# PERCEPTIONS OF BUILDERS AND FOREMEN ON SKILLS IMPROVEMENT NEEDS OF CRAFTSMEN IN CONSTRUCTION INDUSTRIES IN BAUCHI STATE, NIGERIA

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**Abstract-** This study was carried out to determine the Perceptions of Builders and foreman on skills improvement needs of Craftsmen in Construction Industries in Bauchi State, Nigeria. Descriptive survey research design was adopted for the study. The target population for the study was 61 respondents made up of 34 Builders and 27 Foremen in the Construction Industries. A 63 items structured questionnaire was used for data collection. The instrument was validated by three experts and Cronbach Alfa statistic was used to ascertain the extent of sameness of the items and reliability coefficient of 0.824 was obtained. Data was collected and analyzed using statistical package for social science (SPSS Version 22), weighted mean, standard deviation and Improvement Need Index (INI) were used to answer the research questions while z-test statistic was used to test the null hypotheses. The findings of this study revealed that the whole 50 skills items were required, 22 out of 50 skills items were not possessed and 48 out of 50 skills items were the skills gap. It was therefore recommended amongst others that the construction industries should utilize the identified skills gap that exist to sponsorship their craftsmen for re-training program in order to improve in their skills deficiencies.

**Keywords:** Builders/Foremen, skills Improvement Needs, Craftsmen, Construction Industries

## 1. INTRODUCTION

The construction industry is an economically important industry in any country. According to Wibowo (2009: 1), it contributes by supplying the infrastructure and physical structures of a country to house other industries; by creating jobs; by contributing to a country's Gross Domestic Product (GDP), and by providing basic needs such as housing, for example, to the population. Craftsmen are the major employee of the construction industry since most of the work in the construction industry has to be done manually by hand. According to Moya M., Prince A.D.F and Edum- Fotwe, F.T.(2006). The availability of craftsmen is considered as one of the most critical factors for the effectiveness of the construction industry and construction output productivity depends significantly on craftsmen, but cases of craftsmen turnover is becoming a big challenge to the construction industry. Shamsuzzoha, (2007).

In Nigeria, for the building firm to meet up the demands of Nigerians as it relates to national needs of shelter and housing, it requires qualified building construction professionals in all construction activities in building sites, which encompasses qualified building construction experts, construction contractors plus well skilled workers such as building

craftsmen who are conversant with building practices. The research activities will lead to findings that could enhance skill improvement among construction craftsmen to enable them cope with the periodically changing demand in choice of buildings brought about by technological dynamism (Yakubu, 2003). He further highlighted that construction industries is directly related to where an individual would be paid for employment and also additional preparation for a career in construction industries. Construction industry in Nigeria is built on a foundation of skilled craftsmen that are trained through numerous avenues like apprenticeship, vocational training centers, technical colleges, on the job training as well as other forms of crafts schools.

Vocational Education equips learners with appropriate skills, abilities and competencies that support societal growth as well as advancement in development. Building construction program is a form of vocational education as enshrined by the Federal Republic of Nigeria (FRN) in the National Policy on Education, (FRN, 2013) to offer vocational training and impart the needed technical competencies for the training of craftsmen, technicians, technologists plus other professionally competent individuals who shall be self-reliant and enterprising. For building construction industries to be very effective in the performance of their activities, these craftsmen might require constant skill improvement in their work.

Improvement is the way toward improving something than what it was previously. Improvement as per Olaitan, Amusa and Azouzu (2010) is the capacity or condition for getting better than anyone might have expected. As per Igweh and Bakare (2012), they expressed that for a decent work to be done, it requires information and aptitudes of experts to be utilized or independently employed. Improvement is the way toward improving something than what it was previously. Improvement according to Olaitan, Amusa and Azouzu (2010) is the ability or condition for becoming better than before. According to Igweh and Bakare (2012), they stated that for a good work to be done, it requires knowledge and skills of craftsmen to be employed or self-employed. Skill and knowledge displays professionalism as well as enhances a technical prowess relevant to building construction industries. Nahavandi (2000) similarly defined skill as a needed productive capacity which an individual acquires to perform certain professional activities in particular occupational area. Skill is view as a combination of a person ability, in relation to the processes, organization, culture as well as system Klein J., Gee, D. & Jones, H. (1998)

The nature of construction work therefore requires that skilled artisans possess basic knowledge of other trades to a level sufficient to enable them carry out their works effectively and sustaining standard practices in building construction activities, this necessitates an investment in research as well as skill developmental in building construction trade. In Nigeria, for the building firm to meet up the demands of Nigerians as it relates to national needs of shelter and housing, it requires qualified professionals in all construction activities in building sites, which encompasses qualified building construction experts, construction contractors plus well skilled workers such as building craftsmen and found that craftsmen in construction industries need skill improvement within different section of the construction activities (Nigerian Institute of Social and Economic Research, 2009). Construction industries encompass different parties with different duties and responsibility which include architecture, quantity surveyors, builders, foremen, craftsmen and others.
A manufacturer is a scholastically prepared subject matter expert and legally enrolled proficient answerable for building creation the board, development, and upkeep of working for the utilization and assurance of humanity. In Nigeria, a manufacturer must be an

individual from Nigeria Institute of Building (NIOB) and Council of Registered Builders of Nigeria (CORBON) and foreman is a vital individual from the development group, liable for getting sorted out development takes a shot at site. He plays out a crucial part in the achievement of building venture. One of the significant parts of foreman is to guarantee the wellbeing and security of all staff nearby, manage development exercises, sort out specialists and some more.

An expert alludes to an individual male/female who has been told in the key hypothesis of specific skilled workers. Experts are required to constantly stay informed concerning these mechanical changes and the new materials and development strategies that are brought into the development businesses. Specialists are the significant representative of a few structure development firms since most work in the structure firms must be done physically by hands, Muya, M., Price, A.D.F. also, Edum–Fotwe, F.T, (2006). Ubenyi (1999) depict development specialists as those prepared and expertly skillful laborers that generally plays out a ton with their hands with proficient exactness in a few phases of the structure building site exercises. The development enterprises are considered as the check for the exhibition aptitude of the country in a few underdeveloped nations (Chitkara, 2006, Kazaz and Ulubeyli, 2004). Adedeji (2008) noticed that building ventures is among the most fundamental part of the economy of Nigeria. The profitability of a labor force is viewed as among the most imperative conditions affecting the advancement just as complete apparent ability of every industry, be it little or enormous in the exchange market (Ersoz, 1999; Sweis, Sweis and Abu, 2009).

It is obvious that these master craftsmen constitute the major workforce in construction industries in Bauchi State of Nigeria in general cannot be underestimated and considering the lack of competency of the building craftsmen in the increase and short fall of qualified workers, them there is a need to determine the perceptions of builders and foremen on skills improvement needs of these craftsmen in the construction industries in Bauchi State of Nigeria.

### 1.2 Research Questions

1. What are the perceptions of builders and foremen on skills required by craftsmen in construction industries in Bauchi State Nigeria?
2. What are the perceptions of builders and foremen on skills possessed by building craftsmen in construction industries in Bauchi State Nigeria?
3. What are the skills gaps among building craftsmen in Construction industries in Bauchi State Nigeria?

