THE ROLES OF POLYTECHNICS EDUCATION IN THE DIRECTION OF MITIGATING SKILL MANPOWER SHORTAGE IN NIGERIA

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ABSTRACT: *The electrical, electronics, computer & civil engineering professionals are national builders as their expertise are needed in all aspects of human life nation development and sustainability. Endless availability of competent and confident electrical, electronics, computer & civil engineering professionals both in terms of quality and quantity is sin-qua-non to national development and sustainability. Skill Manpower Shortage is a menace affecting industrial and manufacturing sectors in Nigeria. This research work aim at examine the degree and causes of labor shortages in electrical, electronic computer & civil engineering professionals in Nigeria with a focus on imminent roles Polytechnic education to mitigate labor shortage electrical, electronics, computer & civil engineering. The data for this work was emanated from sampled population of 70 respondents among Electrical Electronic Civil Computer Engineer, Polytechnics Students, Academic Staff Polytechnics (Lecturers and Technologists, Non- Academic Staff Polytechnics to the structure questionnaire. The results from data collected identified shortage in skill manpower electrical, electronics, and computer & civil engineering industries both in quality and quantity which more predominant in Electrical engineering. Majority of respondent passed blames on Polytechnic education as it present state, ineffective funding, abandonment of policies, non-emphasis on practical training, reliable on outmodedness of training facilities/curriculum. Consequence upon our findings, it is imperative that polytechnics education has roles to play to reduce labor shortages electrical, electronics, and computer & civil engineering professionals.*

Keywords: *Skill Manpower Shortage, Polytechnic education, Nigeria, Electrical and electronic engineering, Computer Engineering, Civil engineering*

1. INTRODUCTION

The shortage of skilled manpower is a multidimensional problems which threatens the economics of industrial sector of many nations around the globe in which Nigeria is not exempted (E. Awe et al., 2010). These shortage of skilled manpower affects costs and schedules, which consequently ruin the industry and put at risk in the economic benefits such as research in machine learning and artificial intelligence network (Aoki DJ, 2020; CIOB, 2006; Egwim et al., 2021; Ireland B, 2007). Increases in infrastructure spending have seen a steady increase in professional careers such as electrical, electronics, computer & civil engineering as well as skills shortages that accompany such increases (Windapo, 2016). One of the most pressing issues today is the shortage of skilled manpower in the industry which is already having serious implications on both economy and business activities (Connor TO, 2006; McCausland C, 2008). The dependence in developed countries economic activities as affected the growing concern of our national technological advancement in terms of job creation. Most of the developed countries like China, Japan, United State of America and Europe at large as taken advantages of shortage of Nigeria skilled manpower to erode our technological improvement on electronics, building, roads, and computer skills in our national development.

The critical factor facing industrial revolution in Nigeria is skills shortage which has been a persistent problem for a while (Department for Education and Employment, 2000; Erasmus &

Breier, 2015; Makhene & Thwala, 2009) like every other sector, is experiencing severe and prolonged shortages of 'manpower', not just in terms of artisans that puts the world's growing economy at risk but the quality of workforce is also a noticeable factor (CIOB, 2006; Connor TO, 2006; Ireland B, 2007; McCausland C, 2008). Going down the memory lane, there has never been such a period in history when the diversification of craft occupations has increased the challenges of skilled manpower training; because as self-employment continues to rise, competition is becoming tougher, profit margins are smaller and specialization and fragmentation of various trades is increasing; contract times are shorter, and right now, it is very difficult to find important skillful professional in electrical, electronics, computer & civil engineering professions (Dennis R, 2009; Durojaye MoshoodTaofeeq & Adeleke A, 2019; Harvey Nash Group & Christine de Largy, 2011). Skills shortage can be described as an insufficient supply of suitably qualified workers willing to work under existing market conditions, particularly at prevailing wages (Windapo, 2016). A labor-intensive industry is depended heavily on sustainability of human capital (Yusof & Misnan, 2009)

