore the decision is to reject the hypothesis which states that there is no significant relationship between feedback and training evaluation. The implication is that feedback contributes to training evaluation. Since the Pearson value is positive (0.412), the results show that the higher the prevalence of feedback in construction professionals’ task, the higher the training evaluation in construction firms. This means that the higher the prevalence of construction professionals’ task is requiring information and recognition for a task well completed, the higher the level at which construction firms measure training outcome.

The p-value (0.001) for the test of the relationship between feedback and training transfer is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between feedback and training transfer. The implication of the result is that skill variety influences training transfer. Since the Pearson value (0.447) is positive, the result indicates that the higher the prevalence of feedback in construction professionals' task, the higher the level of training transfer. This means that the higher the prevalence of construction professionals' task is requiring information and recognition for a task well completed, the higher the level at which construction professionals' transfer what has been learnt.

The p-value (0.001) for the test of the relationship between task analyzability and training needs assessment is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between task analyzability and training needs assessment. The implication of the result is that task analyzability contributes to training needs assessment. Since the Pearson value (0.253) is positive, the result indicates that the higher the prevalence of task analyzability, the higher the level of training needs assessment. This means that the higher the prevalence of construction professionals' task involves a clearly defined sequence of steps and established procedure, the higher the level at which construction firm identifies the training needs of the professionals.

The p-value (0.004) for the test of the relationship between task analyzability and training delivery is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between task analyzability and training delivery. The implication is that task analyzability influences training delivery. Since the Pearson value (0.195) is positive, the result indicates that the higher the prevalence of task analyzability, the higher the level of training delivery. This means that the higher the prevalence of construction professionals' task involves a clearly defined sequence of steps and established procedure, the higher the level at which construction firms deliver training to professionals.

The p-value (0.001) for the test of the relationship between task analyzability and training evaluation is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between task analyzability and training evaluation. The implication is that task analyzability contributes to training evaluation. Since the Pearson value (0.235) is positive, the result indicates that the higher the level of prevalence of task analyzability, the higher the training evaluation in construction firms. This means that the higher the prevalence of construction professionals' task involves a clearly defined sequence of steps and established procedure, the higher the level at which construction firms measures training outcome.

The p-value (0.001) for the test of the relationship between task analyzability and training transfer is less than the critical p-value (0.05); therefore the decision is to reject the hypothesis which states that there is no significant relationship between task analyzability and training transfer. The implication of the result is that task analyzability influences training transfer. Since the Pearson value (0.235) is positive, the result indicates that the higher the prevalence of task analyzability in construction professionals' task, the higher the level of training transfer. This means that the higher the prevalence of construction professionals' task involves a clearly defined sequence of steps and established procedure, the higher the level at which construction professionals' transfer what has been learnt.

Table 4.16 shows that the p-value (0.001) for the test of the relationship between task difficulty and training needs assessment is less than the critical p-value of 0.05, therefore, the decision is to reject the hypothesis which states that 'there is no significant relationship between task difficulty and training needs assessment. This implies that task difficulty influences training practices. Since, the Pearson value is positive (0.0217), the result indicates that the higher the prevalence of task difficulty in construction professionals' task, the higher the training needs assessment. This means that the higher the prevalence of construction professionals' task is requiring great effort to accomplish, the higher the level at which construction firms identifies the training needs of the professionals.

The p-value (0.379) for the test of the relationship between task difficulty and training evaluation is greater than the critical value (0.05); therefore the decision is to accept the hypothesis which states that there is no significant relationship between task difficulty and training delivery. The implication of the result is that task difficulty does not influence training delivery. This means that the prevalence of construction professionals' task requiring great effort to accomplish does not contribute to the level at which construction firms delivers training to professionals.

The p-value (0.107) for the test of the relationship between task difficulty and training evaluation is greater than the critical value (0.05) therefore; the decision is to accept the hypothesis which states that there is no significant relationship between task difficulty and training evaluation. The implication is that task difficulty does not influence training evaluation. This means that the prevalence of construction professionals' task requiring great effort to accomplish does not contribute to the level at which construction firms measures training outcome of the professionals.

The p-value (0.274) for the test of the relationship between task difficulty and training transfer is greater than the critical value (0.05) therefore; the decision is to accept the hypothesis which states that there is no significant relationship between task difficulty and training transfer. The implication is that task difficulty does not influence training transfer. Thus, the prevalence of construction professionals' task requiring great effort to accomplish does not contribute to the level at which construction professionals' transfer what has been learnt.

The p-value (0.001) for the test of the relationship between task routineness and training needs assessment is less than the critical p-value of 0.05, thus the decision is to reject the hypothesis which states that there is no relationship between task routineness and training needs assessment. This implies that task routineness influences training practices. Since the Pearson value (0.394) is positive, the result shows that the higher the level of prevalence of task routineness in construction professionals' task, the higher the training needs assessment. This means that the higher the prevalence of construction professional's task is requiring a habitual method of executing it, the higher the level at which construction firms identify training needs of the professional.

The p-value (0.001) for the test of the relationship between task routineness and training delivery is less than the critical p-value of 0.05, thus the decision is to reject the hypothesis which states that there is no relationship between task routineness and training delivery. The implication is that task routineness contributes to training delivery. Since the Pearson value (0.231) is positive, the result shows that the higher the prevalence of task routineness, the higher the training delivery of construction firms. This means that the higher the prevalence of construction professional's task is requiring a habitual method of executing it, the higher the level at which construction firms deliver training to the professionals.

The p-value (0.001) for the test of the relationship between task routineness and training evaluation is less than the critical p-value of 0.05, thus the decision is to reject the hypothesis which states that there is no relationship between task routineness and training evaluation. The implication is that task routineness contributes to training evaluation. Since the Pearson value (0.237) is positive, the result shows that the higher the prevalence of task routineness in professionals' task, the higher the training evaluation in construction firms. This means that the higher the prevalence at which construction professional's task requires a habitual method of executing it, the higher the level at which construction firms measures training outcome of the professionals.

The p-value (0.006) for the test of the relationship between task routineness and training transfer is less than the critical p-value of 0.05, thus the decision is to reject the hypothesis which states that there is no relationship between task routineness and training transfer. The implication of the result is that task routineness influences training transfer. Since the Pearson value (0.186) is positive, the result indicates that the higher the prevalence of task routineness in construction professionals' task, the higher the level of training transfer. This means that the higher the prevalence of construction professional's task requires a habitual method of executing it, the higher the level at which professional will apply what was learnt to the task.

With respect to task complexity, the p-value (0.001) for the test of the relationship between task complexity and training needs assessment is less than the critical p-value of 0.05, hence, the decision to reject the hypothesis which states that there is no significant relationship between task complexity and training needs assessment. The implication is that task complexity influences training needs assessment. Since the Pearson value (0.262) is positive, the result shows that the higher the prevalence of task complexity in construction professionals' task, the higher the training needs assessment. This means that the higher the prevalence of a complicated task by construction professional, the higher the level at which the construction firms identifies the training areas and needs of the professionals.

The p-value (0.017) for the test of the relationship between task complexity and training delivery is less than the critical p-value of 0.05, thus, the decision to reject the hypothesis which states that there is no significant relationship between task complexity and training delivery. This implies that task complexity contributes to training delivery. Since the Pearson value (0.017) is positive, the result shows that the higher the prevalence of task complexity in construction professional task, the higher the training delivery. This means that the higher the prevalence of a complicated task by construction professional, the higher the level at which the construction firm will deliver training to the professional.

The p-value (0.007) for the test of the relationship between task complexity and training evaluation is less than the critical p-value of 0.05, thus, the decision to reject the hypothesis which states that there is no significant relationship between task complexity and training evaluation. The implication is that task complexity influences training evaluation. Since the Pearson value is positive, the result shows that the higher the prevalence of task complexity, the higher the training evaluation. This simply means that the higher the prevalence of complicated task by construction professionals, the higher the construction firms measure the training outcome as against the training objectives of the professional.

The p-value (0.029) for the test of the relationship between task complexity and training transfer is less than the critical p-value of 0.05, thus, the decision to reject the hypothesis which states that there is no significant relationship between task complexity and training transfer. The implication is that task complexity influences training transfer. Since the

Pearson value (0.148) is positive, the result shows that the higher the prevalence of task complexity, the higher the training transfers. This means that the higher the prevalence of complicated task by construction professionals, the higher the construction professional transfer what has been gained from training to the task.

Table 4.16 shows that the p-value value (0.001) for the test of the relationship between task structuredness and training needs assessment is less than the critical p-value (0.05), thus the decision to reject the hypothesis which states that there is no significant relationship between task structuredness and training needs assessment. The implication is that task structuredness influences training needs assessment. The Pearson value (0.271) which is positive shows that the higher the prevalence of task structuredness, the higher the training needs assessment. The higher the prevalence of the application of numbers of rules and principles with a well-defined parameter for convergent in construction professional task, the higher the construction firm identifies the training needs of the professional.

The p-value value (0.021) for the test of the relationship between task structuredness and training delivery is less than the critical p-value (0.05), thus the decision to reject the hypothesis which states that there is no significant relationship between task structuredness and delivery. This implies that task structuredness contributes to training delivery. Since the Pearson value (0.156) is positive, the result shows that the higher the prevalence of task structuredness in construction professional task, the higher the training delivery. This means that the higher the prevalence of the application of numbers of rules and principles with a well-defined parameter for convergent in construction professional task, the higher the level at which the construction firm will deliver training to the professional.

The p-value value (0.010) for the test of the relationship between task structuredness and training evaluation is less than the critical p-value (0.05), thus the decision to reject the hypothesis which states that there is no significant relationship between task structuredness and training evaluation. The implication is that task structuredness contributes to training evaluation. Since the Pearson value (0.175) is positive, the result shows the higher the prevalence of task structuredness in construction professionals' task, the higher the training evaluation in construction firms. This means that the higher the prevalence of the application of numbers of rules and principles with a well-defined parameter for convergent in construction professional task, the higher the level at which construction firm measures training outcome of the professional.

The p-value value (0.011) for the test of the relationship between task structuredness and training transfer is less than the critical p-value (0.05), thus the decision to reject the hypothesis which states that there is no significant relationship between task structuredness and training transfer. The implication of the result is that task structuredness influences training transfer. Since the Pearson value (0.171) is positive, the result indicates that the higher the prevalence of task structuredness in construction professionals' task, the higher the level of training transfer. This means that the higher the prevalence of the application of numbers of rules and principles with a well-defined parameter for convergent in construction professional task, the higher the level the professional apply what was learnt to the task.

Table 4.16 reveals that the p-value (0.001) for the test of the relationship between task characteristics and training needs assessment is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between task characteristics and training needs assessment. The implication of the result is that task characteristics contribute or influences training needs assessment. Since the Pearson value (0.411) is positive, the result indicates that the higher the prevalence of task characteristics, the higher the level of training needs assessment. This means that the higher the prevalence of task characteristics namely: skill variety, task identity, task significance, autonomy, feedback, task analyzability, task difficulty, task routineness, task complexity and task structuredness in construction professionals' task the higher the construction firm identifies the training areas and needs of the professionals.

The p-value (0.001) for the test of the relationship between task characteristics and training delivery is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between task characteristics and training delivery. The implication is that task characteristics influence training delivery. Since the Pearson value (0.271) is positive, the result indicates that the higher the prevalence of task characteristics, the higher the level of training delivery. This means that the higher the prevalence of task characteristics namely: skill variety, task identity, task significance, autonomy, feedback, task analyzability, task difficulty, task routineness, task complexity and task structuredness in construction professionals' task the higher the construction firms deliver training to the professionals.

The result in Table 4.16 shows that the p-value (0.001) for the test of the relationship between task characteristics and training evaluation is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between task characteristics and training evaluation. The implication is that task characteristics contribute to training evaluation. Since the Pearson value (0.306) is positive, the result shows that the higher the prevalence of task characteristics, the higher the training evaluation in construction firms. This means that the higher the prevalence of task characteristics namely: skill variety, task identity, task significance, autonomy, feedback, task analyzability, task difficulty, task routineness, task complexity and task structuredness in construction professionals' task, the higher the construction firms measure training outcome of the professionals.

The p-value (0.001) for the test of the relationship between task characteristics and training transfer is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between task characteristics and training transfer. The implication of the result is that task characteristics influence training transfer. Since the Pearson value (0.329) is positive, the result indicates that the higher the prevalence of task characteristics in construction professionals' task, the higher the level of training transfer. This means that the higher the prevalence of task characteristics namely: skill variety, task identity, task significance, autonomy, feedback, task analyzability, task difficulty, task routineness, task complexity and task structuredness in construction professionals' task, the higher the construction professionals transfer what has been learnt.

4.6 RELATIONSHIP BETWEEN TRAINING PRACTICES AND TASK PERFORMANCE OF CONSTRUCTION PROFESSIONALS

To determine the relationship between training practices and task performance, it is important to investigate the frequency of implementing training practices (See 4.5.1 for the frequency of implementing training practices) and the level of task performance.

4.6.1 Task performance level of construction professionals

To investigate the task performance level of professionals in construction firms, task performance was categorised as cognitive ability, job skills, job knowledge and task proficiency. Various statements indicating task performance were constructed and respondents were requested to rate the level of performance of their subordinates using (1 for *very low*, 2 for *low*, 3 for *moderate*, 4 for *high* and 5 for *very high*). The mean score of each variable of task performance was thus analysed and used as the level of task performance among professionals. Table 4.17 shows the mean score for each task performance measures.

Table 4.17: Task performance level of construction professionals

Task Performance	1	2	3	4	5	MS	SD	Rank	Performance
Job Knowledge	2	6	57	102	51	3.92	0.70	1	High
Cognitive Ability	1	7	63	100	47	3.85	0.58	2	High
Job Skills	3	8	56	107	43	3.83	0.53	3	High
Task Proficiency	2	9	67	92	48	3.80	0.64	4	High
Overall Task Performance	**2**	**7**	**61**	**100**	**47**	**3.84**	**0.53**		**High**

Note: 1.00-1.49 for 1, very low; 1.50-2.49 for 2, low; 2.50-3.49 for 3, moderate; 3.50-4.49 for 4, high and 4.50-5.00 for 5, very high.

Table 4.17 reveals the level of task performance of professionals engaged by construction firms. The result shows that the task performance level of construction professionals is generally high with job knowledge constituting the highest type of task performance with the highest level of performance. Cognitive ability is the second most rated aspect of task performance of construction professionals while the third is job skills. Task proficiency is the least rated level of performance.

This implies that construction professionals perform high in their various tasks, that is, the proficiency at which professionals carry out their assigned duties in construction firms is high. Construction professionals perform highest especially in the area of job knowledge. This indicates that construction professionals perform high in technical information, facts and procedure needed for their task.

4.6.2 Comparison of Task Performance Level of Construction Professionals in Lagos and Abuja.

The task performance level of construction professionals in Lagos and Abuja were compared. Table 4.18 shows the mean score for task performance level of construction professionals in Lagos and Abuja.

Table 4.18: Comparison of task performance level of construction professionals in Lagos and Abuja

Task Performance	Total MS	Lagos MS	Rank	Abuja MS	Rank
Job Knowledge	3.92	3.93	2	3.88	1
Cognitive Ability	3.85	3.81	2	3.98	1
Job Skills	3.83	3.78	2	3.99	1
Task Proficiency	3.80	3.80	2	3.78	1
Overall Task Performance	**3.84**	**3.82**		**3.92**	

MS- Mean score, N- Number of respondents

Table 4.18 shows the mean score value for task performance level of construction professionals in Lagos and Abuja. Overall, the task performance level namely: cognitive ability, job skills, job knowledge and task proficiency in both locations is high; however Table 4.18 shows that the mean score for task performance level in Abuja is higher than Lagos. The implication of the result is that location may contribute to the performance level of construction professionals.

4.6.3 Relationship between training practices and task performance

To determine the relationship between training practices and task performance in construction firms, the variables of training practices namely: training needs assessment, training delivery, training evaluation and training transfer and task performance namely: cognitive ability, job skills, job knowledge and task proficiency were correlated. The fourth research hypothesis which states that 'there is no significant relationship between training practices and task performance of construction professionals was tested using Pearson moment correlation test $p \leq 0.05$. This is because training practice and task performance variables are composed of series of Likert type items that represent similar questions combined into a single composite variable. The decision rule for acceptance or rejection is that when p-value ≤ 0.05, then it is significant, reject the hypothesis. When p-value is greater than 0.05, then it is non-significant accept the hypothesis. The results of the test of the hypothesis are presented in Table 4.19.

Table 4.19: Correlation of training practices and task performance of construction professionals

Variables correlated	N	MS	SD	s-value	p-value	Sig	Decision
Training Practices Training Needs Assessment	**218**	**3.25**	**0.70**				
Cognitive Ability	218	3.85	0.58	0.364**	0.001	SS	Reject
Job Skill	218	3.83	0.53	0.432**	0.001	SS	Reject
Job Knowledge	218	3.92	0.70	0.327**	0.001	SS	Reject
Task Proficiency	218	3.80	0.64	0.373**	0.001	SS	Reject
Training Delivery	**218**	**3.32**	**0.70**				
Cognitive Ability	218	3.85	0.58	0.280**	0.001	SS	Reject
Job Skill	218	3.83	0.53	0.375**	0.001	SS	Reject
Job Knowledge	218	3.92	0.70	0.317**	0.001	SS	Reject
Task Proficiency	218	3.80	0.64	0.232**	0.001	SS	Reject
Training Evaluation	**218**	**3.25**	**0.79**				
Cognitive Ability	218	3.85	0.58	0.274**	0.001	SS	Reject
Job Skill	218	3.83	0.53	0.346**	0.001	SS	Reject
Job Knowledge	218	3.92	0.70	0.279**	0.001	SS	Reject
Task Proficiency	218	3.80	0.64	0.266**	0.001	SS	Reject
Training Transfer	**218**	**3.45**	**0.81**				
Cognitive Ability	218	3.85	0.58	0.275**	0.001	SS	Reject
Job Skill	218	3.83	0.53	0.337**	0.001	SS	Reject
Job Knowledge	218	3.92	0.70	0.269**	0.001	SS	Reject
Task Proficiency	218	3.80	0.64	0.234**	0.001	SS	Reject
Overall Training Practices	**218**	**3.30**	**0.66**				
Cognitive Ability	218	3.85	0.58	0.329**	0.001	SS	Reject
Job Skill	218	3.83	0.53	0.415**	0.001	SS	Reject
Job Knowledge	218	3.92	0.70	0.335**	0.001	SS	Reject
Task Proficiency	218	3.80	0.64	0.303**	0.001	SS	Reject

** Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)
Note: NS- Not Significant, SS- Significant, N-Number, MS- Mean Score, SD- Standard Deviation

Table 4.19 shows that the p-value (0.001) for the test of the relationship between training needs assessment and cognitive ability is less than the critical value of 0.05. Hence, the decision to reject the hypothesis which states that there is no significant relationship between training needs assessment and cognitive ability. The result implies that training needs assessment influences cognitive ability. The Pearson value (0.362) is positive therefore the implication is that an increase in the frequency of implementation of training needs assessment will result in an increase in the level of cognitive ability. This means that increase in the frequency at which the training needs of construction professionals are identified will lead to increase in the level of critical thinking and problem solving abilities of construction professionals.