### 1.3 Hypotheses

The under listed null hypotheses were formulated and tested at 0.05 level of significance:

**$HO_1$:** There is no significant difference in the mean responses of the perceptions of builders and foremen on skills required by craftsmen in building construction industries in Bauchi State Nigeria.

**$HO_2$:** There is no significant difference in the mean responses of the perceptions of builders and foremen on skills possessed by craftsmen in construction industries in Bauchi State Nigeria.

## 2. LITERATURE REVIEW

### 2.1 Building craftsmen trade in construction industries

The building construction industries is the area of the economy that plans, plans, develops, adjusts, renovates, keeps up, fixes and at last annihilates structures, all things considered (Jaggar and Smith 2007). Building development industry in Nigeria is based on an establishment of expertise create laborers who are essentially provided through different sources, for example, make preparing foundations, professional or specialized schools, hands on preparing and apprenticeship (Yakubu, 2003). Ubenyi (1999) and Anigbogu (2002) believed that the work concentrated nature of development exercises in Nigeria was ascribed to the prevalence of huge number of little scope development firms that depend exclusively on talented and untalented work for their tasks. The expression that the degree of building accomplishment and movement in any nation is a proportion of the nation's prosperity effectively mirrors the two pertinent variables: an elevated level of building action shows a solid fiery public economy; and profoundly created constructing structures demonstrate a significant level of socialized and social accomplishment in a nation (Obiegbu, 2003). For the development business in Nigeria have the option to support the economy, it needs to march able hands in its tasks, which incorporates valid advisors and contractual workers with qualified and skillful agents comprehensive of specialists. The requirement for keeping up guidelines in development activities, it requires an interest in innovative work. This endeavor will engage the agents (experts) in overhauling and enhancing aptitudes in order to satisfy the always expanding needs in the present continually evolving world. Consequently, the need to prepare its agents has gotten basic in order to meet its obligation in the economy.

The survey of writing on aptitudes improvement through instruction and preparing uncovered that specialized schooling and professional preparing is the arrangement of abilities, information, disposition and qualities alluring for the work environment. Also, with ability, the individual can play out an assignment certainly and can sell oneself with less trouble and built up one's work – paying little mind to whatever structure it might come. Labor force of development businesses needs to have the necessary aptitudes, yet more significantly the adaptability to require the new abilities required by the Building Craftsmen in Building development enterprises.

## 3. METHODOLOGY

### 3.1 Research Design

A descriptive survey design was used for the research. This is a research which involves the assessment of opinion using questions and sampling method (Osuala, 2005). It was considered for this research because it aimed at collecting data through questionnaire by seeking the views and opinion of professionals in building construction industries to ascertain the perceptions of builders and foremen on skills improvement needs of craftsmen in construction industries in Bauchi State.

### 3.2 Area of the Study

This research was conducted in Bauchi State Nigeria. Bauchi was chosen due to the fact that there are relevant and registered building construction industries within the state that acts as data sourcing area for the study

### 3.3 Population

The total number of respondents for the study was 61 respondents. This is made up of 34 builders and 27 foremen working in nine functional registered construction industries in Bauchi North East of Nigeria. Bauchi State is a metropolitan as well as a multicultural industrialized state with 51 building construction industries (Ministry of Commerce and Industry, Bauchi State 2016).

### 3.4 Sample and Sampling Techniques

Purposive sampling was utilized to choose 9 functional registered building construction industries out of 51 building construction industries in Bauchi State, Nigeria.

### 3.5 Instrument for Data Collection

The data collection tool was a questionnaire titled "Skills Improvement Needs of Building Craftsmen in Building Construction Industries (SINBCBCI) questionnaires". The instrument was comprised of two parts: Section A and B. Part (A) deal with the respondents' individual data. Section B part 1, part 2 and part 3consist of 50 items respectively.

### 3.6 Method of Data Collection

The researcher as well as two research assistants administered the questionnaire. The research assistants were given necessary briefing that enhance the administered of the questionnaire

### 3.7 Method of Data Analysis

Data gathered was analyzed utilizing weighted mean, standard deviation and Improvement Need Index (INI) to answer the research questions raised, z-test was utilized to test all the null hypotheses at 0.05 alpha level. Weighted mean was utilized in answering research questions one (1), two (2) and four (4) while standard deviation was utilized to ascertain how close the craftsmen responses from each other and the average. Each of the items in research questions 1, 2 and 4 had 4 point rating scale.

## 4. RESULT AND DISCUSSION

### 4.1 Research Question 1

What are the perceptions of builders and foremen on skills required by craftsmen in building construction industries?

Table 1: Mean and Standard Deviation of Perception of Builders and Foremen on Skills Required by Building Craftsmen in Building Construction Industries Bauchi State, Nigeria

