IMPACT OF AUTHENTICITY OF ENGINEERING PROFESSION ON SOCIOECONOMIC AND HUMAN DEVELOPMENT

Anumaka, M.C[1] and Isioha D.O.[2]

[1]Department of Electrical/Electronic Engineering, Faculty of Engineering, Imo State University, Owerri, Nigeria
[2]Department of Mechanical Engineering, Faculty of Engineering, Imo State University, Owerri, Nigeria

ABSTRACT
The engineering profession has been invaluable in the improvement of capacity building and sustainable development. This research work examines the impact of authenticity of engineering profession on socioeconomic and human development. The focus of this study is to determine if the authenticity of engineering profession has effect on human development and socioeconomic activities. This study outlines the benefits of engineering profession on manpower development. Data from the primary sources were analyzed using descriptive and inferential statistics particularly chi-square distribution test. Findings revealed that engineering profession contributed large percentage of human development and boost socioeconomic activities because the engineering profession pools other resources together for realization of objectives. Therefore, it was recommended that the Government should embrace this unique sector and apportion two and half percent of annual budget to engineering profession and human development in order to ensure continuous improvement in industrialization, and sustainable development.

Keywords: Engineering Profession, Socioeconomic, Human Development, Chi-Square.

1.0 INTRODUCTION
There are a number of factors that contribute to the success of any firm, organization and country. These factors include: engineering profession, capital, equipment, manpower, etc. All these factors are important but the most significant factor is the engineering profession.

A professional engineer is competent by virtue of his or her fundamental education and training to apply scientific principles, methods with viewpoint to the analysis and solution of engineering problems. A professional engineer is able to assume personal responsibility for the development and application of engineering science and knowledge, notably in research, design, construction, manufacturing, superintending, and management of the education of the engineer. His work is principally intellectual and varied, not of a routine mental or physical character only.

The professional engineer requires the exercise of original thought and critical judgment, and the ability to supervise the technical and administrative work of others. A professional engineer is an engineering practitioner, who is concerned with application of scientific knowledge and principles, mathematics, and has the ingenuity to develop solution for technical, societal and business problems. The professional engineers design materials, structures, and systems while considering the limitations imposed by practicality, cost, regulation and safety.

Knowledge of human development is highly gratifying and valuable in itself. Omole (2004) noted that human development involves harnessing the conducive learning and development opportunities, making

training intervention and planning, conducting and evaluating training programmes. The need for improved productivity in an organization has become universally accepted phenomenon that depends on efficient and effective human development and application of engineering principles to improve the standard of living. Absence of staff development programmes in any human settings often manifests common problems including incompetence, inefficiency and ineffectiveness. Oribabor (2000) posits that training and development is aimed at developing competences such as technical, human, conceptual and managerial for the furtherance of individual and organizational growths; while Isyaku (2000) opined that the process of training and development is a continuous one.

Human development is very critical to the socioeconomic activities, organizational survival and accomplishment of the desired goals. However, it has been generally observed that there has been a progressive decline in the ability of the available manpower in Nigeria to cope with the challenges facing country. This trend could be viewed to have resulted due to neglect in engineering fields and subsequent inadequate level of skill acquisition by the employees or their inability to keep abreast with the new modern technological development.

Human is dynamic in nature, the need to be current and relevant in all spheres of human endeavour makes human development a necessity in order to keep track with current sophistication, principles and methods. Griffin (1998), Ajibade (1993) and Adeniyi (1995) posit that human development is very essential for socioeconomic development. In his contribution, Arikewuyo (1999) draws attention of all and sundry to the inestimable value of engineering training and human development.

The concept of human development encompasses subsisting staff training and re-training programmes for the employees in order to meet up with organizational goals and objectives, as well as the sustaining engineering profession for socioeconomic and human growth and development.

Therefore, it becomes imperative to investigate the effects of engineering profession on human development, which this study attempted to explore.

This paper looks at the concepts of authenticity and engineering profession and examines the influence and benefit of engineering profession on human development. It also determines its impact on engineering profession and its effects on human development and socioeconomic activities.

Research Hypotheses:

The following research hypotheses were postulated to guide study:

Ho1: Engineering profession does not have significant effect on human and socioeconomic development.

Ho2: Lack of engineering profession does not significantly affect human and socioeconomic development.

Ho3: There is no link between engineering profession and human development.

Ho4: There is no significant benefit of engineering profession on human and socioeconomic development.

2.0 REVIEW OF RELATED LITERATURE

In engineering context, authenticity of engineering profession implies genuine or real and legitimate engineering personnel. Baas and Palmberg (2001) noted that it refers to how much the engineering professionals possess original or inherent authority, how much sincerity, genuineness of expression, and moral passion they put into the work. Bendix (1997) argued that in real practical human life, the authenticity of the experience among the engineering professionals may be impossible to achieve and recapture.

