EFFECTIVE TRAINING AS A TOOL FOR IMPROVING BUILDING SERVICES IN ENGINEERING PRACTICE

(A Case Study of Aldeen Associates)

By

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A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF POST GRADUATE STUDIES AHMADU BELLO UNIVERSITY, ZARIA
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DECLARATION

I declare that the work in this research project entitled "EFFECTIVE TRAINING AS A TOOL FOR IMPROVING BUILDING SERVICES IN ENGINEERING PRACTICE" was carried out by me in the Department of Mechanical Engineering under the supervision of Dr. M.O Afolayan. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this project was previously presented for another degree in this university or any other Institution.

OLADIPO, Rasheed Olawale _____ _____

Signature Date

CERTIFICATION

This project entitled "EFFECTIVE TRAINING AS A TOOL FOR IMPROVING BUILDING SERVICES IN ENGINEERING PRACTICE" by Oladipo Rasheed Olawale meets the regulations governing the award of Master of Science (M.Sc) degree in Engineering Management of Ahmadu Bello University, Zaria, and is approved for its contribution to knowledge and literary presentation.

Dr. M.O Afolayan Supervisor	Signature	Date
Dr. M. Dauda Head of Department	Signature	Date
Prof. Karbir Bala Dean, School of Postgraduate Studies	Signature	Date

DEDICATION

This research project is dedicated to my parent Dr. Oladipo Taiwo and Mrs. Oladipo Toyin for their relentless efforts, supports and prayers towards the success of this work.

ACKNOWLEDGMENT

My most profound gratitude goes to Almighty Allah (S.W.T), the source and sustainer of life by whose special grace I have successfully completed my program. I am deeply indebted to my supervisor Dr. M.O. Afolayan for his keen interest they have shown from the formative stage to the end of this work, whose despite his busy schedules have always found time to offer cherished advice, guidance and contributions that led to the overall success of this project I‟m grateful sir. My sincerely gratitude also goes to the Entire Staff of Mechanical Engineering Department, A.B.U, Zaria for their relentless effort towards the success of this project. I will not forget to acknowledge the immense contributions of Engr. Muyideen Balogun, Engr. I.A. Samotu, Mr. Ibrahim, Engr. Sa‟ad Bashir, Mr. Adeleke Rafiu. My profound gratitude goes to my lovely wife Mrs. Rasidat Olajumoke and my lovely kids – Aishat and Abdullahi and also other member of my family which include Mrs. Rashidat Ahmed, Mrs Idayat Adesoye, Omolola, Bashirat, Nurudeen, Habib and Mariam, you all are indeed a pillar, ever supporting, ever caring and ever loving thanks so much for your understanding, supports and fervent prayers. Finally, I will not forget all those who served out of spotlight, I called them the hidden heroes, and in this endeavor there have been many, to you all I owe my highest gratitude.

ABSTRACT

It has being observed over time that there are problems associated with the quality of designs and execution of jobs within the Building Services Sector of the Engineering Industry. The sector is an important aspect of Engineering Practice in Nigeria and its performance can only be measured by the quality of its output which include good engineering designs and proper execution of projects. Hence, the focus of this research work is to investigate on effective training as a tool for improving building services in engineering with particular inferences to mechanical and electrical engineering services in Aldeen Associates (A consulting engineering firm) as a case study. The methodology employed in carry out this research work was questionnaire and the data collected through the use of this instrument were analyzed using bar chart. It is of interest to this research work to know the type of relationship that exists between training and performance of technical staffs. Therefore, the training and capacity development shows that 16 respondents representing 40% of population agreed that they are been sent on regular training and capacity development program while the other

60% said they have not being on regular training program. This shows that more still needs to be done in-terms of regular training for the personnel which is very important in developing their skills and also as a motivating factor as a personnel will be de-motivated to work if his not given the opportunity to explore more opportunity in-terms of manpower training. The data on the impact of training on work performance shows that 25 respondents representing

The research 82.5% agreed the various training programs they have undergone have excellently improve their work performance, while the remaining 12.5% disagreed on the fact that training has improve their work performance.

The research also reveals that motivational factors such as adequate payment of salary, good working conditions, conducive physical environments, annual incentives, etc. are needed to sustained and improve the practice of building services as training will equipped a personnel to discharge his duty as required but motivation will enhance the discharge of any responsibility assign to them.

The Chi-square square analysis was also used to test for the proposed hypothesis which confirmed the alternative hypothesis of effective training as a tool for improving building services in engineering.

More so, based on least square method, there is a strong positive correlation between the technical staffs trained to the forecasted numbers of building services design and supervision work that are available for a particular year in view.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

The role of engineering in industrial and economic development is not only limited to equipment and machines, production processes, but also concerned with the management of the available resources and the balancing of the various constraints of the industrial environment. Engineering must therefore not be seen in terms of screwdrivers and spanners but as encompassing all areas of knowledge needed in ensuring that resources which include manpower are effectively translated into desired end-results.

Human resources are a crucial but expensive resource and therefore in order to sustain economic and effective performance of this resource, it is important to optimize their contribution to the achievement of the aims and objectives of the organization through training and development. Training is therefore necessary to ensure an adequate supply of man powers that are technically competent.

Training both physically, intellectually and mentally are very essential in facilitating not only the level of productivity but also the development of personnel in any organization. However, training is the knowledge acquired, while knowledge is the ability, the skill, the understanding, the information, which every individual requires in order to be able to function effectively and perform efficiently. The human resource of any organization is that which is expected to bring about the competitive difference, since the success or failure of an organization is dependent on the quality of this resource as well as its orientation. This is based on the notion that human resource is the competitive advantage of an organization. Hence, while equipment, infrastructure, methods of execution, packaging and distribution strategies could all be copied by other competitors, the innate quality, innovativeness, knowledge, abilities and skills of the human resource cannot easily be copied.

Training is an important part of the human resource development practice, and for personnel to carry out their duties effectively and efficiently they must have the relevant skills, knowledge, values, attitudes and competencies and as well understand their organization‟s culture. More often, newly employed do not have all the competencies usually required for successful or excellent performance on their jobs. Again while on the job, personnel need to be updated through training and development to acquire competencies they did not have at the time of appointment. In the recent years, Federal Government of Nigeria is concerned with the development of all workers to improve performance in their present job and to provide a solid basis for those who are growing up. Perhaps, this influenced her decision in establishing Industrial Training Fund (ITF) to cater for the training needs of personnel in public and private sectors. Since four decades of its formation, Industrial Training Fund (ITF) has been organizing and sponsoring training programs and also encouraging greater involvement of employers, particularly small employers, in the organization and development of training exercises that would lead to the production of highly-skilled manpower. The skills are intended to help practitioners who include engineers, technologists, technicians, artisans and craftsmen to accept specific responsibility at work. According to Heathfield (2012), the right employee training, development and education at the right time, provides big payoffs for the organization to increase productivity, knowledge, loyalty and contribution.

1.2 Statement of Research Problems

Human resources are very crucial but expensive resource and therefore in order to sustain an economic and effective performance of this resource, it is important to optimize their contribution to the achievement of the goals of any organization through training and development policy as well as a succession plan (Mullins, 2011). Moreover, It has being

observed that there are inadequacy in Building Services Designs such as Plumbing Designs, Air-conditioning and Ventilation Designs, Lift Designs and Fire-fighting Designs.

1.3 Present Research

The present study focused on how to forecast the number of Services jobs that will be available for the company in a year through the training of it man-power using the regression analysis method to analysis the rate at which they are being sent on training in relative to the available design for a particular. Since it has been known that the quality of any manpower can only be determined through his/her output or contribution, it is necessary to know what impact the training programs has made on each personnel. Also a good motivational measure that will enhance the performance needed by services engineers to succeed in their role was also surveyed. Hence, it is a good policy to invest in the development of personnel skills so as to increase their performance

1.4 Aim and Objectives

The aim of this project is to identify the effects of training and development on employee performance of Aldeen Associates.

The specific objectives are:

i. To investigate how training and development of personnel can be used to improve Building Services Engineering in Nigeria.
ii. To find out whether there are organizational issues that constrain training of personnel.
iii. To use chi-square statistical method to test the proposed hypothesis.
iv. To use regression analysis to examine the relationship between staff performance with respect to training.

1.4.1 Research questions

At the end of the research, the following questions were answered:

(1) What are the factors imitating the inadequacy in Building Services Engineering?

(2) Why are the practitioners not equipped with the required skills and knowledge?

(3) Does training and skill development affect the personnel performance?

(4) What are the issues that work against training of personnel?

1.4.2 Research hypotheses

H_0: Regular training is not a tool for improving building services in engineering.

H_1: Regular training is a tool for improving building services in engineering.