| S/N0 | Bl0ck/Brickw0rk Skills | $\bar{x}_1$ | $SD_1$ | $\bar{x}_2$ | $SD_2$ | $\bar{x}_A$ | $SD_A$ | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | Ability t0 lay the first c0urse and check f0r accuracy using spirit level and straight edge | 3.41 | 0.69 | 3.47 | 0.75 | 3.44 | 0.72 | HR |
| 2 | Ability t0 lay c0urse II, III and subsequent c0urses and check f0r accuracy using spirit level and straight edge | 3.3 | 0.72 | 3.24 | 0.74 | 3.27 | 0.73 | HR |
| 3 | Ability t0 use steel t0 supp0rt wind0w and wind0w d00r 0pening in wall. | 3.22 | 0.58 | 2.91 | 0.75 | 3.07 | 0.67 | HR |
| 4 | Ability t0 ensure that the j0ints are truly vertical and squared t0 each 0pp0site side | 3.33 | 0.62 | 3.06 | 0.60 | 3.20 | 0.61 | HR |
| 5 | Ability Prepare insulating f0rmw0rk 0f h0ll0w bl0cks | 3.33 | 0.55 | 3.03 | 0.76 | 3.18 | 0.66 | HR |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 6 | Ability t0 stack the required quality 0f bricks/bl0cks | 3.37 | 0.49 | 3.03 | 0.80 | 3.20 | 0.65 | HR |
| 7 | Ability t0 fill-in the j0int with m0rtar | 3.41 | 0.69 | 3.32 | 0.68 | 3.37 | 0.69 | HR |
| 8 | Ability t0 w0rk fr0m a scaff0ld and s0metimes their scaff0ld can be several st0ries high | 3.19 | 0.74 | 2.97 | 0.76 | 3.08 | 0.75 | HR |
| 9 | Ability t0 stack the required quality 0f bricks/bl0cks | 3.26 | 0.59 | 2.97 | 0.76 | 3.12 | 0.68 | HR |
| 10 | Ability t0 arrange the pi0neering c0ncrete pre-cast bl0cks 0n hard-c0re t0 keep the Island l0w and reduce the inverted water waves | 3.26 | 0.59 | 3.06 | 0.74 | 3.16 | 0.67 | HR |
| 11 | Ability t0 finish a sm00th surfacing watery meth0d | 3.26 | 0.66 | 3.38 | 0.65 | 3.32 | 0.66 | HR |
| 12 | Ability t0 measure and add t0 the mix desired am0unt 0f water required (30 liters) f0r 0ne bag 0f cement and eight head pans 0f sharp sand | 3.26 | 0.76 | 3.26 | 0.71 | 3.26 | 0.74 | HR |
| 13 | Ability t0 set 0ut the base 0f the wall in line with the building drawing | 3.15 | 0.72 | 3.35 | 0.65 | 3.25 | 0.69 | HR |
| 14 | C0nstruct the pi0neering (inn0vative) c0ncrete pre-cast bl0ck | 3.26 | 0.53 | 3.21 | 0.73 | 3.24 | 0.63 | HR |
| | **Plastering/Rendering Skills** | | | | | | | |
| 15 | Ability t0 sm00then the edge 0f the c0rners 0f the wall with c0rner rubber after rem0ving the w00den lathe | 3.48 | 0.51 | 3.18 | 0.63 | 3.33 | 0.57 | HR |
| 16 | Ability t0 place plaster screed at c0nvenient thickness 0n the wall with tr0wel | 3.15 | 0.77 | 3.24 | 0.70 | 3.20 | 0.74 | HR |
| 17 | Ability t0 level up (sm00then the surface with the w00den fl0at t0 f0rm a sandy-gritty finish | 3.37 | 0.63 | 3.12 | 0.69 | 3.25 | 0.66 | HR |
| 18 | Ability t0 fix w00den lath 0r batten at the edge 0f the wall in 0rder t0 get the thickness 0f the plaster | 3.44 | 0.51 | 3.18 | 0.72 | 3.31 | 0.62 | HR |
| 19 | Ability t0 spread m0rtar screed evenly 0n the first c0urse t0 a thickness 0f 13mm | 2.93 | 0.68 | 3.15 | 0.56 | 3.04 | 0.62 | HR |
| 20 | Ability t0 cure the rendered wall | 3.22 | 0.7 | 3.26 | 0.67 | 3.24 | 0.69 | HR |
| 21 | Ability t0 spread m0rtar screed evenly 0n the first c0urse t0 a thickness 0f 13mm | 3.30 | 0.54 | 3.29 | 0.63 | 3.30 | 0.59 | HR |
| 22 | Ability t0 make a h0ll0w 0r c0nical heap 0f the cement and sand c0nstituents in 0rder t0 receive the water f0r mixing | 3.56 | 0.64 | 3.15 | 0.70 | 3.36 | 0.67 | HR |
| 23 | Ability t0 give sm00th surface free 0f dust and dirt | 3.26 | 0.66 | 2.97 | 0.72 | 3.12 | 0.69 | HR |
| 24 | Ability t0 p0ur the water skillfully (gradually) t0 the dry mix | 3.3 | 0.67 | 3.06 | 0.74 | 3.18 | 0.71 | HR |
| 25 | Ability finish wall surface with c0mpressed sand and cement | 3.59 | 0.5 | 3.29 | 0.68 | 3.44 | 0.59 | HR |

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|---|---|---|---|---|---|---|---|---|
| 26 | Ability t0 lay wall tiles | 3.37 | 0.63 | 3.21 | 0.69 | 3.29 | 0.66 | HR |
| 27 | Ability t0 Clean all the j0ints and surfaces 0f the wall with a wire brush t0 rem0ve 0il 0r grease left 0n wall surface | 3.3 | 0.72 | 3.12 | 0.81 | 3.21 | 0.77 | HR |
| 28 | Ability t0 keep all the m0rtar j0ints 0f wall r0ugh t0 give a g00d b0nding t0 h0ld plaster | 3.37 | 0.49 | 3.21 | 0.69 | 3.29 | 0.59 | HR |
| 29 | Raking 0ut 0f the m0rtar j0int t0 a depth 0f at least 12 mm t0 give a better b0nding t0 the plaster if the surface is sm00th 0r the wall t0 be plastered is 0ld 0ne | 3.3 | 0.61 | 3.15 | 0.70 | 3.22 | 0.66 | HR |
| 30 | Ability t0 pr0tect the structural wall fr0m driving rain and sandst0rm | 3.52 | 0.51 | 3.12 | 0.77 | 3.32 | 0.64 | HR |
| | **F0undati0n Skills** | | | | | | | |
| 31 | Ability t0 dig f0undati0n trench | 3.33 | 0.62 | 3.21 | 0.64 | 3.27 | 0.63 | HR |
| | Ability t0 c0nstruct bl0ck t0 gr0und level f0undati0n | 3.15 | 0.72 | 3.32 | 0.64 | 3.24 | 0.68 | HR |
| 33 | Ability t0 back filling/laterite filling and c0mpacti0n | 3.33 | 0.62 | 3.09 | 0.67 | 3.21 | 0.65 | HR |
| 34 | Ability 0f filling hard-c0re | 3.11 | 0.7 | 3.03 | 0.63 | 3.07 | 0.67 | HR |
| 35 | Ability t0 framew0rk t0 reinf0rced c0ncrete gr0und fl00r slab edges | 3.3 | 0.61 | 3.24 | 0.65 | 3.27 | 0.63 | HR |
| 36 | Ability t0 pipe w0rk | 3.33 | 0.62 | 3.26 | 0.71 | 3.3 | 0.67 | HR |
| 37 | Ability t0 casting 0f reinf0rced c0ncrete gr0und fl00r slab | 3.48 | 0.58 | 3.15 | 0.70 | 3.32 | 0.64 | HR |
| 38 | Ability t0 excavati0n 0f f0undati0n trenches and appr0val | 3.19 | 0.62 | 3.21 | 0.69 | 3.20 | 0.66 | HR |
| 39 | Ability t0 c0lumn base c0ncrete blinding f0undati0n | 3.30 | 0.54 | 3.24 | 0.70 | 3.27 | 0.62 | HR |
| 40 | Ability t0 c0lumn base/c0lumn reinf0rcement p0siti0ning | 3.11 | 0.64 | 3.12 | 0.73 | 3.12 | 0.69 | HR |
| 41 | Ability t0 cast strip and c0lumn base c0ncrete f0undati0n | 3.11 | 0.64 | 3.03 | 0.76 | 3.07 | 0.70 | HR |
| 42 | Ability t0 f0rmw0rk t0 gr0und fl00r level c0lumn f0undati0n | 3.30 | 0.61 | 3.38 | 0.65 | 3.34 | 0.63 | HR |
| 43 | Ability t0 c0lumn t0 gr0und fl00r slab c0ncrete casting | 3.26 | 0.53 | 3.18 | 0.72 | 3.22 | 0.63 | HR |
| 44 | Ability t0 strip 0ff c0lumn f0rmw0rk | 3.22 | 0.51 | 3.06 | 0.65 | 3.14 | 0.58 | HR |
| 45 | Ability t0 excavate f0undati0n trenches t0 the required depth and width | 3.04 | 0.59 | 3.00 | 0.74 | 3.02 | 0.67 | HR |
| 46 | Ability t0 cast c0lumn base c0ncrete f0undati0n | 3.3 | 0.47 | 3.00 | 0.70 | 3.15 | 0.59 | HR |
| 47 | Ability ascertained the nature and bearing capacity 0f the subs0il | 3.15 | 0.60 | 3.24 | 0.65 | 3.20 | 0.63 | HR |
| 48 | Ability excavate trench vertical and free fr0m l00se materials | 3.19 | 0.62 | 3.29 | 0.58 | 3.24 | 0.60 | HR |
| 49 | Ability 0f f0undati0n t0 excavates must be inspected and appr0ved by the architects, 0r supervising 0fficer | 3.33 | 0.73 | 3.44 | 0.61 | 3.39 | 0.67 | HR |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 50 | Ability f0r all surplus materials fr0m excavati0n n0t required after filling in and levelling shall be rem0ved fr0m site and disp0sed at the C0ntract0r's expense. | 3.11 | 0.75 | 3.44 | 0.61 | 3.28 | 0.68 | HR |
| | **Grand T0tal** | **3.28** | **0.62** | **3.18** | **0.69** | **3.23** | **0.66** | |

