

Re-Integrating Vocational Technical Skill Acquisition into the Educational Curriculum: Capacity Building for Future Professionals

David O. Olukanni¹, Peter A. Aderonmu², Adebajji S. Ogbiye¹, Isaac I. Akinwumi¹

¹ Department of Civil Engineering, College of Engineering, Covenant University, PMB 1023, Ota, Nigeria.

² Department of Architecture, College of Science and technology, Covenant University, Ota, Nigeria.

Abstract

One of the observable problems facing most developing nations today is the non-availability of adequately trained and well-motivated professionals with the capacity to solving problems of national development. Many University graduate professionals complain of unemployment. However, there exist substantial employment opportunities in Africa and other developing nations but the major challenge being that, the skills to match up with imminent challenges are missing. There is, therefore a need to re-integrate vocational technical skill acquisition into the Educational Curriculum for young professionals with proper mental orientation and practical skills for solving societal problems. This paper underlined the necessity of re-integrating vocational technical education (VTE) courses with special targets on sustainability and capacity building aspect of citizenry lives with a view to ascertain the empowerment of students for self employment after graduation. In a bid to achieve this, the current pedagogical approach and curriculum dynamics employed at the Architecture and Civil Engineering Department of Covenant University Ota, Nigeria was evaluated. Specific reference was made in terms of knowledge application from fabrication, construction in timber, reinforced concrete and steel to the main architectural design project. As regards the capacity building development aspect within the architectural and civil engineering education, the application of the respective vocational technical knowledge, obtained through lectures, site works and work shop practices were of major essence in collaborative design projects. It is expected that the indispensability of VTE courses for a successfully-integrated design would bind every element of the design together in different scales. In this way, the sustainability component of the designs in the studio, engineering workshop practice and energy-efficient design would be put to use. The study recommended the investigation and application of all critical elements of VTE-based curriculum development for a sustainable capacity development of emerging future professionals.

Key words: Vocational Technical Skill, Educational Curriculum, Capacity Building, Future Professionals, Sustainability

1.0 INTRODUCTION

Over the years, vocational and technical Education has been a major part of national development in many developed nations because of its positive effect on national industrial productivity and economic growth [1]. The huge rate of unemployment, poverty and poor socio-economic status of most Nigerian graduates has generated an outcry of many non-governmental organizations, parents, government bodies and international organization. This has led to a new education reforms/policies with emphasis on vocational technical education (VTE) geared towards helping the youths and adults to be self-dependent. The constant complains of insufficient jobs for youth by federal parastatals and government organization has made it seem so difficult for graduates to have hope or even search harder for places of employment [1]. The mode of gaining employment has totally shifted from persons having level of education to the level of having capacity to apply basic skills in solving real world issues. Integrating technical and vocational education in youth empowerment programs is an approach to nation building and job creation. The government is therefore re-examining and strengthening the implementation of the VTE policies and putting in place, a framework for bringing together resources and expertise. In addition, VTE institutions

would have to align its curricula to suit labour market demands so that youths can possess the kind of skills needed to match good jobs [2].

The word 'vocational' is usually ascribed to vocabularies that are connected with skills and knowledge among others, that one need to have in order to do a particular job; while 'technical' relates to terms connected with the practical use of machinery and methods in science and industry [2]. It is also referred to as the education designed to prepare individuals or skilled personnel for an occupation, trade or job. The concept of Vocational Education (VE) aims at equipping individuals to use their heads and hands in order to survive in a world that is essentially work-oriented. Terms such as vocation, job, work, occupation, profession, career, education, vocational training, pre- vocational training, vocational education, e.t.c., need to be thoroughly understood in order to appreciate its various forms. For vocational technical education to survive in Nigeria and meet the world economic order, Okolocha [2] stated that teaching and learning must take place in an environment where all the necessary tools, machines, equipments and facilities are in place and resemble the place for real work environment. It was further stressed that experience gained in a real work environment will enhance individual minds to operate.