1.5 Scope and Limitation of the Research

The research work focus on effect of training as a tool for improving performance of personnel in Building Services Engineering with particular inference to Aldeen Associates – A Building Services Engineering Firm based in Abuja. The research is limited to the technical staffs of the firm which include the Draughts-men, Technical Officers and Engineers.

1.6 Significance of the Study

(1). This research will help improve performance of personnel in the Building Services Engineering firms and establishment.

(2). It would also help in the effective utilization of training as a means to increase performance.

(3). This research will also help Aldeen Associates and any other Engineering firm on how to sustain and improve its training policies.

(4). The study would also serve as an appraisal of training programs.

1.7 Company Description at a Glance

ALDEEN ASSOCIATES is a multi-disciplinary engineering consulting firm and project managers and solely indigenous with Nigerian Engineers and project managers forming bulk of the expertise, it was established to provide a professional practice embracing the full range of activities in engineering vis-à-vis:- Electrical & Mechanical Engineering, Civil and Building Engineering, Water resources, Engineering Economies and Project Management. The firm has at its disposal crop of young, dynamic and competent Engineers and Technologist with vast experience in various engineering disciplines.

ALDEEN ASSOCIATES is an indigenous consulting firm with the basic motivation of providing the best indigenous expertise to our country, because it belief that a country can only be great when her indigenous engineers are in position to develop her resources. The high caliber staff of the firm has also been extensively involved in the design, supervision and management of construction of a number of electrical, mechanical and civil engineering and projects development all over the country and has acquired considerable experience in this field.

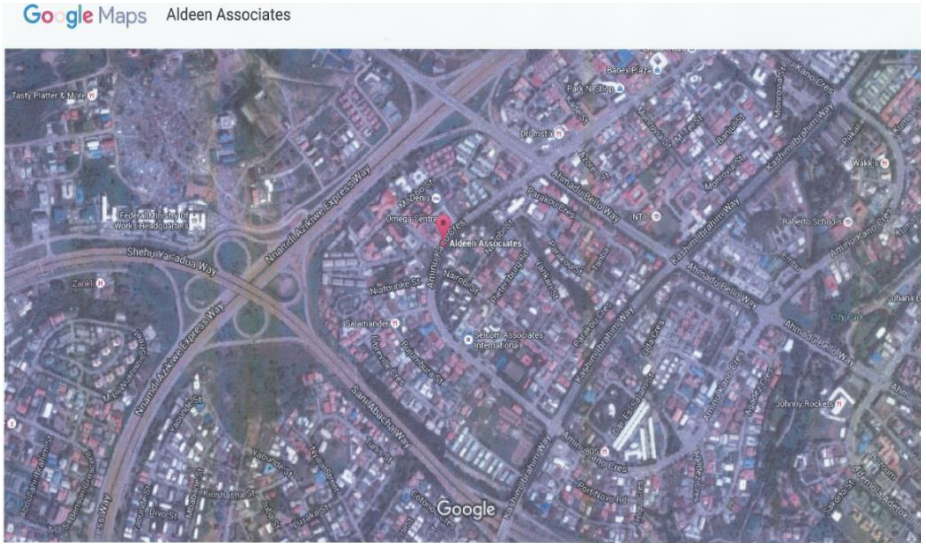


Plate 1.1: Map of Aldeen Associates
Source: Google Map

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Review of Related Literature

It is widely recognized that improved capabilities, knowledge and skills of any workforce proved to be a major source of competitive advantage in the global industry (McKinsey, 2012). To develop the desired knowledge, skills and abilities required of personnel to perform well on their job, they requires effective training programs that may also effect employee motivation and commitment (Meyer and Allen, 1997).

Onyango and Wanyoike, (2014) undertook a research on "Effect of Training on Health Sector Performance with specific interest in the health sector of Kenya. They collected their data through the administration of questionnaires using a sample size of 56 respondents who works in various departments of the hospital. Their study shows that non-monetary incentives have the potential to affect the motivation of public personnel positively if necessary circumstances are met. These non-monetary incentives are vital to satisfy personnel many other needs such as social interaction, belongingness, recognition, respect and a feeling of achievement.

Eric, (2012) conducted a research on Training as a Tool for Enhancing Performance in Higher Institutions of Learning, a case study of Accra polytechnic. Primary data was collected from a sample of fifty (50) senior staff. The study revealed that there were organizational issued such as lack of management support for training and development which is affecting the quality of services delivery.

Voyager, (2012) investigated on a research on Evaluating the Effectiveness of Training and in Srivirad System and services. The research tries to know the level of knowledge and skills imparted in personnel using a simple random sampling method in which 65 out of 150

personnel who attend training were chosen. The result was analysed using chi-square method. The analysis revealed that the trainings were only job related but not concerned with the personal development of the personnel. He recommends that recruitment must be made not only on skills but also on attitude of employee as a positive attitude makes training more effective.

Mwesigmwa, (2010) set out to know the Impact of Training on Engineering Lecturers of higher institutions. The research was conducted using self-administered questionnaire. The study population constitutes of lecturers from different higher institution. He used a sample size of 80 respondents. The research was analysed qualitatively and it was revealed that training may lead to better performance if personnel are provided with complementary input and resources. It also revealed that poor selection criteria for participant of short term training have encouraged wrong people going for right courses. He therefore recommends that criteria for selection of lecturers for training need to be reviewed. Performance and appraisal should also be used to identify training needs. Institutions should take a lead and responsibilities in identifying the training need of lecturers that take into consideration the need of the institution and budget for such training.

Ifeanyi and Victor, (2011) worked on "Regular training as a tool for Good Engineering Practice. Their data were collected using a samples size of 40 fresh graduate personnel of different firms with different job responsibilities. Their research shows that training is basic for proper engineering practice, for when an engineer leaves school, it can only be presumed that he has mastered some rudimentary concepts of engineering but he needs to undergo thorough and necessarily demanding training under experienced and knowledgeable senior colleagues in a related industry. They recommend regular training course for professionals in the industry to get them acquitted with latest global practices and also through supervised Industrial training Schemes for graduate engineers.

2.2 Concepts and Definitions

Well trained personnel are key tools to organisation success. It has been shown that the most successful and productive personnel are those who have received extensive training. These groups of personnel can be described as the “cream of the crop” that often has the strongest stake in an organization‟s future.

According to (Dessler 2011) even when personnel are carefully selected, it does not still guarantee totally acceptable performance from the personnel. This is because while the potential of an employee to perform is one thing, performing is another and therefore an personnel with a high potential to perform may not still perform his job if he does not go through good training. This is why training of newly engaged personnel starts with organizational orientation.

Cole (2011) postulates that human resources are the most dynamic of all the organization‟s resources and therefore need considerable attention from the organization to realize their full potential in their work.

Training and development activities just as most other activities in an organization depended on the policies and strategies of the organization. An organization with a well-organized training would refer to it as “systematic training” which is why job descriptions are inevitable during the recruitment and selection process. Furthermore, in establishing what training needs of a firm is, it must start with a job description and later performance appraisal.

2.3 Organization’s Need for Training

Well trained personnel when fully utilized by the employing organization benefits it as well as the personnel themselves. Therefore for any firm to grow and survive in today‟s globally competitive and fast changing environment especially in the engineering industry there would be the need for such establishment to come up with systems and programmes that

would bring the needed efforts, attention, creativity and general innovations as individual employee and as groups or teams. For this reason organisation seek to adapt to new structures, new cultures and new effective methods of performance management and employee motivation to be able to cope with rapid change and competition in the industrial environment.

Innovative changes or adjustments become successful when people acquire new perspective or understandings, values, knowledge and skills. For an example, the introduction of effective and up-to-date technique in performance management would require that the employers (supervisors and management) who administer this system must understand the need for it and have the knowledge and skills to implement it. This understanding, Knowledge and skills would come from organizing seminars, training and workshops that will provide these personnel with the relevant perspectives, skills and knowledge for successful implementation. The ultimate human resource management outcome therefore is performance and hence all other outcomes such as competencies, morale of personnel, attitudes and motivation are determinants of performance. Performance of personnel as said elsewhere thus is about employee output which is twofold; first, the effective use of inputs or resources and second, the translation of resources into quality services in an organization.

Human resource training, education and development activities therefore are aim at equipping personnel with the necessary competencies that they require for their effective performance on their job. It therefore fairly correct and important to argue that, without the right kind of competencies, no amount of motivation either in cash or kind will be able to get personnel to perform creditably or totally acceptable.

Asare-Bediako, Ivancevich and Beardwell, all agree that competencies needed by personnel to perform at a totally acceptable levels fall into three main categories, namely; technical, managerial and personality competencies.

Training and development interventions therefore must aim at providing personnel with the required technical, managerial and personality competencies for them to achieve and sustain a high level of performance. Adoption of this position in an engineering firm like Aldeen Associates would be the way for it to be very competitive in the industry.