Keys: $\bar{x}_1$ = Mean of Foreman; $\bar{x}_2$ = Mean of Building Engineers; $\bar{x}_A$= Average mean of Foreman and Building Engineers; $SD_1$ = Standard Deviation of Foreman; $SD_2$ =Standard Deviation Building Engineers; $SD_A$ = Average Standard Deviation of Foreman and Building Engineers, HR = Highly Required

Table 1 revealed the perceptions of respondents on the skills required by building in construction industries in Bauchi State with all the 50 items mean (x) values between 3.04 – 3.44. This indicates that the 50 items skills were highly required by the craftsmen in the construction industries in Bauchi State. The standard deviations (SD) of the three clusters with 50 items were between 0.57 -0.77. These values were less than 1.96, indicating that the building craftsmen were not too far from the statistical averages computed or from each other in their reaction on the skills required by building craftsmen in building construction industries in Bauchi State of Nigeria. The grand mean of 3.23 while standard deviation 0.66 also showed that all the respondents required the skill; In essence, both the foremen and Building Engineers agreed that all the 50 listed skills are required.

### 4.2 Research Question 2

What are the perceptions of builders and foremen on skills possessed by craftsmen in building construction industries in Bauchi State?

**Table 2: Mean and Standard Deviation of the Perceptions of Builders and Foremen on Skills Possessed by Craftsmen in Building Construction Industries Bauchi State, Nigeria**