Nigeria as a developing nation with a growing population and commensurate with roles of polytechnics education needs requires the services of skilled manpower in industrial development. In the employment Industry, skilled manpower professionals in electrical, electronics, computer & civil engineering professions amongst others, form some large part of technological sector whose input determine; to a great extent, the quality of the industry's products (Akindoyeni A, 2005; Obiegu ME, 2005). Skilled manpower plays a very important role in the success of every industry and stands tall in the advent of sophistication and technology in educational sector success delivery (Akomah et al., 2020). Gudiene et al., (2013) considered skilled manpower to be of the critical factors of production in employment industry. As activities on education, labor is largely reliant on skilled manpower (MacKenzie et al., 2000), any shortage has a negative implication on the employment industry.Various researchers (Dainty et al., 2004; Lill I, 2004; Olsen et al., 2012; Oseghale & Ata, 2008; Tarnoki, 2002; University of Exeter, 2002) ascribed to the shortage of skilled labor to the increasing number of elderly employees, increasing number of projects, lack of sustained training and training policies, the bad public perception about industrial workers and the unpleasant nature of the industry to the youth who were in the majority.

Extensive studies also have been carried out on the subject of skilled labour shortage in the industry and ways to alleviate the problem (Windapo, 2016). These studies can be clustered into three classes. Identification and discussion of various factors contributing to the skilled labor shortage can be classified as the first one (Ademeso et al., 2011). The second class talks about the effects and significances of skilled labour shortages (Rasool & Botha, 2011) The third class discuss about the ways and approaches of dealing with the improvement of the skilled labour crisis (Agapiou et al., 1995; E. Awe, 2004; Tshilongamulenzhe & Christopher. M, 2012). These have serious implications for a wide range of government's macro-economic priorities, plans and interventions for the future development. On the other hand, shortage of labor can also be ascribed the negative image of the industry (Bennett & McGuinness, 2009). This is considered as one of the accident−prone and high risks in the industry

The traditional method of locally organised apprenticeship scheme is becoming archaic (E. M. Awe et al., 2009). The aged and retiring electrical, electronics, computer & civil engineering professionals are not wishing that their children take to their profession; rather, their goals are for their children and wards to become musicians, athletes and entertainer (Dennis R, 2009; Ireland B, 2007). It was observed by (McCausland C, 2008) that gone were the days when skills were passed from father to son. Now young people seem to eschew the high-end education in exchange for the lure of promising positions in entertaining industry or other

emerging fields, leaving a shortage of skilled manpower in the Nigeria industrial sector (E. M. Awe et al., 2009). Acquiring skills is now becoming a major problem for the Nigeria students; in which is not the same with developed country like the United Kingdom, United State of America and other part of Europe and Asia where there is high demand from young people for apprenticeship is surpassing the number of training place available in the industry (CIOB, 2006). Any shortage of skilled manpower that suffocates industrial activities will destructively impact the national economy. This shows that each acquired skilled will definitely made direct impact on the economic not only to a particular sector, but to the country in general (Ward, 1979).

In Nigeria industrial sector skilled manpower adequacy and availability continue to be a major challenge in the industry. Skilled labor shortage has been defined as a"mismatch between worker qualifications and available jobs" (Barnow et al., 2010). Nigerian younger generations see themselves as being tutored to perform supervisory roles on completion of their education. This has indicated that the current picture of skilled labour shortage in the region shows that there is imbalance between supply and demand. If this trend goes unchecked; a period will come when there will be many graduates of polytechnics in electrical, electronics, computer & civil engineering professions with few or insufficient number of skilled manpower to carryout the actual work; a situation that will be catastrophic for the Nigerian employment industry the nation's economy at large (E. Awe et al., 2010). The shortage of skilled labor had serious disadvantages on Nigeria industrial productivity mechanism such as phones, motor brake-pads, electrical appliances, textile and so on (Othman, 2014). These should have been managed effectively if our industries are performing to the maximum capacity in terms of skilled manpower and, therefore, any attempt to find a solution should be swiftly taken (Baloyi & Bekker, 2011) .