This does not however mean that training is the solution to all performance problems in an organization. This has lead Asare-Bediako (2008) to derive a performance mathematical model as indicated in equation (1) below:

Performance = (Ability) x (Motivation) ---------- (2.1)

From the above mathematical model, performance is the product of ability and motivation. While ability is the "can" factor in the equation, "motivation is the "want to" factor. Thus if a personnel has the ability (can factor) and at the same is provided the needed motivation (wan to factor), then performance would be guaranteed from the combined effect of ability and motivation. It therefore follows that while the ability may exist in the personnel, the absence of motivation e. g. ergonomics of the environment, rewards and leadership style (just to mention a few) will bring about poor performance. In this instance, no amount of training would solve the problem.

However, training can have an impact on both of these variables (Ability x Motivation); it can heighten the skills and ability of the personnel and their motivation by increasing their sense of commitment and encouraging them to develop and use new skills. Training is thus a powerful tool that can have a major impact on both personnel‟ productivity and morale if properly used.

Thomson (2002) quotes from a survey carried out in the UK in 1996 which showed that the young personnel of today values training and development opportunities over pay and perks. According to her the survey further showed that seventy three percent (73%) of those

surveyed said they would stay with an organization that invested time and energy in their development rather than move to a rival organization that paid more money but less investment in helping them to develop professionally. Furthermore since the mid – 1980s, it has been widely recognized that the training and development of personnel should be a major item on any organization‟s agenda. This means that every manager or supervisor must have responsibility for his own self-development and then the development of the personnel he manages. Therefore, every engineering firm must make efforts to identify, define and assess the competitiveness of skills of the personnel and make a way for these individuals to develop the skills required. However, for an engineering manager to be able to assess the competitiveness of the competencies of personnel and thus set objectives for the necessary improvement of these competencies through training and development, he must first set up some kind of an employee appraisal system. A manager has accountability for the performance of his personnel and therefore a manager‟s success would be dependent on the abilities of his personnel. A better or very well trained employee should increase efficiency and even productivity by reducing fatigue and wastage. Thomson (2002) goes on to state that each employee fell into one of three categories in relation to competence to perform current job. These are:

1. Competent to perform current job
2. Not yet competent to perform current job
3. Better than competent to perform current job

Boxall and Purcell (2011) say that the opportunity to use training powerfully arises when organizations have invested more comprehensively in recruitment and has thus built a labour pool with greater long – run potential and consequently greater aspirations.

According to Robbins and Judge (2011), competent personnel do not remain competent forever. Skills deteriorate and become obsolete and therefore new skills need to be learned.

They cite a report from the USA where corporations with 100 or more personnel spent more than $51 billion dollar on formal training in one year.

Most training is directed at upgrading and improving an employee‟s technical skills. This form of training has become increasingly important for two (2) reasons:

1. Due to new technology and new organization structure design
2. Jobs change as a result of new technologies and improved methods

Technical training has become increasingly important because of changes in organizational design. For example as organizations flatten their structures, expand their use of teams and break down traditional barriers, personnel need mastery of wider variety of tasks and increased knowledge (problem solving techniques, working in teams, quality circles, e.t.c.) of how their organizations should operate.

Training in general terms is designed to improve personnel‟ job skills, be it technical or personality. E.g. Personnel may be trained to run machines, taught new skills or acquainted with personal growth and development methods.

Moorhead and Griffin, give the example of the situation where in multinationals, one training that is becoming increasingly important is the training of people to work in other countries.

The need for training of personnel further comes from both demographic and economic trends which have meant radical changes in the composition of the labour force. Further factors affecting the numbers, types and requirements of available jobs include automation, worker displacement due to mergers and acquisitions, downsizing and business paradigm shift e. g. from manufacturing to service job (or vice versa); the increasing sophistication in technological systems that are imposing training and retraining requirements on existing workforce, the need to train underutilized personnel and the training needs brought about by national and international competitions in the environment of many organizations.

Brody (1987) quotes a Motorola company spokesperson as saying "we‟ve documented the savings from the statistical process control methods and problem solving methods we‟ve trained our people in. We‟re running a rate of return of about 30 times the dollars invested – which is why we‟ve gotten pretty good support from senior management" This is a clear indication that a systematic and well planned training and development policy that is well executed would surely bring returns to the organization in cost savings (reducing in waste and scrap for example, increased productivity and so on), employee effectiveness and efficiency and the list could go on and on.

From the view point of Dessler (2013), training and development could be placed in a strategic context. This occurs with the paradigm shift to the situation when trainers sit with management to identify strategic goals and objectives and the skills and knowledge that could be used to achieve these strategic goals and objectives. This then followed by the identification processes as to whether staff have the skills and knowledge, when they do, not then training needs discussions are evoked. Once again, this is why human resource management has become an increasing partner of the other functional areas of businesses. This position is further strengthened by the fact that for every decision that is taken by senior management, there is an implication on the human resource of the organization, Asare-Bediako (2010).

According to Taylor, for the successful creation of an organizational culture managements make sure that the personnel have the appropriate outlook and the required set of attitudes. This further leads credence for the need for training and development of personnel‟ right from new personnel through orientation to current personnel who from time to time need modification of attitude to remain in line with the culture of the organization.

2.4 Training Needs Identification and Analysis

According to Monappa and Saiyadain (2008), many methods for training needs identification and analysis have been proposed. They quote a survey that was conducted by Sinha (1974) in which the under listed methods have been identified:

1. Views of the Senior Executives
2. Performance appraisal
3. Organization and developmental plans
4. Views of the training manager and
5. Analysis of job difficulties and job description

In the Thayer and McGhee model the above methods seem to have been summarized into only three broad areas for consideration:

1. Organizational analysis
2. Task analysis
3. Man analysis.

This model agrees with the position of Cascio (1992), as found in is his book "Managing human Resources: Productivity, Quality of Life, Profits". With just slight change in the choice of words he says also that there are three levels of analysis for determining the need that training can fulfill for the organization: Organizational, Operational (task in Thayer and McGhee Model) and Individual (man in Thayer and McGhee model) analyses. Cascio then explains as follows:

2.4.1 Organizational Analysis

Here the focus is on identifying where within the organization training is needed. These training needs are assessed against the organization‟s objectives and strategies. This would help avoid wastage of resources in training and development where personnel are trained in skills they already have or that are not transferable to the job situation. Again there is the need to analyze the external environment and the internal climate of the organization. This is

the critical first step for Human Resources Development personnel in assessing and relating training needs to the achievement of organizational goals.

2.4.2 Operational Analysis

This is the stage which assesses painstakingly the job to be performed after the employee had been trained. This stage‟s process is made up of:

(i) The systematic collection of information on exactly how the job is done (job analysis).

(ii) A performance standards for those jobs to done are determined.

(iii) How tasks are to be performed to meet standards.

(iv) The knowledge, skills, abilities and other characteristics necessary for effective task performance.

2.4.3 Individual Analysis

At this final stage, training needs could be defined in terms of the following:

(a) Difference between desired performance and actual performance e.g from a performance appraisal report

(b) Performance standards identified in the operational analysis

(c) Individual performance data from performance appraisals

(d) Diagnostic ratings of personnel by supervisors

(e) Records of performance kept by personnel in a diary form

(f) Interview survey by researchers

From the above processes the identification of a gap existing between actual performance and desired performance may be filled by training, but it does not mean that training provides solution to all performance problems.

For Dessler (2013), the whole process of training needs identification and analysis could be broken down into two (2) stages only:

1. New employee- The task here is to determine what the job involves and break it down into subtasks which are taught to the new personnel.

2. Current employee- Training needs analysis for current personnel is more complex since Human Resources Development department and supervisor have the added task of deciding whether training is the solution to the whatever performance gap exist. This again is important (as its been emphasized) given the fact that not all problems could be solved through training and development.

Training need analysis could also come from what Dessler (2013) called a "competency model". This model means knowledge, skills and behaviors that enable personnel to effectively perform their jobs. This process begins with interviewing senior executives to understand the organization‟s strategies and objectives. Human Resources Development experts would then conduct behavioral interviews with the jobs to performers (bench marking) as well as focus groups to identify the set of competencies that together would comprise the job‟s competency model.

Ivancevich (2012) adds that, interviews, surveys, reviews of records, observation and discussions with management and subject matter experts are methods used to conduct training needs identification or assessment. These methods of data and information gathering provide the basis for what type of training would be needed, who should be selected for training, when the training must be done and finally whether training is the solution to the deficiency identified and therefore the solution.

In the light of the above it appears that organisations would need restructuring of their human resource department that is staffed with re-trained personnel to be able to carry out the detailed assessment methods outlined especially in terms of orientation and performance appraisal. It further appears that, the only time some form of performance appraisal are done

are when newly appointed personnel are about to be confirmed at the end of the six months probationary period. Then after their confirmation, performance appraisal seems to stop completely. The need for the above methods for training need analysis within the practice of engineering cannot be overemphasized with the creation of new departments and the roll on of new courses.