The p-value (0.001) for the test of the relationship between training needs assessment and job skills is less than the critical value of 0.05, thus, the decision to reject the hypothesis which that states that there is no significant relationship between training needs assessment and job skills. The implication is that training needs assessment influences job skills. Since the Pearson value (0.432) is positive, the result shows that an increase in the frequency of implementation of training needs assessment will result to increase in the level of job skills. This means that increase in the frequency at which the training needs of construction professionals are identified will result to increase in abilities that directly impact job outcome of construction professionals.

The p-value (0.001) for the test of the relationship between training needs assessment and job knowledge is less than the critical value of 0.05, thus, the decision to reject the hypothesis which states that there is no significant relationship between training needs assessment and job knowledge. This implies that training needs assessment contributes to job knowledge. The Pearson value (0.327) is positive therefore the implication of the result is that an increase in the frequency of implementation of training needs assessment will lead to increase in the level of job knowledge. This means that increase in the frequency at which the training needs of construction professionals are identified will lead to an increase in the level of technical information, facts and procedure for executing a task by construction professionals.

The p-value (0.001) for the test of the relationship between training needs assessment and technical proficiency is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between training needs assessment and technical proficiency. The implication of the result is that training needs assessment influences technical proficiency. Since the Pearson value (0.373) is positive, the result shows that increase in the frequency of implementation of training needs assessment will lead to an increase in the level of technical proficiency. This means that increase in the frequency at which the training needs of construction professionals are identified will lead to increase in technical and functional qualities of professionals.

The p-value (0.001) for the test of the relationship between training delivery and cognitive ability is less than the critical value (0.05), therefore, the decision to reject the hypothesis which states that ‘there is no significant relationship between training delivery and cognitive ability. The implication is that training delivery contributes to cognitive ability. Since the Pearson value (0.280) is positive, the result shows that an increase in the frequency of training delivery implementation will lead to increase in the level of cognitive ability. This means that increase in the frequency at which construction firms deliver training to professionals will lead to increase in the level of critical thinking and problem solving ability of professionals.

The p-value (0.001) for the test of the relationship between training delivery and job skills is less than the critical value (0.05), therefore, the decision to reject the hypothesis which states that 'there is no significant relationship between training delivery and job skills. The implication is that training delivery influences job skills. The Pearson value (0.375) is positive which implies that increase in the frequency of implementation of training delivery will lead to increase in the level job skills. This means that increase in the frequency at which construction firms deliver training to professionals will lead to increase in abilities that directly impact job outcome of construction professionals.

The p-value (0.001) for the test of the relationship between training delivery and job knowledge is less than the critical value (0.05), thus, the decision to reject the hypothesis which states that 'there is no significant relationship between training delivery and job knowledge. This implies that training delivery influences job knowledge. The result of the Pearson correlation (0.317) is positive which shows that an increase in the frequency of implementation of training delivery will lead to increase in the level of job knowledge. This means that increase in the frequency at which construction firms deliver training to their professionals will lead to increase in the level of technical information, facts and procedure for executing a task by construction professionals.

The p-value (0.001) for the test of the relationship between training delivery and technical proficiency is less than the critical value (0.05), thus, the decision to reject the hypothesis which states that 'there is no significant relationship between training delivery and technical proficiency. The implication of the result is that training delivery influences task proficiency. Since the Pearson value (0.232) is positive, the result shows that increase in the frequency at which construction firms deliver training to their professionals will lead to increase in the level of technical and functional qualities of professionals.

The p-value (0.001) for the test of the relationship between training evaluation and cognitive ability is less than the critical value of 0.05, thus, the decision to reject the hypothesis which states that 'there is no significant relationship between training evaluation and cognitive ability. The implication of the result is that training evaluation influences cognitive ability. The Pearson value (0.274) is positive. The result shows that an increase in the frequency of implementation of training evaluation will result in an increase in the level of cognitive ability of professionals. This means that increase in the frequency at which construction firms measure training outcomes with training objectives will result to increase in the level of critical thinking and problem solving ability of the professionals.

The p-value (0.001) for the test of the relationship between training evaluation and job skills is less than the critical value of 0.05, thus the hypothesis which states that there is no significant relationship between training evaluation and job skills is rejected. This implies that training evaluation influences job skills. The Pearson value (0.346) is positive which implies that an increase in the frequency of implementation of training evaluation will result in an increase in the level of job skills. This means that increase in the frequency at which construction firm measure training outcome with training objectives will result to increase in the level of abilities that directly impact job outcome of construction professionals.

The p-value (0.001) for the test of the relationship between training evaluation and job knowledge is less than the critical value of 0.05, thus the decision to reject the hypothesis which states that there is no significant relationship between training evaluation and job knowledge. The implication of this result is that training evaluation influences job knowledge. Since the Pearson value (0.279) is positive, the result shows that an increase in the frequency of implementation of training evaluation will lead to increase in the level of job knowledge. This means that increase in the frequency at which construction firms measure training outcomes with training objectives will lead to increase in the level of technical information, facts and procedure for executing a task by construction professionals.

The p-value (0.001) for the test of the relationship between training evaluation and technical proficiency is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between training evaluation and technical proficiency. The implication of the result is that training evaluation influences technical proficiency. Since the Pearson value (0.266) is positive, it shows that increase in the frequency of implementation of training evaluation will result in an increase in the level of technical proficiency. This means that increase in the frequency at which construction firms measure training outcomes with training objectives will lead to increase in the level of technical and functional qualities of professionals.

The p-value (0.001) for the test of the relationship between training transfer and cognitive ability is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between training transfer and cognitive ability. The result implies that training transfer influences cognitive ability. Since the Pearson value (0.275) is positive, it shows that an increase in the frequency of implementation of training transfer will lead to increase in the level of cognitive ability. This means that increase in the frequency at which construction professionals transfer what they learnt to their task will lead to increase in the level of critical thinking and problem solving ability of the professionals.

The p-value (0.001) for the test of the relationship between training transfer and job skills is less than the critical p-value (0.05), therefore the decision is to reject the hypothesis which states that there is no significant relationship between training transfer and job skills. The implication of the result is that training transfer contributes to job skills. The

Pearson value (0.337) is positive which implies that an increase in the frequency of implementation of training transfer will lead to increase in the level of job skills. This means that increase in the frequency at which construction professionals transfer what they learnt to their task will lead to increase in the level of abilities that directly impact job outcome of construction professionals.

The p-value (0.001) for the test of the relationship between training transfer and job knowledge is less than the critical p-value (0.05); therefore the decision is to reject the hypothesis which states that there is no significant relationship between training transfer and job knowledge. This implies that training transfer influences job knowledge. Since the Pearson value is (0.269) positive, it shows that an increase in the frequency of implementation of training transfer will lead to increase in job knowledge. This means that increase in the frequency at which construction professionals transfer what they learnt to their task will lead to increase in the level of technical information, facts and procedure for executing a task by construction professionals.

The p-value (0.001) for the test of the relationship between training transfer and technical proficiency is less than the critical p-value (0.05); therefore the decision is to reject the hypothesis which states that there is no significant relationship between training transfer and technical proficiency. The implication of the result is that training transfer influences task proficiency. Since the Pearson value (0.234) is positive, it implies that increase in the frequency of implementation of training transfer will lead to increase in task proficiency level. This means that increase in the frequency at which construction professionals transfer what they learnt to their task will lead to increase in the level of technical and functional qualities of the professionals.

Table 4.19 shows that the p-value (0.001) for the test of the relationship between training practices and cognitive ability is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between training practices and cognitive ability. The implication of the result is that training practices influence cognitive ability. Since the Pearson value (0.329) is positive, the result indicates that increase in the frequency of implementation of training practices will lead to increase in the level of cognitive ability. This means that increase in the systematic procedures of acquiring skills, knowledge and capabilities such as training needs assessment, training delivery, training evaluation and training transfer will lead to increase in the level of critical thinking and problem solving ability of the professionals.

The p-value (0.001) for the test of the relationship between training practices and job skills is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between training practices and job skills. The implication of the result is that training practices contribute to job skills. Since the Pearson value (0.415) is positive, it shows that an increase in the frequency of implementation of training practices will lead to increase in the level of job skills. This means that increase in the systematic procedures of acquiring skills, knowledge and capabilities such as training needs assessment, training delivery, training evaluation and training transfer will lead to increase in the level of abilities that directly impact job outcome of construction professionals.

The p-value (0.001) for the test of the relationship between training practices and job knowledge is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between training practices and job knowledge. The implication of this result is that training practices influence job knowledge. Since the Pearson value (0.335) is positive, it shows that an increase in the frequency of implementation of training practices will lead to increase in job knowledge. This means that increase in the systematic procedures of acquiring skills, knowledge and capabilities such as training needs assessment, training delivery, training evaluation and training transfer will lead to increase in the level of technical information, facts and procedure for executing a task by construction professionals.

The p-value (0.001) for the test of the relationship between training practices and technical proficiency is less than the critical p-value (0.05) therefore; the decision is to reject the hypothesis which states that there is no significant relationship between training practices and technical proficiency. The implication of the result is that training practices influence technical proficiency. Since the Pearson value (0.303) is positive, it shows that increase in the frequency of implementation of training practices will lead to increase in the level of technical proficiency. This means that increase in the systematic procedures of acquiring skills, knowledge and capabilities such as training needs assessment, training delivery, training evaluation and training transfer will lead to increase in the level of technical and functional qualities of professionals.

4.7 MODEL FOR PREDICTING TASK PERFORMANCE FROM TRAINING PRACTICES

The model for predicting task performance from training practices is developed using Structural Equation Modeling (SEM). Before arriving at the model, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were conducted before developing the SEM.

4.7.1. Exploratory Factor Analysis (EFA)

To establish the link between the observed and latent variables of training practices and task performance and in order to identify the minimal number of factors that underlie for covariance among the observed variables (Byrne, 2010), exploratory factor analysis was carried out to identify the significant factors for training practices variables and task performance variables.

This was achieved using maximum likelihood with Promax rotation in order to identify groups or clusters of variables of training practices and task performance. Table 4.20 depicts the factorial analysis of training practices and task performance.

Table 4.20: Factorial analysis for training practices and task performance variables

Cronbach's Alpha		**.921**	**.878**	**.897**	**.860**	**.721**	**.872**
Item No	**Variables**	**1**	**2**	**3**	**4**	**5**	**6**
27	JK_1	.769					
33	JK_7	.736					
23	JS_18	.716					
28	JK_2	.700					
10	JS_5	.697					
30	JK_4	.694					
24	JS_19	.681					
8	JS_3	.673					
14	JS_9	.660					
34	JK_8	.647					
20	JS_15	.642					
22	JS_17	.568					
06	JS_1	.567					
34	TD_19		.811				
33	TD_18		.777				
31	TD_16		.755				
35	TD_20		.703				
29	TD_14		.661				
26	TD_11		.524				
40	TE_3			.845			
46	TT_1			.720			
48	TT_3			.695			
41	TE_4			.664			
47	TE_2			.617			
45	TE_8			.571			
14	TNA_14				.972		
13	TNA_13				.790		
15	TNA_15				.706		
11	TNA_11				.581		
19	JS_14					.780	
5	CA_5					.690	
48	TP_12						.824
47	TP_11						.791

Extraction Method: Maximum Likelihood.

Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

Note: 1- Job knowledge and skills, 2- Training delivery, 3- Training evaluation and transfer, 4- Training needs assessment, 5- Cognitive ability, 6- Task proficiency

A total of Ninety-eighty training practices and task performance indicators were factor analyzed using maximum likelihood with Kaiser Normalization and Promax rotation. A total of 6 factors with eigenvalues ≥ 1.00 were extracted explaining 58.579% of the variance for the entire set of variables. Based on Stevens as Cited in Field (2005) recommendation, a factor loading is significant when it is greater than .364 for a sample size of 200; therefore the cut-off point was placed at 0.500. To test for factorability of the variables, Kaiser-Meyer-Olkin (KMO) test of sampling adequacy was 0.898, which falls within the range classified as great (between .8 and .9, Hutcheson & Sofroniou, in Field, 2005). Barlett's Test of sphericity was significant X^2 (528) = 4219.64, $p < .05$, supporting sample suitability for factor analysis. The first factor accounts for 27.861% of variance while the remaining five factors account for 14.577%, 6.661%, 3.296%, 3.568% and 2.615 of the variance respectively.

Table 4.20 shows the factor loadings for each of the items in the six factors. 13 items load heavily on factor 1 termed job knowledge and skills, 6 items on factor 2 termed training delivery, 6 items on factor 3 termed training evaluation and transfer, 4 items on factor 4 termed training needs assessment, 2 items on factor 5 termed cognitive ability and 2 items on factor 6 termed task proficiency. The implication is that each of the items under the six factors relates to the factors.

The Cronbach's Alpha for the six factors are .921, .878, .897, .860, .721, .872 respectively indicating good reliability of the research instrument.

4.7.2 Assessment of Normality and Outliers

A very important assumption in SEM analysis is that data are multivariate normal (Byrne, 2010). This requirement is rooted in large sample size. It is therefore pertinent to check the data for normality. Data with multivariate kurtosis are ones that have distribution with both tails and peaks differing from those characteristics of a multivariate normal distribution. This indicates non-normal distribution (Byrne, 2010). For example, positive kurtosis exhibit peakedness together with heavy or thick tails while a multivariate negative kurtosis exhibits flat distributions with light tails. Assessing the multivariate normality is done through univariate normality. Table 4.21 shows the assessment of normality for the data.

Table 4.21: Assessment for Normality

Variables	Minimum	Maximum	Skewness	cr	Kurtosis	cr
TP_11	2.000	5.000	-.472	-2.846	-.507	-1.529
TP_12	1.000	5.000	-.646	-3.891	.100	.301
CA_5	2.000	5.000	-.307	-1.852	-.404	-1.219
JS_14	1.000	5.000	-1.217	-7.337	1.567	4.724
TNA_11	1.000	5.000	-.231	-1.392	-.752	-2.268
TNA_15	1.000	5.000	-.180	-1.082	-1.079	-3.252
TNA_13	1.000	5.000	-.238	-1.436	-.716	-2.157
TNA_14	1.000	5.000	-.187	-1.126	-.873	-2.630
TE_4	1.000	5.000	-.624	-3.764	.434	1.307
TT_3	1.000	5.000	-.546	-3.293	.443	1.336
TT_1	1.000	5.000	-.169	-1.020	-.158	-.476
TE_3	1.000	5.000	-.474	-2.858	-.177	-.533
TD_14	1.000	5.000	-.488	-2.942	-.302	-.910
TD_16	1.000	5.000	-.396	-2.386	-.687	-2.069
TD_18	1.000	5.000	-.352	-2.121	-.438	-1.320
TD_19	1.000	5.000	-.583	-3.517	.026	.079
JS_17	1.000	5.000	-.870	-5.246	1.458	4.395
JS_15	1.000	5.000	-.601	-3.620	.826	2.491
JS_9	1.000	5.000	-.603	-3.635	.676	2.038
JS_5	1.000	5.000	-.148	-.893	.073	.221
JK_2	1.000	5.000	-.301	-1.817	.334	1.007
JS_18	1.000	5.000	-.546	-3.294	.503	1.515
JK_7	1.000	5.000	-.393	-2.366	-.266	-.802
JK_1	1.000	5.000	-.574	-3.463	.695	2.096
Multivariate					**87.300**	**18.243**

Cr –Critical ratio (Parameter estimate divided by standard error)

Focusing on the last two columns in Table 4.21; where the univariate kurtosis values and their critical ratios are listed for the 24 items. As shown, the positive value ranges from .026 to 1.458 while the negative value ranges from -.266 to -1.079. Based on West, et al. in Byrne (2010) criteria for normality, rescaled β_2 values equal to or greater than 7 is an indication of early departure from normality. A review of the items in Table 4.21 on kurtosis shows no value greater than 7, therefore no item reveals substantial kurtosis.

Although the observed variables may be univariate normal, the multivariate distribution may be multivariate non-normal, Based on this, check on multivariate normality was conducted. The value for multivariate kurtosis (z-statistics) was 18.243 which is greater than the recommended value of 5.00 which suggest a non-normality in the sample. This may be due to the sample size since it requires large sample size. Byrne (2010) suggested using asymptotic distribution free (ADF) rather than Maximum Likelihood (ML) estimation but this will only be applicable for a minimum sample size of 470.

Byrne (2010) also suggested incorporating scaling correction for the χ^2 (S-Bχ^2) statistics rather than changing the method based on Satorra and Bentler (1994). But this is not applicable in AMOS software; therefore scaling correction cannot be done. Byrne (2010) compares non-normal multivariate data with the one scaling correction and found out that overall conclusions were consistent across CFA estimation in both methods. Therefore based on this, the data are appropriate for the analysis.

Assessment of multivariate outliers is carried out using Mahalanobis distance (D^2) for each variable. According to Byrne (2010), outliers represent instances whose scores substantially differ from all others in a particular set of data. Univariate outliers have an extreme score on a single variable while multivariate outliers have an extreme score on two or more variables (Kline, 2011). Table 4.22 shows the Mahalanobis distance for some of the variables.

An outlying case will have a D2 value that stands out from all other D2 values, therefore a review of the values in Table 4.22 shows minimal evidence of serious multivariate outliers. Thus, the data can be used for the analysis.

Table 4.22: Assessment of Multivariate Outliers

Observation number	Mahalanobis d-squared	p1	p2
73	64.254	.000	.002
135	62.799	.000	.000
116	55.016	.000	.000
22	54.906	.000	.000
61	54.862	.000	.000
87	52.649	.000	.000
85	50.801	.001	.000
11	48.528	.001	.000
81	46.274	.003	.000
26	45.117	.004	.000
15	44.831	.004	.000
152	43.964	.005	.000
76	43.817	.006	.000
37	43.309	.006	.000
89	43.062	.007	.000
8	42.841	.007	.000
7	42.818	.007	.000
199	42.470	.008	.000
46	42.157	.009	.000
127	41.826	.010	.000
154	39.928	.016	.000
134	38.253	.024	.000
104	38.232	.024	.000
52	36.881	.033	.000
201	36.176	.040	.000
17	36.067	.041	.000
119	35.874	.042	.000
117	34.793	.055	.000
18	34.448	.059	.000
60	33.929	.066	.000
75	33.720	.069	.000
12	33.638	.071	.000
28	33.602	.071	.000
203	33.303	.076	.000
80	32.301	.094	.001
56	32.261	.095	.001
53	32.137	.097	.001
10	31.507	.111	.003
38	31.166	.119	.006

Note: see Appendix D for complete table

4.7.3 Confirmatory Factor Analysis (CFA) - First- order

CFA was used to test the hypothesis that training practices are a multidimensional construct composed of three factors (training needs assessment, training delivery and training evaluation and training transfer). The theory underpinning this hypothesis is derived from Human capital theory. Also, CFA was used to test the hypothesis that task performance is a multidimensional construct composed of three factors (Cognitive ability, job knowledge and skill and task proficiency). This was based on the work of Ahadzie et al. (2008).

CFA was initially used for training and task performance so as to ensure that the variables analysed were truly distinct. Five approaches were adopted to assess the measurement model; (1) the feasibility of parameter estimates (2) appropriateness of standard error (SE), the statistical significance of parametric estimates (4) Model fit (5) Square multiple correlation (R^2). Table 4.23 presents the variables and indicators for measurement.