VE as it is presently serves as the greatest force that can be used to bring about change and the greatest investment that a nation can make for the quick development of its economic, political, sociological and human resources [3]. It was stated in the document of the national policy on education (2004) that the objective of vocational and technical education (VTE) is to acquire vocational and technical skills, expose students to career awareness by exploring usable options in the world of work, enable youths to have an intelligent understanding of the increasing complexity of technology and stimulate creativity. In view of these objectives, VTE is geared towards the production of the educated man who can effectively work with his head, heart and hands [4]. However, it is disappointing to know that these virtues have been disintegrated from the curriculum configuration (in practice), so in order to re-integrate these objective values into the curriculum, there is a need for reformation. Proper planning, efficient implementation, adequate funding and motivation have been expressed by Okolocha [2] to attain success in vocational technical education programme in Nigeria. This can be achieved by dieting VTE values across all levels of educational development i.e primary, post-primary and tertiary curricula [5], [6].

The objectives of introducing Vocational Technical Education (VTE) into educational curriculum are to acquire vocational and technical skills, expose students to career path and explore usable options in the world of work (industry, agriculture, social, commerce, etc). These objectives enable youths to have an intelligent understanding of the increasing complexity of technology and stimulate creativity. Therefore, the greatest force that can be used to effect change in education, and the best investment that a nation can make for the quick development of its economic, political, sociological and human resources cannot be underestimated [3]. Therefore, there is an emergent need to re-integrate vocational technical skill acquisition into the Educational Curriculum for future professionals with proper mental orientation and practical skills for solving societal problems. This paper is aimed at the necessity of re-integrating vocational technical education (VTE) courses with special targets on sustainability and capacity building aspect of citizenry lives. In a bid to achieve this, the study evaluated the current pedagogical approach and Curriculum dynamics at the Architecture and Civil Engineering Department of Covenant University Ota, Nigeria.

1.1.1 Covenant University Mission

The mission of the university is to create knowledge and restore man's dignity through a Human Development concept of the Total Man, employing innovative, leading-edge, teaching and learning methods. This will help in addressing the issue of imbalance in the provision of education in different parts of the country with regards to access and quality of education that is being offered currently. The university's specific mandate is to bring up a new generation of leaders through a qualitative and life-applicable training system that focuses on value and skill development. The philosophy of the university is built on the following philosophical platform:

- i. A departure from form to skill
- ii. A departure from knowledge to empowerment
- iii. A departure from figures to future-building
- iv. A departure from legalism to realism
- v. A departure from mathematics to life-matics.

1.2 Background Studies on Vocational Technical Education

Education is considered the most valuable treasure any nation can give to its citizens. Functional education should be geared towards the acquisition of knowledge and information as well as relevant competencies such as skills, attitudes, aptitudes, etc. [7]. The policies and reforms in education in the 1970s and 1980s focused more on acquisition of certificates instead of the needed vocational skills have caused many Nigerian youths and adults to move into the education industry in pursuit of certificates. This led to the rapid growth of education industries which was mainly in size and not in quality [8]. It was further expressed that the education system of Nigeria and some other development nations are still far from being ready for the challenges of preparing students for the contemporary work life challenges. In Nigerian context, and the world over, effective education need to transcend beyond mere literacy - ability to read and write and of necessity, incorporate ability to "do" and "apply". It should equip the learners with some form of technical know-how; enabling the learners to free themselves from poverty and to build sustainable livelihoods as key roles for education and prerequisite for sustainable development (SD). The number of unemployed graduates in Nigeria suggests that most of them do not possess relevant, saleable, employable or even entrepreneurial skills that are needed in the society. This partly explains why the nation has remained economically dependent till date. This is because most nations who are economic giants today, started by equipping their citizens with the right type of education - education that will enable them use both their heads and hands. The type of education that equips its recipients with such abilities to think is generally described to work as vocational education. This type of education is very crucial to every nation particularly those that are still "developing" such as Nigeria. The reason is that economic stability and independence is a product of technological status and independence. Nations and in fact individuals should therefore aspire to acquire education that is "work-oriented".