2.5 Training and Development Methods

Nadler (1984) noted that all the human resource development activities are meant to either improve performance on the present job of the individual, train new skills for new job or new position in the future and general growth for both individuals and organization so as to be able to meet organization‟s current and future objectives.

For training method to be useful it should meet the minimal condition for effective learning to take place. This means that training methods that are worth adapting for the purposes of training should;

1. Motivate the trainee to improve his performance. (the motivational factor of the performance equation)
2. Clearly illustrate the desired skill to be acquired at the end of training programmes
3. Provide for active participation by trainees (experiential learning technique)
4. Provide an opportunity for trainees to practice
5. Provide time feedback on trainee‟s performance
6. Be structured from simple to complex
7. Encourage positive transfer from the training to the job

There are many types of training and manpower development program available. The particular method chosen by a company can be influenced by considering cost and time available, number of persons to be trained, depth of knowledge required, background of the trainee, etc. Manpower development is a systematic process of training and growth by which

individuals gain and apply knowledge, skill, insights and attitude, manage work and personnel effectively. It involves the estimation of the demand for the supply of management staff for the organization in future. it is the involvement of efforts aimed at improving the quality as well as the number of management staff. Studies showed that many workers fail in organizational expectations because the training needs were not identified and provided for. Development may help to build confidence in the workers and make him work more efficiently and effectively. There are two major types of training, namely on-the-job training and off-the-job training as identified by Alo Oladimeji (1999).

(1). **On-the-job training**: This is normally handled by colleagues, supervisors, mangers, mentors to help personnel adjust to their work and to equip them with appropriate job related skills. Armstrong (2014) argues that on-the-job training may consist of teaching by a highly experienced resource people or trainers, it may also consist of individual or group assignment. According to Armstrong, on-the-job training is the only way to develop and practice the specific managerial, team leading, technical, manual, and administrative skills needed by the organization and it has the advantages of individual works learns and develops expertise at the same time.

The disadvantages of this type of training according to Armstrong are that the effectiveness of the learning is strongly influenced by the quality of the guidance and coaching provided on the job. Many managers and team leaders are unskilled at training and disinclined to carry it out or to encourage it. Furthermore, relying on fellow personnel in "sit by me" training has obvious disadvantages as instruction may be inadequate and the training may perpetuate bad habits. Again, the learner may be distracted by the same environment and find it difficult to acquire basic skills quickly.

(2). **Off-the-job training**: According to Ejiogu (2000), off-the-job training would include lecture, vestibule training, role playing, case study, discussion and simulation. Armstrong

(2014) listed group exercises, team building, distance learning, outdoor and workshops as part of off-the-job training. He further explains that off-the-job training may be provided by members of the training department, external education and training establishments, or training providers-training consultants or guest speakers. He encourages line managers to be closely involved to bring reality into the classroom, to ease the transfer of learning, and to make sure that those involved in off-the-job training are carefully selected, briefed and monitored so as to ensure that they make the right contribution.

2.5.1 Job rotation and transfers of personnel

Job rotation and transfers according to McCourt and Eldridge (2003), as a way of developing employee skills within organization involves movements of personnel from one official responsibility to another for example taking on higher rank position within the organization, and one branch of the organization to another. For transfers for example, it could involve movement of personnel from one region to another. These rotations and transfers facilitate personnel acquire knowledge of the different operations within the organization together with the differences existing in different states where the organization operates. The knowledge acquired by the selected personnel for this method is beneficial to the organization as it may increase the competitive advantage of the organization.

2.5.2 Coaching and mentoring of personnel

This involves having the more experienced personnel coach the less experienced ones. (Devanna, et al., 2011) argued that mentoring offers a wide range of advantages for development of responsibility and relationship building. (Torrington et al., 2014) Stated that practice is often applied to newly recruited graduates in the organization by being attached to mentor (i.e Registered Engineers) who might be their immediate senior. This however does not imply that older personnel are excluded from this training and development method but it is mainly emphasized for the newly employed personnel within the organization.

2.5.3 Orientation of personnel

This involves getting new personnel familiarized and trained on the new job within an organization. During this process, they are exposed to different undertakings for example the nature of their new work, how to take on their identified tasks and responsibilities and what is generally expected of the personnel by the organization. They are further given a general overview of the organizational working environment including for example working systems, technology, and office layout, briefed about the existing organizational culture, health and safety issues, working conditions, processes and procedures.

2.5.4 Organizing Conferences and Seminar for Personnel

A as a training and development method it involves presentations by more than one person to a wide audience. It is more cost effective as a group of personnel are trained on a particular area of interest all at the same time in large audiences. This method is however disadvantageous because it is not easy to ensure that all individual trainees understand the topic at hand as a whole; not all trainees follow at the same pace during the training sessions; focus may go to particular trainees who may seem to understand faster than others and thus leading to under training of other individuals.

2.5.5 Role Playing

Involves training and development techniques that attempt to capture and bring forth decision making situations to the employee being trained. In other words, the method allows personnel to act out work scenarios. It involves the presentation of problems and solutions for example in an organization setting for discussion. Trainees are provided with some information related to the description of the roles, concerns, objectives, responsibilities, emotions, and many more. Following is provision of a general description of the situation and the problem they face. The trainees are there after required to act out their roles. This

method is more effective when carried out under stress-free or alternatively minimal-stress environments so as to facilitate easier learning.

2.6 Training Evaluation for Personnel

The final step in the training and development process is the evaluation of the whole training program. The evaluation process is very important because, the training had at it on set some objectives to achieve and thus the evaluation process at the end of the training program. The evaluation gives an opportunity to take a look and make a cost-benefit analysis of the training program. This is done by comparing the results of the training with the objective of the training and development program that were set before the commencement of the program. The criteria used to evaluate training and development program depends on the objectives set. According to Ivancevich (2012), it is more effective to use multiple criteria to evaluate training. There are also others who argue that a single criterion such as the extent of transfer of the training to the job performance is enough or satisfactory approach to evaluation. This would be true where the main purpose of the training programmed was to improve employee performance to increase productivity for example.

Dessler (2013) sets four basic categories of training program outcomes:

1. Reactions of the trainees to the program are evaluated; an example is whether they like the program and if they think it was worth their time, energy and efforts.
2. In respect of learning, trainees are given some kind of a test to find out whether they learned the principles, skills and facts that they were supposed to learn.
3. Find out whether trainees behavior on the job has changed due to the training program
4. Find out whether the objectives set before the training has been achieved. This last category seems to be the most important. Though the previous three categories are important, yet the training program must achieve measurable results to achieve its goals as stated in the objectives.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Research Design

The design for this research is going to be the deductive approach. The method utilizes a wide range of findings from existing research works and findings about training and personnel enhancement. The case study approach that was adopted took place at Aldeen Associates. The case study method was chosen because case study is suitable for practical problems. Again, case study method has the uniqueness ability to use and apply differently a lot of different empirical evidence. It utilizes a wide range of existing research and findings about training and personnel performance which will form the basis to compare, analyze and investigate the findings of the research.

3.2 Methods of Data Collection

3.2.1 Primary data

Primary data is the information gathered directly by the researcher. The instrument used includes questionnaires and interview that have been constructed exclusively for the purpose of this study.

3.2.2 Secondary data

This are collected from other subject related sources such as journals on training and development, relevant text-books, notes, colleagues, websites, seminar papers and other related academic papers.

3.3 Questionnaire

A questionnaire is a research instrument consisting of series of questions and other prompts for the purpose of gathering information from respondents. A questionnaire is a pre-formulated written set of questions to which respondents records their answers, usually

within rather closely defined alternatives. A questionnaire was structured for this research and was administered to senior engineers, project/resident engineers, draft-mens and other member of staff. The choice of the questionnaire as one of the means of gathering data is borne out of the fact that it is cheap, do not require as much effort like the telephone or verbal surveys.

3.4 Interview

Interviews were conducted with the various members of staffs so as to find out the following:

1. Their view and perceptive on the training programs of the organization.
2. The effectiveness and quality of the training programs they are been introduced.
3. What are the hindrances to the full implementation of the various training programs.

The Interviews conducted were not structured in a particular manner to enable me obtain clarifications of some variables which need further in-depth investigation. This was also done in an informal mode because of the sensitivity of some of the issues been raised and to remove bias on the part of the respondents who might want to present false information on the subject of discuss.

3.5 The Population for the Study

The targeted samples for this study are the technical staffs of Aldeen Associates- A Building Services Engineering Firm based in Abuja.

3.6 Sampling and Sampling Procedures

A sample size of 40 was selected by using convenience sampling method. Convenience sampling is a simple approach where a sample is selected according to the convenience of the researcher. This convenience is with respect to availability of data and accessibility of the elements.