There is a serious gap in knowledge in which this study intends to fill. Little or no literature on can be cited for this exercise. In the light of the above background and problem, this research aims at examining the roles of polytechnics education in the direction of extenuating skill manpower shortage in Nigeria electrical, electronics, computer & civil engineering professional. From the extant literature the proposed objectives are:

i. Identification and discussion of various factors contributing to the skilled labor shortage.
ii. The ways and approaches of dealing with the improvement of the skilled labour crisis
iii. Develop and validate a practicable framework for skilled manpower acquisition.

2. LITERATURE REVIEW

The labor industry is considered as one of the biggest industries world-wide. Performances depends solely on skilled labor which is an essential developmental component of a nation's economy. The adequacy and availability of a skilled labor will continue to be a major challenge in the industry. The performance of labor activities is an intricate phenomenon of skilled labour shortage. Windapo, (2016) hypothesized that most project disappointments were due to scarce skilled manpower. Projects such as construction of roads, buildings, bridges, dams, sewage plants, are carried out on a large scales.

There is a need for the training, development and constant supply of indigenous manpower to acquire use and adapt the available technologies because most of the technology of construction comprises of both local and imported materials/equipment.

The level of economic activities and development has not been able to match the stock of skilled manpower in most of the developing countries, in which Nigeria is not an exemption Apprentice systems were widespread throughout all occupations in the Nigeria of yesteryears. These systems includes those that have the ability to perform a set of tasks, the ability to understand what others are doing and why, and the ability to adapt to changes and unforeseen

circumstances. However, it was established from the literature that the factors influencing skills shortage include the role of the government, the ageing workforce, construction industry's poor image, the quality and relevance of the training received by artisans, the cyclical nature of the demand for construction services, technological advancements, economic conditions and the need for certification.

According to Mukora (2008), youth of today would rather work with computers rather than preference for hands-on labour. As a result this, the industry has struggled to attract young people and unsuccessful to replace the labour that has left the industry and to gratify the increased demand for skilled labour. The industry is undergoing a job of low social standing and lacking attractiveness because of its physical demands, long hours, remote work sites and nomadic lifestyle.

The Employment, Workplace Relations, and Education References Committee (2003) found that "the causes of skill shortages and skill gaps are often complex and multi-faceted with the specific causes varying with the industry and occupation". Watson (2007) established that a diverse range of factors contributing to current and future skill shortages was identified by the National Industry Advisory Body (2003). These include: an ageing workforce and forthcoming retirement rates; changing skills required from various occupations; differences in demand and/or supply of skilled workers as a result of employment arrangements; poor educational qualifications translating into smaller and lower numbers of successful job applicants; inadequate apprenticeship rates and difficulties in attracting and retaining employees.

The following researchers [5] concluded that one of the factors influencing skills shortages relates to insufficient manpower prediction. "Manpower" has been traditionally used to predict and represent the forecasted supply and demand of labour. Wong et al., (2012) predicted the importance of manpower by recognizing the "imbalances between the demand for and supply of specific skills in the construction industry which is particularly important since it contains a large number of distinct skill categories". Rapid changes notably took place in the sectors of business and industry in the 20th and 21st century. Various forecasting methodologies to determine the future training needs have been applied by many countries that recognized the significant of manpower forecasting.

Introducing the technical and vocational skills training and education is one of the initiatives to overcome the issue of labour shortage and unskilled workmanship. According to Olsen & Tatum (2012), vocational educations is one of the possible solutions to the skilled labour shortages.The vocational education and training system has a major role in assisting with the matching of the skills required by industry with the skills obtainable by the labours [56]. There is a wide variety of technical and vocational training programs available nowadays.