Table 4.23: Variables and indicators of measurement

Variables	Indicators
Job Knowledge and skill	
JK_1	Knowledge on appropriate construction technology for construction works
JK_7	Knowledge of appropriate material management system for construction works
JS_18	Controlling acceptable quality standards
JK_2	Knowledge of appropriate saving techniques for construction works
JS_5	Site supervisor's ability to negotiate i.e. increase common interest and expand cooperation in order to broaden the area of agreement to cover the item under dispute
JK_4	Knowledge of appropriate programme for delivering construction works
JS_19	Ensuring a smooth flow of resources- men, machines and materials as and when required
JS_3	The effectiveness with which the human dimensions of conflicts, roadblocks and negotiating processes are managed by the site supervisor
JS_9	Rearranging the works and programme to cater for changes and delays
JK_8	Knowledge of appropriate health and safety issues for construction works
JS_15	Implementing fair systems of discipline and morale at site level
JS_17	Establishing sound communication links between all subsystems of the project
JS_1	Conceptualise all elements of the project situation and the extent to which the elements interact with each other
Training Delivery	
TD_19	The firm uses demonstration to train me to a ……………
TD_18	The company trains me through group work (Discussion) to a ……….
TD_16	The company uses lectures to train me to a ……………….
TD_20	The company trains me through coaching or mentoring to a ……
TD_14	The frequency at which your company uses off-the-job training within the organisation i.e. receiving training in the organisation but not while working is
TD_11	The company provides training in site supervision to a………….
Training Evaluation and Transfer	
TE_3	To what frequency does your firm interview you at the end of the programme to evaluate the training you received?
TT_1	To what frequency does your company measure your training context?
TT_3	The company measures the extent of what I have achieved in a training to a
TE_4	The frequency at which the company asks the trainees' managers or supervisor for their assessment of my learning is
TE_2	The company makes an intended effort towards my mastering of the content of the training programme to a …….
TE_8	The company measures the outcome of my training based on result i.e. the effect in the organisation's performance resulting from the change of behaviour such as cost saving, quality improvement and client satisfaction to a ………

Table 4.23: Variables and indicators of measurement cont'd

Variables	Indicators
Training Needs Assessment	
TNA_14	To what frequency does your company sees low profitability as an indicator for your training needs?
TNA_13	To what frequency does your firm uses client dissatisfaction as an indicator of training needs assessment?
15TNA_15	To what frequency does your company sees low employee morale as an indicator of training needs?
11TNA_11	To what frequency does your company uses poor performance in assigned tasks as an indicator of your training needs?
Cognitive Ability	
JS_14	Liaise with subcontractors
CA_5	Ability to ensure that all conflicts situations are resolved before they begin to impact negatively on the triple constraints of performance specifications, schedule and budget
Task Proficiency	
TP_12	Functional quality of health and safety measures for construction works
TP_11	Technical quality of health and safety measures for construction works

Figure 4.1 shows the factor loadings of each indicator on the six factors of job knowledge and skills, training delivery, training evaluation and transfer, training needs assessment, cognitive ability and task proficiency while Table 4.24 shows the maximum likelihood of factor loadings for measurement model of training practices and task performance. The unstandardized loadings, standardized loadings and standard error for each parameter are shown in Table 4.24.

Table 4.24: **Maximum Likelihood Estimates of factor loadings for measurement model of training practices and task performance**

Parameter			Unstandardized Estimate	standardize Estimate	S.E.	C.R.	P
JK_1	<---	JKS	1	0.758			
JK_7	<---	JKS	0.935	0.681	0.094	9.999	***
JS_18	<---	JKS	0.967	0.729	0.09	10.777	***
JK_2	<---	JKS	0.915	0.752	0.082	11.151	***
JS_5	<---	JKS	0.827	0.662	0.085	9.7	***
JS_9	<---	JKS	1.01	0.707	0.097	10.426	***
JS_15	<---	JKS	0.941	0.721	0.088	10.656	***
JS_17	<---	JKS	0.881	0.657	0.091	9.624	***
TD_19	<---	TD	1	0.736			
TD_18	<---	TD	0.963	0.701	0.08	12.039	***
TD_16	<---	TD	1.308	0.862	0.114	11.517	***
TD_14	<---	TD	1.058	0.757	0.101	10.462	***
TE_3	<---	TE	1	0.767			
TT_1	<---	TE	1.022	0.855	0.079	12.96	***
TT_3	<---	TE	0.949	0.798	0.079	12.03	***
TE_4	<---	TE	0.915	0.772	0.079	11.593	***
TNA_14	<---	TNA	1	0.841			
TNA_13	<---	TNA	0.857	0.777	0.069	12.456	***
TNA_15	<---	TNA	1.001	0.815	0.076	13.156	***
TNA_11	<---	TNA	0.808	0.692	0.075	10.778	***
JS_14	<---	CA	1	0.738			
CA_5	<---	CA	0.881	0.775	0.136	6.471	***
TP_12	<---	TP	1	0.847			
TP_11	<---	TP	1.018	0.915	0.091	11.22	***

Note: SE – Standard Error
*P<.05 ***P<.0001

See Table 4.23 for definition of variables

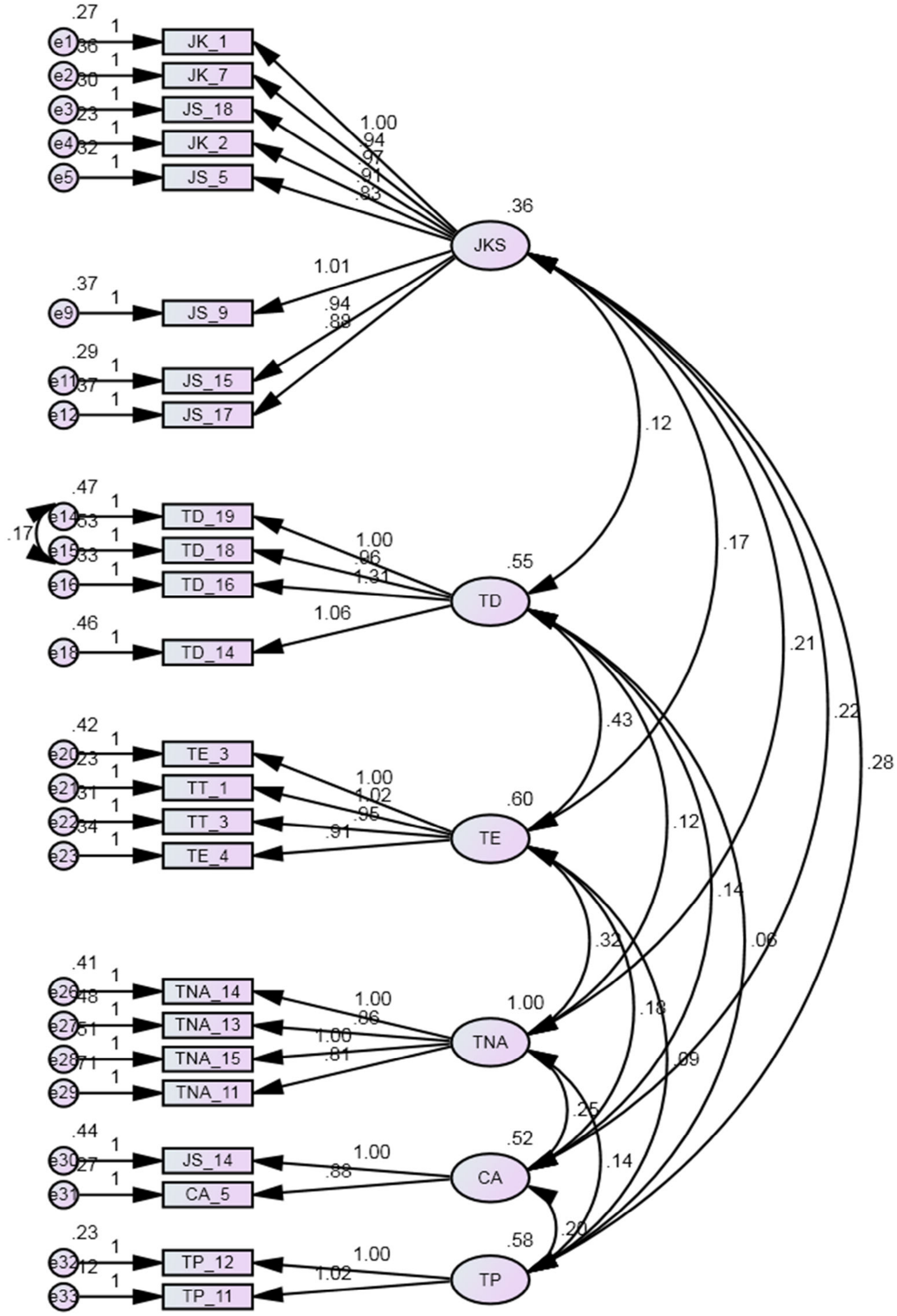

Figure 4.1: Hypothesized six-factor CFA model of training practices and task performance

4.7.3.1 Job Knowledge and skill (JBS)

JKS was measured using 8 items with item 1 (JK_1) freely estimated at (1.00). The other items JK_7 (0.681), JS_18 (0.729), JK_2 (0.752), JS_5 (0.662), JS_9 (0.707), JS_15 (0.721), JS_17 (0.657) have standardized regression weight as noted in parenthesis respectively. This implies that when JKS goes up by 1 standard deviation, JK_7 goes up by 0.681, JS_18 goes up by 0.729, JK_2 goes up by 0.752, JS_5 goes up by 0.662, JS_9 goes up by 0.707, JS_15 goes up by 0.721, and JS_17 goes up by 0.657. Table 4.24 and Fig. 4.1 present the values for each of the items. Also, see Table 4.23 for the definition of items.

The critical ratio (CR) which was arrived at by dividing the regression weight estimate by estimate of its standard error for the following JKS indicators are; JK_7 (9.999), JS_18 (10.777), JK_2 (11,151), JS_5 (9.7), JS_9 (10.426), JS_15 (10.656), JS_17 (9.624. This means that the regression weight estimate is 9.999 standard errors above 0 for JK_7. When the critical ratio (CR) is > 1.96 for a regression weight, then the path is significantly different from zero. Thus JKS indicators reliably measure JKS construct.

4.7.3.2 Training Delivery (TD)

TD was measured with 4 items (see Table 4.24 and Fig. 4.1). Items 1 (TD_19) was estimated freely at 1.00 while item 2 (TD_18), 3 (TD_16) and 4 (TD_14) have standardized loadings of 0.701, 0.862 and 0.757 respectively. This means that for every increase in TD by 1 standard deviation, there will be 0.701 increases in TD_18, 0.862 increases in TD_16 and 0.757 increases in TD_14. The standardized errors for the items are 0.080, 0.114 and 0.101 which indicate that they are significant at 0.05 two tail. The critical ratio for each TD indicators are TD_18 (12.039), TD_16 (11.517) and TD_14 (10.624). This means that regression weight estimate for TD_18 is 12.039 above 0. This shows that they are >1.96.This is an indication that the items measured TD.

4.7.3.3 Training Evaluation and Transfer (TET)

This was measured with 4 items with item 1 (TE_3) estimated freely at 1.00. The other items TT_1, TT_3, TE_4 have standardized loadings and Critical ratio of 0.855(12.96), 0.798(12.03) and 0.772(11.593) respectively. This implies that for every one increase in TET, there will be 0.772 increases in TT_1, 0.798 increases in TT_3 and 0.772 increases in TE_4. The critical ratio which represents the parameter estimates divided by its standard error for each of the indicators shows that the regression estimate is not equal to 0, that is, regression estimate, for example, TT_1 is 12.96 above 0. This confirms that the items measured TET.

4.7.3.4 Training Needs Assessment (TNA)

TNA was measured using 4 items with item 1 (TNA_14) allowed to load freely at 1.00. The rest of the items TNA_13, TNA_15 and TNA_11 loads with the standardized estimate and the critical ratio of 0.777(12.456), 0.815(13.156) and 0.692(10.778) respectively. This signifies that an increase by 1 in the standard deviation of TNA will lead to 0.777 increases in TNA_13, 0.815 increase in TNA_15 and 0.692 increases in TNA_11. Also, the values of critical ratios for the items indicate that they are >1.96, which means that the regression estimates for the various items are above 0. It can, therefore, be inferred that the items measured TNA.

4.7.3.5 Cognitive Ability (CA)

CA was measured with only two items with the first item (JS_14) loading freely at 1.00 and the second item CA_5 loads with 0.775 (6.471) as regression weight and critical ratio. It means that when CA increases by 1 standard deviation, CA_5 increases by 0.775. Also, the critical ratio is greater than 1.96 which shows that the regression weight is above zero. Therefore, it means that the item measured CA.

4.7.3.6 Task Proficiency (TP)

The last factor TP was measured using two items with the first item (TP_12) estimated freely at 1.00. The second item TP_11 loads at 0.915(11.22). This implies that TP_11 will increase by 0.915 when there is an increase of 1 in the standard deviation of TP. The critical ratio for TP_11 (11.22) is greater than 1.96 which implies that the regression weight of TP_11 is more than zero; therefore, this indicates that the items measured TP.

The CFA model provides a good fit for the data (χ^2= 400.27, df= 236, CFI= 0.939, GFI= 0.868, TLI= 0.929, RMSEA= 0.057). The model was finally accepted after passing through validity test and based on criteria for model fit as compared to 4 other models. Table 4.25 presents the different models tested.

Table 4.25: Confirmatory Factor Analysis Result

Models	χ^2	$\Delta\chi^2$	Df	ΔDf	CF1	GFI	TLI	RMSEA
6 factors (29 items)	632.36	-	362	-	.919	.833	.909	.059
6 factors (28 items)	587.10	45.26	335	27	.921	.839	.911	.059
6 factors (28 items)	519.22	67.88	307	28	.931	.852	.921	.056
6 factors (27 items)	425.86	93.36	259	48	.940	.866	.931	.054
6 factors (24 items)	400.27	25.59	236	23	.939	.868	.921	.057

*P<.05 ***P<.0001

The first model consists of 6 factors with 29 indicators, chi-square for the model was 632.36 with 362 degrees of freedom at a probability level of P<.05. Goodness-of-fit index (GFI, .833) which is not within the threshold of acceptance of >.95 is a measure of the relative amount of variance and covariance in sample data that is jointly explained by the hypothesized model while that of the Comparative Fit Index (CFI) is .919. This is derived from the comparison of a hypothesized model with the independence (Null) model. The Tucker-Lewis Index (TLI) yields a value of .909 which is within an acceptable range of 0-1.00, implying a good fit. Root mean square error of approximation (RMSEA) measures how well the model would fit the population covariance matrix if unknown optimally chosen parameter values are available (Byrne, 2010). RMSEA value for the model equals (.059). This implies that the model did not fit the data. Given the sensitive nature of Chi-square to sample size, the use of it for determining model provides little guidance. Based on this, the above model indices and the threshold for the goodness of fit measures (see Tables 3.2) were used to determine model fit.

The second model consists of 6 factors with 28 indicators; it provides a model fit of (χ^2= 587.10, Df= 335, CFI= .921, GFI= .839, TLI= .911, RMSEA= .059). The model difference was significance ($\Delta\chi^2$ $_{(1)}$ = 45.26) while the third model consisting of 6 factors with 28 indicators provides a goodness of fit of (χ^2= 519.22, Df= 307, CFI= .931, GFI= .852, TLI= .931, RMSEA= .054). The fourth model also consists of 6 factors but with 27 indicators having model fit of (χ^2= 425.86, Df= 259, CFI= .940, GFI= .866, TLI= .931, RMSEA= .054). It can thus be stated that each of the model represents substantial improvement in the model fit and are therefore statistically significant due to the significant $\Delta\chi^2$. See Table 4.25.

The last and acceptable model consist of 6 factors with 24 indicators having model of fit (χ^2= 400.27, Df= 236, CFI= .939, GFI= .868, TLI= .929, RMSEA= .057). Although RMSEA for the fourth model seems to have good value compare to the acceptable one, it fails the test of validity, therefore the fifth model which pass the test of validity was thus accepted. Model 5, therefore, represents the final best-fitting and most parsimonious model representing the data.

The chi-square for the model is 400.27 with 236 degrees of freedom. The difference in the fit of the model with model 5 is statistically significant ($\Delta\chi^2_{(5)}$ = 25.59). CFI equals (.939) which are within the acceptable range of 0-1.00 (Byrne, 2010). The GFI (.868) also falls within the acceptable range of 0-1.00, with a value closer to 1.00 indicating good fit (Byrne, 2010). The TLI (.929) falls within the acceptable range of 0-1.00 with a value close to .95 for large samples as indicative of good fit (Hu & Bentler, In Byrne, 2010). The last criterion for the model, RMSEA is (.057). According to Bryne (2010), RMSEA values less than .05 indicates good fit, therefore the model could be said to be within the acceptable standard.

Based on the goodness-of-fit results discussed above and having met up with the criteria that standard regression weight should not be more than 1.0 and less than -1.0 (Byrne, 2010), critical ratio values >.1.96. It can, therefore, be inferred that the six-factor CFA model fits the sample data well.

4.7.4 Construct Validity

Construct validity of the factors was carried out using convergent and discriminant validity. Table 4.26 present the convergent and discriminant validity of the factors for training practices and task performance.

Table 4.26: Convergent and Discriminant Validity

CR	**AVE**	CA	JKS	TD	TE	TNA	TP	
CA	0.728	0.573	**0.757**					
JKS	0.890	0.503	0.512	**0.709**				
TD	0.850	0.587	0.259	0.276	**0.766**			
TE	0.876	0.638	0.313	0.356	0.740	**0.799**		
TNA	0.863	0.614	0.342	0.347	0.157	0.417	**0.783**	
TP	0.875	0.777	0.356	0.613	0.113	0.154	0.182	**0.882**

In determining the convergent and discriminant validity of the research instrument, average variance extracted (AVE) is used to determine the convergent validity while Construct reliability (CR) is for the reliability of the research instrument. Construct validity refers to the extent to which the scale correlates with other measures of the same construct while discriminant validity is the extent to which the scale does not correlate with another construct from which it differs (Denis, 2011). The level of acceptance for AVE was ≥.05 while for CR ≥.06 (Gaski, in Saleh, 2006). Based on the criteria, the entire constructs are above the level of acceptance; as a result, the scale of the instrument is valid and reliable.

4.7.5 Confirmatory Factor Analysis (CFA) - Second-order

The second-order CFA model provides a good fit for both training practices and task performance data. The training practices second-order CFA model provides a model fit (χ^2=85.642, Df= 49, CFI= .974, GFI= .939, TLI= .965, RMSEA= .059). The model was accepted compare to the first model. Table 4.27 shows the different models tested.

Table 4.27: Second-order CFA Result for training practices and task performance

Models	χ^2	$\Delta\chi^2$	Df	ΔDf	CF1	GFI	TLI	RMSEA
Training practices								
3 factors (12 items)	116.918	-	51	-	.954	.971	.940	.077
3 factors (12 items)	85.642	31.28	49	2	.974	.938	.965	.059
Task performance								
3 factors (12 items)	85.785	-	51	-	.970	.940	.961	.056

*P<.05 ***P<.0001

The first model for training practices gave a model fit (χ^2=116.918, Df= 51, CFI= .954, GFI= .971, TLI= .940, RMSEA= .077). The RMSEA was not within the acceptable limit; therefore a second model was tested using Modification Index (MI). Two different indicators (TNA_14 and TNA_13) were then link to TD and TE respectively to arrive at the model. The difference between the first and the second model was significant (($\Delta\chi^2$ $(_1)$ = 31.28). The second-order CFA model for task performance provided a good fit for the data (X^2=85.785, Df= 51, CFI= .970, GFI= .940, TLI= .961, RMSEA= .056).