3.7 Techniques for Data Collection

The procedures for collection of data for this study were basically questionnaires and observation. Only one type of questionnaire was given to both junior and senior management to answer. Observation is critically studying the behaviors of personnel in the working environment when they are been motivated. That is the behaviors they put up either positive or negative and the effects it can have on their performance in the organization.

3.8 Data Analysis and Presentation

Microsoft Excel was used in the study for the purpose of analysis and presentation of results in chapter four. The descriptive statistics that was used in the study was based on tables of frequency distribution and percentages of the responses received which was represented using Bar Charts.

This research seeks to know the effect of regular training on staff performance through the test of the null hypothesis using the Chi-square method. This hypothesis will be tested at 5% significance level. The research also intends to forecast the number of Building Services Jobs that will be available for execution in a particular year using the least square regression analysis method.

- Least Square regression Equation:

This can be express mathematically as:

$$y = ax_i + b \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.1)$$

The least square method will be used to estimate the regression constant ‘a’ and ‘b’.

Where:

$$a = \frac{n(\sum x_i y_i) - (\sum x_i)(\sum y_i)}{n(\sum x_i^2) - (\sum x_i)^2} \qquad \ldots\ldots\ldots\ldots\ldots \qquad (3.2)$$

$$b = \frac{(\Sigma y_i)(\Sigma x_i^2) - (\Sigma x_i)(\Sigma x_i y_i)}{n(\Sigma x_i^2) - (\Sigma x_i)^2} \quad \ldots\ldots\ldots\ldots\ldots \quad (3.3)$$

Also:

The Coefficient of Correlation (r) between the variables to be compared is also given by:

$$r = \frac{n(\Sigma x_i y_i) - (\Sigma x_i)(\Sigma y_i)}{\sqrt{[(n\Sigma x_i^2 - (\Sigma x_i)^2)][(n\Sigma y_i^2 - (\Sigma y_i)^2)]}} \quad \ldots\ldots\ldots\ldots\ldots \quad (3.4)$$

Where, y = Number of Engineering Design that will be Executed.

x = Number of trained Staff.

a = least Number of staff to be send on training.

b = A factor that determine the number of Design and Supervision work that will be available for execution.

CHAPTER FOUR

4.0 DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 Data Analysis

This chapter deals with the analysis of data received and interpretation of the findings. The results have been grouped under major headings namely: Background of Technical Personnel and General Information, Welfare and Motivational measures, Training and Training Policies. The results have been presented in both tables and figures showing frequencies and percentages of the responses given by the Technical Personnel of Aldeen Associates (Consulting Mechanical and Electrical Engineer), Abuja.

4.2 Background of Technical Personnel and General Information This section looks at the background and other general information about the technical personnel of Aldeen Associates which includes their Sex, Age, Educational Background, Years of Service and Position in the Organisation. The data obtained are as represented by the table 4.1 and figure 4.1 below:

Table 4.1: Background of Technical Personnel and General Information

Response	A	B	C	D
Sex	33	7	0	0
Age	13	20	4	3
Educational Background	3	7	17	13
Years of Experience	8	17	10	5
Position of Staff	5	6	19	10

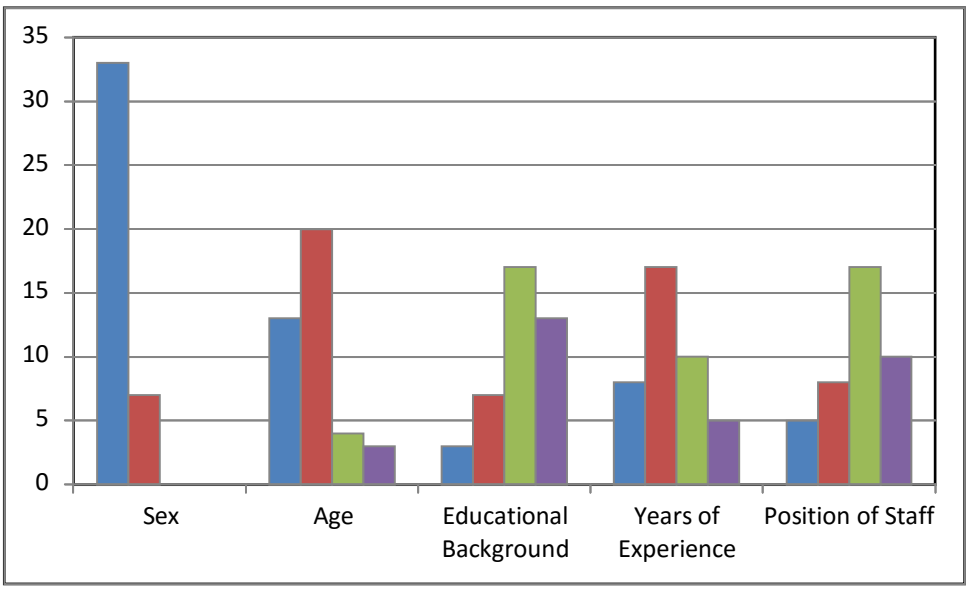


Figure 4.1: Bar Chart Showing Background of Technical Personnel and General Information

The sex of the technical staffs shows that 33 of the respondents which represent 82.5% of the personnel are male while 7 respondents representing 17.5% are female. This analysis is an indication that the firm has highly male composition.

The data on the age range of personnel shows that most of them are within the youthful age brackets that possess the required physical and mental ability towards effective engineering designs. This is depicted by 33 of the respondent representing 82.5% that are within the age range of 20-50 years. This is also supported by assumptions of Douglas McGregor Theory Y, "the expenditure of physical and mental effort in work is as natural as play or rest".

The data obtained on the level of Education shows that most of the technical personnel possess high level of Education as a minimum of 30 respondents have obtained a minimum of First Degree. This will have equipped them with basic skill in practicing the Engineering Profession. This is also supported by McGregor's in one of his assumptions which states that "the capacity to exercise a relatively high degree of imagination, ingenuity and creativity in the solution of organizational problems is widely, not narrowly distributed in the population".

We can there say that, higher potentiality are widely spread within personnel good qualification.

The Data's collected based on the length of service shows that 17 personnel have spent between 6-10 years which represent 42.5% of the population while another 15 personnel representing 37.5% population have spent more than 10 years. This shows that 80% of the technical personnel have been able to gather reasonable year of working experience. This statistics are very important in decision making for selection of technical staffs for training.

With regards to the current position of the technical personnel, 29 of the respondents representing 72.5% are registered engineers, 10 out of this 29 respondents are senior engineers with vast experience in various accept of engineering designs and post-contract supervisions. This actually shows that with this level of man-power, the firm can boost of capable hands for the execution of different engineering task.

4.3 Welfare and Motivational Measures for Technical Personnel

This section will be used to analyses the response that was gotten from the technical personnel based on the level of welfare and motivational package which include: Level of Motivation, Level of Incentives, Regular Payment of Salary, Salary Increment and Physical Working Environment. The data obtained are as represented by the table 4.2 and figure 4.2 below:

Table 4.2: Welfare and Motivational Measures

Response	Strongly Agree	Agree	Disagree	Strongly Disagree
There is a high level of staff motivation	5	11	19	5
The Organisation is providing good incentives to it staffs.	4	8	21	7
There is prompt payment of staff salary.	25	10	4	1
There have always being regular salary increment.	28	5	4	3
There is a conducive physical working environment.	30	3	2	5