The production of multi-skilled labours is also an initiative to ssustain the industry. Lill (2009) specified that multiskilling are labour cost savings and fewer workers needed, thus it allows growth in average employment period. In order to improved workload and less accidents, multi-skilled labours can also be used to generate more saving when they are properly utilized due to lower turnover rates. Multi-skilled labour are faithful to their employer because they stay longer on a project and have wider diversity of knowledge. Another strategy to managing labour shortage is by changing the way the work is done. This can be done by replacement of capital and new technology to cut down on the shortage of labour [56]

3. METHODOLOGY MATERIALS & RESULTS

Methodology and Materials

The methodology involve survey to determine the presence of the problem of skill manpower shortage in with focus on electrical, electronics, computer & civil engineering profession and

roles of Polytechnic education to mitigate the problem of skilled manpower shortage. *The data* for this work was emanated from sampled population of 70 respondents among electrical electronic civil computer engineer, polytechnics students, academic staff polytechnics (Lecturers and Technologists, Non- Academic Staff Polytechnics) to the structure questionnaire. Data collected were tabulated as and presented for analysis and discussion as presented in table 1 – 3.

Data Analysis and Results

Frequency and percentage weightings were used to analyze and discussed the data from tables. The results from data collected acknowledged shortage in skill manpower in electrical, electronics, computer & civil engineering industries both in quality and quantity. The problem of skilled manpower shortage is more predominant in electrical engineering profession. Majority of respondent passed blames on polytechnic education as it present state, ineffective funding, abandonment of policies, non-emphasis on practical training, reliable on obsolete of training facilities/curriculum. Consequence upon our findings, it is imperative that polytechnics education has roles to play to reduce labor shortages in electrical, electronics, computer & civil engineering professionals.

Table 1. Respondents' Background

Background	*Frequency (F)*	*Percentage (%)*
Electrical Engineers	*24*	*34.29*
Electronic Engineers	*9*	*12.86*
Civil Engineers	*13*	*18.57*
Computer Engineers	*6*	*8.57*
Polytechnics Students	*3*	*4.29*
Academic Staff Polytechnics (Lecturers)	*3*	*4.29*
Academic Staff Polytechnics (Technologists)	*6*	*8.57*
Non- Academic Staff Polytechnics	*6*	*8.57*
	70	*100*