Based on the acceptable limit for each criterion for goodness-of-fit discussed above, it can, therefore, be inferred that the three-factor second-order CFA model fits the sample data well for training practices and task performance respectively.

Figure 4.2 and Figure 4.3 show the path diagram for training practices and task performance respectively with their various standardized factor loadings while Table 4.28 and Table 4.30 show the unstandardized regression weight, standard error and standardized regression weight for latent variables of training practices and task performance.

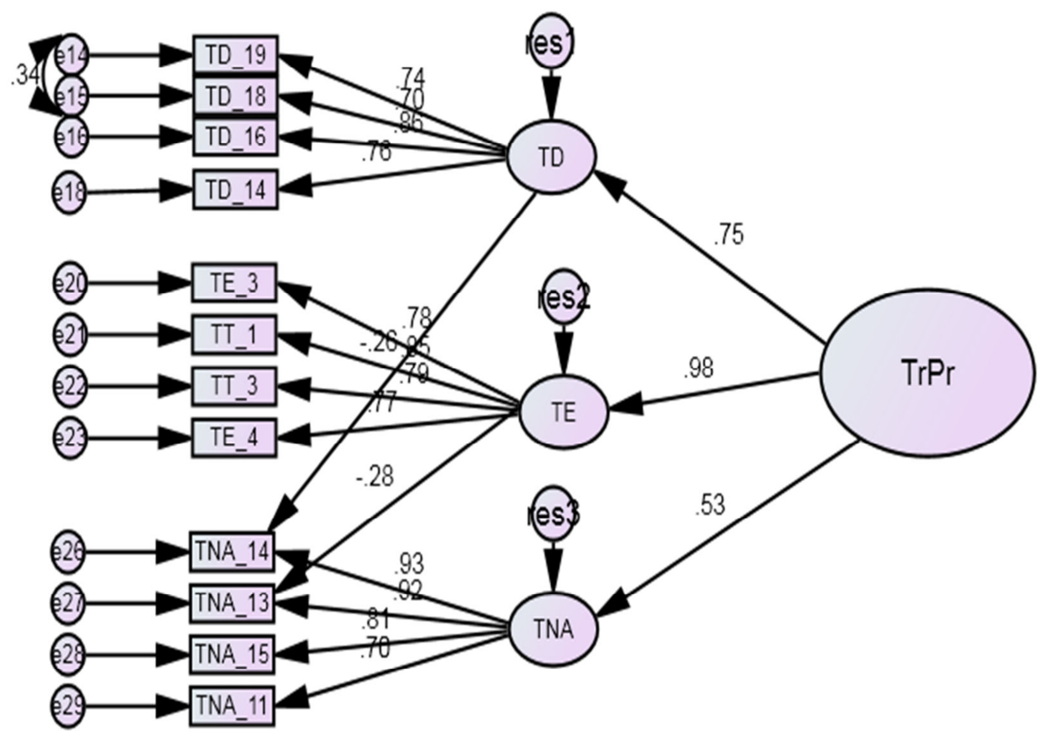

Figure 4.2: Hypothesized second-order model of factorial structure for training practices

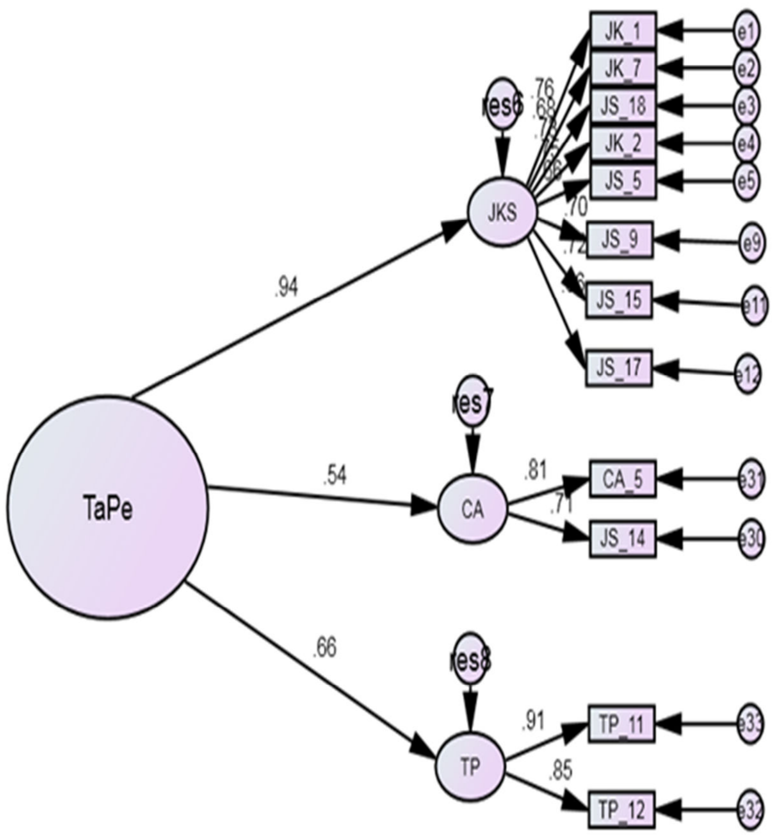

Figure 4.3: Hypothesized second-order model of factorial structure for task performance

Table 4.28: **Maximum Likelihood Estimates of factor loadings for second-order CFA model of training practices**

			Unstandardized Estimate	Standardized Estimate	S.E.	C.R.	P
TD	<---	TrPr	0.93	0.75	0.092	10.102	***
TE	<---	TrPr	1	0.984			
TNA	<---	TrPr	0.736	0.525	0.117	6.28	***
TD_19	<---	TD	0.769	0.736	0.067	11.495	***
TD_18	<---	TD	0.736	0.697	0.069	10.7	***
TD_16	<---	TD	1	0.858			
TD_14	<---	TD	0.816	0.76	0.067	12.091	***
TE_3	<---	TE	0.998	0.781	0.076	13.221	***
TT_1	<---	TE	1	0.853			
TT_3	<---	TE	0.926	0.794	0.068	13.531	***
TE_4	<---	TE	0.896	0.771	0.069	12.989	***
TNA_4	<---	TNA	1	0.929			
TNA_3	<---	TNA	0.928	0.917	0.076	12.224	***
TNA_5	<---	TNA	0.908	0.806	0.07	12.921	***
TNA_1	<---	TNA	0.744	0.695	0.069	10.807	***
TNA_4	<---	TD	-0.312	-0.257	0.072	-4.348	***
TNA_3	<---	TE	-0.397	-0.284	0.096	-4.127	***

Note: SE – Standard Error *P<.05 ***P<.0001
See Table 4.23 for definition of variables

All estimated value in Table 4.28 were found to have critical ratio value >1.96, thereby implying their statistical significant difference from zero. Listed first is the second-order loadings for training practices, followed by the first-order loadings. TD loads on TrPr with standardized regression value of 0.750, TE with 0.984 while TNA loads with the lowest value of 0.525. This implies that as TrPr increases by 1 standard deviation, TD increases by 0.750, TE by 0.984 and TNA by 0.525.

The probability of getting a critical ratio as large as the values in Table 4.28 is less than 0.001. For example, the regression weight for TrPr in the prediction of TD is significantly different from zero at 0.001 level (two-tailed). Therefore, the regression weight estimate is 10.102 standard errors above zero.

The first-order loadings consist of TD_19, TD_18, TD_16 and TD_14 loading on TD with values of 0.736, 0.697, 0.858 and 0.760 respectively. A look at TE shows that TE_3, TT_1, TT_3 and TE_4 load on TE with standardized regression value of 0.781, 0.853, 0.794 and 0.771 respectively. Four items TNA_14, TNA_13, TNA_15 and TNA_11 load on TNA with values of 0.929, 0.917, 0.806 and 0.695. The implication is, when TD goes up by 1, the four items TD_19, TD_18, TD_16 and TD_14 will go up by 0.736, 0.697, 0.858 and 0.760 respectively. When TE and TNA also goes up by 1 standard deviation, then TE_3, TT_1, TT_3, TE_4 and TNA_14, TNA_13, TNA_15, TNA_11 go up by their respective regression weight.

Due to model modification, TNA_14 loads on TD with a value of -0.257 while TNA_13 loads on TE with a value of -0.284. The implication is that as TD increases by 1 standard deviation, TNA_14 decreases by 0.257 and as TE increases by 1 standard deviation, TNA_13 decreases by 0.284.

For the first-order and second-order CFA, the factor loadings on each latent variables account for variability of each observed variables, therefore all the observed variables truly indicate their latent variable.

Table 4.29: Squared Multiple Correlations for Training Practices

Variables	Estimate
TNA	0.276
TE	0.968
TD	0.562
TNA_11	0.483
TNA_15	0.649
TNA_13	0.653
TNA_14	0.742
TE_4	0.595
TT_3	0.631
TT_1	0.727
TE_3	0.61
TD_14	0.578
TD_16	0.736
TD_18	0.486
TD_19	0.542

See Table 4.23 for definition of variables

Square Multiple Correlations is the extent to which the predictors of a variable explain its variance. Table 4.29 shows the squared multiple correlations for training practices. For variable TNA, it is estimated that the predictors of TNA explain 27.6 % of its variance. In other words, the error variance of TNA is approximately 72.4% of the variance of TNA itself. Most of the R^2 in Table 4.29 is greater than 0.5 (Kline, 2011) acceptable range for R^2, therefore it can be said that the model is a good indicator of convergent validity.

Table 4.30: **Maximum Likelihood Estimates of factor loadings for second-order CFA model of Task performance**

Parameters			Unstandardized Estimate	Standardized Estimate	S.E.	C.R.	P
JKS	<---	TaPe	1	0.935			
CA	<---	TaPe	0.668	0.543	0.167	3.992	***
TP	<---	TaPe	0.9	0.655	0.19	4.744	***
JK_1	<---	JKS	1	0.759			
JK_7	<---	JKS	0.933	0.681	0.093	9.996	***
JS_18	<---	JKS	0.971	0.733	0.09	10.848	***
JK_2	<---	JKS	0.909	0.749	0.082	11.104	***
JS_5	<---	JKS	0.828	0.664	0.085	9.726	***
JS_15	<---	JKS	0.939	0.721	0.088	10.653	***
JS_17	<---	JKS	0.877	0.656	0.091	9.602	***
JS_14	<---	CA	1	0.705			
CA_5	<---	CA	0.966	0.812	0.166	5.811	***
TP_12	<---	TP	0.988	0.849	0.088	11.192	***
TP_11	<---	TP	1	0.912			
JS_9	<---	JKS	1.005	0.705	0.097	10.382	***

Note: SE – Standard Error
*P<.05 ***P<.0001
See Table 4.23 for definitions of variables

All estimated regression weights in Table 4.30 are statistically significant, having critical ratio value >1.96. A critical look at Table 4.30 shows that the second-order loadings are listed first, followed by the first-order loadings. JKS, CA and TP predict TaPe with a standardized value of 0.935, 0.543 and 0.655. This implies that as TaPe increases by 1 standard deviation, JKS, CA and TP increases by their respective regression weight.

JK was predicted with JK_1, JK_7, JS_18, JK_2, JS_5, JS_15, JS_19 and JS_17. Each of the JKs has factor loadings of 0.759, 0.681, 0.733, 0.749, 0.664, 0.721, 0.705 and 0.656 respectively. CA was measured with CA_5 and TP_12 with factor loadings of 0.705 and 0.812 respectively, while TP was measured with TP_12 (.849) and TP_11 (.912). The implication is that the observed variables account for variability in the latent variable with the amounts stated above for each loadings.

Table 4.31: Squared Multiple Correlations for Task Performance

Variables	Estimate
TP	0.43
CA	0.295
JKS	0.874
TP_11	0.832
TP_12	0.72
CA_5	0.659
JS_14	0.497
JS_17	0.43
JS_15	0.52
JS_9	0.496
JS_5	0.441
JK_2	0.56
JS_18	0.537
JK_7	0.463
JK_1	0.576

Table 4.31 shows the R^2 for task performance. For variable JKS, it is estimated that the predictors of JKS explain 87.4 % of its variance. In other words, the error variance of TNA is approximately 12.6% of the variance of TNA itself. Most of the R^2 in Table 4.31 is greater than 0.5 (Kline, 2011) acceptable range for R^2, therefore it can be said that the model is a good indicator of convergent validity.

A summary of all the approaches used (Regression weight, critical factor, standard error, statistical significance, R^2, Model fit) to assess the measurement model for training practices and task performance indicate a measurement model with a good fit and convergent validity.

4.7.6 SEM for training practices and task performance

To develop the model showing the relationship between latent variables of training practices and task performance, SEM was used to find the relationship. Using Maximum Likelihood (ML) estimation, the regression coefficients between the observed and latent variables of both training practices and task performance and the latent variables of both training practices and task performance were estimated. Table 4.32 shows the model fit; Figure 4.4 shows the structural model with estimated standardized regression coefficient in the path links in the SEM. The arrows in the path diagram connecting observed and latent variables and latent and latent variables show the direct effect of one variable on another.

Table 4.32: SES Model for training practices and task performance

Models	χ^2	Df	CF1	GFI	TLI	RMSEA	PCLOSE
1	363.436	221	.943	.872	.934	0.54	.225

*P<.05 ***P<.0001

The structural portion of the structural equation model involves relationship among latent variables and important preliminary steps required in the analysis is to test for validity of the measurement model. Since the measurement models have been validated previously, the structural model developed was only one as it passes the goodness of fit test and the Modification indices (MI) did not reveal any significant path.

Estimation of the model yielded an overall χ^2 $_{(221)}$ value of 363.436. Model fit statistics were as follows: CFI = .943, GFI = .872, TLI = .934, RMSEA = .054 with the probability associated with the test of close fit .225. Based on the criteria for model fit in Chapter Three, the model can be said to be a good fit.

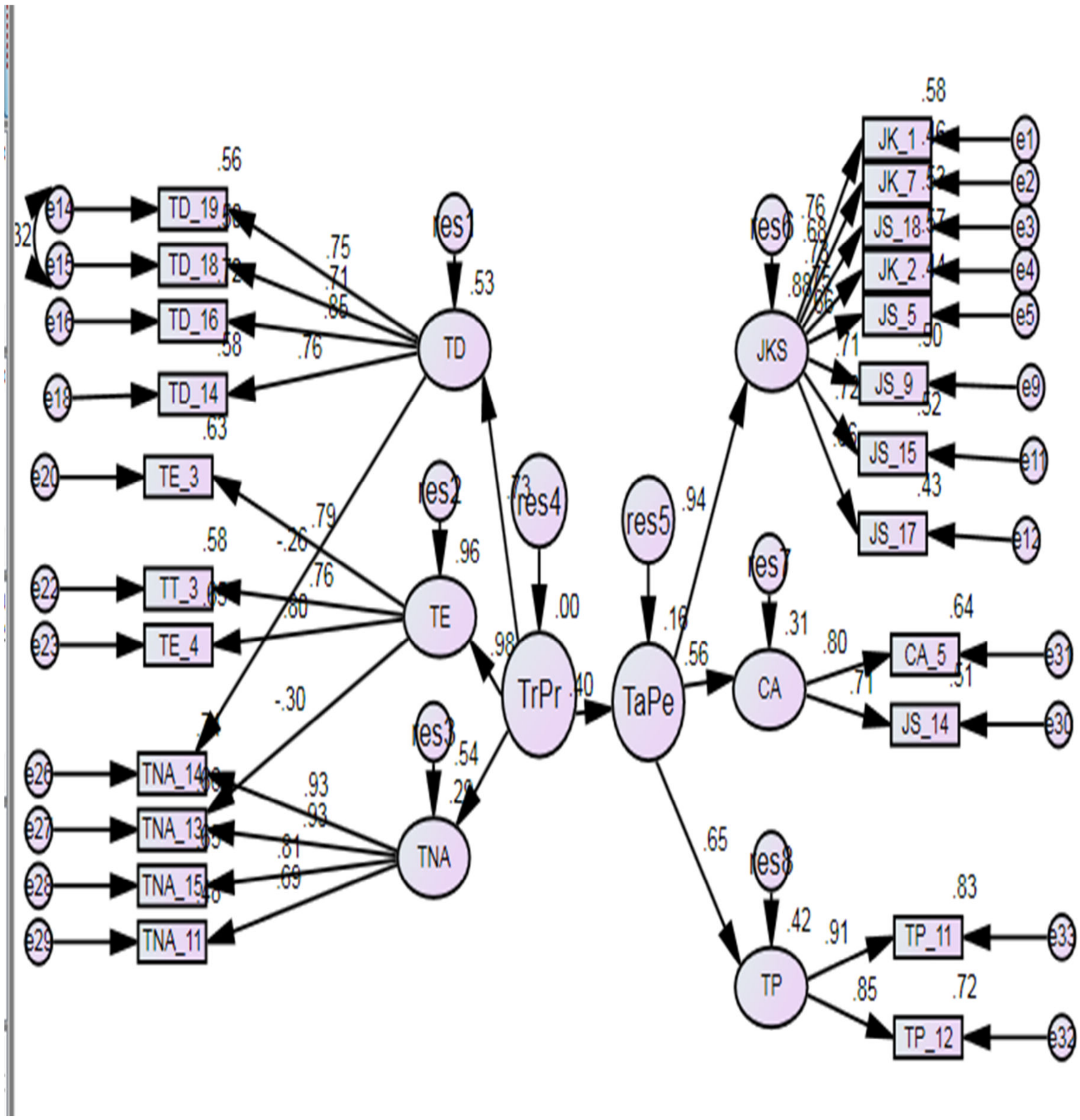

Figure 4.4: Final SEM for training practices and task performance

See Table 4.23 for definition of variables

Mathematically, the model is represented below:

Let Y be a vector containing the p=23 manifest or observable variables namely: TD_19, TD_18, TD_16, TD_14, TE_3, TT_3, TE_4, TNA_14,TNA_13, TNA_15, TNA_11, JK_1, JK_7, JS_18, JK_2, JS_5, JS_9, JS_15, JS17, CA_5,JS_14,TP_11, AND TP_12.

$y = \Lambda\eta + \varepsilon$ ……….. eqn. (4.1)

$$\begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_{p-1} \\ y_p \end{bmatrix} = \begin{bmatrix} \lambda_{11} & \lambda_{12} & \cdots & \lambda_{1k} \\ \lambda_{21} & \lambda_{22} & \cdots & \lambda_{2k} \\ \vdots & \vdots & \vdots & \vdots \\ \vdots & \vdots & \cdots & \vdots \\ \lambda_{p1} & \lambda_{p2} & \cdots & \lambda_{pk} \end{bmatrix} [\eta_1 \quad \eta_2 \quad \cdots \quad \eta_k] + \begin{bmatrix} e_1 \\ e_2 \\ \vdots \\ \vdots \\ e_p \end{bmatrix} \text{…… eqn. (4.2)}$$

Where,

$\eta_1, \eta_2, \dots \eta_k$ represent the $k = 6$ first-order or lower order latent variables (also called common factors) namely: TD, TE, TNA, JKS, CA and TP;

$\Lambda = [\lambda_{ij}]$, is the $p \times k$ matrix of first-order factor loadings; $i = 1, 2, \dots, p \ and \ j = 1, 2, \dots, k$;

$e_1, e_2, \dots, e_p$ are the residual terms in the first stage.

