

Students' Perceptions on Choice and Retention of Engineering Technology as a Career Course. (A Study of Federal Polytechnic Bali)

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Abstract

The aim of the study was to determine the students' perception on the choice and retention of Engineering Technology as a Career Course. The study was guided by two objectives and two research questions. The study adopted Survey as the research design. Which was carried out in Federal polytechnic Bali, Taraba State. The population of the study was 343, which is comprised of all students of Agric. and Bio-Environmental Engineering, Building Technology, Civil engineering, Computer engineering, and Electrical/Electronics engineering departments. There was no sampling technique as all the population was managed as samples for this study. Structured questionnaire was used in data collection for the study which was validated experts; Cronbach Alpha coefficient formula was used in determining the internal consistency of the instrument, which gave a coefficient value of 0.78, indicated that it is reliable. The data collected was analyzed using mean and standard deviation with the help of Statistical Package for Social Science (SPSS) software, version 22. The result reveals that all the respondents themselves have chosen engineering as a course before admitted, engineering is the career they wanted since from their secondary schools with the total support of their parents/guardians. They also found engineering as best course for career take-up, showed their happiness being as engineering students. It was concluded that Students follows their interests as they were encouraged by their parents/guardians since from their early years. It is also recommended that there is need for special counselling services to encourage the students since from their childhood years, as they understands of the societal needs of becoming an engineers, Government should provide all manpower and training facilities needed for training engineers in the tertiary institutions of learning.

Keywords: *Engineering Education, Engineering Materials and equipment, Career take up.*

Introduction

Increasing the economic wellbeing of a country can only be achieved by the ways of improving the productivity of employment and capital which brings about National development. Achieving the National development or economic development, the nation needs to imbibe the culture of prices reduction of assets, transport and infrastructure toward enhancements that contract economy, thereby labour can be moveable and easy to reach. Job seeking will be easier and accessible which will maximize the potentialities of development, though reducing running costs for companies can access a wider labour market. Dosi et al. (2006), defines Economic development as “crucial in creating the conditions necessary to achieve long run growth, particularly in developing nations”. It is also affirmed that Technological learning encompasses numerous elements than merely inventing discovery and patenting: similarly significant activities are imitation, reverse engineering, and acceptance of capital embodied modernizations, learning by doing then learning by using.

Adamu (2020), posed a question for a National development be achieved in a country as: “How much of the input and engineering technology dictate the quality as well as the quantity obtained”? The answer to this question will shape the Economy to view the kind of mechanisms that will transform input elements like labour, capital, and natural resources into output. He also pointed out that for a need for engineering technology and National Development, high class, endorsed engineering technology graduates are looked-for in nations so that good results can be possibly recognized. Engineers are needed for skilled jobs in the country for national development. Therefore, there is increased demand for engineers which will result only sufficient and qualified graduates will fill in to the nations demand as well as foreign investment, international engineering organizations and operations, offshore contracts out from advanced nations,

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and commercial start-ups. Country engineers and government representatives need to follow active economic expansion and employment generation policies so as to make required reserves to boost the value and number of engineering graduates that acquired qualitative education.

Engineering Education in Nigeria

Nigeria realized that the field of engineering education is the foremost foundation of any country, after the independence, numerous of Technical Schools, Polytechnics and Faculty of Engineering in Universities were established in the country. Even though, around the middle of the 19th century Engineering education remained mistreated as claimed by Oloyede et al. (2017). Based on that in Nigeria, learning of any engineering degree is structured for a five years due to realization of significance and technicality of engineering education, year one to be spent in studying basic sciences and general studies. The Council for the Regulation of Engineering in Nigeria (COREN) is the body that regulates the engineering practice in Nigeria which stipulates that for a graduate to become a competent engineer must exercise for a four years minimum to get registered.

However, it was commendable as Engineering education in Nigerian did thrived by meeting the instantaneous essential of the early post-independence era, as majority teachers of engineering teaches with the industry based knowledge particularly giving the contents of theory and practical in line with the industry based, Moja (2000).

Nevertheless, Idris and Rajuddin (2012) pointed out the falling standard of engineering education in Nigeria in recent times, thereby created a foremost worry most specifically to the industries. Consequently, generating a divide amongst the skills necessary by the labour markets and what is expected by the graduates. This results the call for enhancement of the current standard course delivery

approaches toward reaching the labour market essentials.