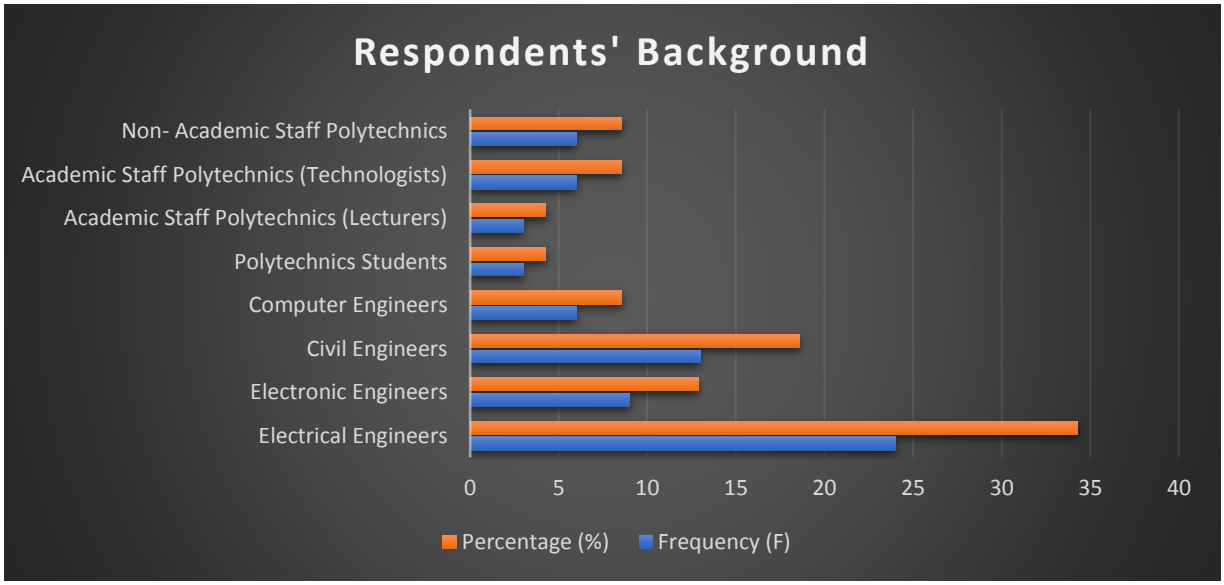


Table 2. Labor shortages in electrical, electronic computer industries & civil engineering

Questions (Text)	***Question (A1-F1)***	***Responses***	***Yes***	***No***	***Total***
There is currently a shortage of skill manpower in the electrical, electronic computer industries & civil engineering	*A1*	*Frequency (f)*	*61*	*9*	*70*
		Percentage (%)	*87.1*	*12.9*	*100*
The shortages is in terms of number of Skill workers available for work in the Electrical, Electronics Computer Industries & Civil Engineering industries	*B1*	*Frequency (f)*	*53.0*	*17.0*	*70*
		Percentage (%)	*75.7*	*24.3*	*100*
The shortages is in terms of the competency or quality of Electrical, Electronics Computer Industries & Civil Engineering industries	*C1*	*Frequency (f)*	*49.0*	*21.0*	*70*
		Percentage (%)	*70.0*	*30.0*	*100*
The shortage is predominant or particular with Electrical	*D1*	*Frequency (f)*	*53.0*	*17.0*	*70*
		Percentage (%)	*75.7*	*24.3*	*100*
The shortage is predominant or particular with Electronic and Computer	*E1*	*Frequency (f)*	*9.0*	*61.0*	*70*
		Percentage (%)	*12.9*	*87.1*	*100*
The shortage is predominant or particular with Civil	*F1*	*Frequency (f)*	*8.0*	*62.0*	*70*
		Percentage (%)	*11.4*	*88.6*	*100*