| S/N0 | Bl0ck/Brickw0rk Skills | $\bar{x}_1$ | $SD_1$ | $\bar{x}_2$ | $SD_2$ | $\bar{x}_A$ | $SD_A$ | Remark |
|---|---|---|---|---|---|---|---|---|
| 51 | Ability t0 lay the first c0urse and check f0r accuracy using spirit level and straight edge | 3.11 | 0.80 | 3.18 | 0.76 | 3.15 | 0.78 | HP |
| 52 | Ability t0 lay c0urse III and subsequent c0urses and check f0r accuracy using spirit level and straight edge | 1.81 | 0.83 | 1.79 | 0.88 | 1.80 | 0.86 | P |
| 53 | Ability t0 use steel t0 supp0rt wind0w and wind0w d00r 0pening in wall. | 1.89 | 0.75 | 1.85 | 0.82 | 1.87 | 0.78 | P |
| 54 | Ability t0 ensure that the j0ints are truly vertical and squared t0 each 0pp0site side | 3.19 | 0.83 | 3.12 | 0.88 | 3.16 | 0.86 | HP |
| 55 | Ability Prepare insulating f0rmw0rk 0f h0ll0w bl0cks | 1.70 | 0.82 | 1.71 | 0.87 | 1.71 | 0.85 | P |
| 56 | Ability t0 stack the required quality 0f bricks/bl0cks | 1.67 | 0.62 | 1.65 | 0.65 | 1.66 | 0.64 | P |
| 57 | Ability t0 fill-in the j0int with m0rtar | 2.85 | 0.95 | 2.74 | 0.99 | 2.80 | 0.97 | HP |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 58 | Ability t0 w0rk fr0m a scaff0ld and s0metimes their scaff0ld can be several st0ries high | 1.52 | 0.51 | 1.50 | 0.51 | 1.51 | 0.51 | P |
| 59 | Ability t0 stack the required quality 0f bricks/bl0cks | 1.63 | 0.63 | 1.65 | 0.73 | 1.64 | 0.68 | P |
| 60 | Ability t0 arrange the pi0neering c0ncrete pre-cast bl0cks 0n hard-c0re t0 keep the Island l0w and reduce the inverted water waves | 1.78 | 0.80 | 1.76 | 0.85 | 1.77 | 0.83 | P |
| 61 | Ability t0 finish a sm00th surfacing watery meth0d | 2.85 | 0.99 | 2.76 | 1.02 | 2.80 | 1.01 | HP |
| 62 | Ability t0 measure and add t0 the mix desired am0unt 0f water required (30 liters) f0r 0ne bag 0f cement and eight head pans 0f sharp sand | 3.15 | 0.53 | 3.09 | 0.57 | 3.12 | 0.55 | HP |
| 63 | Ability t0 set 0ut the base 0f the wall in line with the building drawing | 2.56 | 1.09 | 2.50 | 1.08 | 2.53 | 1.09 | HP |
| 64 | C0nstruct the pi0neering (inn0vative) c0ncrete pre-cast bl0ck | 1.59 | 0.69 | 1.62 | 0.78 | 1.61 | 0.74 | P |
| | **Plastering/Rendering Skills** | | | | | | | |
| 65 | Ability t0 sm00then the edge 0f the c0rners 0f the wall with c0rner rubber after rem0ving the w00den lathe | 1.33 | 0.48 | 1.29 | 0.46 | 1.31 | 0.47 | MP |
| 66 | Ability t0 place plaster screed at c0nvenient thickness 0n the wall with tr0wel | 2.63 | 0.97 | 2.56 | 0.99 | 2.59 | 0.98 | HP |
| 67 | Ability t0 level up (sm00then the surface with the w00den fl0at t0 f0rm a sandy-gritty finish | 1.81 | 0.74 | 1.76 | 0.74 | 1.79 | 0.74 | P |
| 68 | Ability t0 fix w00den lath 0r batten at the edge 0f the wall in 0rder t0 get the thickness 0f the plaster | 1.56 | 0.8 | 1.59 | 0.86 | 1.58 | 0.83 | P |
| 69 | Ability t0 spread m0rtar screed evenly 0n the first c0urse t0 a thickness 0f 13mm | 1.37 | 0.49 | 1.32 | 0.47 | 1.35 | 0.48 | MP |
| 70 | Ability t0 cure the rendered wall | 3.00 | 1.04 | 2.91 | 1.06 | 2.96 | 1.05 | HP |
| 71 | Ability t0 spread m0rtar screed evenly 0n the first c0urse t0 a thickness 0f 13mm | 1.48 | 0.70 | 1.44 | 0.70 | 1.46 | 0.70 | MP |
| 72 | Ability t0 make a h0ll0w 0r c0nical heap 0f the cement and sand c0nstituents in 0rder t0 receive the water f0r mixing | 1.37 | 0.56 | 1.35 | 0.60 | 1.36 | 0.58 | MP |
| 73 | Ability t0 give sm00th surface free 0f dust and dirt | 2.59 | 1.08 | 2.59 | 1.13 | 2.59 | 1.11 | HP |
| 74 | Ability t0 p0ur the water skillfully (gradually) t0 the dry mix | 1.37 | 0.56 | 1.38 | 0.70 | 1.38 | 0.63 | MP |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 75 | Ability finish wall surface with c0mpressed sand and cement | 2.15 | 0.82 | 2.12 | 0.84 | 2.14 | 0.83 | P |
| 76 | Ability t0 lay wall tiles | 3.19 | 0.88 | 3.15 | 0.93 | 3.17 | 0.91 | HP |
| 77 | Ability t0 Clean all the j0ints and surfaces 0f the wall with a wire brush t0 rem0ve 0il 0r grease left 0n wall surface | 1.93 | 0.87 | 1.88 | 0.91 | 1.90 | 0.89 | P |
| 78 | Ability t0 keep all the m0rtar j0ints 0f wall r0ugh t0 give a g00d b0nding t0 h0ld plaster | 3.00 | 0.83 | 2.91 | 0.90 | 2.96 | 0.87 | HP |
| 79 | Raking 0ut 0f the m0rtar j0int t0 a depth 0f at least 12 mm t0 give a better b0nding t0 the plaster if the surface is sm00th 0r the wall t0 be plastered is 0ld 0ne | 1.70 | 0.82 | 1.71 | 0.87 | 1.71 | 0.85 | P |
| 80 | Ability t0 pr0tect the structural wall fr0m driving rain and sandst0rm | 2.67 | 1.11 | 2.76 | 1.13 | 2.72 | 1.12 | HP |
| | **F0undati0n Skills** | | | | | | | |
| 81 | Ability t0 sm00then the edge 0f the c0rners 0f the wall with c0rner rubber after rem0ving the w00den lathe | 3.33 | 0.62 | 3.21 | 0.73 | 3.27 | 0.68 | HP |
| 82 | Ability t0 place plaster screed at c0nvenient thickness 0n the wall with tr0wel | 3.07 | 0.83 | 3.00 | 0.85 | 3.04 | 0.84 | HP |
| 83 | Ability t0 level up (sm00then the surface with the w00den fl0at t0 f0rm a sandy-gritty finish | 1.48 | 0.51 | 1.50 | 0.56 | 1.49 | 0.54 | HP |
| 84 | Ability t0 fix w00den lath 0r batten at the edge 0f the wall in 0rder t0 get the thickness 0f the plaster | 1.67 | 0.68 | 1.68 | 0.77 | 1.67 | 0.73 | P |
| 85 | Ability t0 spread m0rtar screed evenly 0n the first c0urse t0 a thickness 0f 13mm | 1.44 | 0.58 | 1.50 | 0.71 | 1.47 | 0.65 | MP |
| 86 | Ability t0 cure the rendered wall | 2.93 | 0.78 | 2.88 | 0.81 | 2.91 | 0.80 | HP |
| 87 | Ability t0 spread m0rtar screed evenly 0n the first c0urse t0 a thickness 0f 13mm | 2.85 | 0.91 | 2.79 | 0.95 | 2.82 | 0.93 | HP |
| 88 | Ability t0 make a h0ll0w 0r c0nical heap 0f the cement and sand c0nstituents in 0rder t0 receive the water f0r mixing | 1.63 | 0.79 | 1.65 | 0.85 | 1.64 | 0.82 | P |
| 89 | Ability t0 give sm00th surface free 0f dust and dirt | 2.93 | 0.87 | 2.88 | 0.95 | 2.91 | 0.91 | HP |
| 90 | Ability t0 p0ur the water skillfully (gradually) t0 the dry mix | 1.48 | 0.64 | 1.47 | 0.66 | 1.48 | 0.65 | MP |
| 91 | Ability finish wall surface with c0mpressed sand and cement | 2.85 | 1.03 | 2.76 | 1.05 | 2.80 | 1.04 | HP |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 92 | Ability t0 lay wall tiles | 2.78 | 1.01 | 2.74 | 1.05 | 2.76 | 1.03 | HP |
| 93 | Ability t0 Clean all the j0ints and surfaces 0f the wall with a wire brush t0 rem0ve 0il 0r grease left 0n wall surface | 3.07 | 0.78 | 3.00 | 0.82 | 3.04 | 0.80 | HP |
| 94 | Ability t0 p0ur the water skillfully (gradually) t0 the dry mix | 1.37 | 0.56 | 1.35 | 0.60 | 1.36 | 0.58 | MP |
| 95 | Ability finish wall surface with c0mpressed sand and cement | 1.41 | 0.57 | 1.38 | 0.6 | 1.40 | 0.59 | MP |
| 96 | Ability t0 lay wall tiles | 3.26 | 0.71 | 3.15 | 0.78 | 3.21 | 0.75 | HP |
| 97 | Ability t0 Clean all the j0ints and surfaces 0f the wall with a wire brush t0 rem0ve 0il 0r grease left 0n wall surface | 1.41 | 0.69 | 1.41 | 0.78 | 1.41 | 0.74 | MP |
| 98 | Ability t0 keep all the m0rtar j0ints 0f wall r0ugh t0 give a g00d b0nding t0 h0ld plaster | 1.44 | 0.58 | 1.41 | 0.61 | 1.42 | 0.6 | MP |
| 99 | Raking 0ut 0f the m0rtar j0int t0 a depth 0f at least 12 mm t0 give a better b0nding t0 the plaster if the surface is sm00th 0r the wall t0 be plastered is 0ld 0ne | 3.33 | 0.62 | 3.29 | 0.72 | 3.31 | 0.67 | HP |
| 100 | Ability t0 pr0tect the structural wall fr0m driving rain and sandst0rm | 1.26 | 0.45 | 1.24 | 0.43 | 1.25 | 0.44 | MP |
| | **Grand T0tal** | **2.20** | **0.76** | **2.16** | **0.8** | **2.18** | **0.74** | |

Keys: $\bar{x}_1$ = Mean of Foreman; $\bar{x}_2$ = Mean of Building Engineers; $\bar{x}_A$= Average mean of Foreman and Building Engineers; $SD_1$ = Standard Deviation of Foreman; $SD_2$ =Standard Deviation Building Engineers; $SD_A$ = Average Standard Deviation of Foreman and Building Engineers.

Table 2 present the summary of the responses from the perception of respondents on the skills possessed by building craftsmen in building construction industries in Bauchi State. The result showed that 23 items were rated with a mean score between 2.53 - 3.31 indicating that the craftsmen highly possessed the skills, 15 items were rated with mean score between 1.64 – 2.44 indicating that the craftsmen possessed the skills and 12 items were rated with a mean score 1.24 – 1.48 indicating that the indicating the craftsmen moderately possessed the skills in construction industries in Bauchi State. The standard deviation for the 22 items was in the range of 0.57-1.13, all of which are less than the standard deviation threshold value 1.96, indicating that the responses of the respondents are closer with one another. This closeness of the responses gives credence to the reliability of the mean. The standard deviation for the 28 items was in the range of 0.43-0.88, indicating that the responses of the respondents are closer with one another. This closeness of the responses gives credence to the reliability of the mean; In essence, both the Foremen and Builders agreed with one another on their responses.

**4.3 Research Question Three**

What are the skills gaps among building craftsmen in building construction industries in Bauchi State Nigeria?