Conversely, as the years goes, the advent of information technology, trending on technological concepts and growing initiative are fashionable in the world due to engineering innovations, Jaraiedi and Ritz (1994) said that “there are no major changes in engineering education, lecturing style, and attitude within the same time frame in Nigeria”. Notwithstanding these encounters, some argues are generated by Nigerians that the system is not as unscrupulous as some Nigerian engineering students are still managing to highest level of achievement both at home and abroad, while pursuing their higher education.

Engineering Education has to do with the training engineers so as to initiate, facilitate and implement the technological expansion in the humanity. According to Falade (2009), “Engineers are to solve societal problems in a sustainable way using appropriate engineering tools to proffer required solutions. Prospective engineers and technologists are trained in the universities and polytechnics respectively”. However, some graduates of polytechnics who gotten better results in their final examinations can developed themselves to be engineers either by admission into universities after the Ordinary or Higher National Diploma at the suitable level or through undertaking specialized development training prepared by the Council for the Regulation of Engineering in Nigeria (COREN).

Similar to other forms of education, Engineering Technology education, is aimed at preparing students who after the completion of studies should be able to overcome the menace of their immediate societies and beyond. Akor et al. (2019) pointed out that the expectation of teaching and learning environment is to be an imitation of the working environment. This includes the laboratories and workshops in the learning institutions should be the same in content with those in sites and industries.

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However, there are some challenges that hinder Engineering Technology education which are the following:

- **The Engineering education curriculum:** There is a need of thorough review of Engineering Education Curriculum as it is outdated from time to time by the body concerned so as to attain with the international standard thereby Nigerian graduates will compete worldwide. The curriculum must address certain features of engineering applications that are predominant in Nigeria today. Consequence of re-training of ex-students of engineering education by the industries indicates the sign of the curriculum shortfalls. Accordingly, for engineering education to wholly upkeep economic progress, Onwuka (2009) postulated that “there be should provisions for the change of tools that is used in solving the problem as the problem is equally changing from time to time”. This indicates that engineering education curriculum ought to remain malleable in nature, inspected regularly and improved in order to house certain societal requirements.
- **Deficient skill necessity for leading edge technology,** low practical knowledge and confidence displayed by Nigerian engineering students from Universities and Polytechnics which is a substantial subject of worry from almost all Nigerian industries. Nevertheless, Bubou et al. (2014) pointed out that many of Nigerian engineering students went through numerous retraining programs since many of them are believed to be non-employable affecting by the quality of training learned from the numerous universities.
- **Bad infrastructures in engineering faculties:** Universities and Polytechnics where massive amount of students are coming from, cannot influence positively on the growth of industries for economic

emancipation and development. To this, Akor et al. (2019) pointed out that the problem will cripple the level of economic development of each country particularly if depends on its level of human capital development, predominantly in engineering and science in addition to technical development and industrialization. Nigeria is far away from going through some milestone in technical advancement towards industrialization. To counter this problem, Idris and Rajuddin (2012) pointed that, “the dilapidation of laboratories and equipment in the Nigerian tertiary institutions has been a major concern to all stakeholders in engineering education as most of the tertiary institutions laboratories and equipment were the old ones provided since the inception of the institutions for decades and hence they are completely obsolete for the current training of our graduates”, even though there were calls on the government to provide engineering and related instructional facilities and materials for teaching and caution teachers and school heads on better handling and the proper maintenance of the facilities and materials, Nuri (2022).

- **Engineering education students in Nigeria**

It is quite true that the institutions that are awarding engineering degrees in Nigeria remained to be holistically inspected in relation to equipment, the certificates given to graduates is questionable. “It is quite embarrassing to discover that there are some graduate of such professional fields who never experience to handle or touched tool throughout their program” as lamented by (Adedokun, 2011).