Psychologically, authenticity concerns the truthfulness of origins, attributes, commitments, sincerity, devotion, and intentions. To guard against forgeries like this, a certificate of authenticity may be used to prove that a work of art is authentic. The word "authentic or authenticity" traditionally referred to any work of art that is an original, not a copy. The financial importance of authenticity may bias collectors to acquiring recent works of art where provenance can more easily be proven, perhaps even by a statement from the artist. For older works, an increasingly sophisticated array of forensic techniques may be deployed to establish authenticity of provenance.

Coleman, (2005) and Carrier (2005) noted that authenticity can be expressed through form and design; materials and substance; use and function; traditions and techniques; location and setting; spirit and feeling; and other internal and external factors.

The engineer recognizes that the greatest merit is the work and exercises his profession committed to serving society, attending to the welfare and progress of the majority. By transforming nature for the benefit of mankind, the engineer has increased his awareness of the world as the abode of man, his focus in the universe is to guarantee and overcome advancement and apply the knowledge of reality to make the world fairer and happier. The engineer should reject any project that is intended to harm the general interest, avoiding a situation that might be hazardous or threatening to the human environment, life, health, or other rights of human beings. It is an unavoidable duty of the engineer to uphold the prestige of the profession, to ensure its proper emancipation, and to maintain a professional demeanor rooted in skillfulness, honesty, fortitude, temperance, magnanimity, modesty, and judicious allocation of available resources; with the consciousness of individual well-being and the social good. The engineer and his employer are responsible ensure the continuous improvement of his knowledge, particularly of his profession, circulate his technical knowledge, share his experience, provide opportunities for education and training of workers, provide recognition, moral and material support to the society he found himself.

The fields of engineering profession abound and classified as follows:

[1] Aerospace engineering [2] Agricultural engineering [3] Chemical engineering [4] Civil engineering [5] Electrical engineering [6] Electronic engineering [7] Mechanical engineering [8] Mechatronics engineering [9] Aerospace engineering [10] Metallurgical/Material engineering [11] Computer engineering [12] Software engineering [13] Petroleum engineering [14] Biomedical engineering. [15] Environmental engineering [16] Health and Safety engineering [17] Industrial engineering [18] Marine engineering.

In Human Development and Psychology, lay emphasis on how to support healthy development across cultures and across the lifespan, and how to apply this knowledge in schools and other education-related settings. The embodiment of human development is as depicted in figure 1.0.

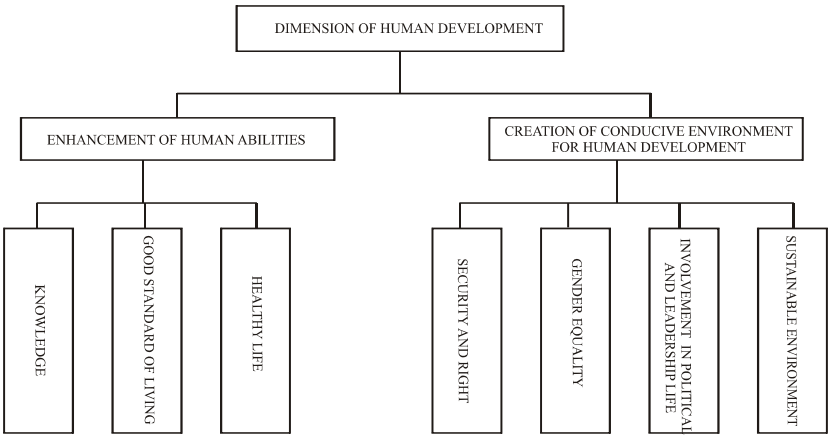

Figure 1.0. Embodiment of human development.

Engineering profession is an essential ingredient needed in the growth and development of the any dynamic economy.

The Human Development and Psychology (HDP) emphasizes early childhood development, organizational psychology, emotional, cognitive and moral development, trauma and child advocacy, and much more.

The socio-economic development refers to the process of social and economic development in a society. Socio-economic development is measured with indicators, such as GDP, life expectancy, literacy and levels of employment. Causes of socio-economic impacts entail new technologies, changes in laws, changes in the physical environment and ecological changes.

3.0 METHODOLOGY

The study adopted survey research design. The target population for this study comprised employees of different companies in Nigeria, put at 2200. The population consisted of men and women above (25) twenty years of age. The sample was made up of one hundred employees randomly selected from the said population for this study.

A structured likert- type rating scale was prepared by the researcher for the study. The scale comprised of twenty items. The rating scale was tested on thirty selected number of employees. A reliability coefficient of 0.63 was established using the Pearson product moment correlation statistic.

The data were obtained by administering the instrument on 100 respondents. A total of eighty copies of the instrument were properly responded to and returned while the remaining forty copies were improperly filled and discarded.

The data collected were analyzed using inferential statistics. Frequency counts and percentages were used to analyze the data. The chi-square statistical test was employed. The scores for the items were solved using the following chi-square formula:

$$X^2 = \sum_{i-i}^{n} \frac{(O_{i-} E_i)^2}{E_i} \qquad (1)$$

Where:
O_i =Observed cell frequencies

E_i = Expected cell frequencies

Σ = summation

X^2 = chi-square test.