2.0 HINDRANCES TO NPE POLICY AND CURRICULUM REALIZATION

In devising the most effective way by which knowledge content can be delivered, the national policy on education in Nigeria presented the objectives of education. These objectives are expected to acquire technical skills, expose students to career awareness by exploring usable options in the world of work, enable students to have an intelligent understanding of the increasing complexity of technology and stimulate creativity. The major impediment to the growth of VTE include lack of vocational teachers, low capital base, poor funding, poor technology among others, which result in graduates with low skills. This

implies that productivity and competitiveness of Nigeria in the economic world order is dependent on a well educated, skilled and adaptable workforce [2]. Having examined the various policy statements on Educational curriculum reform and development, there are factors hindering policy implementation and development, they are:

2.1 Stakeholders' Disintegration and Weak motivational Attitudes from Vocational Ethics

The policy statements and the documentations are vivid evidences of the Stakeholders' intention to foster educational sustainability. Though these documents contain roadmaps and target dates of implementation, but the stakeholders' attitudes (weak motivation, lack of self-will power and declination from vocational ethics) have affected implementation and development. Therefore, virile and motivational attitude is required of the stakeholders in order to reintegrate vocational ethics back into curricula at all levels. Okebukola has identified the input factors in the university education process as the students, the staff, the managers, the curriculum, facilities, finance, instructional materials and other general resources [9]. These are combined in the process of teaching, research, use of time and spaces, student services, administration, leadership, community impact and quality assurance. As output, we have skilled and employable graduates, responsible citizens, economic and social development, and creation of new knowledge. The most visible input of the university seems to be the teaching qualities since many students come to be taught things related to attitudes, skills and research orientation [10].

2.2 Challenges of Quality Management at African Universities

The expectation of many African nations, including Nigeria has been that investments in higher education would trigger rapid development of the newly independent nations. The different commissions set up by the colonial administrations recommended the establishment of Universities and other tertiary institutions in Africa [10]. Generally, African Universities are currently facing some challenges in attaining quality curriculum development and delivery: inadequate teaching staff, high academic staff turn-over, a lack of incentives for highly qualified academics and competition from private universities. The University needs to come up with a quick employment process for academic staff, particularly in departments with high staff turnover. Academic staffs on permanent terms of service are more stable than those on a contract basis. In order to decrease staff turnover, some incentives should be developed for highly qualified staff to improve on staff retention [11], [12], and creates long term sense of belonging.

2.3 Lack of economic incentives

The education policy documents contain roadmap to translate the policy into implementable projects, activities and programmes [4], [13], [14]. It however lacks the implementation. The government needs to develop incentives such as tax holidays for stakeholders, inventors and investors. They can provide low or interest-free loans to aid vocational educational technology investment in educational institutions, develop appropriate feed-in tariff for interconnected curriculum, legalize the right to register patent of certified original craftworks and royalties for creative discoveries in diverse fields. This should be certified by responsible authority to have possessed local and global relevance. The federal ministry of education needs to decentralize to state and local government levels in order to observe, monitor, control and review policies and curriculum regularly and consistently.

2.4 Multiple taxations

In Nigeria, the occurrence of multiple taxations can be a hindrance to educational development. Tax payment by educational institutions to Federal, State and Local Governments can be harmonized and made payable at once through a central collecting organization. Such payments should also be minimal to the extent that it could aid interests and return on investments. Tax chargeable on private/individual educational projects should not be on the same rating as those from public sources. The value added tax and other tax payable by both consumers and marketers should be such that would aid the adoption and utilization of sustainable technology, especially VTE policy-curriculum orientation.

2.5 Non-existent favorable customs and excise duty act to promote VTE Technologies

Presently the customs and excise duty act of Nigeria lacks aspects that could aid easy importation of VTE tools and equipments. To aid VTE development and attract foreign investors, the government may need to look into the customs and excise duty act with the aim of creating sections that will be VTE-specific. This by so doing will make the revenue generation from VTE technology importations to be at variance from other imported goods. Marking VTE technology imports as 'special' for duty free or subsidized duty will encourage investors to import technologies to promote VTE in sustainable education development.

3.0 METHODOLOGY

The curricula of two (2) accredited department offering Architecture and Civil Engineering in Covenant University Ota (CU), South West Nigeria were selected for this study. The two departments of the university selected for the study were both in the college of science and technology, and college engineering, respectively. The curricula were qualitatively analyzed with the aim of comparing their VTE contents that sensitize and teach the students on sustainability and capacity building aspect of citizenry lives with a view to ascertain the empowerment of students for self-employment after graduation. Inferences were drawn from knowledge-application from fabrication, construction in timber, reinforced concrete and steel to the main architectural design studio project. As regards the capacity building development aspect within the architectural and civil engineering education, the application of the respective vocational technical knowledge, obtained through lectures, site works and work shop practices were of major essence in collaborative design projects. Strength Index and percentage of the incorporation were also compared and analyzed quantitatively.