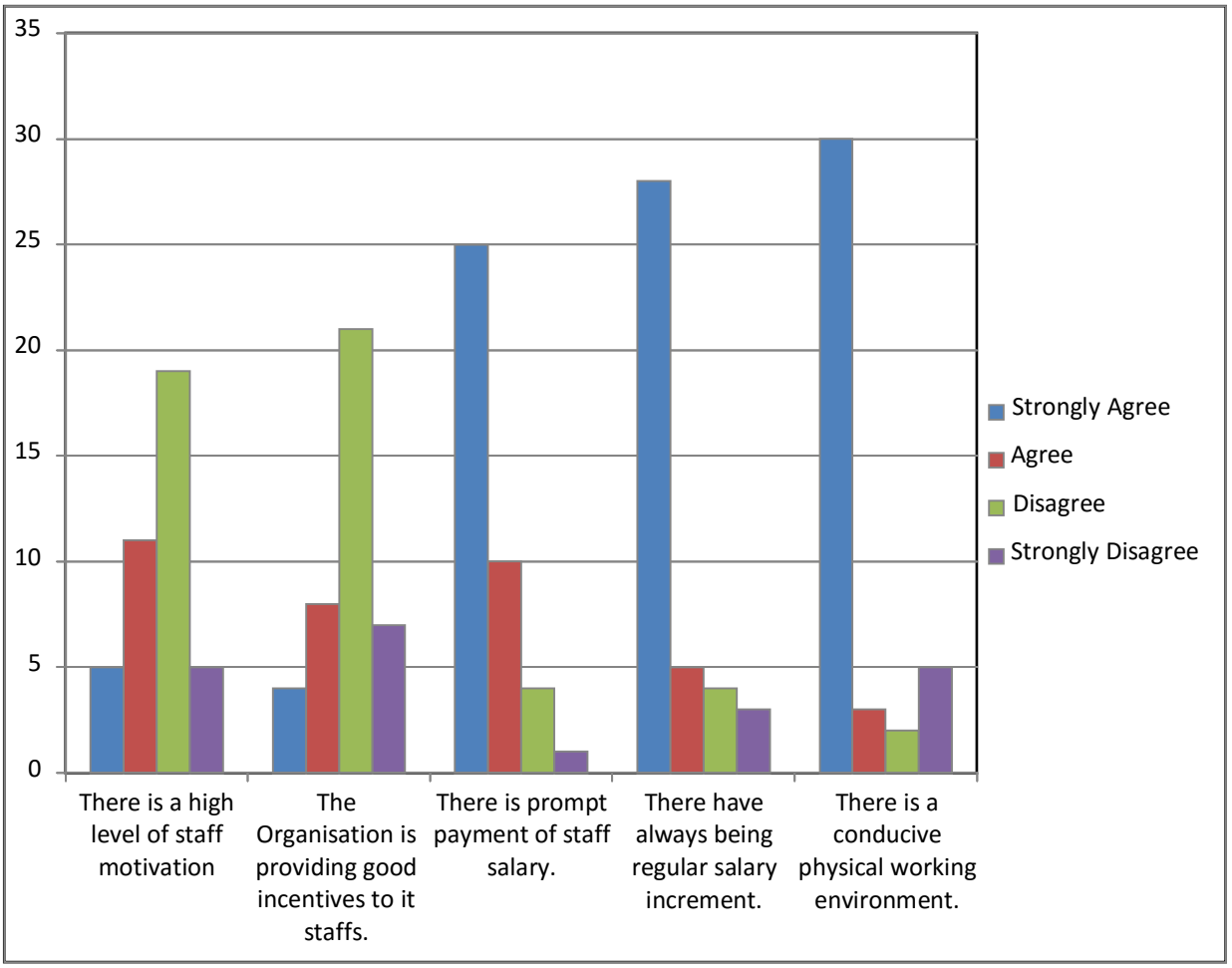


Figure 4.2: Bar Chart Showing Welfare and Motivation measures

The data collected on the level of motivation shows that only 16 respondents which represent 30% of the Technical personnel strongly agreed that they are highly motivated. These data depict that the organization has to do more in terms of motivation for it technical personnel.

The data on the level of incentives received shows that 4 respondents representing 10.0% strongly agreed that incentives received is high, 8 respondent representing 20.0% while 28 respondents representing 70.0% felt the organization is not doing enough in-terms of good incentives. This shows that much has to be done in terms of incentives that are being given to staffs which also act as a good motivating factor for good performance.

The data obtained on prompt payment of salaries and arreals shows that 25 respondents which represents 62.5% strongly agreed to the fact that the organization is doing its very best in the areas of salaries and Incentives, this will afford the technical person to attends to their basic needs of foods, shelter and security. According to Maslow Theory of Motivation "individuals are motivated by basic need for survival and this may include food, warmth, clothing and shelter. When people are hungry, don't have shelter or clothing, they are more motivated to fulfill these need because these needs become the major influence on their behavior". The data also shows that 2 respondents does not see prompt payment of salary as a motivator as this is likely due his position on hierarchical table as stated by Abraham Maslow that, as man proceed from one level to another, what use to be motivator seizes to motivate.

The Data collected based on the Effect of regular salary increment to improve the performance of personnel shows that 33 respondents representing 82.5% agreed to this subject while 7 respondents representing 17.5% are of the option that regular salary increment may not actually be a motivating factor because at a particular point in their career personnel tends to yarn for self-esteem and self-actualization with involvement in more

decision making within the organization which make not be accomplice through regular salary increment.

With regards to the good physical environment, 30 respondents representing 75.0% of the population strongly agreed that the working environment is conducive, 3 respondents which represent 7.5% are of the opinion that the atmosphere is averagely conducive while only 7 respondents representing 17.5% of the population are of the opinion that the atmosphere is not conducive for effective performance. It can therefore be said that the condition of the physical environment is fairly conducive and favourable which can serve as relatedness need according to Clayton Alderfer‟s view. Alderfer suggested that one may be motivated by needs on several levels at the same time.

4.4 Training and Capacity Development

This section will analyse the response of the technical personnel based on the Training and Capacity Development that are put in place by the organisation which include: Training undergone since joining the organisation, Form of Training, Frequency of Training, Impact of Training on Personal Performance, Relevant of Training in achieving personal goals and Development, Contribution of Training to the Effectiveness and Efficiency of the Firm, Level of Investment in Training, Duration of Training programs. The data obtained are as represented by the table 4.3 and figure 4.3 below:

Table 4.3: Training and Capacity Development

Response	Strongly Agreed	Agreed	Disagreed	Strongly Disagreed
Form of Training attended	24	16	0	0
There have being frequent staff training	6	10	20	4
Trainings have impacted positively on work performance	25	8	5	2
Training content are relevant to Self-Development	22	8	2	6
Trainings have contributed to effectiveness and efficiency.	28	8	3	1
The Organization is investing adequately in Training	5	8	20	7
Training are Targeted at all Cadres of staff	30	5	3	2
Training Programs span over a long period.	7	25	5	3
Have you being on any Training	33	7	0	

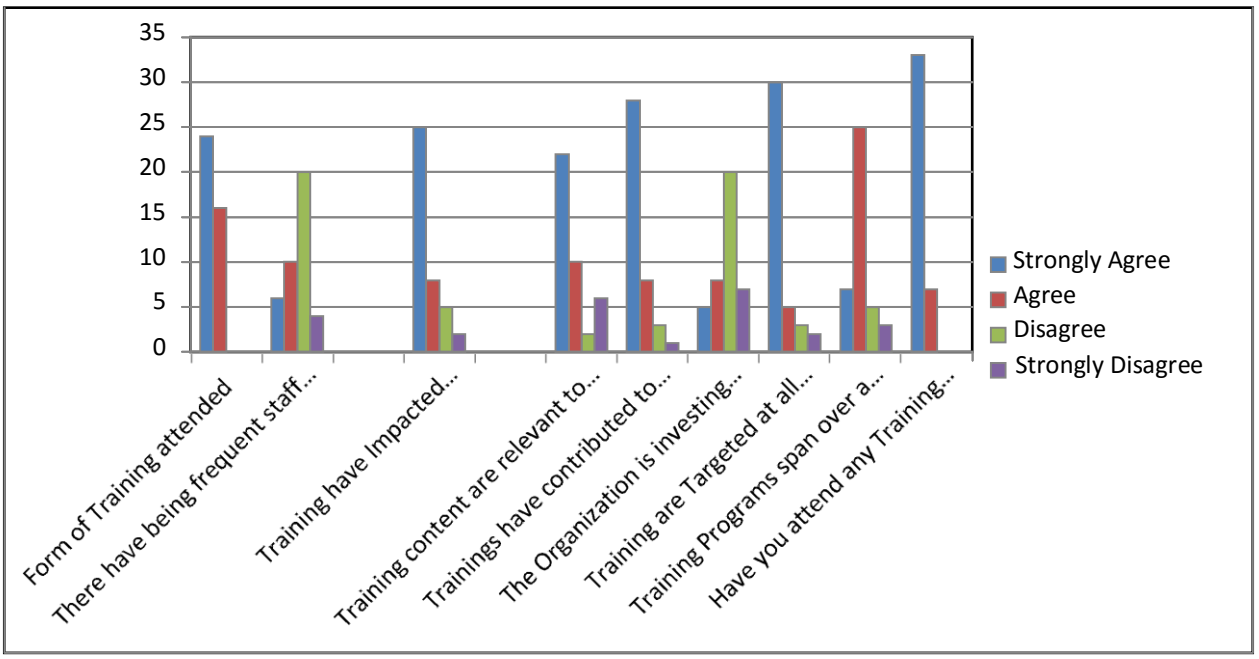


Figure 4.3: Bar Chart Showing Training and Capacity Development

The data on the forms of training shows that 24 respondents representing 60% of population strongly agreed that they had received training in the form of local in-house whilst 40% said they had received training in the form of external training. The analysis implies that training and development program usually takes several forms including in-house (workshops, seminars etc) or external training which involves engaging consultants that are specialized in some specific areas of engineering designs.