4.0 FINDINGS / RESULT

Table 1. *Effect of Engineering Profession On Human Development*

Variable	[0]	E	0-E	$[O-E]^2$	$[0-E]^2/E$
Very high extent	51	20	31	961	48.05
High extent	22	20	2	4	0.2
Low extent	4	20	-16	256	12.8
Very low extent	3	20	-17	189	14.45
Total	60				75.5

Source: *Field Research, 2016.*

$$X^2 = \sum_{i-i}^{n} \frac{(O_{i-} E_i)^2}{E_i}$$

So, X^2 Cal = 59.34
Degree of Freedom = n-1= 5-1= 4
The Degree of Freedom (4) at 5% level of significance is 9.49, which is the table value of chi-square
Decision: X^2 Cal (75.5) is greater than X^2 tab (9.49). Therefore, engineering profession has effects on human development.

Table 2. *Relationship Between Engineering Profession and Human Development*

Variable	[0]	E	0-E	$[O-E]^2$	$[0-E]^2/E$
Very high extent	35	20	15	225	11.25
High extent	19	20	-1	1	0.05
Low extent	16	20	-3	16	0.8
Very low extent	10	20	-10	100	5

Total	80				17.1

$$X^2 = \sum_{i-i}^{n} \frac{(O_i - E_i)^2}{E_i}$$

So, X^2 Cal = 17.1
Degree of Freedom = n-1= 5-1= 4
The Degree of Freedom at 5% level of significance is 9.49, which is the table value of chi-square
Decision: X^2 Cal (17.1) is greater than X^2 tab (9.49). Therefore, engineering profession has effects on human development.

Table 3.*Relationship Between Engineering Profession and Socioeconomic activities*

Variable	[0]	E	0-E	$[O-E]^2$	$[0-E]^2/E$
Very high extent	35	20	15	225	11.25
High extent	35	20	15	225	11.25
Low extent	5	20	-15	225	11.25
Very low extent	5	20	-15	225	11.25
Total	80				45

$$X^2 = \sum_{i-i}^{n} \frac{(O_i - E_i)^2}{E_i}$$

So, X^2 Cal = 45
Degree of Freedom = n-1= 5-1= 4
The Degree of Freedom (4) at 5% level of significance is 9.49, which is the table value of chi-square
Decision: X2 Cal (1) is greater than X^2 tab (9.49). Therefore, engineering profession has effects on human development.

Table 4. Merits of Engineering Profession on Human Development

Variable	[0]	E	0-E	$[O-E]^2$	$[0-E]^2/E$
Very high extent	70	20	50	2500	125
High extent	10	20	-10	36	1.8
Low extent	0	20	-20	256	12.8

Very low extent	0	20	-20	256	12.8
Total	80				152.4

$$X^2 = \sum_{i-i}^{n} \frac{(O_i - E_i)^2}{E_i}$$

So, X^2 Cal = 552.4

Degree of Freedom = n-1= 5-1= 4

The Degree of Freedom at 5% level of significance is 9.49, which is the table value of chi-square

Decision: X^2 Cal (152.4) is greater than X^2 tab (9.49). Therefore, engineering profession has effects on human development.

DISCUSSION

Table 1 clearly reveals that engineering profession and development is a crucial factor to industrialization and advancement as the X^2 Cal (75.5) is greater than the X^2 tab (9.49). This shows that engineering profession have significant effects on human development. Therefore, it is imperative that the three organs of the Governments should put more effort in promoting engineering profession.

Result from table 2 indicates that lack of engineering professionals significantly affect human development as the X^2 Cal (17.1) is greater than the X^2 tab (9.49).

The hypothesis three was rejected and a null hypothesis was accepted. This is because the X^2 Cal (45) is greater than the X^2 tab (9.49). The findings also revealed that human struggle to achieving the better standard of living will drastically improve and increase when rely on engineering profession. This will ensure improvement on the quality of work life by making it more enjoyable and less boring.

Table 4 shows that there is significant benefit of engineering profession on human development. Thus, hypothesis four was rejected as the X^2 Cal (152.4) is greater than the X^2 tab (9.49) while the alternative hypothesis was accepted. The finding implies that engineering professions are indispensible in human development. The findings of the study also established that engineering profession have direct influence on human and socioeconomic.

CONCLUSION

The findings of this research work have shown that the engineering profession is indispensible in the human development. It has contributed significantly to the socioeconomic activities and sustainable development. Therefore, it becomes imperative to channel more effort towards training more engineers.

It is therefore recommended that:

[1] The three –tier Governments, should put in promoting engineering profession and more efforts allocate two-third of annual budget to the engineering profession.

[2] Government should indulge in massive provision of engineering equipment in all tertiary institutions offering engineering courses in the country and embark on On-the-Job training for engineering staff.

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