The first-order factors or latent variables can be expressed as follow,

$\eta = \Gamma\xi + \zeta$….. eqn. (4.3)

$$\begin{bmatrix} \eta_1 \\ \eta_2 \\ \vdots \\ \eta_{k-1} \\ \eta_k \end{bmatrix} = \begin{bmatrix} \gamma_{11} & \gamma_{12} \\ \gamma_{21} & \gamma_{22} \\ \vdots & \vdots \\ \vdots & \vdots \\ \gamma_{k1} & \gamma_{k2} \end{bmatrix} [\xi_1 \quad \xi_2] + \begin{bmatrix} \zeta_1 \\ \zeta_2 \\ \vdots \\ \vdots \\ \zeta_k \end{bmatrix} \text{…… eqn. (4.4)}$$

Where,

$\xi_1 \quad \xi_2$, represent the q=2 second-order latent variables or factors namely: TrPr and TaPe;

$\Gamma = [\gamma_{lm}]$, is the $k \times l$ matrix of second-order factor loadings; $l = 1,2, \ldots, k \; and \; m = 1, \ldots, q$;

$\zeta_1, \zeta_2, \ldots, \zeta_k$ are the residual terms in the second stage.

The complete model:

$$\begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_{p-1} \\ y_p \end{bmatrix} = \begin{bmatrix} \lambda_{11} & \lambda_{12} & \cdots & \lambda_{1k} \\ \lambda_{21} & \lambda_{22} & \cdots & \lambda_{2k} \\ \vdots & \vdots & \vdots & \vdots \\ \vdots & \vdots & \cdots & \vdots \\ \lambda_{p1} & \lambda_{p2} & \cdots & \lambda_{pk} \end{bmatrix} \underbrace{\left[\begin{bmatrix} \boldsymbol{\gamma_{11}} & \boldsymbol{\gamma_{12}} \\ \boldsymbol{\gamma_{21}} & \boldsymbol{\gamma_{22}} \\ \vdots & \vdots \\ \vdots & \vdots \\ \boldsymbol{\gamma_{k1}} & \boldsymbol{\gamma_{k2}} \end{bmatrix} [\boldsymbol{\xi_1} \quad \boldsymbol{\xi_2}] + \begin{bmatrix} \boldsymbol{\zeta_1} \\ \boldsymbol{\zeta_2} \\ \vdots \\ \vdots \\ \boldsymbol{\zeta_k} \end{bmatrix} \right] + \begin{bmatrix} e_1 \\ e_2 \\ \vdots \\ \vdots \\ e_p \end{bmatrix}}_{\eta} \ldots\text{.eqn. (4.5)}$$

Table 4.33: Standardized Total Effects

Variables	TrPr	TaPe	TP	CA	TNA	TE	TD	JKS
TaPe	0.396	0	0	0	0	0	0	0
TP	0.256	0.645	0	0	0	0	0	0
CA	0.221	0.556	0	0	0	0	0	0
TNA	0.538	0	0	0	0	0	0	0
TE	0.98	0	0	0	0	0	0	0
TD	0.73	0	0	0	0	0	0	0
JKS	0.372	0.939	0	0	0	0	0	0
TP_11	0.233	0.587	0.909	0	0	0	0	0
TP_12	0.218	0.549	0.851	0	0	0	0	0
CA_5	0.177	0.447	0	0.803	0	0	0	0
JS_14	0.157	0.397	0	0.713	0	0	0	0
TNA_11	0.374	0	0	0	0.695	0	0	0
TNA_15	0.435	0	0	0	0.807	0	0	0
TNA_13	0.204	0	0	0	0.929	-0.302	0	0
TNA_14	0.312	0	0	0	0.929	0	-0.256	0
TE_4	0.789	0	0	0	0	0.805	0	0
TT_3	0.749	0	0	0	0	0.764	0	0
TE_3	0.776	0	0	0	0	0.792	0	0
TD_14	0.556	0	0	0	0	0	0.761	0
TD_16	0.619	0	0	0	0	0	0.848	0
TD_18	0.515	0	0	0	0	0	0.706	0
TD_19	0.545	0	0	0	0	0	0.746	0
JS_17	0.244	0.616	0	0	0	0	0	0.656
JS_15	0.269	0.679	0	0	0	0	0	0.723
JS_9	0.263	0.664	0	0	0	0	0	0.707
JS_5	0.247	0.623	0	0	0	0	0	0.663
JK_2	0.28	0.707	0	0	0	0	0	0.752
JS_18	0.271	0.683	0	0	0	0	0	0.728
JK_7	0.253	0.637	0	0	0	0	0	0.679
JK_1	0.282	0.712	0	0	0	0	0	0.758

See Table 4.23 for definition of variables

The standardized total effect is the summation of standardized direct and indirect effects. Table 4.33 presents the standardized total effect of the observed and latent variables for training practices and task performance. A careful look at Table 4.33 shows the direct and positive effects of training practices on task performance (β= 0.396). This means that the standardized total (direct and indirect) effect of TrPr on TaPe is 0.396. That is due to both the direct (unmediated) and indirect (mediated) effects of TrPr on TaPe, when TrPr goes up by 1 standard deviation, TaPe goes up by 0.396 standard deviations. According to Cohen (1988), the effect of a predictor is classified as small when is less than or equal to 0.02, medium when it is within 0.15 and large when within 0.35 and above. Therefore it can be said that the effect size of training practices on task performance is large. This implies that the effect size of training practices on task performance is large.

The total effects of a second-order factor on indicators can reveal the measures that are closely related to it. For example, a second-order factor TrPr has indicators TNA, TD and TE. The total standardized effects of TrPr on TNA (β= 0.538), TrPr on TD (β= 0.98) and TrPr on TE (β= 0.73). This implies that training practices have the largest total standardized effects on training delivery. For the second-order factor of TaPe with indicators TP, CA and JKS. The total standardized effects of TaPe on TP (β=0.901), TaPe on CA (β=0.777) and TaPe on JKS (β=1.16). This implies that task performance has a large effect on TP, CA and JKS and the largest total effects on job knowledge and skills.

For variables with direct and indirect effect, for example, there is a direct positive effect between TaPe and TP (β=0.645) and TrPr has an indirect positive effect on TP (β=0.256). This means that the causal link between TaPe and TP is mediated by the intervening variable TrPr.

Table 4.34: Standardized Direct Effects

Variables	TrPr	TaPe	TP	CA	TNA	TE	TD	JKS
TaPe	0.396	0	0	0	0	0	0	0
TP	0	0.645	0	0	0	0	0	0
CA	0	0.556	0	0	0	0	0	0
TNA	0.538	0	0	0	0	0	0	0
TE	0.98	0	0	0	0	0	0	0
TD	0.73	0	0	0	0	0	0	0
JKS	0	0.939	0	0	0	0	0	0
TP_11	0	0	0.909	0	0	0	0	0
TP_12	0	0	0.851	0	0	0	0	0
CA_5	0	0	0	0.803	0	0	0	0
JS_14	0	0	0	0.713	0	0	0	0
TNA_11	0	0	0	0	0.695	0	0	0
TNA_15	0	0	0	0	0.807	0	0	0
TNA_13	0	0	0	0	0.929	-0.302	0	0
TNA_14	0	0	0	0	0.929	0	-0.256	0
TE_4	0	0	0	0	0	0.805	0	0
TT_3	0	0	0	0	0	0.764	0	0
TE_3	0	0	0	0	0	0.792	0	0
TD_14	0	0	0	0	0	0	0.761	0
TD_16	0	0	0	0	0	0	0.848	0
TD_18	0	0	0	0	0	0	0.706	0
TD_19	0	0	0	0	0	0	0.746	0
JS_17	0	0	0	0	0	0	0	0.656
JS_15	0	0	0	0	0	0	0	0.723
JS_9	0	0	0	0	0	0	0	0.707
JS_5	0	0	0	0	0	0	0	0.663
JK_2	0	0	0	0	0	0	0	0.752
JS_18	0	0	0	0	0	0	0	0.728
JK_7	0	0	0	0	0	0	0	0.679
JK_1	0	0	0	0	0	0	0	0.758

See Table 4.23 for definition of variables

Standardized direct effects are those influences unmediated by any other variables in the model. Table 4.34 shows the standardized direct effects of training practices and task performance variables. TrPr has a standardized direct and positive effect value of (β=.396) on TaPe. This implies that TrPr and TaPe are connected with the value 0.396 and that no other variable is in the middle of the link between TPr and TaPe.

Table 4.35: Standardized Indirect Effects

Variables	TrPr	TaPe	TP	CA	TNA	TE	TD	JKS
TaPe	0	0	0	0	0	0	0	0
TP	0.256	0	0	0	0	0	0	0
CA	0.221	0	0	0	0	0	0	0
TNA	0	0	0	0	0	0	0	0
TE	0	0	0	0	0	0	0	0
TD	0	0	0	0	0	0	0	0
JKS	0.372	0	0	0	0	0	0	0
TP_11	0.233	0.587	0	0	0	0	0	0
TP_12	0.218	0.549	0	0	0	0	0	0
CA_5	0.177	0.447	0	0	0	0	0	0
JS_14	0.157	0.397	0	0	0	0	0	0
TNA_11	0.374	0	0	0	0	0	0	0
TNA_15	0.435	0	0	0	0	0	0	0
TNA_13	0.204	0	0	0	0	0	0	0
TNA_14	0.312	0	0	0	0	0	0	0
TE_4	0.789	0	0	0	0	0	0	0
TT_3	0.749	0	0	0	0	0	0	0
TE_3	0.776	0	0	0	0	0	0	0
TD_14	0.556	0	0	0	0	0	0	0
TD_16	0.619	0	0	0	0	0	0	0
TD_18	0.515	0	0	0	0	0	0	0
TD_19	0.545	0	0	0	0	0	0	0
JS_17	0.244	0.616	0	0	0	0	0	0
JS_15	0.269	0.679	0	0	0	0	0	0
JS_9	0.263	0.664	0	0	0	0	0	0
JS_5	0.247	0.623	0	0	0	0	0	0
JK_2	0.280	0.707	0	0	0	0	0	0
JS_18	0.271	0.683	0	0	0	0	0	0
JK_7	0.253	0.637	0	0	0	0	0	0
JK_1	0.282	0.712	0	0	0	0	0	0

See Table 4.23 for definition of variables

The standardized indirect (mediated) effect of TrPr on TaPe is (β=.000), that is, due to the indirect (mediated) effect of TrPr on TaPe, when TrPr goes up by 1 standard deviation, TaPe goes up by 0 standard deviations. This is in addition to any direct (unmediated) effect that TrPr may have on TaPe.

Table 4.36: Maximum Likelihood Estimates of factor loadings for the Model

Parameters			Unstandardized Estimate	Standardized Estimate	S.E.	C.R.	P
TaPe	<---	TrPr	0.322	0.396	0.073	4.417	***
TD	<---	TrPr	1	0.73			
TE	<---	TrPr	1	0.98			
TNA	<---	TrPr	0.841	0.538	0.145	5.808	***
JKS	<---	TaPe	1	0.939			
CA	<---	TaPe	0.683	0.556	0.154	4.428	***
TP	<---	TaPe	0.873	0.645	0.16	5.455	***
JK_1	<---	JKS	0.991	0.758	0.095	10.419	***
JK_7	<---	JKS	0.923	0.679	0.099	9.365	***
JS_18	<---	JKS	0.956	0.728	0.095	10.016	***
JK_2	<---	JKS	0.907	0.752	0.088	10.341	***
JS_5	<---	JKS	0.821	0.663	0.09	9.158	***
JS_15	<---	JKS	0.934	0.723	0.094	9.953	***
JS_17	<---	JKS	0.871	0.656	0.096	9.067	***
TD_19	<---	TD	0.789	0.746	0.069	11.438	***
TD_18	<---	TD	0.753	0.706	0.071	10.642	***
TD_16	<---	TD	1	0.848			
TD_14	<---	TD	0.827	0.761	0.07	11.885	***
TE_3	<---	TE	1.126	0.792	0.119	9.476	***
TT_3	<---	TE	0.991	0.764	0.107	9.242	***
TE_4	<---	TE	1.039	0.805	0.109	9.571	***
TNA_14	<---	TNA	1	0.929			
TNA_13	<---	TNA	0.939	0.929	0.077	12.13	***
TNA_15	<---	TNA	0.91	0.807	0.07	12.966	***
TNA_11	<---	TNA	0.743	0.695	0.069	10.798	***
JS_14	<---	CA	1	0.713			
CA_5	<---	CA	0.946	0.803	0.157	6.004	***
TP_12	<---	TP	0.994	0.851	0.089	11.116	***
TP_11	<---	TP	1	0.909			
JS_9	<---	JKS	1	0.707			
TNA_14	<---	TD	-0.315	-0.256	0.073	-4.339	***
TNA_13	<---	TE	-0.467	-0.302	0.115	-4.06	***

Note: SE – Standard Error
*P<.05 ***P<.0001
See Table 4.23 for definition of variables

The aim of the study was to analyse the conceptual relationship between training practices and task performance. Fig. 4.4 and Table 4.36 show the parameters of the structural model estimated by AMOS 20. The path coefficient (β) shows the strength of the relationship between two constructs of training practices and task performance. The higher the path coefficient, the stronger the effect of the independent variable (training practices) construct on the dependent (task performance) construct of the path.

The unstandardized and standard estimates are presented in Table 4.36. The standardized estimate (β=.396) for the structural parameter path (TaPe<---TrPr) with CR value of 4.417 (>1.96) is statistically significant at p= 0.0001. This implies that as TrPr (training practices) goes up by 0.396, TaPe (task performance) goes up by 1 standard deviation. This means that as the frequency of implementation of training practices by construction firms increases, the level of task performance of construction professionals' increase by 39.6%. Also, the regression weight is 4.417 above 0. Thus, the hypothesis that training practices predict task performance is supported, that is, training practices predict task performance with 39.6%. This implies that training practices of construction firms account for 39.6% variance in task performance of professionals in construction firms. Other factors account for variability in task performance. Furthermore, this means that training practices (all the 11 training practices indicators in the path diagram as defined in Table 4.36) have a predictive relevance when trying to understand the level of task performance. In other words, 11 training practices indicators indicating training practices can predict 12 task performance indicators indicating task performance.

Table 4.37: Squared Multiple Correlations for the model:

Variables	Estimate
TrPr	0
TaPe	0.157
TP	0.416
CA	0.31
TNA	0.29
TE	0.961
TD	0.533
JKS	0.882
TP_11	0.827
TP_12	0.725
CA_5	0.645
JS_14	0.508
TNA_11	0.482
TNA_15	0.652
TNA_13	0.658
TNA_14	0.741
TE_4	0.647
TT_3	0.584
TE_3	0.628
TD_14	0.58
TD_16	0.718
TD_18	0.498
TD_19	0.557
JS_17	0.431
JS_15	0.523
JS_9	0.499
JS_5	0.44
JK_2	0.566
JS_18	0.529
JK_7	0.461
JK_1	0.575

See Table 4.23 for definition of variables

Table 4.37 depicts the squared multiple correlations for task performance. This shows the proportion of variability in the dependent variables that are explained by the predictors. For variable TaPe, it is estimated that the predictors of TaPe explain 15.7% of its variance. In other words, 84.3% of the variability in TaPe is unaccounted for by the predictors (training practices).

Table 4.38: Variances of Variables and Factors Errors

	Estimate	S.E.	C.R.	P	Label
res4	.488	.098	4.967	***	par_49
res5	.272	.067	4.081	***	par_50
res2	.020				
res1	.427	.076	5.589	***	par_51
res3	.847	.122	6.951	***	par_52
res6	.043	.047	.917	.359	par_53
res7	.336	.079	4.227	***	par_54
res8	.345	.064	5.373	***	par_55
e1	.266	.030	8.849	***	par_56
e2	.366	.039	9.430	***	par_57
e3	.298	.033	9.115	***	par_58
e4	.231	.026	8.906	***	par_59
e5	.314	.033	9.510	***	par_60
e9	.367	.040	9.264	***	par_61
e11	.292	.032	9.151	***	par_62
e12	.367	.038	9.543	***	par_63
e14	.453	.056	8.110	***	par_64
e15	.524	.061	8.530	***	par_65
e16	.359	.059	6.080	***	par_66
e18	.454	.056	8.075	***	par_67
e20	.382	.051	7.436	***	par_68
e22	.356	.045	7.947	***	par_69
e23	.299	.042	7.172	***	par_70
e26	.359	.061	5.921	***	par_71
e27	.417	.061	6.891	***	par_72
e28	.527	.066	7.968	***	par_73
e29	.707	.076	9.244	***	par_74
e30	.471	.087	5.428	***	par_75
e31	.240	.070	3.420	***	par_76
e32	.222	.049	4.513	***	par_77
e33	.124	.046	2.670	.008	par_78

Note: S.E. = standard error, C.R. = Critical ratio, P = Probability value

Table 4.38 indicates that the variances of all the variables errors (e11-e33) and factors errors (res1-res8). (e11-e33) are measurement error associated with observed variable while (res1-res8) are a residual error in the prediction of an unobserved variable.

Table 4.39: Estimates of Intercepts

	Estimate	S.E.	C.R.	P
TD_19	3.339	.069	48.640	***
TD_18	3.294	.069	47.514	***
TD_16	3.055	.077	39.878	***
TD_14	3.317	.071	47.028	***
TE_3	3.206	.069	46.627	***
TT_3	3.472	.063	55.329	***
TE_4	3.413	.063	54.598	***
TNA_14	2.995	.080	37.519	***
TNA_13	3.028	.075	40.378	***
TNA_15	2.908	.084	34.812	***
TNA_11	3.101	.079	39.084	***

Note: S.E. = standard error, C.R. = Critical ratio, P = Probability value

Table 4.39 shows the estimates of intercept in the equation for predicting each variable in the model. When developing the equations between dependent and independent variables, the intercept is needed to arrive at the equations (Motawa & Oladokun, 2015). For example, when developing an equation for task performance (TaPe) using training practice TD_19, then the equation is TaPe= Bo +β*TD_19. This implies that task performance can be predicted based on estimated value of intercept and the regression value of training practices.

The SEM model gave a positive significant relationship between training practices and task performance. The model is represented graphically in Figure 4.4.

Mathematically, the regression model can be represented with the equation

$$TaPe = "\ \beta o + \beta \times TrPr + e'' \text{.............eqn. (4.6)}$$

Where TaPe = Task Performance

TrPr = Training Practices

βo = intercept

β = Regression weight

e = standard error

$$TaPe\ =\ 35.128 + .396\, TrPr\ +\ 0.073 \text{......... eqn. (4.7)}$$

Where TrPr equals

$$TrPr\ = .929TNA\_14 + e + .929TNA\_13 + e + .807\ TNA\_15 + e + .695TNA\_11 + e + .746TD\_19 + e + .706TD\_18 + e + .848TD\_16 + e + .761TD\_14 + e + .792TE\_3 + e + .764TT\_3 + e + .805TE\_4 + e \text{.....eqn. (4.8)}$$

$$TrPr = 35.128\ +\ 0.396\ (.929TNA\_14 + e + .929TNA\_13 + e + .807\ TNA\_15 + e + .695TNA\_11 + e + .746TD\_19 + e + .706TD\_18 + e + .848TD\_16 + e + .761TD\_14 + e + .792TE\_3 + e + .764TT\_3 + e + .805TE\_4 + e)\ +\ 0.073 \text{.....eqn. (4.9)}$$

(See table 4.23 for the definition of variables in the equation)

4.8 External Validation of Predictive Model

The model for predicting task performance of construction professionals from training practices was validated using fresh data. This was because data were based on significant factors used for the model. Twenty questionnaires were used for the validation. Similar studies in construction management use sample sizes between 10 and 20, for example (Ahadzie, 2007). Mean Average Percentage Error (MAPE) was used for testing the accuracy of prediction using the formular $\sum|(e/y)|/n$ where e= actual values, y= predicted values and n= sample size. The result gave a MAPE of 6.92%. This value compares favourably with other regression models in construction management for example 23.72% from El-Sawah and Moselhi (2014). Therefore, the model can be adopted by construction firms to predict the task performance of construction professionals through training practices.