- **University-Industrial linkages**

Lack of relationship between industries and the institutions of learning is a great problem hindering the Engineering education. Unlike Traditional science

education, management, psychology, medicine, arts etc. engineering education is considered with uncountable reputations to the development of creativity of students, unlimited significance must be devoted to learning by doing in which for this purpose, “conducting engineering education must be in conjunction with industries, this will yield great importance for the training of engineering students”, Weiwei and Wu (2011). In addition to the said statement regarding University-industry linkages, Onwuka (2009), pointed out that “hiring of students by the industries, graduates; exchange of researchers temporarily; consultancies; academic and industry, engineers and scientist joint research, grants and contracts offered by the industries to academia, conferences, seminars, publications etc. in some cases, the stake holders of industries are made advisory board in a number of universities and is increasingly seeing as an effort in promoting science and technology”. In disappointment, such engagements amongst the universities and industries remain totally absentminded in the Nigerian education system.

- **Provision of Fund to education in Nigeria**

Proper funding of engineering education by the bodies concerned for of teaching, learning and research facilities is distressing quality of output from tertiary institutions. Developing country must give importance to its education at all levels through proper funding to its general budgeting relative to the general resources allocation. The entire expenditure of academic institutions and other auxiliary educational amenities is depended on the budget its country allocates.

- **Teaching methods**

Most lecturers in Nigeria’s tertiary institutions often uses demonstration,

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students centered or lecture method as their methods of instruction. Based on that menace, Idris and Rajuddin (2012) pointed out that “the situation is partly due to the difficulties to run experiments and run some tests required for teaching and learning because of the absence of materials and equipment for practical training”. This caused exertion teaching and research in engineering education so producing half-baked and deficient graduates to work for enriching national development as revealed by Owolabi & Rafiu, (2010) in Idris and Rajuddin (2012).

Another astonishing challenge in the students of engineering in Nigeria is lackadaisical attitudes of the students and their parents or guardians toward the choice of engineering admission as their future careers. Some engineering students used to wail about how they were forced in to engineering as an accident by their parents which is not their hearts' choice, this will seriously affecting the students into engineering as choice of carrier life, supported by Chen and Chen (2021). Moreover, Zhang et al. (2019) lamented that “Parental influence has the possibility of influencing what education and career paths a child undertakes. Responsibility is accorded to parent or guardian with respect to education and career choice as children may rely on affection and financial capacities of their parents in taking this decision”. This is a great problem affecting choice of career in engineering education.

In another assertion by Badmus and Jita (2023), some students got in to studying engineering as a result of the particular issue that influence them as most undergraduates' choice of engineering fields is based on the career outcomes expectancy

With all these assertions, this research is intended to find out Students' Perceptions on the Choice and Retention of Engineering Technology as a Career Course. A case study of Federal Polytechnic Bali.

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Objectives of the Study:

1. To determine the students' choice of engineering as a course before admitted.
2. To ascertain whether the admitted students found engineering as the best course for career take-up.

Research Questions:

- i. Did the students have the choice of engineering as a course before admitted?
- ii. Did the admitted students found engineering as the best course for career take-up?

Methodology

The study employed a survey research design. The area of the study consists all students in the five engineering departments the Federal polytechnic Bali, Taraba State. The total the population is 343, which is comprised of all students of Agric. and Bio-Environmental Engineering, Building Technology, Civil engineering, Computer engineering, and Electrical/Electronics engineering departments of Federal polytechnic Bali, Taraba State. There was no sampling technique as all the population was managed as samples for this study. The instrument used for the study was the questionnaire, developed by the researcher based on the review of related literature. To ensure the validity of the instrument, three experts validated the questionnaire. The reliability of the instrument was established using the Cronbach Alpha coefficient formula to determine the internal consistency of the instrument using SPSS version 22 software. An average reliability coefficient of 0.78 alpha value was obtained which indicates that the instrument was highly reliable since the value was above 0.70 and the closer the reliability value to 1, the greater the item consistency of the rating scale and vice-versa Enemali (2010).

Data collected from retrieved questionnaires was analyzed using mean and standard

deviation with the help of Statistical Package for Social Science (SPSS) software, version 22. The mean and the standard deviation were used in answering research questions 1, & 2. The response modes was assign numerical value as follows: Strongly Agree - 5 points, Agree - 4 points, Undecided - 3 points, Disagree - 2 points and Strongly Disagree- 1 point. For answering

the research questions in this study, a decision rule was taken that, any item with a mean response of 3.50 and above was considered as agreed while those below 3.50 were regarded as not agreed. This is because 3.50 is the beginning of the lower limit average of the sum of five response values and the lower true limit of agreed as shown in Table 1.