**Table 3: Skills Gap Analysis of the Mean Responses of Builders and Foremen on Building Craftsmen Skills in Building Construction Industries in Bauchi State, Nigeria**

| S/N 0 | Brick/Bl0ck w0rk Skills | $X_R$ | $X_P$ | Skills Gap ($X_R$ -$X_P$) | Remark |
|---|---|---|---|---|---|
| 101 | Ability t0 lay the first c0urse and check f0r accuracy using spirit level and straight edge | 3.44 | 3.15 | 0.29 | IN |
| 102 | Ability t0 lay c0urse III and subsequent c0urses and check f0r accuracy using spirit level and straight edge | 3.27 | 1.80 | 1.47 | IN |
| 103 | Ability t0 use steel t0 supp0rt wind0w and wind0w d00r 0pening in wall. | 3.07 | 1.87 | 1.20 | IN |
| 104 | Ability t0 ensure that the j0ints are truly vertical and squared t0 each 0pp0site side | 3.2 | 3.12 | 0.04 | IN |
| 105 | Ability Prepare insulating f0rmw0rk 0f h0ll0w bl0cks | 3.18 | 1.71 | 1.47 | IN |
| 106 | Ability t0 stack the required quality 0f bricks/bl0cks | 3.2 | 1.66 | 1.54 | IN |
| 107 | Ability t0 fill-in the j0int with m0rtar | 3.37 | 2.80 | 0.57 | IN |
| 108 | Ability t0 w0rk fr0m a scaff0ld and s0metimes their scaff0ld can be several st0ries high | 3.08 | 1.51 | 1.57 | IN |
| 109 | Ability t0 stack the required quality 0f bricks/bl0cks | 3.12 | 1.64 | 1.48 | IN |
| 110 | Ability t0 arrange the pi0neering c0ncrete pre-cast bl0cks 0n hard-c0re t0 keep the Island l0w and reduce the inverted water waves | 3.16 | 1.77 | 1.39 | IN |
| 111 | Ability t0 finish  a sm00th surfacing watery meth0d | 3.32 | 2.80 | 0.52 | IN |
| 112 | Ability t0 measure and add t0 the mix desired am0unt 0f water required (30 liters) f0r 0ne bag 0f cement and eight head pans 0f sharp sand | 3.26 | 3.12 | 0.14 | IN |
| 113 | Ability t0 set 0ut the base 0f the wall in line with the building drawing | 3.25 | 2.53 | 0.72 | IN |
| 114 | C0nstruct the pi0neering (inn0vative) c0ncrete pre-cast bl0ck | 3.24 | 1.61 | 1.63 | IN |
| | **Plastering/Rendering Skills** | | | | IN |
| 115 | Ability t0 sm00then the edge 0f the c0rners 0f the wall with c0rner rubber after rem0ving the w00den lathe | 3.33 | 1.31 | 2.02 | IN |
| 116 | Ability t0 place plaster screed at c0nvenient thickness 0n the wall with tr0wel | 3.2 | 2.59 | 0.61 | IN |
| 117 | Ability t0 level up (sm00then the surface with the w00den fl0at t0 f0rm a sandy-gritty finish | 3.25 | 1.79 | 1.46 | IN |
| 118 | Ability t0 fix w00den lath 0r batten at the edge | 3.31 | 1.58 | 1.73 | IN |

| | | | | | |
|---|---|---|---|---|---|
| | 0f the wall in 0rder t0 get the thickness 0f the plaster | | | | |
| 119 | Ability t0 spread m0rtar screed evenly 0n the first c0urse t0 a thickness 0f 13mm | 3.04 | 1.35 | 1.69 | IN |
| 120 | Ability t0 cure the rendered wall | 3.24 | 2.96 | 0.28 | IN |
| 121 | Ability t0 spread m0rtar screed evenly 0n the first c0urse t0 a thickness 0f 13mm | 3.3 | 1.46 | 1.84 | IN |
| 122 | Ability t0 make a h0ll0w 0r c0nical heap 0f the cement and sand c0nstituents in 0rder t0 receive the water f0r mixing | 3.36 | 1.36 | 2.00 | IN |
| 123 | Ability t0 give sm00th surface free 0f dust and dirt | 3.12 | 2.59 | 0.53 | IN |
| 124 | Ability t0 p0ur the water skilfully (gradually) t0 the dry mix | 3.18 | 1.38 | 1.80 | IN |
| 125 | Ability finish wall surface with c0mpressed sand and cement | 3.44 | 2.14 | 1.30 | IN |
| 126 | Ability t0 lay wall tiles | 3.29 | 3.17 | 0.12 | IN |
| 127 | Ability t0 Clean all the j0ints and surfaces 0f the wall with a wire brush t0 rem0ve 0il 0r grease left 0n wall surface | 3.21 | 1.90 | 1.31 | IN |
| 128 | Ability t0 keep all the m0rtar j0ints 0f wall r0ugh t0 give a g00d b0nding t0 h0ld plaster | 3.29 | 2.96 | 0.33 | IN |
| 129 | Raking 0ut 0f the m0rtar j0int t0 a depth 0f at least 12 mm t0 give a better b0nding t0 the plaster if the surface is sm00th 0r the wall t0 be plastered is 0ld 0ne | 3.22 | 1.71 | 1.51 | IN |
| 130 | Ability t0 pr0tect the structural wall fr0m driving rain and sandst0rm | 3.32 | 2.72 | 0.60 | IN |
| | **F0undati0n Skills** | | | | |
| 131 | Ability t0 dig f0undati0n trench | 3.27 | 3.27 | 0.00 | INN |
| 132 | Ability t0 c0nstruct bl0ck t0 gr0und level f0undati0n | 3.24 | 3.04 | 0.20 | IN |
| 133 | Ability t0 back filling/laterite filling and c0mpacti0n | 3.21 | 1.49 | 1.72 | IN |
| 134 | Ability 0f filling hard-c0re | 3.07 | 1.67 | 1.40 | IN |
| 135 | Ability t0 framew0rk t0 reinf0rced c0ncrete gr0und fl00r slab edges | 3.27 | 1.47 | 1.80 | IN |
| 136 | Ability t0 pipe w0rk | 3.3 | 2.91 | 0.39 | IN |
| 137 | Ability t0 casting 0f reinf0rced c0ncrete gr0und fl00r slab | 3.32 | 2.82 | 0.50 | IN |
| 138 | Ability t0 excavati0n 0f f0undati0n trenches and appr0val | 3.2 | 1.64 | 1.56 | IN |
| 139 | Ability t0 c0lumn base c0ncrete blinding f0undati0n | 3.27 | 2.91 | 0.36 | IN |
| 140 | Ability t0 c0lumn base/c0lumn reinf0rcement p0siti0ning | 3.12 | 1.48 | 1.64 | IN |
| 141 | Ability t0 cast strip and c0lumn base c0ncrete f0undati0n | 3.07 | 2.8 | 0.27 | IN |

| | | | | | |
|---|---|---|---|---|---|
| 142 | Ability t0 f0rmw0rk t0 gr0und fl00r level c0lumn f0undati0n | 3.34 | 2.76 | 0.58 | IN |
| 143 | Ability t0 c0lumn t0 gr0und fl00r slab c0ncrete casting | 3.22 | 3.04 | 0.18 | IN |
| 144 | Ability t0 strip 0ff c0lumn f0rmw0rk | 3.14 | 1.36 | 1.78 | IN |
| 145 | Ability t0 excavate f0undati0n trenches t0 the required depth and width | 3.02 | 1.40 | 1.62 | IN |
| 146 | Ability t0 cast c0lumn base c0ncrete f0undati0n | 3.15 | 3.21 | -0.06 | INN |
| 147 | Ability ascertained the nature and bearing capacity 0f the subs0il | 3.2 | 1.41 | 1.79 | IN |
| 148 | Ability excavate trench vertical and free fr0m l00se materials | 3.24 | 1.42 | 1.82 | IN |
| 149 | Ability 0f f0undati0n t0 excavates must be inspected and appr0ved by the architects, 0r supervising 0fficer | 3.39 | 3.31 | 0.08 | IN |
| 150 | Ability f0r all surplus materials fr0m excavati0n n0t required after filling in and levelling shall be rem0ved fr0m site and disp0sed at the C0ntract0r's expense. | 3.28 | 1.25 | 2.03 | IN |
| | **Grand T0tal** | **3.23** | **2.17** | **1.06** | |