Table 4.40: External validation of Predictive Model using MAPE

Respondent	Actual	Predicted	Error	ABS ERR	PER ERROR	APE	MAPE
1	41	46.64	-5.64	5.64	-0.14	0.14	6.92%
2	40	46.29	-6.29	6.29	-0.16	0.16	
3	51	46.51	4.49	4.49	0.09	0.09	
4	48	46.80	1.20	1.20	0.02	0.02	
5	48	44.99	3.01	3.01	0.06	0.06	
6	48	44.99	3.01	3.01	0.06	0.06	
7	59	48.85	10.15	10.15	0.17	0.17	
8	45	49.11	-4.11	4.11	-0.09	0.09	
9	47	47.82	-0.82	0.82	-0.02	0.02	
10	48	49.48	-1.48	1.48	-0.03	0.03	
11	44	47.17	-3.17	3.17	-0.07	0.07	
12	38	45.58	-7.58	7.58	-0.20	0.20	
13	52	49.56	2.44	2.44	0.05	0.05	
14	49	49.05	-0.05	0.05	0.00	0.00	
15	50	48.91	1.09	1.09	0.02	0.02	
16	47	48.14	-1.14	1.14	-0.02	0.02	
17	52	49.37	2.63	2.63	0.05	0.05	
18	52	49.24	2.76	2.76	0.05	0.05	
19	47	48.08	-1.08	1.08	-0.02	0.02	
20	52	49.57	2.43	2.43	0.05	0.05	

Note: ABS ERR- Absolute error, PER ERROR- Percentage error, APE- Absolute percentage error, MAPE- Mean Absolute Percentage Error.

4.9 DISCUSSION OF RESULTS

Discussion of results based on each objective.

4.9.1 Task characteristics of construction of professionals.

The study investigated the prevalence of task characteristics among construction professionals. The result reveals that construction professionals agreed that task characteristics dimensions are prevalent in their task, that is, their tasks are dominated by task significance, skill variety, task identity, feedback, autonomy, task analyzability, task difficulty, task routineness, task complexity and task structuredness. The finding is in agreement with the assertion of Djastuti (2010) in that employees of construction firms accepted that their task as characterised by skill variety, task identity, task significance, autonomy and feedback. The findings also support Hackman and Oldham (1980) theory on job characteristics that the characteristics of a task are important in the motivation of the employee. Based on the assertion of Djastuti (2013) that when all the dimensions of task characteristics are prevalent in employees' task, employees will feel the importance of their work, the findings of the study imply that construction professionals in Lagos and Abuja feel the importance of site supervision. This confirms that the nature of the task in construction involves several task characteristics since they all agree that their task is characterised by task significance, skill variety, task identity, feedback, autonomy, task analyzability, task difficulty, task routineness, task complexity and task structuredness.

The first task characteristics considered by construction professionals as prevalent is task significance. Since task significance defines the degree to which the tasks of professionals' have an impact on people live in the organisation or environment at large (Hackman & Oldham, 1980). The implication of the finding is that construction professionals agree that site supervision has an impact on peoples' lives. The finding is in line with Mukul et al. (2013) in which they discovered that top management considered the task of their textile workers as having a substantial impact on people lives or the world at large. This confirms that task significance is not only prevalent in the construction industry but also in textile industry.

The study also discovered that construction professionals agreed that there is prevalent of skill variety in their task, that is, their tasks require a variety of skills to accomplish them. Every structure in the construction industry is unique and not the same. Therefore it is of utmost importance that construction professionals exhibit different varieties of skills to execute their task. The implication of the finding is that site supervision requires several skills and talents to carry out. The finding is as a result of the unique nature of construction in which professionals require diverse skills and talents to execute their task. Accordingly, the finding support Oladiran (2015) assertion that construction professionals possessed different types of skill which is important for executing their task. This confirms that construction professionals use different skills to execute their task. A contrast finding was reported by Mukul et al. (2013) in which workers in textile firms reported the absence of skill varieties in their task. The finding of this study clearly indicates that while tasks in the textile industry do not require a variety of skills and talents to perform, that of construction industry requires several skills and talents to perform.

Professionals in construction firms also agreed that there is the prevalence of autonomy in their task. This means that when executing their task, they have the freedom to make decisions on their task. Since the construction industry is fragmented and consists of different activities in achieving a task, it is expected that construction professionals make good decisions when executing their task. A delay in making decisions due to lack of autonomy can result in time overrun which may affect the performance of the project (Akinsiku & Akinsulire, 2012). A contrast finding was reported by Mukul et al. (2013) in that they discovered that workers in textile firms have no freedom in deciding the procedure to be used in carrying out their task. This implies that the prevalence of autonomy in the construction industry is not the same as that of the textile industry. Professionals in the construction industry have no strict rules on how to carry out their task, they are given freedom to carry out their task while in the textile industry, they have no freedom.

Another finding of the study is that construction professionals agreed that task identity is prevalent in the task of site supervision. Since task identity has to do with completing a task with the visible outcome, this finding implies that construction professionals considered site supervision as a task that must be completed once started. Since site supervision is concerned with the delivery of projects, the finding suggests that construction professionals believe that the end product of site supervision which is a building or civil engineering projects should not be abandoned but should be completed. This agrees with the assertion of Mukul et al. (2013) in which textile workers reported that task identity is highly prevalent in their task. The finding shows that the prevalence of task identity is not peculiar to construction industry but also applicable in the textile industry.

The study also discovered that task difficulty, complexity and routineness are prevalent in the task of construction professionals; the finding suggests that the task of site supervision is difficult, complex and complicated to perform. The prevalence of these task characteristics can lead to negative attitudes such as absenteeism, staff turnover and burnout. However, the study also discovered that feedback and autonomy are prevalent in the tasks of construction professionals. According to the findings of Maslasch et al. (2001), the prevalence of feedback and autonomy can prevent burnout. Since construction professionals have their task characterised by feedback and autonomy, then the negative psychological condition of burnout which will be caused by the prevalence of task difficulty and complexity can be suppressed by the prevalence of feedback and autonomy.

Another important finding of the study is that the difference in the prevalence of task characteristics among construction professionals is insignificant since the construction professionals sampled are distributed over five professions namely: Architect, Builder, Civil Engineer, Quantity Surveyor and Project Manager. The implication of the finding is that the prevalence of task characteristics in the tasks performed by the five professionals is the same. The finding indicates that the prevalence of task characteristics in site supervision is the same irrespective of the professional that perform it.

4.9.2 Effect of Construction Professionals personal characteristics on task characteristics

The findings of the study on the effect of construction professionals' personal characteristics on task characteristics are noteworthy. Construction professionals' personal characteristics parameters are experience, age, gender, and qualification while task characteristics are skill variety, task identity, task significance, autonomy, feedback, task analyzability, task difficulty, task routineness, task complexity and task structuredness. The study discovered that three construction professionals' personal characteristics namely: experience, qualification and gender have an effect on the prevalence of task characteristics.

Construction professionals with PGD, B.Sc. and HND reported a high prevalence of task characteristics. This means that construction professionals with higher qualification perceive task characteristics as more prevalent in their task. This is in agreement with Vicente et al. (2016) in which academic degree was found to influence task characteristics of Nurses in Egypt. This confirms that qualification does not only affect the prevalence of task characteristics in the construction industry alone, it also affects task characteristics in the health industry. Furthermore, it shows that the finding in Nigeria is the same with that of Egypt. The implication is that the finding is universal and not only peculiar to Nigeria.

The gender of construction professionals is discovered to affect the prevalence of task characteristics. Male construction professionals reported more prevalence of skill variety, task identity, task significance, autonomy, feedback, task analyzability, task difficulty, task routineness, task complexity and task structuredness than the female construction professionals. This means that task characteristics are more prevalent in male construction professional than female. The finding is in agreement with Vicente et al. (2016) in which gender of professionals was discovered to have an influence on the task characteristics of finance officers in Portugal. This shows that gender affects task characteristics both in the construction industry and finance industry.

The experience of construction professionals is also discovered to affect the prevalence of task characteristics. Construction professionals with lesser years of experience reported less prevalence of task characteristics. It was discovered that the longer the number of years a construction professional spent in undertaking a site supervisory task, the more the prevalence of task characteristics. The finding is in contrast with Mohamed and Morsy (2016) in which years of experience have a negative influence on task characteristics among Nurses in Egypt. The differences may be due to the industry in which the study took place and in the study area. This confirms that the effect of experience on task characteristics is not the same in the construction industry and health industry.

On age, it was discovered that the prevalence of task characteristics is the same among young and old construction professionals. Thus, age has no effect on the characteristics of site supervisory task. The result does not agree with findings of Gulko and Deakin, (2014) that older people have more prevalent task identity, autonomy and skill in their task. The finding is also not in agreement with Zaniboni et al. (2016) in which older construction American workers were found to have more of autonomy in their task compared to younger colleagues This is quite different as both old and young professionals covered in this study show no difference in the prevalence of task characteristics. The finding implies that the prevalence of task characteristics is not the same with construction professionals in Lagos and Abuja and America.

4.9.3 Relationship between Task Characteristics and Training Practices

The finding of the study on the extent of implementation of training practices is that the extent of implementation of training practices among professionals in construction firms in Nigeria is moderate. The finding does not agree with Dzasu and Ayegba (2010) that the participation in training of staff by construction firms in Niger, Kogi and Kwara is low. This finding implies that the implementation of training practices by construction professionals in Lagos and Abuja does not agree with that of their counterparts in Niger, Kogi and Kwara states. The finding of the study on the relationship between task characteristics and training practices is that there is a positive relationship between task characteristics and training practices. This means that the higher the prevalence of task characteristics namely: skill variety, task identity, task significance, autonomy, feedback, task analyzability, task difficulty, task routineness, task complexity and task structuredness in construction professionals' task, the higher the systematic procedures of carrying out training namely: training needs assessment, training delivery, training evaluation and training transfer in construction firms. The finding is not in agreement with Morgeson and Humphrey (2006) in that task characteristics were discovered not to have a relationship with training. This means that the finding in Nigeria is not in agreement with the finding in America. It can, therefore, be said that the characteristics of a task determine the training practices of the firm in Nigeria.

The significance of this finding is that construction firms should understand the characteristics of their employee task as this will help to determine the type of training that is needed. This is further needed during training needs assessment as the nature of task will aid to identify the kind of training to give. For example, a complex and difficult task requires special training process, so also a significant and routine task affect the training practices of the firm.

4.9.4 Relationship between Training Practices and Task Performance

The finding of the study on the task performance of construction professionals is that construction professionals' supervisors rated their subordinate's task performance high. This finding is not in agreement with the finding in the study conducted by Abas-Mastura et al. (2013) in which public sector employee task performance was rated by supervisors as satisfactory. This finding shows that task performance of professionals in construction firms is rated higher than the task performance of supervisors in public sector. This result does not differ from the finding in the study conducted by Onukwube and Iyagba (2011) in that the task performance level of professionals in indigenous construction companies is on the average while that of expatriate construction companies is good. Thus, it can, therefore, be said that the task performance level of professionals in the construction industry is the same.

Another finding from the study is that a positive relationship exists between training practices and task performance. The finding is an indication that improvement in training practices of construction firms will lead to improvement in task performance of construction professionals. The finding supports the finding of Muzaffar et al. (2012) and Sila (2014) that training has a relationship with task performance. The implication of the study is that the contribution of training to task performance is universal and not peculiar to a country like Nigeria.

4.9.5 Model for predicting task performance from training practices

Model for predicting task performance of construction professionals was developed using SEM. A positive linear relationship was discovered between training practices and task performance with training accounting for 39.6% of the variance, therefore others factors not considered in this study are responsible for the other variance. The model also shows that 11 significant attributes of training practices can be used to predict 12 significant attributes of task performance. A similar study (Ling, 2002) develop a model for predicting the performance of Architects and Engineers (AEs) in Singapore and identified 24 attributes for predicting performance. Job knowledge, task proficiency and job experience were found not to significantly predict AEs performance. The finding in this study is not in agreement with Ling in that Job knowledge and skills, task proficiency and cognitive ability predict task performance. The finding implies that the influence of task performance on training practices of construction professionals in Nigeria is not the same as what obtains in Singapore. Since SEM has the advantage of showing the effect of exogenous variables on endogenous variables; the finding shows that training practices have a large effect size on task performance of construction professionals.

4.10 Summary of Findings

The summary of the findings arising from the data analysis and hypotheses tested in the study is as follows:

1. All the ten dimensions of task characteristics in the study namely: Skill variety, task identity, task significance, autonomy, feedback, task analyzability, task routineness, task difficulty, task complexity and task structuredness are prevalent in construction professionals' task.
2. The professional background of construction professionals does not influence the nature of their task.
3. Construction professionals' personal characteristics namely: experience, gender and educational qualification of construction professionals influence the nature of the task.
4. The extent of implementing training practices in construction firms is moderate.
5. Task characteristics of construction professionals influence the training practices of the construction firms and the higher the level of prevalence of task characteristics in construction professionals' task, the higher the training practices of construction firms.
6. A significant relationship exists between training practices and task performance. Training practices of construction firms' influence the task performance of

construction professionals that is; an increase in training practices will result in an increase in task performance.

7. 11 significant attributes of training practices predict 12 significant attributes of task performance. Thus, training practices predict task performance with 39.6% variance.
8. Training practices have an effect on task performance. The effect size of training practices on task performance is large with a value of 0.396.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 PREAMBLE

This chapter discusses the conclusion made from the findings, recommendations and a possible area for further research. It also discusses the contribution of the study to knowledge.

5.2 CONCLUSIONS

The study examined the relationship between training practices and task performance of construction professionals. Furthermore, the prevalent task characteristics of construction professionals were determined and the effect of construction professionals' personal characteristics on task characteristics was examined. The relationship between task characteristics and training practices was determined also. The following conclusions are drawn based on the findings;

The study discovered that task characteristics are prevalent in construction professional's task. Based on the findings, it is concluded that task characteristics namely: skill variety, task significance, task identity, feedback, autonomy, task analyzability, task difficulty, task routineness and task structuredness are dominant in the task of Architects, Builders, Civil Engineers, Quantity Surveyors and Project Managers working as Site Supervisor on construction site. Furthermore, the study discovered that the profession of the construction professionals who are engaged as site supervisors did not affect the prevalence of task characteristics. Based on this finding, it is concluded that the task characteristics of construction professionals who are engaged as site supervisors are based on their responsibility and not their profession, although the National Building code encapsulates the task of site supervision to selected profession.

Based on the findings of the study, three personal characteristics construction professionals namely, experience, qualification and gender affect task characteristics. Construction professionals with more years of experience, higher qualifications and male gender reported more prevalence of task characteristics. It is therefore concluded that more experienced professionals, professionals with higher qualifications and male construction professionals have more prevalent task characteristics in their task. Thus, the three construction professionals' personal characteristics are significant in the allocation of responsibility to construction professionals.

It was also discovered that construction firms train their professionals moderately, therefore it is concluded that construction firms moderately carry out systematic training namely: training assessment, training delivery, training evaluation and transfer of their professionals. Also, since the task characteristics of construction professionals have a relationship with training practices of construction firms, it is concluded that the prevalent nature of site supervisor's task which is explained by skill variety, task identity, task significance, autonomy, feedback, task analyzability, task difficulty, task routineness, task complexity and task structuredness contribute to the systematic training of construction professionals.

The study has established a relationship between training practices of construction firms and task performance of construction professionals, it is therefore concluded that the systematic training namely: training assessment, training delivery, training evaluation and training transfer of Architects, Builders, Civil Engineers, Quantity Surveyor and Project Managers saddled with the responsibility of site supervision contribute to their task performance. Based on the relationship, a model was developed, the validation of the model show that the model is valid. Based on this, it can be concluded that task performance of construction professionals can be predicted from the training practices of construction firms using the developed model.

5.3 RECOMMENDATIONS

In line with the research findings and conclusions, the following recommendations are made in order to improve training practices of construction firms so as to improve the task performance of construction professionals:

1. Construction firms should adopt the following personal characteristics namely: qualification (PGD, B.Sc. and HND), Experience (Short, medium and long experience) and gender (Male and Female) as criteria when assigning a task to construction professionals because the personal characteristics of construction professionals affect their task characteristics. Furthermore, construction firms should also come up with policies that emphasise personal characteristics of construction professional by adopting it as criteria for recruitment and selection of construction professionals.

2. Construction firms should carry out regular task evaluation system to determine the training practice to be adopted when training their staff. Thus, the training programmes proposed for professionals engaged by construction firms should be based on the characteristics of the tasks performed by them since task characteristics influence training practices.

3. Since construction professionals are moderately trained, the management of construction firms should adopt the 11 key training practices indicators discovered in the study when training construction professionals. Such indicators include assessing the training needs of construction professionals through low profitability, client dissatisfaction, low employee morale and poor performance from construction professionals. They should also deliver training to construction professionals using demonstration, group work (discussion), lecture, coaching or mentoring. Construction firms should evaluate trained construction professionals through interview; they should measure the training context and ask the trainee manager for his/her assessment of the construction professionals. They should also measure the change of behaviours such as cost saving, quality improvement and client satisfaction.

4. Construction firms should use the task performance indicators discovered in the study when appraising the performance of professionals engaged by them. Such indicators include knowledge on appropriate construction technology for construction works, knowledge of appropriate material management system for construction works, controlling acceptable quality standards, knowledge of

appropriate saving techniques for construction works and site supervisor's ability to negotiate, that is, increase common interest and expand cooperation in order to broaden the area of agreement to cover the item under dispute.

5. The model developed for predicting task performance of construction professionals is strongly recommended for adoption and implementation by construction firms. Construction firms should adopt the model developed in setting targets and managing the performance of construction professionals.

5.4 AREAS FOR FUTURE RESEARCH

Possible directions for future research are stated below:

1. Future research should look at the relationship between training and task performance in other states not covered in this study, so as to know whether the influence of geographical location will add to the findings of the study.

2. Other studies can look at the relationship between training and contextual performance of construction professionals. Contextual performance is another aspect of job performance and it serves as a catalyst for task activities.

3. The study concludes that construction professionals are moderately trained, therefore future studies should investigate the factors responsible for the moderate level of training.

4. Future studies should carry out this study using experimental research design or longitudinal survey research.

5.5 CONTRIBUTIONS TO KNOWLEDGE

1. The study developed a model for predicting the task performance of professionals in construction firms.

2. The study established key training practices indicators for professionals in construction firms which can be used for determining training needs and method.

3. The study also established key task performance indicators for professionals in construction firms.

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APPENDIX A

Training Practices and Task Performance of Professionals in Construction Organisation in Nigeria

Construction Professionals' Questionnaire A (site supervisors)

Dear respondent,

This survey is aimed at eliciting information about construction professional training practices, task characteristics and task performance in construction organisation in Nigeria.

Filling the questionnaire will take less than 10-15 minutes, depending on the level of details you are able and willing to provide. The outcome of this exercise would be used to recommend and provide remedies for construction professionals training and their task performance in construction organisation.