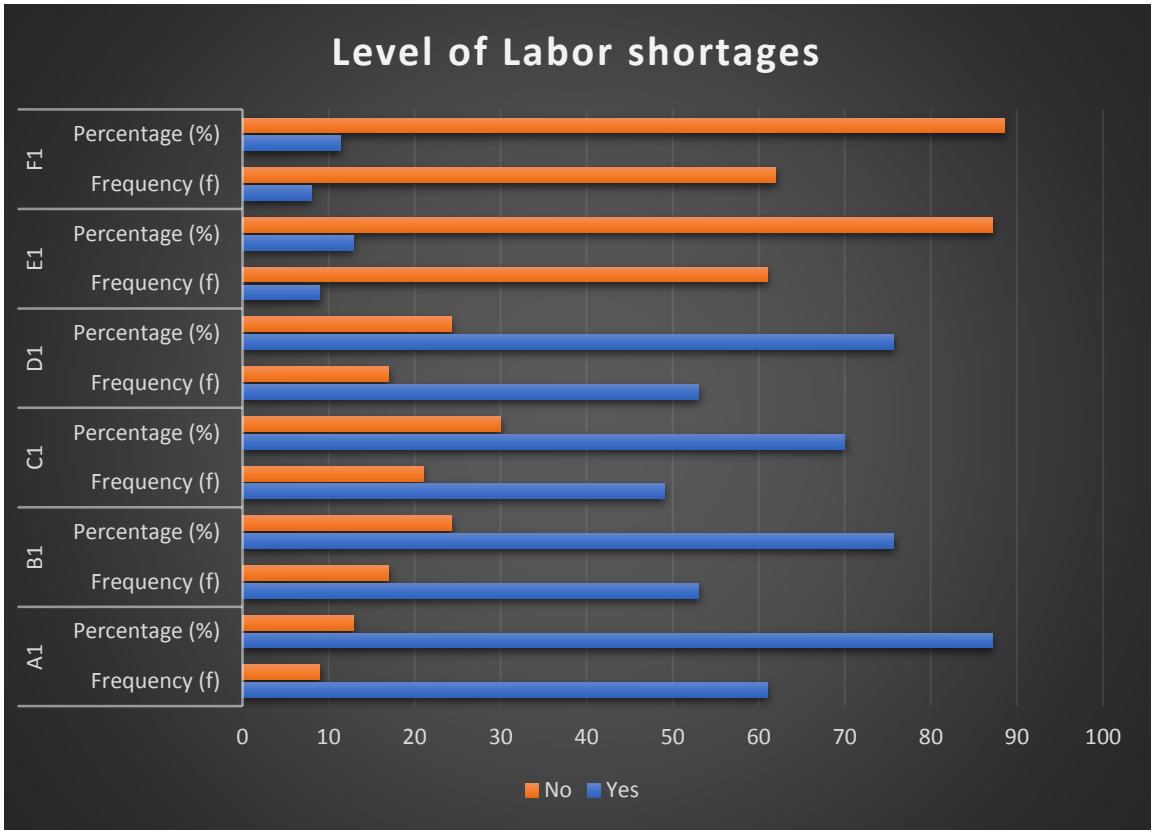
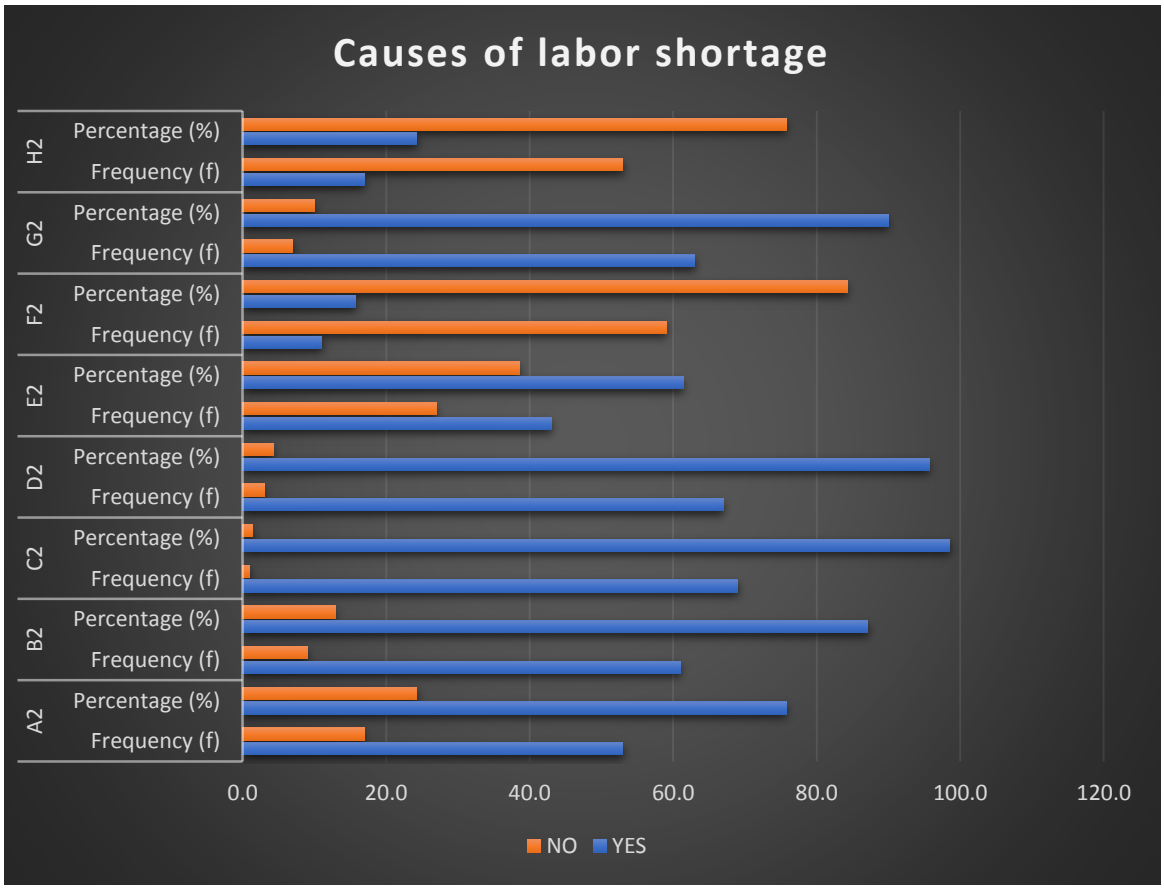