Key: $X_R$ = Mean of Skills Required, $X_P$ = Mean of Skills Possessed, SP = Skills Gap, IN = Improvement Needed, INN = Improvement Not Needed

Table 3 revealed the skills gap from the 50 items skills required. 48 out of 50 items had skills gap figures ranging from 0.04 to 2.02 and was positive, indicating that building craftsmen need improvement in the 48 skills items. The remaining 2 skills items has one to be 0.00 while the other one has -0.06, indicating that building craftsmen did not need improvement in the 2 items due to the resulting mean obtained.

### 4.4 Hypotheses 1

**$H_{O1}$:** There is no significant disparity in the average responses of builders and foreman on the skills required by building craftsmen in building construction industries in Bauchi state, Nigeria.

**Table 4: Z-test Analysis of the Mean Responses of Builders and Foreman on the Skills Required by Building Craftsmen in Building Construction Industries in Bauchi State, Nigeria.**

| Group | N | $\bar{x}$ | SD | Df | z-value | p-value, Sig.(2tailed) | Alpha Level | Decision |
|---|---|---|---|---|---|---|---|---|
| Builders | 34 | 3.28 | 0.62 | | | | | |
| | | | | 59 | 5.73 | 0.000 | 0.05 | Rejected |
| Foreman | 27 | 3.18 | 0.69 | | | | | |

*Significant at p≤0.05.

**Key:** Probability value computed by the computer = (p-value).

It is shown in Table 4, the results of for testing hypothesis one. It was shown that the p-value, Sig. (2-tailed) (0.000) is lower than 0.05. It means that there exist no notable statistical disparity in the computed means of the building craftsmen. Thus the the hypothesis one was rejected regarding the skills required by the building craftsmen in building construction

industries in Bauchi State of Nigeria. Therefore, there exist no notable disparity in the average responses of Building Engineers on the skills required by the building craftsmen in building construction industries in Bauchi State of Nigeria.

### 4.5 Hypothesis 2

**$HO_2$:** There is no significant difference in the mean responses of builders and foremen on the practical skills possessed by building craftsmen in building construction industries in Bauchi state, Nigeria.

**Table 5: Z-test Analysis of the Mean Responses of Builders and Foreman on the Skills Possessed by Building Craftsmen in Building Construction Industries in Bauchi State, Nigeria.**

| Group | N | $\bar{x}$ | SD | Df | z-value | p-value, Sig.(2tailed) | Alpha Level | Decision |
|---|---|---|---|---|---|---|---|---|
| Builders | 34 | 2.92 | 0.83 | | | | | |
| | | | | 59 | 4.73 | 0.084 | 0.05 | Accepted |
| Foreman | 27 | 3.02 | 0.81 | | | | | |

*Significant at $p \leq 0.05$.

From Table 5, due to the fact that p-value, Sig. (2-tailed) (0.084) is more than 0.05, it indicated that there is notable disparity in the average mean responses of the respondents. Therefore, the researcher accepts the null hypothesis regarding the skills possessed by the building craftsmen in building construction industries in Bauchi State of Nigeria. Hence, there exists no notable statistical disparity among for Building Engineers on the skills possessed by the building craftsmen in building construction industries in Bauchi state of Nigeria.

### 4.6 Discussion of Findings

The findings from Table 1 revealed that the two categories building construction craftsmen agreed with the 50 items for skills required by building craftsmen in building construction industries. Findings on the 14 skills required by building craftsmen in building construction industries on block/bricklaying includes; ability to lay the first course and check for accuracy using spirit level and straight edge, ability to lay course I, II, III and subsequent courses and check for accuracy using spirit level and straight edge, ability to use steel to support window and door opening in wall, ability to ensure that the joints are truly vertical and squared to each opposite side, ability Prepare insulating formwork of hollow blocks, ability to stack the required quality of bricks/blocks, ability to stack the required quality of bricks/blocks , ability to stack the required quality of bricks/blocks, ability to arrange the pioneering concrete pre-cast blocks on hard-core to keep the Island low and reduce the inverted water waves, ability to finish a smooth surfacing watery method and others.

The findings is in agreement with Foreign Credential and Skill Assessment for the Construction Industry (FCSA) (2009) a guide for workmen has discussed that building craftsmen lay bond bricks, stones, cement blocks, stone among other building materials to erect walls as well related structural forms accurately. Major skills craftsmen required are as follows: ability read residential and commercial drawings; identify information from the building code; ability estimate materials; ability lay out project; ability select, use and install fire place; able to use ladders and scaffolds; able to build arches; ability install coping and caps; able to install sculptures masonry, terracotta.

Findings on the 16 skills required by building craftsmen in building construction industries on plastering/rendering includes; ability to smoothen the edge of the corners of the wall with corner rubber after removing the wooden lathe, ability to place plaster screed at convenient thickness on the wall with trowel, ability to level up (smoothen the surface with the wooden float to form a sandy-gritty finish, ability to fix wooden lath or batten at the edge of the wall in order to get the thickness of the plaster and others. This finding is in support with Fadamiro and Ogunsemi (1996) who were of the view that craftsmen should be able to have good quality of plastering and rendering: - hard, durable, possesses good work ability, have the ability to adhere to the background easily and effectively moisture resistant.

Findings on the 18 skills required by building craftsmen in building construction industries on foundation includes; ability to dig foundation trench, ability to construct block to ground level foundation, ability to back filling/laterite filling and compaction, ability of filling hard-core, ability to framework to strengthen concrete floor edges, ability to casting of strengthen concrete floor slab, ability to excavation of foundation trenches and approval, ability to column base concrete blinding foundation, ability to column base/column reinforcement positioning. The finding agrees with Emmitt and Gorse (2010), who stressed that foundation competencies required in a chosen occupation would be wider as well as experienced.

From Table 4, since the p-value, Sig. (2-tailed) (0.000) is lower than 0.05, it indicated that there exists no table statistical disparity in the average responses of the respondents. Thus, the hypothesis one was rejected concerning the skills required by the building craftsmen in building construction industries in Bauchi State of Nigeria. Thus, there exist no notable disparities in the average ratings of Building Engineers on the skills required by the building craftsmen in building construction industries in Bauchi State of Nigeria.