Table 1: Percentage of VTE content in the Architecture Curriculum

UNDER GRADUATE COURSES	VTE-Related Undergraduate Course	Total VTE-Related Units	Credit Load of Architectural Design Studio(ADS) Courses per level	Program Allowance for VTE Implementation in Architecture Programmes	Impact of VTE on Graduation Requirements (VTE/173)	Capacity Building & Sustainability Requirements for Professional Practice
100 Level	ARC111/121(Architectural -Graphics=3unitseach), ARC112/122(2units), ARC113(3units),	13units	0units	None	13/173=0.075	Need to introduce the simple elements of in terms of site visits and excursions to relevant places of interests
200 Level	ARC214(Interior Design), ARC215/225(Building Structures=3units each), ARC216/226(Building Structures=3units each);	14units	ARC211/221(Architectural-Design Studio=4units each); 8units	Detail Knowledge of wood-timbers, jointing system still need to be made explicit; elements of structures in terms of simple beams and columns' systems	14/173=0.089	More emphasis on pedagogic goals especially in the integration of building structures to architectural design studio works

300 Level	ARC315/325(Building Structures=3units each) ARC316/326(Building Components &Methods=3units each) ARC322;	14units	ARC311/321 (Architectural Design-Studio=4units); 8units	Site visits made to project sites within and outside the schools during the semester; in order to understand practically the structural members and relate to classrooms' situations	14/173=0.089	Practical assignments be given regularly and good interconnections between structural designs and detailed understanding of components involved interrelationship of k
400 Level	ARC415/425(Building Structures) ARC416/426(Building components &methods v &vi) ARC427(Introduction to professional practice	14units	ARC411/ARC421 (Architectural Design Studio); 8units	Visits to project sites and Excursions to places of significant architectural interest	14/173=0.089	Introduction of Workshop practice as part of the curriculum, student industrial work experience in fabrication, construction in timber, reinforced concrete and steel building
Total Units	20VTE-Contented Courses (55units)	55units(31.79%) VTE Related Courses	24ADS-units(13.87%)		0.342	

Table 2: Percentage of VTE content in the Civil Engineering Curriculum

UNDER GRADUATE COURSES	VTE-Related Undergraduate Course	Total VTE-Related Units	Program Allowance for VTE Implementation in Civil Engineering Programmes	Impact of VTE on Graduation Requirements (VTE /212)	Capacity Building &Sustainability Requirements for Professional Practice
100 Level	GEC 117 (Technical Drawing-2 units); EDS111 (Entrepreneurial Development Studies I-1 unit); MC111 (Total Man Concept I-1 unit); EDS121 (Entrepreneurial development Studies II-1 unit); TMC121 Total Man Concept II- unit).	6 units	none	6/212 = 0.028	Need to introduce the simple elements of in terms of site visits and excursions to relevant places of interests
200 Level	GEC211 Introduction to Electrical Engineering I-2units; GEC212 Engineering Graphics-2 units; GEC215 Applied Computer Programming I-2 units); GEC216 General Engineering Laboratory I-3units); GEC218 Workshop Technology-2 units); CVE211 Introduction to Civil Engineering-2 units); EDS211 Entrepreneurial Development Studies III-1 unit); TMC221 Total Man Concept III-1 unit); GEC222 (Computer Aided Design & Manufacture-2 units); GEC228 Introduction to Electrical engineering II-2 units; GEC229 Student Work Experience Program-1 unit; EDS221 Development Studies IV-1 unit; TMC 221 Total Man Concept IV-1	22 units	Detail Knowledge of wood-timbers, jointing system still need to be made explicit; elements of structures in terms of simple beams and columns' systems	22/212= 0.104	More emphasis on pedagogic goals especially in the aspect of introducing students to Civil Engineering. It is also important to entrepreneurial and computer programming and aided design