The data on the frequent of training shows that 16 respondents representing 40% of population agreed that they are been sent on regular training and capacity development program while the other 60% had not being on regular training program. This shows that more still needs to be done in-terms of regular training for the personnel which is very important in developing their skills and also as a motivating factor as a personnel will be de-motivated to work if his not given the opportunity to explore more opportunity in-terms of manpower training.

The data on the impact of training on work performance shows that 25 respondents representing 62.5% strongly agreed that the various training programs they have undergone has excellently improve their work performance, 8 respondents representing 20% agreed their performance was better than before while the remaining 17.5% mentioned that the impact has not positively impacted on their work performance. The implication of the results confirms that training adversely impacts on work performance.

The question of whether training content was relevant to achieving personal needs, goals and self-development, 22 respondents representing 55.0% strongly agreed that the training contents were relevant to achieving their personal needs, goals and self-development, 10 respondents representing 25.0% agreed that contents were relevant and the remaining 20.0% indicated content was not relevant in achieving their personal needs, goals and self-

development. The analysis explains Asare-Bediako (2008) report that training content must seek to achieve individual personal needs, goals and self-development.

The data also shows the technical personnel response on whether training has actually contributed to achieving effectiveness and efficiency in the firm, a total of 28 respondents representing 70% strongly agreed that training and development have contributed to achieving effectiveness and efficiency, 8 respondents representing 20.0% agreed that training has contributed to effectiveness while the remaining 10.0% disagreed. Ivancevich (2012) confirms this analysis which says "training contributes to improving efficiency and effectiveness of current or future performance of personnel in any institution".

The personnel also express their view on the rate at which the organization is investing in training and capacity development. The data shows that 13 respondents representing 32.5% agreed that rate of investing in training and development is appreciable while the other 27 respondents which represent 67.5% express that rate of investing in training is not enough. This result shows that much still has to be done in terms of investing in the training of the man-power by making adequate fund available for sending technical personnel on training outside their shore which will better equipped them for the best global practice.

The technical personnel also bear their minds on whether the trainings are being targeted at all cadre of staffs. The data shows that 5 respondents which represent 12.5% signifies that the trainings are targeted to specific cadre of staffs while a total of 35 respondents representing 87.5% express that there is no discrimination in the cadre of staffs that are being sent on training. This statistics totally shows that the organization is given all his technical person equal opportunity to be trained and acquire more skills for better performance.

The durations of trainings are also an important aspect of training which is also considered in this research work. A total of 32 respondents, which represents more than 80% of the

population express that the various training programs usually spanned more than four weeks. This gives the technical personnel a better opportunity to actually learn, gain more and also an avenue to meet other profession colleague to share ideas and opportunity in the engineering industry.

4.5 Test of Hypothesis

- **Chi-square Test**

Table 4.4: THERE HAVE BEING FREQUENT STAFF TRAINING.

	Observed N
Strongly Disagreed	4
Disagreed	20
Agreed	10
Strongly Agreed	6
Total	40

Table 4.5: TRAINING HAVE IMPACTED POSITIVELY ON WORK PERFORMANCE.

	Observed N
Strongly Disagreed	2
Disagreed	5
Agreed	8
Strongly Agreed	25
Total	40

Table 4.6: TRAINING CONTENTS ARE RELEVANT TO PERSONAL NEEDS, GOALS AND SELF DEVELOPMENT.

	Observed N
Strongly Disagreed	6
Disagreed	2
Agreed	10
Strongly Agreed	22
Total	40

Table 4.7: TRAINING AS CONTRIBUTED TO EFFECTIVENESS AND EFFICIENCY.

	Observed N
Strongly Disagreed	1
Disagreed	3
Agree	8
Strongly Agreed	28
Total	40

Table 4.8: THE ORGANISATION IS INVESTING ADEQUATELY IN TRAINING.

	Observed N
Strongly Disagreed	7
Disagreed	20
Agreed	8
Strongly Agreed	5
Total	40

Table 4.9: WHAT ARE THE DURATIONS OF THE TRAINING PROGRAMS

	Observed N
1-2 weeks	3
3-4 weeks	5
More than one month	25
4.00	7
Total	40

In order to test for the proposed null hypothesis Tables 4.4, 4.5, 4.6, 4.7, 4.8 and 4.9 were used to test for the hypothesis. Ho: Regular training is not a tool for improving building services in engineering. The chi-square test results obtained are summarized on Table 4.10

Table 4.10 Test Statistics

	There have being frequent staff training	Training have impacted positively on work performance	Training contents are relevant in achieving personal needs, goals and self-development	Training has contributed to effectiveness and efficiency	The organisation is investing adequately in training.	What are the durations of the training programs
Chi-Square	15.200[a]	31.800[a]	22.400[a]	45.800[a]	13.800[a]	30.800[a]
Df	3	3	3	3	3	3
Asymp. Sig.	.050	.050	.050	.050	.050	.050

From normal distribution table for chi-square test, value at degree of freedom (df) 2 using 0.50 level of significance is 5.991. Since values obtain from analysis done are greater than 5.991 (see Table 4.10), then the null hypothesis is rejected, therefore it could be concluded that regular training is a tool for improving building services in engineering.

4.6 Analysis of the Relationship between Technical Staff Training and Engineering Job Executed.

This section deals with the descriptive analysis of the relationship between the number of technical staffs of the company that have been sent on training and how this has actually reflect on the quality of their performance in relation to the number Engineering designs executed and post-contract supervision the company has been able to acquire within the period under review. The table below shows a ten year (2004-2014) analysis of the number of technical staffs been sent on training in relation to the jobs executed within these periods:

Table 4.11: Technical Staff Training and Number of Engineering Job Executed:

Year	No. of Technical Staff Trained	Engineering Designs Executed
2004	0	3
2005	0	3
2006	1	3
2007	3	5
2008	2	9
2009	4	11
2010	4	15
2011	4	20

2012	3	27
2013	5	33
2014	7	38

Source: Company Annual Report 2014

The above table will be analysed using the least-Square method from the simple linear regression equation, which is to estimate the regression constant „**a**" and „**b**". if „**a**" and „**b**" are estimated, then the estimate of **y** for a given value of **x** can also be determined.

Hence, equation (3.1) through equation (3.4) above:

$$y = ax_i + b$$

Where:

$$a = \frac{n(\sum x_i y_i) - (\sum x_i)(\sum y_i)}{n(\sum x_i^2) - (\sum x_i)^2}$$

$$b = \frac{(\sum y_i)(\sum x_i^2) - (\sum x_i)(\sum x_i y_i)}{n(\sum x_i^2) - (\sum x_i)^2}$$

Also:

The Coefficient of Correlation (r) is also given by:

$$r = \frac{n(\sum x_i y_i) - (\sum x_i)(\sum y_i)}{\sqrt{[(n\sum x_i^2 - (\sum x_i)^2)][(n\sum y_i^2 - (\sum y_i)^2)]}}$$

Table 4.12: Analysis of Training and Job Executed:

Year	(x_i)	(y_i)	x_i^2	y_i^2	$(x_i)(y_i)$
2004	0	3	0	9	0
2005	0	3	0	9	0
2006	1	3	1	9	3
2007	3	5	9	25	15
2008	2	9	4	81	18
2009	4	11	16	121	44
2010	4	15	16	225	60
2011	4	20	16	400	80
2012	3	27	9	729	81
2013	5	33	25	1089	165
2014	7	38	49	1444	266
TOTAL	**33**	**167**	**145**	**4141**	**732**

From the table above;

n= 11

$\sum x$= 33

$\sum y$= 167

$\sum x^2$= 145

$\sum y^2$= 4141

$\sum xy$= 732

From equation (2) above:

$$a = \frac{n(\sum x_i y_i) - (\sum x_i)(\sum y_i)}{n(\sum x_i^2) - (\sum x_i)^2}$$

$$a = \frac{11(732) - (33)(167)}{11(145) - (33)^2}$$

$$a = \frac{(8052) - (5511)}{(1595) - (1089)}$$

$$a = \frac{(2541)}{(506)} = 5.02$$

Hence, the least number of staff sent on training is 5.02

From equation (3) above:

$$b = \frac{(\sum y_i)(\sum x_i^2) - (\sum x_i)(\sum x_i y_i)}{n(\sum x_i^2) - (\sum x_i)^2}$$

$$b = \frac{(167)(145) - (33)(732)}{11(145) - (33)^2}$$

$$b = \frac{(24215) - (24156)}{(1595) - (1089)}$$

$$b = \frac{(59)}{(506)} = 0.12$$

Hence, the factor that determine number of design that will be executed is 0.12

From equation (5) above:

$$r = \frac{n(\sum x_i y_i) - (\sum x_i)(\sum y_i)}{\sqrt{[(n\sum x_i^2 - (\sum x_i)^2)][(n\sum y_i^2 - (\sum y_i)^2)]}}$$

$$r = \frac{11(732) - (33)(167)}{\sqrt{[(11(145) - (33)^2)][(11(4141) - (167)^2)]}}$$

$$r = \frac{8052 - 5511}{\sqrt{[(1595) - (1{,}089)][(45{,}551) - (27{,}889)]}}$$

$$r = \frac{2541}{\sqrt{[(506)][(17{,}662)]}}$$

$$r = \frac{2541}{\sqrt{[8{,}936{,}972]}}$$

$$r = \frac{2541}{2{,}989.47}$$

$$r = 0.849$$

From the least square method of correlation, the coefficient of correlation (r) has the following characteristics:

If $0 \leq r \leq 0.5$ ---------- Weak Correlation

If $0.5 \leq r \leq 0.8$ ---------- Moderate Correlation

If $0.8 \leq r \leq 1$ ---------- Strong Correlation.