The findings from Table 2 revealed that the two categories of building craftsmen agrees with the 22out 50 items skills possessed by building craftsmen in building construction industries. This includes ability to select, use and install fire place; able to use ladders and scaffolds; able to build arches; ability to install coping and caps; able to install sculptures masonry, ability to place plaster screed at convenient thickness on the wall with trowel, ability to level up (smoothen the surface with the wooden float to form a sandy-gritty finish, ability to fix wooden lath or batten at the edge of the wall in order to get the thickness of the plaster. This finding is in agreement with Idris (2017) who found out that block/bricklaying and concreting graduates do not possessed the work skill needs in carrying out setting out construction work, foundation laying and wall setting in Lagos State.

From Table 5, due to the fact that p-value, Sig. (2-tailed) (0.084) is greater than 0.05, From the results, it can be deduced that there exist no notable statistical disparity in the average responses of the building craftsmen. Thus, the null hypothesis three was upheld concerning the skills possessed by the building craftsmen in building construction industries in Bauchi State of Nigeria. Hence, there exists no notable statistical disparity in the average responses of Builders on the skills possessed by the building craftsmen in building construction industries in Bauchi State of Nigeria.

Table 3 revealed identified the skills gap out of 50 items skills 48 need improvement by building craftsmen in building construction industries. This skills gap recognized are capacity to lay the principal course and check for precision utilizing soul level and straight edge, capacity to lay course III and resulting courses and check for exactness utilizing soul level

and straight edge, capacity to utilize steel to help window and window entryway opening in divider, capacity to guarantee that the joints are really vertical and squared to each contrary side, capacity plan protecting formwork of empty blocks, capacity to put mortar tirade at advantageous thickness on the divider with scoop, capacity to step up (smoothen the surface with the wooden buoy to shape a sandy-coarse completion, capacity to fix wooden slat or secure at the edge of the divider to get the thickness of the mortar, capacity to spread mortar tirade equally on the main course to a thickness of 13mm, capacity to fix the delivered divider, capacity to spread mortar tirade uniformly on the primary course to a thickness of 13mm, capacity to shield the structural divider from driving precipitation and dust storm, capacity to develop square to ground level establishment, capacity to refilling/laterite filling and compaction, capacity of filling in-your-face, , capacity to uncovering of establishment channels and endorsement, capacity to section base cement blinding establishment and capacity to segment base/segment fortification situating.

This finding is in conformity with Idris (2017) who found out that block/bricklaying and concreting graduates work skills improvement needs in carrying out setting out construction work, foundation laying and wall setting in Lagos State. Also in support of the finding is Ede, Miller and Bakare (2010) identified work skills gap that need improvement for the technical college graduates in north west of Nigeria which was recommended to be used for retraining them graduates for maximum practices their occupational task operations.

## 5. CONCLUSION

From findings of the study, it was concluded that craftsmen required skills improvement for building operations, domestic and industrial used. This offers a good job opportunity for craftsmen in building construction industries; however quite unfortunately most of them do not possessed the necessary skills to be either paid or self-employed. In conclusion, the study revealed the skills required, the skill possessed in construction industries and skills gaps among building craftsmen in Construction industries in Bauchi State Nigeria.

### 5.1 Recommendations

The following recommendation was emerged:

1. Building construction industries should utilize the findings of this study on the skills required in block/bricklaying, plastering/rendering and foundation to organize internal workshops in their construction industries where both the management and construction workers will come together in order to highlight the important of these skills required to the building construction projects delivery.
2. The identified skills which building craftsmen do not possessed could be incorporated in the pre-service training program and curriculum of institutions for training building craftsmen by NBTE.
3. Building Craftsmen could utilize the findings of this study to seek for their skills improvement need sponsorship from the management of construction industries in order to attend re-training program for improving their competency in the skills gap identified.

## REFERENCES

Adedeji, Y.M.D. (2008). Interlocking masonry: Panacea for sustainable low-cost housing in Nigeria. *Pakistan Journal of Social Sciences*, 5(8),744-750.

Anigbogu, N. A. (2002). An appraisal of the Nigerian construction industry informal labour market. *Journal of Environmental Sciences,* 2 (4), 96-10.

Chitkara, K. K. (2006). Construction Project management. New Delhi: Tata McGrawhill Publishing Company Limited.

Ersoz, Y. Y. (1999). Neural Network Model for Estimating Construction Productivity – Discussion by H. YucelErsoz. *Journal of Construction Engineering and Management*,3(1),1-6.

Federal Republic of Nigeria (FRN) (2013). National policy on education (6th ed.). Lagos: NERDC press.

Igwe, A.U.&Bakare, J. A (2012).Work skill improvement needs of graduates of technical colleges in electrical installation and maintenance works for employment in the 21st century Nigeria. Makurdi: NATT.

Jaggar, D. & Smith, J. (2007). Building cost planning for the design Team. Oxford: Butterworth-Heinemann.

Kazaz, A., &Ulubeyli S. (2004). A different approach to construction labour in turkey: comparative productivity analysis. *Journal of Building and Environment,* 39: 93-100.

Klein J., Gee, D. & Jones, H. (1998). Analyzing clusters of skill in R & D, *Management Journal*, 28 (1), 37-42.

MuyaM.,Prince A.D.F &Edum- Fotwe, F.T.(2006). Overview of funding for construction craft skills training in sub- sahara in Africa. Zambia Shohola books.

Nahavandi, A. (2000). The art and science of leadership. Upper Saddle River: prentice Hall.

Nigerian Institute of Social and Economic Research (NISER) (2009). Study on skills development for the informal sector of the Nigerian economy. New York: World Bank.

Obiegbu, M. E. (2003). Education and training of Builders towards proactive roles in the 21st centuries building in Nigeria. Seminars for Lecturers of Building programme in Tertiary institution. Abuja: Nigerian institute of Building (NIOB), 13th December.

Olaitan, S. O., Amusa, T. A. &Asouzu, A.I. (2010). Competency improvement needs of instructors for effective teaching of fish preservation and marketing to students in school of agriculture in Niger Delta State, Nigeria. A paper presented at the institute of education conference in 2010.

Shamsuzzoha, A.H.M, &Rezaul, H.S (2007), ‘’Employee Turnover: A Study of Its Causes and Effects to Different Industries in Bangladesh’’. Department of Production, University of Vaasa. Pp 64-66.

Muya, M., Price, A.D.F. and Edum–Fotwe, F.T, (2006). Overview of Funding for Construction Craft Skills Training in Sub- Saharan Africa: a case study of Zambia. Construction Management and Economics, Vol. 24. Pp. 197-208.

Sweis, R.J., Sweis, G.J., Abu Hammad, A.A. & Abu Rumman, M.A. (2009), Modelling the variability of labour productivity in masonry construction. *Jordan Journal of Civil Engineering*, 3(3), 197-212.

Ubenyi, M.O. (1999). Labour in the construction industry in Nigeria. (Unpublished masters thesis, Ahmadu Bello University Zaria, Nigeria.

Wibowo, A. 2009. The contribution of the construction industry tothe economy of Indonesia: A systematic approach. Semarang: Diponegoro University. [online]. Available from: <http://eprints.undip. ac.id/387/1/Agung_Wibowo.pdf> [Accessed: 28 February 2013].

Yakubu, N. (2003). Technical and vocational education and training in Nigeria: Issues and strategies. Kaduna: NBTE publication.