I seek your kind cooperation in completing this questionnaire and assure you that responses shall be treated with confidentiality and used strictly for research purposes only.

Thank you.

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Section A: General background information

Part 1

Please tick (√) appropriate responses.
Respondent's profile

1. How long have you been in the company? [1]( ) 0 - 4 years [2]( ) 5-10 years [3]( ) above 10 years.
2. Highest academic qualification [1]( ) OND [2]( ) HND [3]( ) B.Sc [4]( ) PGD [5]( ) M.Sc [6]( ) PhD
3. Professional background [1] ( ) Architecture [2] ( ) Building [3] ( ) Quantity Surveying [4] ( ) Civil Engineering [5] ( ) Project Management

4. Professional affiliation [1]( ) NIA [2]( ) NIOB [3]( ) NIQS [4]( ) NSE [5]( ) others specify__________
5. Grade of membership [1]( ) Associate [2]( ) Graduate [3] ( ) Corporate [4]( ) Fellow
6. What is your age bracket as at your last birthday? [1]( ) 21-30 years old [2]( ) 31-40 years old [3]( ) 41-50 years old [4] ( ) 51-60 years old [5]( ) above 60 years old.
7. Gender…… ………… [1]( ) Male [2]( ) Female

Part 2

Please tick (√) appropriate responses.

Organisation's profile

1. Name of company/establishment ……………………………… (optional)
2. What is the total number of employees in your firm including partners and directors?

[1] ( ) 1-10 [2] ( ) 11-20 [3] ( ) 21-30 [4] ( ) 31-40 [5] ( ) over 40

3. How long has the company been in operation in Nigeria?

[1] ( ) <10 [2] ( ) 10-29 years [3] ( ) 30-39years [4] ( ) 40 years above

4. Form of management

[1] ( ) Indigenous [2] ( ) Multinational

Section B: Training practices in your organisation.

This section seeks to elicit information on the frequency of training practices implementation in your organisation.

The statement below describe the training practices which your organisation implements. Please indicate on a five point scale, the extent to which your firm has implemented these training practices ranging **1 = Nil, 2= Low frequency, 3=Moderate frequency, 4=High frequency and 5=Very high frequency**

Training practices		**1**	**2**	**3**	**4**	**5**
A	**Training Needs Assessment**					
1	The frequency at which your company anticipates trends in construction works and prepare you to meet them is					
2	The frequency at which the company anticipates future changes in construction works and prepares me to meet them is					
3	The frequency at which the company assesses my training needs through group interview with managers and supervisors is					
4	The frequency at which my training needs are determined by the company through personal face to face interview with managers and supervisor is					
5	The frequency at which my training needs are determined through the use of questionnaires is					
6	The frequency at which the company determines my training needs through performance appraisal information or results is					
7	To what frequency does your company determines your training needs through direct observations from your superior?					
8	To what frequency does your company uses lack of skills in your tasks as training needs indicators?					

9	The frequency at which your company uses lack of knowledge as indicator for your training needs is					
10	To what frequency does your company uses new work methods as an indicator for your training needs?					
11	To what frequency does your company uses poor performance in assigned tasks as an indicator for your training needs?					
12	The frequency at which your company uses employees transfer from site to site as an indicator for training needs is					
13	To what frequency does your firm uses client dissatisfaction as an indicator for training needs assessment?					
14	To what frequency does your company sees low profitability as indicator for your training needs?					
15	To what frequency does your company sees low employee morale as indicator for training needs?					
B	**Training Delivery**					
16	The frequency at which your company provides training in team concepts/ working in groups is					
17	The frequency which your firm provides training in skills require for current construction works is					
18	To what frequency does your company provides training in problem solving in construction works?					
19	To what frequency does your company provides training in quality initiatives in construction works?					
20	The frequency at which your firm provides training in managing performance of construction projects is					
21	The frequency at which your organisation provides training in construction business knowledge is					
22	To what frequency does your company provides training in skills require for future career in construction?					
23	The frequency at which your company provides training in negotiating skills required for construction projects is					
24	The frequency at which your company provides training in technical skills required for construction works is					
25	To what frequency does your firm provides training in conflict management in construction projects?					
26	The company provides training in site supervision to a…………					
27	The frequency at which your company provides training in health and safety on construction site is					
28	The frequency at which your company uses on-the-job training i.e. receiving training while working on site is					
29	The frequency at which your company uses off-the-job training within the organisation i.e. receiving training in the organisation but not while working is					
30	The frequency at which your company uses off-the-job training outside the organisation i.e. receiving training outside the organisation is					
31	The company uses lectures to train me to a					
32	The frequency which the company sponsors me to workshops, seminars or conferences is					

33	The company trains me through group work (Discussion) to a					
34	The firm uses demonstration to train me to a					
35	The company trains me through coaching or mentoring to a					
36	The frequency at which my company trains me through transfer from one site to another i.e. job rotation is					
37	The company uses computer based training for my training to a					
C	**Training Evaluation**					
38	The company conducts pre and post-test to evaluate the training I received to a….					
39	The frequency at which the company requires me to fill questionnaires at the end of the programme to evaluate the training I received is					
40	To what frequency does your firm interview you at the end of the programme to evaluate the training you received?					
41	The frequency at which the company asks the trainees' managers or supervisor for their assessment of my learning is					
42	The frequency at which your company measures the outcome of your training based on your reaction i.e. my feeling and opinion about the programmes' material, facilities, methods, contents, trainers, durations and relevance of the training programmes is					
43	To what frequency does your firm measures the outcome of your training based on learning outcomes i.e. the skills, knowledge and attitudes I acquired during the training programme?					
44	To what frequency does your company measures the outcome of your training based on behavioural change i.e. the change in on-the-job performance, which can be attributed to the training programme?					
45	The company measures the outcome of my training based on result i.e. the effect in the organisation's performance resulting from the change of behaviour such as cost saving, quality improvement and client satisfaction to a ……….					
D	**Training Transfer**					
46	To what frequency does your company measure your training context?					
47	The company makes an intended effort towards my mastering of the content of the training programme to a …….					
48	The company measures the extent of what I have achieved in a training to a ….					
49	The company makes sure the attainments made by me are apply back to the job to a …….					
50	The company assigns me duties related to the training I received to a ……					

Section C: Task Characteristics

This section sought to elicit information on nature of your task in your organisation.

Please indicate by ticking (√) your level of agreement with the following statements that describe the nature of your task, where **1= Strongly disagree, 2= Disagree 3= moderately agree, 4= Agree, 5= Strongly agree**

S/N	Task characteristics	1	2	3	4	5
	Skill Variety					
1	My tasks involves the use of variety of skill to execute them					
2	I have a variety of tasks to perform					
	Task Identity					
3	There is a role clarity in the tasks I do					
4	My task are complete from the start to finish					
5	My contribution to the task can be seen in the final result					
	Task Significance					
6	My tasks have impact on the project					
7	The degree of responsibilities I am given in my tasks is high					
8	The results of my tasks have significant effect on other people lives and well being					
	Autonomy					
9	I have an amount of authority to order others to execute work					
10	I have an amount of control to execute my tasks					
11	My tasks gives me the chance to use my personal initiative or judgment in carrying out the task					
	Feedback					
12	There is availability of information to carry out my tasks					
13	My supervisor frequently discusses matters related to my job performance					
14	I receive recognition for a task completed well					
	Task Analyzability					
15	My tasks involve a clearly defined sequence of steps					
16	My tasks involve a clearly established procedures					
	Task Difficulty					
17	My tasks require great physical effort to accomplish it					
18	My tasks require great mental effort to comprehend					
	Task Routineness					
19	My tasks involve a habitual method of carrying it out					
20	My tasks involve an unvarying procedure of carrying it out					
	Task Complexity					
21	The nature of my task is complex in structure					
22	The task is complicated in structure					
	Task Structuredness					
23	My tasks involve the application of a limited number of rules and principles with well-defined parameter for convergent					
24	My tasks possess multiple solutions					

APPENDIX B

Training Practices and Task Performance of Professionals in Construction Organisation in Nigeria

Construction Professionals' Supervisors' Questionnaire B (Site managers' questionnaire)

Dear respondent,

This survey is aimed at eliciting information about construction professional training and task performance in construction organisation in Nigeria.

Filling the questionnaire will take less than 10-15 minutes, depending on the level of details you are able and willing to provide. The outcome of this exercise would be used to recommend and provide remedies for construction professionals training and their task performance in construction organisation.

I seek your kind cooperation in completing this questionnaire and assure you that responses shall be treated with confidentiality and used strictly for research purposes only.

Thank you.

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Section A: General background information

Part 1

Please tick (√) appropriate responses.

Respondent's profile

1. How long have you been in the company? [1]( ) 0-4 years [2]( ) 5-10 years [3]( ) above 10 years.
2. Highest academic qualification [1]( ) OND [2]( ) HND [3]( ) B.Sc. [4]( ) PGD [5]( ) M.Sc. [6]( ) Ph.D.

Professional background

3. Professional Background [1] ( ) Architecture [2] ( ) Building [3] ( ) Quantity Surveying [4]( ) Civil Engineering [5] ( ) Project Management
4. Professional affiliation [1]( ) NIA [2]( ) NIOB [3]( ) NIQS [4]( ) NSE [5]( ) others specify___________
5. Grade of membership [1]( ) Graduate [2]( ) Corporate [3] ( ) Fellow
6. What is your age bracket as at your last birthday? [1]( ) 21-30 years old [2]( ) 31-40 years old [3]( ) 41-50 years old [4] ( ) 51-60 years old [5]( ) above 60 years old.
7. Gender…… ………… [1]( ) Male [2]( ) Female

Part 2

Please tick (√) appropriate responses.

Organisation's profile

Name of company/establishment ……………………………… (optional)

What is the total number of employees in your firm including partners and directors?

[1] ( ) 1-10 [2] ( ) 11-20 [3] ( ) 21-30 [4] ( ) 31-40 [5] ( ) over 40

How long has the company been in operation in Nigeria?

[1] ( ) <10 [2] ( ) 10-29 years [3] ( ) 30-39years [4] ( ) 40 years above

Form of ownership

[1] ( ) Indigenous [2] ( ) Multinational

Section B: Site Supervisor/Engineer Performance

This section sought to elicit information on the performance of site supervisor/engineer in your organisation.

Kindly assess your worker based on performance in his/her tasks/duties where **1= Very low, 2= Low, 3= Moderate, 4= High, 5= Very high**

Code	Measures	1	2	3	4	5
C1	**Cognitive ability**					
1	Ability to envisage problems on all structure under construction					
2	Ability to provide alternative solution to problems encountered on all structure under construction					
3	Ability to maintain emotional stability when dealing with problems on all structure under construction					
4	Ability to recall progress of works on all construction works					
5	Ability to ensure that all conflicts situations are resolves before they begin to impact negatively on the triple constraints of performance specifications, schedule and budget					
C5	**Job skills**					
6	Conceptualise all elements of the project situation and the extent to which the element interact with each other					
7	Build a cooperative efforts both within the team being led and within the wider group of project stakeholders					
8	The effectiveness with which the human dimensions of conflicts, roadblocks and negotiating processes are managed by the site supervisor					

9	The extent to which the site supervisor makes sure that those responsible for providing inputs to the project provide the required inputs on a timely basis					
10	Site supervisor's ability to negotiate i.e. increase common interest and expand cooperation in order to broaden the area of agreement to cover the item under dispute					
11	Site supervisor's degree of technical skill encompassing the technological discipline on which the project is based					
12	Liaising with planning staff over methods to be used in construction					
13	Attending site meetings and keeping site workers up to date					
14	Rearranging the works and programme to cater for changes and delays					
15	Liaise with subcontractor over dates and attendance					
16	Implement an effective planning and control system					
17	Liaising with the design team, particularly the architect and professional quantity surveyor					
18	Liaising with the site managers over the interpretation of economy policies					
19	Liaise with subcontractors					
20	Implementing a fair systems of discipline and morale at site level					
21	Lifting all correspondence/letter writing as required by company policy					
22	Establishing sound communication links between all subsystems of the project					
23	Controlling acceptable quality standards					
24	Ensuring a smooth flow of resources- men, machines and materials as and when required					
25	Overall responsibility for site safety and working conditions					
26	Availability of safety gadgets to workers					
C3	**Job Knowledge**					
27	Knowledge on appropriate construction technology for construction works					
28	Knowledge of appropriate saving techniques for construction works					
29	Knowledge of appropriate labour management for construction works					
30	Knowledge of appropriate programme for delivering construction works					
31	Knowledge of appropriate quality management techniques for construction works					
32	Knowledge of appropriate progressing techniques for construction works					
33	Knowledge of appropriate material management system for construction works					
34	Knowledge of appropriate health and safety issues for construction works					
35	Knowledge of appropriate risk management measures for construction works					
36	Knowledge of appropriate technology transfer					
C4	**Task Proficiency**					
37	Technical quality of programme for delivering construction works					
38	Functional quality of programme for delivering construction works					

39	Technical quality of cash-flow programme for construction works					
40	Functional quality of cash-flow programme for construction works					
41	Technical quality of specifications provided for the construction works					
42	Functional quality of specifications provided for the construction works					
43	Technical quality of programme for achieving client satisfaction					
44	Functional quality of programme for achieving client satisfaction					
45	Technical quality of risk containment for construction works					
46	Functional quality of risk containment for construction works					
47	Technical quality of health and safety measures for construction works					
48	Functional quality of health and safety measures for construction works					

APPENDIX C

EXTERNAL VALIDATION INSTRUMENTS

Training Practices and Task Performance of Professionals in Construction Organisation in Nigeria

Construction Professionals' Questionnaire A (site supervisors)

Dear respondent,

This survey is aimed at eliciting information about construction professional training practices, task characteristics and task performance in construction organisation in Nigeria.

Filling the questionnaire will take less than 10-15 minutes, depending on the level of details you are able and willing to provide. The outcome of this exercise would be used to recommend and provide remedies for construction professionals training and their task performance in construction organisation.

I seek your kind cooperation in completing this questionnaire and assure you that responses shall be treated with confidentiality and used strictly for research purposes only.

Thank you.

Irewolede Aina Ijaola,
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08062370205
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Section A: General background information

Part 1

Please tick (√) appropriate responses.

Respondent's profile

1. How long have you been in the company? [1]( ) 0 - 4 years [2]( ) 5-10 years [3]( ) above 10 years.
2. Highest academic qualification [1]( ) OND [2]( ) HND [3]( ) B.Sc[4]( ) PGD [5]( ) M.Sc [6]( ) PhD.
3. Professional background [1] ( ) Architecture [2] ( ) Building [3] ( ) Quantity Surveying [4] ( ) Civil Engineering [5] ( ) Project Management

4. Professional affiliation [1]( ) NIA [2]( ) NIOB [3]( ) NIQS [4]( ) NSE [5]( ) others specify__________
5. Grade of membership [1]( ) Associate [2]( ) Graduate [3] ( ) Corporate [4]( ) Fellow
6. What is your age bracket as at your last birthday? [1]( ) 21-30 years old [2]( ) 31-40 years old [3]( ) 41-50 years old [4] ( ) 51-60 years old [5]( ) above 60 years old.
7. Gender…… ………… [1]( ) Male [2]( ) Female

Part 2

Please tick (√) appropriate responses.

Organisation's profile

1. Name of company/establishment ……………………………… (optional)

2 .What is the total number of employees in your firm including partners and directors?

[1] ( ) 1-10 [2] ( ) 11-20 [3] ( ) 21-30 [4] ( ) 31-40 [5] ( ) over 40

2. How long has the company been in operation in Nigeria?

[1] ( ) <10 [2] ( ) 10-29 years [3] ( ) 30-39years [4] ( ) 40 years above

3. Form of management

[1] ( ) Indigenous [2] ( ) Multinational

Section B: Training practices in your organisation.

This section seeks to elicit information on the frequency of training practices implementation in your organisation.

The statement below describe the training practices which your organisation implements. Please indicate on a five point scale, the extent to which your firm has implemented these training practices ranging **1 = Nil, 2= Low frequency, 3=Moderate frequency, 4=High frequency and 5=Very high frequency**

Training practices		**1**	**2**	**3**	**4**	**5**
A	**Training Needs Assessment**					
11	To what frequency does your company uses poor performance in assigned tasks as an indicator for your training needs?					
13	To what frequency does your firm uses client dissatisfaction as an indicator for training needs assessment?					
14	To what frequency does your company sees low profitability as indicator for your training needs?					
15	To what frequency does your company sees low employee morale as indicator for training needs?					
B	**Training Delivery**					
29	The frequency at which your company uses off-the-job training within the organisation i.e. receiving training in the organisation but not while working is					
31	The company uses lectures to train me to a					
33	The company trains me through group work (Discussion) to a					
34	The firm uses demonstration to train me to a					
C	**Training Evaluation**					
40	To what frequency does your firm interview you at the end of the programme to evaluate the training you received?					

41	The frequency at which the company asks the trainees' managers or supervisor for their assessment of my learning is					
D	**Training Transfer**					
48	The company measures the extent of what I have achieved in training to a ….					

APPENDIX 4

EXTERNAL VALIDATION INSTRUMENTS

Training Practices and Task Performance of Professionals in Construction Organisation in Nigeria

Construction Professionals' Supervisor Questionnaire B (Site managers' questionnaire)

Dear respondent,

This survey is aimed at eliciting information about construction professional training and task performance in construction organisation in Nigeria.

Filling the questionnaire will take less than 10-15 minutes, depending on the level of details you are able and willing to provide. The outcome of this exercise would be used to recommend and provide remedies for construction professionals training and their task performance in construction organisation.

I seek your kind cooperation in completing this questionnaire and assure you that responses shall be treated with confidentiality and used strictly for research purposes only.

Thank you.

Irewolede Aina Ijaola,
Department of Building,
University of Lagos, Lagos.
08062370205
iredbuilder@yahoo.com, iredbuilder@gmail.com

Section A: General background information
Part 1
Please tick (√) appropriate responses.
Respondent's profile
1. How long have you been in the company? [1]( ) 0-4 years [2]( ) 5-10 years [3]( ) above 10 years.
2. Highest academic qualification [1]( ) OND [2]( ) HND [3]( ) B.Sc [4]( ) PGD [5]( ) M.Sc [6]( ) PhD.
3. Professional background
[1] ( ) Architecture [2] ( ) Building [3] ( ) Quantity Surveying [4] ( ) Civil Engineering [5] ( ) Project Management

4.Professional affiliation [1]( ) NIA [2]( ) NIOB [3]( ) NIQS [4]( ) NSE [5]( ) others specify__________

5. Grade of membership [1]( ) Graduate [2]( ) Corporate [3] ( ) Fellow

6. What is your age bracket as at your last birthday? [1]( ) 21-30 years old [2]( ) 31-40 years old [3]( ) 41-50 years old [4] ( ) 51-60 years old [5]( ) above 60 years old.

7. Gender…… ………… [1]( ) Male [2]( ) Female

Part 2

Please tick (√) appropriate responses.

Organisation's profile

1. Name of company/establishment ……………………………… (optional)
2. What is the total number of employees in your firm including partners and directors?

[1] ( ) 1-10 [2] ( ) 11-20 [3] ( ) 21-30 [4] ( ) 31-40 [5] ( ) over 40

3. How long has the company been in operation in Nigeria?

[1] ( ) <10 [2] ( ) 10-29 years [3] ( ) 30-39years [4] ( ) 40 years above

4. Form of ownership

[1] ( ) Indigenous [2] ( ) Multinational

Section B: Site Supervisor/Engineer Performance

This section sought to elicit information on the performance of site supervisor/engineer in your organisation.