This infers that there is a strong positive correlation between the training of technical staffs and the number of Engineering Design that will be executed.

Therefore, from equation (1)

$$y = ax + b$$

$$y = 5.02x + 0.12$$

The above equation is the regression equation for which y can be estimated for a given value of x.

Where: y is the Estimated Engineering Design that will be Executed for a given number of trained technical staffs (x).

To forecast for 2015 to determine the number of Engineering Designs that will be executed given that 10 staffs are sent on training.

i.e: $x = 10$

$$y = 5.02(10) + 0.12$$

$$y = 50.2 + 0.12$$

$$y = 50.32$$

This means that 50 more Engineering Designs are estimated to be executed for 2015. This shows that the more staff trained the more Design and Supervision works will be available.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter gives a summary of the study, drawn conclusions from the study and also makes recommendations as to how to address the critical issues that emerge from the study. The study sought to find out how training can be used as a tool for improving Engineering practice in a Building Services sector of Engineering, the motivational measures that are in place and other alternative measures that can be identified to improve performance.

5.1 Summary of the Research Findings

The primary objective of this study was to identify how training can serve as a Tool for Improving Engineering practice in the Building Services Sector of Engineering and other motivational factor for engineering practitioners and obstacles that might be hindering their performance.

The research reveal that there are other factor which can help to improve the performance of Engineering personnel aside the regular training which includes regular and prompt payment of salaries, better work conditions, good physical working environment will also help to motivate personnel towards better services delivery aside regular training programs. The conclusion from this study was built on the results of the findings to bring to lime-light of Effective Training as a Tool for Improving Building Services in Engineering with reference to Aldeen Associates – A Mechanical and Electrical Engineering Services Consultants. Having examined all the critical issues raised by the respondents, it is very clear that the importance of training to the services engineer cannot be overlooked and the survival of most Engineering firms is indeed largely dependent on the skill it manpower possess. This means that Engineering firms like Aldeen Associates needs to really invest in training and re- training of it manpower in order to stand-out in the Building Services and infrastructure Design Industry. More so, the research reveals that motivational factors

such as adequate

payment of salary, good working conditions, conducive physical environments, annual incentives, etc. are needed to sustained and improve the practice of Engineering.

5.2 Conclusion from the Research Findings

To achieve these objectives a sample of 50 questionnaires were prepared and administered to the personnel of the organisation, 48 of the questionnaires were retrieve of which 45 were usable and 40 of this were technical staffs which comprise of Draught-men, technical officers and Engineers. The Simple Linear regression analysis was used to analysis the result of the findings. The study reveals the following findings:

i. The study shows that more has to be done in-terms of technical staffs motivation as the study shows that 16 of the respondents representing 40.0% of the population agreed to the fact they are highly motivated, this means that the organization has to do more in-terms of motivating the technical personnel which will help to encourage them to be more effective in their work.

ii. The research shows that most of technical staffs have not been given the opportunity to go outside the firm for training as only about 40% of the respondent responds that they have only been trained externally since they joined Aldeen Associates.

iii. The research also reveals that 40% of the technical staffs agreed that there is frequent staff training. This is very important as the more they are being trained the more they get updated with the latest practices in the industry.

iv. Also it was indicated from this study that the content of the various training programs are very relevant to skill-development of the technical personnel as 32 respondent representing 80% indicated that the training programs have been very relevant to their skill development. This analysis explains Asare-Bediako (2008) report that training content must seek to achieve individual personal needs, goals and skill development.

v. The research also shows that respondents agreed that the training programs have contributed to effectiveness as indicated by 36 respondents which represents 90.0% of the personnel who reveals that with the different training programs they have gone through they are able to solve most challenges that comes along with the Engineering Designs which they may not be able to tackle before the training programs.

vi. The research also reveals that the organization is not adequately investing in training and re-training of its technical personnel as only 32.5% of the personnel agreed that the rate of training and development is adequate.

5.3 Recommendations

Based on research findings, it is necessary to make the following recommendations towards improving the organizational productivity in the Engineering Industry;

- The organization should make an improvement in the level of motivational and welfare packages for is personnel in order to encourage them to contribute maximally and efficiently.
- There should be regular workshops, seminars, training and re-training of the Engineering personnel in order to updated and improve their efficiency.
- Managements of Engineering Firms should see Investment in training as a tool that will help to actually improve their overall performance and productivity.
- More should be done in-terms of overseas training for the services engineers.

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Appendix

QUESTIONNAIRE:

This questionnaire is to know your opinion on a research work title Effect of Regular Training as a Tool for Improving Building Services in Engineering with reference to Aldeen Associates – A Building Services and Infrastructure Engineering Firm. Please I would be very pleased if you could spare some time and complete this questionnaires. The information provided will be used for academic purpose and as such it will be confidential. **Mark a box as your selected option** to the available question but for the ease of analysis please indicates your personal details as presented in the Questionnaire. Thank you.

SECTION I: Background and General Information

1. Sex: (a) Male ☐ (b) Female ☐

2. Age of respondent: (a) 20-30 ☐ (b) 31-40 ☐ (c) 41-50 ☐ (d) 51-60 ☐

3. Educational background: (a) N.B.T.E ☐ (b) Diploma Certificate ☐ (c) Bachelor Degree/H.N.D Certificate ☐ (d) Master's Degree ☐ (e) Others (please specify)…….

4. For how long have you been working with Aldeen Asssociates? (a) 1-5 years ☐ (b) 6-10 years ☐ (c) 11-15years ☐ (d) 16-20years ☐

5. What is your position in the Aldeen Associates: (a) Draughtsman ☐ (b) Technical Officer ☐ (c) Registered Engineer ☐ (d) Senior Engineer ☐

SECTION II: Welfare and Motivational Measures

6. There is a high level of staff motivation at Aldeen Associates? (a) Strongly Agree ☐ (b) Agree ☐ (c) Disagree ☐ (d) Strongly Disagree ☐

7. The organization is providing a high level of staff Incentives? (a) Strongly Agree ☐

(b) Agree ☐ (c) Disagree ☐ (d) Strongly Disagree ☐

8. Do you think regular payment of salary has motivated personnel to perform better?

(a) Strong Agree ☐ (b) Agree ☐ (c) Disagree ☐ (d) Strongly Disagree ☐

9. Regular Increment of Salary has enhanced performance of personnel?

(a) Strongly Agree ☐ (b) Agree ☐ (c) Disagree ☐ (d) Strongly Disagree ☐

10. There is good physical working environment which has encourages personnel to give in their best performance? (a) Strongly Agree ☐ (b) Agree ☐ (c) Disagree ☐

(d) Strongly Disagree ☐

SECTION III: Training and Capacity Development

11. What are the forms of training you have been opportune to undergo?

(a) In-House ☐ (b) External ☐

12. There have being frequent staff training within the organisation?

(a) Strongly Agree ☐ (b) Agree ☐ (c) Disagree ☐ (d) Strongly Disagree ☐

13. Training and Development have impacted positively on work performance?

(a) Strongly Agree ☐ (b) Agree ☐ (c) Disagree ☐ (d) Strongly Disagree ☐

14. Training contents are relevant in achieving personal needs, goals and self-development?

(a) Strongly Agree ☐ (b) Agree ☐ (c) Disagree ☐ (d) Strongly Disagree ☐

15. The various training programs have contributed to effectiveness and efficiency.

(a) Strongly Agree ☐ (b) Agree ☐ (c) Disagree ☐ (d) Strongly Disagree ☐

16. The organization is investing adequately in training programs?

(a) Strongly Agree ☐ (b) Agree ☐ (c) Disagree ☐ (d) Strongly disagree ☐

17. Training programs are targeted to all cadres of staffs?

(a) Strongly Agree ☐ (b) Agree ☐ (c) Disagree ☐ (d) Strongly Agree ☐

18. What are the durations of the training programs? (a) 1 – 2 Weeks ☐ (b) 3 – 4 Weeks ☐ (c) More than One Month ☐

19. Have you being on any training program since you joined the firm?

(a) Yes ☐ (b) No ☐