Table 1: Likert Scale and response value

Options	Numerical value	Lower limit	Upper limit
Strongly Agree (SA)	5	4.50	5.00
Agree (A)	4	3.50	4.49
Undecided (UD)	3	2.50	3.49
Disagree (DA)	2	1.50	2.49
Strongly Disagree (SD)	1	0.50	1.49

Results

Research Question 1: Did the students have the choice of engineering as a course before admitted?

Table 2 answered research question three, which aimed at determining the students'

choice of engineering as a course before admitted, All the items of the research question were agreed by the respondents, total mean scores is in the category of 3.50 - 4.49, (see Table 1) and grand mean of 4.11. This is showing that the students themselves have chosen engineering as a course before admitted.

Table 2: Mean rating and standard deviation of the respondents on the student's choice of engineering as a course before admitted.

S/N	ITEMS	Mean	SD	Remarks
1.	I always want to study engineering since my secondary school years	4.02	1.02	Agreed
2.	I applied to study engineering in Federal Poly Bali, myself	4.30	1.03	Agreed
3.	My parents/guardians supported my views to study engineering	4.31	0.94	Agreed
4.	My parents/guardians provide me with all needs in studying engineering	4.31	0.94	Agreed
5.	I always have my career guidance to study engineering since my childhood	3.60	1.30	Agreed
Grand Mean		4.11	1.05	Agreed

Field survey (2022)

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Research Question 2: Did the admitted students found engineering as the best course for a career take up?

Table 3 answered research question four, which aim at determining that the admitted students found engineering as the best course for career

take-up, All the items of the research question were agreed by the respondents, total mean scores is in a category of 3.50 - 4.49, (see Table 1) and grand mean of 4.45. This is showing that the admitted students found engineering as the best course for career take-up.

Table 3: Mean rating and standard deviation of the respondents on the admitted students found engineering as the best course for career take-up.

S/N	ITEMS	Mean	SD	Remarks
1.	I am happy to be an engineering student	4.65	0.67	Agreed
2.	Engineering is the best course for me in life career	4.54	0.79	Agreed
3.	I am thankful to the management of Federal poly Bali, as the best campus for me to study engineering	4.34	0.80	Agreed
4.	The lecturers and the Technologists are doing their best to make me an engineer	4.51	0.67	Agreed
5.	Equipment and practical facilities are best and encouraging to make me an engineer	4.23	0.99	Agreed
Grand Mean		4.45	0.78	Agreed

Field survey (2022)

Findings of the Study

- i. All the respondents indicated that the students themselves have chosen engineering as a course before admitted. This showed that they want to study engineering since their secondary schools, which made them applied to study engineering with the support of their parents/guardians as they always provide all their needs in study.
- ii. All the respondents indicated that the admitted students found engineering as the best course for career take-up. They are also happy being them an engineering students to the best in their life career, they express their thanks to the management of

Federal poly Bali, as the best campus for them in studying engineering, Lecturers and the Technologists are doing their best to make them engineers, where the most encouraging to the students are the equipment and practical facilities installed in the institution.

Conclusion

The students follow their interests, as they were encouraged by their parents/guardians since from their homes, as well as primary and secondary schools to understand the societal needs of becoming engineers, they have chosen to be in engineering careers. This career outcomes expectancy taking advantage of the specialized chances and prospects in the engineering which drives them to become

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engineers to accomplish economic security and freedom as stated by Badmus and Jita (2023).

The students' interests, personalities and self-efficacies make serious impact on career decision making when choosing a life career. As all the respondents follow their interests in engineering careers and found it best for their lives. Their cognitive factors in studying engineering is justifiable as their emphasis on the individual's career decision-making, as endorsed by Yu and Jen (2021).

Recommendations

- i. Government should provide all modalities to employ qualified lecturers, Technologists and Technicians necessary for imparting engineering knowledge to the students. Also provision of retraining through in service, workshop and seminar is necessary so as to account away the brain drain and to update the knowledge as new innovations are coming out globally.
- ii. Government should provide engineering practical facilities (equipment and materials) in the laboratories and workshops in tertiary institutions of learning, so that the students can learn and appreciate the real replica of the outside industries.

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