Kindly assess your worker based on performance in his/her tasks/duties where **1= Very low, 2= Low, 3= Moderate, 4= High, 5= Very high**

Code	Measures	1	2	3	4	5
C1	**Cognitive ability**					
5	Ability to ensure that all conflicts situations are resolves before they begin to impact negatively on the triple constraints of performance specifications, schedule and budget					
C5	**Job skills**					
10	Site supervisor's ability to negotiate i.e. increase common interest and expand cooperation in order to broaden the area of agreement to cover the item under dispute					
14	Rearranging the works and programme to cater for changes and delays					
19	Liaise with subcontractors					
20	Implementing a fair systems of discipline and morale at site level					
22	Establishing sound communication links between all subsystems of the project					
23	Controlling acceptable quality standards					
C3	**Job Knowledge**					
27	Knowledge on appropriate construction technology for construction works					
28	Knowledge of appropriate saving techniques for construction works					
33	Knowledge of appropriate material management system for construction works					
C4	**Task Proficiency**					
47	Technical quality of health and safety measures for construction works					
48	Functional quality of health and safety measures for construction works					

APPENDIX D

Observations farthest from the centroid (Mahalanobis distance) (Group number 1)

Observation number	Mahalanobis d-squared	p1	p2
73	64.254	.000	.002
135	62.799	.000	.000
116	55.016	.000	.000
22	54.906	.000	.000
61	54.862	.000	.000
87	52.649	.000	.000
85	50.801	.001	.000
11	48.528	.001	.000
81	46.274	.003	.000
26	45.117	.004	.000
15	44.831	.004	.000
152	43.964	.005	.000
76	43.817	.006	.000
37	43.309	.006	.000
89	43.062	.007	.000
8	42.841	.007	.000
7	42.818	.007	.000
199	42.470	.008	.000
46	42.157	.009	.000
127	41.826	.010	.000
154	39.928	.016	.000
134	38.253	.024	.000
104	38.232	.024	.000
52	36.881	.033	.000

Observation number	Mahalanobis d-squared	p1	p2
201	36.176	.040	.000
17	36.067	.041	.000
119	35.874	.042	.000
117	34.793	.055	.000
18	34.448	.059	.000
60	33.929	.066	.000
75	33.720	.069	.000
12	33.638	.071	.000
28	33.602	.071	.000
203	33.303	.076	.000
80	32.301	.094	.001
56	32.261	.095	.001
53	32.137	.097	.001
10	31.507	.111	.003
38	31.166	.119	.006
16	30.935	.124	.008
82	30.530	.135	.017
193	30.210	.143	.028
150	30.079	.147	.026
113	30.077	.147	.017
102	29.791	.156	.027
24	29.673	.159	.025
114	29.376	.168	.041
133	29.373	.168	.028
168	29.357	.169	.020
146	29.155	.175	.025
77	29.013	.180	.026

Observation number	Mahalanobis d-squared	p1	p2
20	28.691	.191	.047
78	28.558	.195	.048
120	28.202	.208	.090
205	28.027	.215	.104
171	27.392	.240	.299
207	27.235	.246	.323
153	26.873	.261	.464
95	26.805	.264	.442
14	26.750	.267	.414
39	26.386	.283	.567
167	26.238	.290	.594
112	26.188	.292	.566
111	25.969	.302	.636
130	25.924	.304	.605
190	25.829	.309	.604
19	25.752	.313	.593
58	25.590	.321	.632
27	25.266	.337	.758
1	25.221	.339	.734
5	25.103	.345	.747
55	24.921	.354	.791
101	24.780	.362	.815
54	24.649	.369	.832
2	24.575	.373	.827
149	24.565	.373	.793
25	24.454	.379	.803
90	24.357	.384	.808

Observation number	Mahalanobis d-squared	p1	p2
121	24.353	.384	.770
161	24.087	.399	.850
50	24.008	.403	.848
204	24.005	.404	.814
198	23.942	.407	.804
51	23.931	.408	.770
69	23.893	.410	.746
191	23.707	.420	.798
44	23.663	.423	.780
92	23.435	.436	.846
208	23.120	.454	.922
178	23.048	.458	.920
3	22.825	.471	.951
70	22.768	.474	.947
105	22.663	.481	.952
214	22.266	.504	.987
195	22.137	.512	.990
107	21.905	.526	.995
72	21.861	.529	.994
31	21.830	.531	.993
108	21.742	.536	.994
148	21.724	.537	.991

AMOS RESULT FOR SEM

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	78	363.436	221	.000	1.645
Saturated model	299	.000	0		
Independence model	46	2732.246	253	.000	10.799

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.867	.848	.943	.934	.943
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.874	.757	.823
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	142.436	94.026	198.746
Saturated model	.000	.000	.000
Independence model	2479.246	2314.946	2650.917

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	1.675	.656	.433	.916
Saturated model	.000	.000	.000	.000
Independence model	12.591	11.425	10.668	12.216

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.054	.044	.064	.225
Independence model	.213	.205	.220	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	519.436	538.835		
Saturated model	598.000	672.363		
Independence model	2824.246	2835.686		

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	2.394	2.171	2.653	2.483
Saturated model	2.756	2.756	2.756	3.098
Independence model	13.015	12.258	13.806	13.068

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	154	163
Independence model	24	25

SPSS OUTPUT

ONE-WAY ANOVA FOR HYPOTHESIS ONE

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
MeanSI	218	1.67	5.00	4.2393	.67843
MeanSV	218	2.00	5.00	4.1697	.72392
MeanAU	218	1.33	5.00	4.1644	.63469
MeanTI	218	1.33	5.00	4.1055	.74678
MeanFB	218	1.33	5.00	4.0650	.67581
MeanAN	217	1.50	5.00	4.0300	.72187
MeanTCoverall	218	2.29	5.00	4.0193	.54371
MeanDI	216	1.00	5.00	3.9074	.92422
MeanST	218	1.50	5.00	3.8532	.79689
MeanCO	218	1.00	5.00	3.7775	.97305
MeanRO	218	1.00	5.00	3.6307	.91335
Valid N (listwise)	216				

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
MeanSV	Between Groups	3.130	4	.782	1.507	.201
	Within Groups	110.590	213	.519		
	Total	113.720	217			
MeanTI	Between Groups	3.765	4	.941	1.710	.149
	Within Groups	117.253	213	.550		
	Total	121.018	217			
MeanSI	Between Groups	3.370	4	.843	1.860	.119
	Within Groups	96.508	213	.453		
	Total	99.878	217			
MeanAU	Between Groups	.726	4	.181	.446	.775
	Within Groups	86.690	213	.407		
	Total	87.416	217			
MeanFB	Between Groups	3.612	4	.903	2.014	.094
	Within Groups	95.495	213	.448		
	Total	99.107	217			
MeanAN	Between Groups	2.992	4	.748	1.447	.220
	Within Groups	109.563	212	.517		
	Total	112.555	216			
MeanDI	Between Groups	7.516	4	1.879	2.251	.065
	Within Groups	176.132	211	.835		
	Total	183.648	215			
MeanRO	Between Groups	2.703	4	.676	.807	.522
	Within Groups	178.321	213	.837		
	Total	181.024	217			
MeanCO	Between Groups	9.578	4	2.395	2.604	.037
	Within Groups	195.882	213	.920		
	Total	205.460	217			
MeanST	Between Groups	4.603	4	1.151	1.840	.122
	Within Groups	133.200	213	.625		
	Total	137.803	217			
MeanTCoverall	Between Groups	2.401	4	.600	2.070	.086
	Within Groups	61.748	213	.290		
	Total	64.149	217			

ONE-WAY ANOVA FOR HYPOTHESIS TWO

ANOVA AGE

		Sum of Squares	df	Mean Square	F	Sig.
MeanSV	Between Groups	1.053	3	.351	.666	.574
	Within Groups	112.668	214	.526		
	Total	113.720	217			
MeanTI	Between Groups	5.025	3	1.675	3.090	.028
	Within Groups	115.993	214	.542		
	Total	121.018	217			
MeanSI	Between Groups	5.313	3	1.771	4.008	.008
	Within Groups	94.565	214	.442		
	Total	99.878	217			
MeanAU	Between Groups	2.774	3	.925	2.338	.075
	Within Groups	84.641	214	.396		
	Total	87.416	217			
MeanFB	Between Groups	1.151	3	.384	.838	.474
	Within Groups	97.956	214	.458		
	Total	99.107	217			
MeanAN	Between Groups	2.017	3	.672	1.296	.277
	Within Groups	110.538	213	.519		
	Total	112.555	216			
MeanDI	Between Groups	3.901	3	1.300	1.534	.207
	Within Groups	179.747	212	.848		
	Total	183.648	215			
MeanRO	Between Groups	5.544	3	1.848	2.254	.083
	Within Groups	175.480	214	.820		
	Total	181.024	217			
MeanCO	Between Groups	1.682	3	.561	.589	.623
	Within Groups	203.778	214	.952		
	Total	205.460	217			
MeanST	Between Groups	2.182	3	.727	1.148	.331
	Within Groups	135.620	214	.634		
	Total	137.803	217			
MeanTCoverall	Between Groups	2.024	3	.675	2.324	.076
	Within Groups	62.125	214	.290		
	Total	64.149	217			

ANOVA QUALIFICATION

		Sum of Squares	df	Mean Square	F	Sig.
MeanSV	Between Groups	4.063	4	1.016	1.973	.100
	Within Groups	109.658	213	.515		
	Total	113.720	217			
MeanTI	Between Groups	7.513	4	1.878	3.525	.008
	Within Groups	113.504	213	.533		
	Total	121.018	217			
MeanSI	Between Groups	5.207	4	1.302	2.929	.022
	Within Groups	94.671	213	.444		
	Total	99.878	217			
MeanAU	Between Groups	8.167	4	2.042	5.488	.000
	Within Groups	79.248	213	.372		
	Total	87.416	217			
MeanFB	Between Groups	3.474	4	.869	1.935	.106
	Within Groups	95.633	213	.449		
	Total	99.107	217			
MeanAN	Between Groups	7.618	4	1.904	3.848	.005
	Within Groups	104.937	212	.495		
	Total	112.555	216			
MeanDI	Between Groups	15.942	4	3.985	5.014	.001
	Within Groups	167.706	211	.795		
	Total	183.648	215			
MeanRO	Between Groups	8.731	4	2.183	2.698	.032
	Within Groups	172.293	213	.809		
	Total	181.024	217			
MeanCO	Between Groups	15.782	4	3.946	4.431	.002
	Within Groups	189.678	213	.891		
	Total	205.460	217			
MeanST	Between Groups	15.247	4	3.812	6.625	.000
	Within Groups	122.555	213	.575		
	Total	137.803	217			
MeanTCoverall	Between Groups	7.087	4	1.772	6.614	.000
	Within Groups	57.062	213	.268		
	Total	64.149	217			

ANOVA EXPERIENCE

		Sum of Squares	df	Mean Square	F	Sig.
MeanSV	Between Groups	.752	2	.376	.716	.490
	Within Groups	112.968	215	.525		
	Total	113.720	217			
MeanTI	Between Groups	2.640	2	1.320	2.397	.093
	Within Groups	118.378	215	.551		
	Total	121.018	217			
MeanSI	Between Groups	3.774	2	1.887	4.222	.016
	Within Groups	96.104	215	.447		
	Total	99.878	217			
MeanAU	Between Groups	2.434	2	1.217	3.079	.048
	Within Groups	84.982	215	.395		
	Total	87.416	217			
MeanFB	Between Groups	2.615	2	1.307	2.913	.056
	Within Groups	96.492	215	.449		
	Total	99.107	217			
MeanAN	Between Groups	1.567	2	.784	1.511	.223
	Within Groups	110.988	214	.519		
	Total	112.555	216			
MeanDI	Between Groups	1.628	2	.814	.952	.388
	Within Groups	182.021	213	.855		
	Total	183.648	215			
MeanRO	Between Groups	6.676	2	3.338	4.117	.018
	Within Groups	174.348	215	.811		
	Total	181.024	217			
MeanCO	Between Groups	7.764	2	3.882	4.222	.016
	Within Groups	197.696	215	.920		
	Total	205.460	217			
MeanST	Between Groups	2.282	2	1.141	1.811	.166
	Within Groups	135.520	215	.630		
	Total	137.803	217			
MeanTCoverall	Between Groups	2.682	2	1.341	4.690	.010
	Within Groups	61.468	215	.286		
	Total	64.149	217			

Independent Samples Test for Age

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Diff
MeanSV	Equal variances assumed	.469	.494	1.483	216	.139	.29587	
	Equal variances not assumed			1.559	15.069	.140	.29587	
MeanTI	Equal variances assumed	.090	.764	.916	216	.361	.18908	
	Equal variances not assumed			.755	14.170	.463	.18908	
MeanSI	Equal variances assumed	5.171	.024	.957	216	.340	.17939	
	Equal variances not assumed			.712	13.920	.488	.17939	
MeanAU	Equal variances assumed	.555	.457	1.148	216	.252	.20110	
	Equal variances not assumed			1.391	15.911	.183	.20110	
MeanFB	Equal variances assumed	.276	.600	1.882	216	.061	.34932	
	Equal variances not assumed			1.715	14.481	.108	.34932	
MeanAN	Equal variances assumed	.003	.955	1.505	215	.134	.29926	
	Equal variances not assumed			1.670	15.368	.115	.29926	
MeanDI	Equal variances assumed	.123	.726	1.561	214	.120	.39745	
	Equal variances not assumed			1.695	15.260	.110	.39745	
MeanRO	Equal variances assumed	.522	.471	1.927	216	.055	.48319	
	Equal variances not assumed			2.167	15.432	.046	.48319	
MeanCO	Equal variances assumed	.895	.345	1.534	216	.127	.41106	
	Equal variances not assumed			1.759	15.547	.098	.41106	
MeanST	Equal variances assumed	.000	.983	1.722	216	.086	.37745	
	Equal variances not assumed			1.851	15.184	.084	.37745	
MeanTCoverall	Equal variances assumed	.600	.439	2.037	216	.043	.30372	
	Equal variances not assumed			2.316	15.496	.035	.30372	

PEARSON PRODUCT MOMENT CORRELATION FOR OBJECTIVE THREE

		MeanTNA	MeanTD	MeanTE	MeanTT	MeanTROverall
MeanSV	Pearson Correlation	.377**	.168*	.173*	.288**	.264**
	Sig. (2-tailed)	.000	.013	.010	.000	.000
	N	218	218	218	218	218
MeanTI	Pearson Correlation	.292**	.209**	.246**	.235**	.263**
	Sig. (2-tailed)	.000	.002	.000	.000	.000
	N	218	218	218	218	218
MeanSI	Pearson Correlation	.149*	.160*	.168*	.253**	.183**
	Sig. (2-tailed)	.027	.018	.013	.000	.007
	N	218	218	218	218	218
MeanAU	Pearson Correlation	.269**	.199**	.208**	.245**	.245**
	Sig. (2-tailed)	.000	.003	.002	.000	.000
	N	218	218	218	218	218
MeanFB	Pearson Correlation	.450**	.363**	.412**	.447**	.441**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	218	218	218	218	218
MeanAN	Pearson Correlation	.253**	.195**	.235**	.289**	.249**
	Sig. (2-tailed)	.000	.004	.000	.000	.000
	N	217	217	217	217	217
MeanDI	Pearson Correlation	.217**	.060	.110	.075	.126
	Sig. (2-tailed)	.001	.379	.107	.274	.064
	N	216	216	216	216	216
MeanRO	Pearson Correlation	.394**	.231**	.237**	.186**	.298**
	Sig. (2-tailed)	.000	.001	.000	.006	.000
	N	218	218	218	218	218
MeanCO	Pearson Correlation	.262**	.161*	.181**	.148*	.209**
	Sig. (2-tailed)	.000	.017	.007	.029	.002
	N	218	218	218	218	218
MeanST	Pearson Correlation	.271**	.156*	.175**	.171*	.211**
	Sig. (2-tailed)	.000	.021	.010	.011	.002
	N	218	218	218	218	218
MeanTCoverall	Pearson Correlation	.411**	.271**	.306**	.329**	.352**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	218	218	218	218	218
MeanTNA	Pearson Correlation	1	.764**	.742**	.734**	.897**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	218	218	218	218	218
MeanTD	Pearson Correlation	.764**	1	.836**	.776**	.954**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	218	218	218	218	218
MeanTE	Pearson Correlation	.742**	.836**	1	.832**	.909**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	218	218	218	218	218
MeanTT	Pearson Correlation	.734**	.776**	.832**	1	.867**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	218	218	218	218	218
MeanTROverall	Pearson Correlation	.897**	.954**	.909**	.867**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	218	218	218	218	218

Descriptive Statistics

	Mean	Std. Deviation	N
MeanSV	4.1697	.72392	218
MeanTI	4.1055	.74678	218
MeanSI	4.2393	.67843	218
MeanAU	4.1644	.63469	218
MeanFB	4.0650	.67581	218
MeanAN	4.0300	.72187	217
MeanDI	3.9074	.92422	216
MeanRO	3.6307	.91335	218
MeanCO	3.7775	.97305	218
MeanST	3.8532	.79689	218
MeanTCoverall	4.0193	.54371	218
MeanTNA	3.2493	.69712	218
MeanTD	3.3165	.69514	218
MeanTE	3.2498	.78593	218
MeanTT	3.4535	.80557	218
MeanTROverall	3.2995	.66345	218

PEARSON PRODUCT MOMENT CORRELATION FOR OBJECTIVE FOUR

		MeanCA	MeanJS	MeanJK	MeanTPr	MeanTPoverall
MeanTNA	Pearson Correlation	.364**	.432**	.327**	.373**	.429**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	218	218	218	218	218
MeanTD	Pearson Correlation	.280**	.375**	.317**	.232**	.350**
	Sig. (2-tailed)	.000	.000	.000	.001	.000
	N	218	218	218	218	218
MeanTE	Pearson Correlation	.274**	.346**	.279**	.266**	.337**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	218	218	218	218	218
MeanTT	Pearson Correlation	.275**	.337**	.269**	.234**	.320**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	218	218	218	218	218
MeanTROverall	Pearson Correlation	.329**	.415**	.335**	.303**	.399**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	218	218	218	218	218
MeanCA	Pearson Correlation	1	.781**	.623**	.632**	.811**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	218	218	218	218	218
MeanJS	Pearson Correlation	.781**	1	.714**	.723**	.932**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	218	218	218	218	218
MeanJK	Pearson Correlation	.623**	.714**	1	.744**	.875**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	218	218	218	218	218
MeanTPr	Pearson Correlation	.632**	.723**	.744**	1	.888**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	218	218	218	218	218
MeanTPoverall	Pearson Correlation	.811**	.932**	.875**	.888**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	218	218	218	218	218

Descriptive Statistics

	Mean	Std. Deviation	N
MeanTNA	3.2493	.69712	218
MeanTD	3.3165	.69514	218
MeanTE	3.2498	.78593	218
MeanTT	3.4535	.80557	218
MeanTROverall	3.2995	.66345	218
MeanCA	3.8463	.58342	218
MeanJS	3.8261	.52520	218
MeanJK	3.9161	.69613	218
MeanTPr	3.7992	.64041	218
MeanTPoverall	3.8405	.53270	218