	unit.				
300 Level	CVE315 Engineering Surveying and Photogrammetric I-2 Units; CVE316 Laboratory Practical and Design Studio I-2units; EDS 311 Entrepreneurial Development Studies V-1unit; TMC311 Total Man Concept V-1unit; CVE325 Engineering Surveying & Photogrammetric II-2units; CVE326 Laboratory Practicals and Design Studio II-2 units; CVE 328 Elements of Architecture-1 unit; GEC 324 Technical Drawing Communication-1 unit; EDS312 Entrepreneurial Development Studies VI-1 unit; TMC321 Total Man Concept VI-1unit	14 units	Visits made to project sites within and outside the schools during the semester; in order to understand practically the structural members and relate to classrooms' situations	14/212 = 0.066	Practical assignments are given regularly and good interconnections between structural designs and detailed understanding of components involved. Student should be taken through the practical that will enable them understand theoretical concept.
400 Level	CVE411 Civil Engineering Practice-2units; CVE416 Laboratory Practical and Design Studio III-2units; Entrepreneurial Development Studies VII-1unit; Total Man Concept VII-1unit; CVE429 Student Industrial Work Experience scheme (SIWES)-6units	10 units	Industrial Training program (Internship) for 6 months	10/212= 0.0472	Introduction of Workshop practice as part of the curriculum, student industrial work experience in fabrication, construction in timber, reinforced concrete and steel building
500 Level	CVE513 Civil Engineering Seminar-2units; CVE 516 Laboratory practical and Design Studio IV-2units; EDS511 Entrepreneurial Development Studies IX-1 unit; TMC511 Total Man Concept IX-1 unit; CVE522 Building Technology-2 units; CVE526 Laboratory practical and Design Studio V-2 units; CVE529 Student Project II-6units; EDS521 Entrepreneurial Development Studies X-1 unit; TMC521 Total Man Concept X-1unit.	16 units	Visits to project sites and Excursions to places of significant architectural interest	16/212= 0.0754	Exposing student to world of work. Seminars, workshop and skills that will help after they are graduated. The program should emphasize strong foundations in critical thinking and technical skills and also incorporate cutting edge laboratory and field works.

3.1 Teaching Mechanism and effective learning in Civil Engineering Program

The role of teaching mechanisms to enhance learning capacity of students in science and engineering technology is vital to the development of students' skills which ultimately reflect in their output. One of the observable critical problems facing most developing nations today is the non-availability of adequately trained and well-motivated professionals with the capacity to solving problems of national development. The engineering program introduces practices and skills through supervised hands-on workshop and laboratory exercises. These exercises include familiarization with basic tools that relates to each discipline in civil engineering so as to entrench basic knowledge in the students. The student at Covenant University embarks on a 12 weeks student work experience program (SWEP) program that equips them with skills in all practical engineering programs that is being offered in the University. However, the skills acquired in SWEP cannot be compared with experienced gained when the students go for a six (6) months industrial training, where they are exposed to real life practical that is related to the profession of their choices.

3.1.1 Audio Visual Tools

In devising the most effective way by which knowledge content can be delivered, the national policy on education in Nigeria presented the objectives of education. These objectives are expected to acquire technical skills, expose students to career awareness by exploring usable options in the world of work, enable students to have an intelligent understanding of the increasing complexity of technology and stimulate creativity. In order to enhance learning activities, the faculty and all other teaching staff are encouraged to use pictures, short video clips on any subject matter, connecting to social media like YouTube, twitter, Facebook, and so on. These help students to have a vivid picture or real life scenario of a particular context. The significance of teaching and learning through this medium have the potential to facilitate almost any educational experience, allowing learners use virtual video and other audio visual facilities with peers anywhere in the world, use specialized software and tools, and collaborate on shared documents, among many other things. This will enhance quality delivery and effective learning outcomes. Instructors are also encouraged to connect to the World Wide Web for any other information that could be useful in enhancing students' total understanding of the subject. Internet facilities are made available to support this drive.

3.2 Implementation of Standardized Training and Certification:

In Nigeria, there is no uniform standard in training and certification at all levels of government. Certification patterns differ from one sector to another (formal and informal). This makes it impossible to integrate different vocational education training into one national system. In this wise, government needs to analyze the number of VTE institutions and training centers. The essence of uniformity of VTE program for all institution is to provide a platform that will encourage training that would subsequently lead to individuals actively engaging in a vocation of interest without any worry or doubt of the authenticity of certification for operation. There is also need for government to put in place proper machinery in order to standardize, monitor and control the issuance of these certificates [2]. This will help to ensure that only the qualified candidate have certificate. It was stated by Okolocha that some Nigerians for instance, buy trade test certificate with money without under-going the actual training. It is important to stress that this kind of occurrence could be prevented if proper and adequate measures are put in place.