Table 3. Causes of labor shortage electrical, electronic computer industries & civil engineering

Questions	*Questions (A2-H2)*	*Responses*	*YES*	*NO*	*Total*
The present state of Polytechnic education in Nigeria is far below producing Industry Ready workers	*A2*	*Frequency (f)*	*53.0*	*17.0*	*70.0*
		Percentage (%)	*75.7*	*24.3*	*100.0*
Polytechnics not producing the needed competent and confident workforce for the nation's Electrical, Electronics Computer Industries & Civil Engineering industries	B2	*Frequency (f)*	*61.0*	*9.0*	*70.0*
		Percentage (%)	*87.1*	*12.9*	*100.0*
The Polytechnics education can be blamed on reduced emphasis on practical training.	*C2*	*Frequency (f)*	*69.0*	*1.0*	*70.0*
		Percentage (%)	*98.6*	*1.4*	*100.0*
The Polytechnic education should be blame for abandonment and/or truncation of Enrolment policies of 30:70 for social sciences and Science/Engineering Courses.	*D2*	*Frequency (f)*	*67.0*	*3.0*	*70.0*
		Percentage (%)	*95.7*	*4.3*	*100.0*
The Polytechnic education should be blame for absence of or obsolescence of training facilities to acquire practical skills.	*E2*	*Frequency (f)*	*43.0*	*27.0*	*70.0*
		Percentage (%)	*61.4*	*38.6*	*100.0*

The Polytechnics Students should be blame for their unwillingness to acquire in-depth knowledge/skill in the chosen course.	*F2*	*Frequency (f)*	*11.0*	*59.0*	*70.0*
		Percentage (%)	*15.7*	*84.3*	*100.0*
Ownership of the Polytechnic should be blame for inadequate funding of polytechnic education	*G2*	*Frequency (f)*	*63.0*	*7.0*	*70.0*
		Percentage (%)	*90.0*	*10.0*	*100.0*
Ownership of the Polytechnic should be blame for inadequate policy formulation with respect to Polytechnic education.	*H2*	*Frequency (f)*	*17.0*	*53.0*	*70.0*
		Percentage (%)	*24.3*	*75.7*	*100.0*



CONCLUSSION

The findings from the results confirm shortage in skill manpower in electrical, electronics, computer & civil engineering industries. The shortage of skilled manpower shortage is more predominant in electrical engineering profession. Majority of respondent opined that the present stage polytechnic education as at present which revolves round ineffective funding, abandonment of policies, non-emphasis on practical training, reliable on obsolete of training facilities/curriculum are reasons for shortage in the skill manpower. Consequence upon our findings, it is imperative that polytechnics education has roles to play to reduce labor shortages in electrical, electronics, computer & civil engineering fields. Consequently, it is highly recommended that Polytechnic education should be reposition to address the shortage of skilled manpower in the Nigeria industrial sector and economy at large.

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