4.0 RESULTS AND DISCUSSIONS

The findings are discussed as follows: From Table 1, Architecture department in CU offers a total of 173 credit units of courses from year one to year four and out of the 173 units, from year 1-4, a total number of 20 (55units) VTE-related courses were incorporated into the curriculum, 6(24units) ADS courses contents are offered. While in Table 2, civil engineering offers 212 credit units courses from year one to year five. Out of the 212 units, 68 units were designated for VTE courses. Further examination of the curriculum revealed that two major courses (Building Structure, Building component and Methods) were seriously hinted at VTE, while (ARC214) content has little context relevance to VTE in its implementation. For the civil engineering program, a number of courses are provided that place emphasis on the VTE curriculum. The science and engineering programs introduce practices and skills through supervised hands-on workshop and laboratory exercises. These exercises include familiarization with basic tools that relates to each discipline in science and engineering so as to entrench basic knowledge in the students. The former courses have considerable VTE-content and context relevance. It was however observed that although both relevant VTE courses actually addressed VTE matters but there was no medium to integrate them together to address professional practice demands. Exposing student to world of work. Seminars and Workshops will afford them the skills required after they are graduated. The program should emphasize strong foundations in critical thinking and technical skills and also incorporate cutting edge laboratory and field works.

Although, Covenant University has broken barriers in the field of entrepreneurial development (EDS- customized in line with the vision of raising future generation leaders. In the same way, this study has enumerated factors that contribute to the professional responsive methods of project design and implementation- it emphasized a pragmatic problem-solving formula. The issues on context relevance of the VTE diets on architecture and civil engineering programmes emphasized dynamic improvement on the conditions of professional training in terms of capacity building and development of students to prepare them to meet different needs of the awaiting clients' categories. The incorporation and application of VTE studies is also part of the architecture and engineering school philosophy. The pedagogy of schools make VTE studies paramount in the design process by implementing design philosophy in the direction of total client-user satisfaction of human needs the brief interpretation need to eliminate unemployment induced stress. The alignment of the professional acumen, intelligence, and creativity with client-user needs for professional practice will be needed for acceptable design and great buildings. Since great buildings are usually judged by how conducive they are to human existence which is alive, more human, more capable and free [15]. More so, VTE-Dieting [5] strategies should be given an important place in the curriculum implementation and instructional strategies as employed by the architects and engineers in project design. Mores so, further research need to be carried out on the contents and context relevance of VTE courses offered in Nigerian higher education. Finally, this study concludes that capacity development of future professionals be equipped with relevant VTE Dieted-courses in the flexible manner that would allow to meet the needs of clients, communities and societies. Also student architects, engineers and others in allied professions should be pedagogically integrated while in school in order to foster their productivity in team work after graduation.

5.0 CONCLUSION AND RECOMMENDATIONS

The study first proposed that the culture of synergy, joint workshop practice and interconnected VTE courses be developed and incorporated as part of the hidden curriculum; for allied professional courses which requires team work in civic and other societal engagements. It is stated also, that the OECD (Organisation for Economic Cooperation and Development) methodologies be deployed in Vocational Education and Training policy standard for programme of architecture and civil engineering schools; that curriculum development in reintegration agenda be pedagogically inclined to (a) Link educational policy to national, regional and economic issues (b) place each country's system in an international comparative perspective (c) make policy recommendations to government [16], [17]. This falls in line with proper mental orientation, pragmatic, and practical skills for solving societal problems. The disconnect between architecture, engineering, and other students in allied programmes study relationship in school be bridged by creating a nexus of interactive engagements in form of workshop practices, practicals, site visits, and industrial attachment of future professionals to specific architecture and civil engineering practicing firms in order to acquire relevant knowledge, skills and acumen to meet societal needs and expectations. More so, the proprietor base will do more to the system by supplementing and aligning their educational policies and implementation strategies with specific emphasis 'on active labour markets' requirement and ensure its effectiveness. Beyond aforementioned ingredients, much more can also be achieved by improving labour force skills and competences through local and international linkages with education and training systems adopted by the developed nations.

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***Corresponding Author:** Department of Civil, Engineering, Covenant University, P.M.B.1023, Ota, Ogun State, Nigeria. Phone: +234-8030726472; E-mail: david.olukanni@covenantuniversity.edu.ng