

*Original Research Article*

## Emerging Careers and Professions and their Implications for Technical and Vocational Education and Training in the 21st Century

Manabete S. S.<sup>1\*</sup> and Bobboi Umar<sup>2</sup>

<sup>1</sup>Academic Planning Unit, Adamawa State Polytechnic, Yola, Nigeria.

<sup>2</sup>The Rectorate, Adamawa State Polytechnic, Yola, Nigeria.

Accepted 4th April, 2015.

One fundamental problem bedevilling global career initiatives is for existing careers to meet global demands for employment. A key answer to this problem lies in career redefinition and expansion for adequately meeting developmental and employment challenges. Existing career occupations such as electrician, office manager, auto-mechanics and professional photographer, appear to be thinning in with regard to market opportunities. There is need therefore, for career opening and expansion in other areas of human endeavour so as to deal with employment challenges. It is clear that technological knowledge production which utilizes skilled manpower has been concentrated in industrialized countries of the world. Developing countries like Ghana and Nigeria are lagging behind in this stride. But rather than struggle to 'catch up' with the industrialized nations, developing countries need to look inwards, build on existing indigenous knowledge systems, deploying science, technology and innovation in specific areas where they have comparative advantage, and then develop viable career occupations for citizens. In the 21st century, limitations in existing career opportunities have given rise to emerging careers in agriculture, eco-tourism, eco-design, recycling, pollution control and alternative energy sources, among others. What all this implies for technical and vocational education and training (TVET) is that TVET institutions need to explore and share information about innovative teaching and learning methods in areas like re-orientation of TVET curricula, renewable energy programmes and innovative approaches to integrating learning in TVET with on-the-job training and community services. TVET should empower people to contribute to economically sound sustainable development through chosen occupations and other fields of endeavour. Similarly, it contributes to societal goals and then develops the potential of individuals for active participation in the establishment and implementation of goals, irrespective of race, religion and age.

**Keywords:** Unemployment, Emerging Career, Profession, Technical and vocational education, Training.

### INTRODUCTION

A fundamental problem that bedevils nations the world over is the issue of the existence of adequate jobs to cater for the needs of citizens. There is a dictum that says "An empty mind is the devil's workshop." At the moment therefore, it does appear that available jobs are highly saturated, market opportunities are limited and the productive workforce is now wasted. A serious ill arising from this is the emergence of social ills like armed robbery, hooliganism and prostitution. A key answer to this problem however, lies in examining existing careers and jobs that are capable of engaging the productive

sector of the populace. Consequently, new career frontiers and employment opportunities are now being explored such as ecotourism, waste recycling and pollution control.

This paper looks at the concepts "career", "job", "profession" and "vocation". It considers existing global careers and professions and emerging careers and professions in the 21<sup>st</sup> century. The paper looks at the implications of the emerging careers and professions for technical and vocational education and training (TVET). Finally, it proffers suggestions

on ways of enhancing emerging careers and professions for technological development of developing countries.

## **JOB, CAREER, VOCATION AND PROFESSION**

The terms “job”, “career”, “vocation” and “profession” are closely related in their usage. A job, according to Hamm (2010) simply means any situation where one is paid in exchange for one’s labour. Hamm explained that a career can be described as a sequence of jobs in similar field which is able to lead one to promotion in that field. Wikipedia (n.d.) saw career as an individual’s journey through learning work and other aspects of life. Buttressing this definition, the Dictionary.com (2012) defines “career” as an occupation or a profession that usually involves special training or formal education. It is considered to be a person’s life work. A career is therefore, seen as a lifelong work which an individual has taken onto for a useful living, normally achieved after receiving formal training in a reputable educational institution.

The word vocation, according to Gettings (2012) comes from the Latin root word “vocationem”, which means calling. Gettings held that one’s vocation entails one’s abilities, skills, interests, gifts, dreams and passions, adding that vocation refers to that occupation that an individual feels very strongly about, in spite of monetary inducements and other benefits. Buttressing this point, Horst (n.d.) saw vocation as a calling that merges one’s mission in life with God’s mission on earth. It is work that draws our attention to connecting our God-given gifts and passions with God’s activity in the world. Horst added that vocation may not necessarily be tied to wages. Rather, it is actually work that is outside one’s wage earning sphere of activity.

Buttressing this, the Free Online Dictionary (n.d.) defined vocation as a regular occupation, especially one for which a person is particularly suited or qualified. It refers to a particular occupation, business, profession or calling. The term profession, according to Wikipedia (n.d.), refers to a vocation founded upon specialized educational training the purpose of which is to supply objective counsel and service to others, for a definite compensation. Consequently, a career vocation is job or work in which an individual provides labour by displaying his skills and talents to get the job or work done at the end of which he receives pay.

## **EMERGING CAREERS AND PROFESSIONS**

Globally, common careers and professions as presented by 123test (2013) are numerous. They include nurse, medical practitioner, lawyer, engineer, lecturer (or teacher), technician, bricklayer, civil servant, politician, pilot, accountant and farmer. Others are mechanic, tailor, banker, architect, dentist and clerks. Yet others are company director, confectionery maker, educationist, stores manager and plant operator. These existing careers and professions appear to be saturated and employment opportunities in those areas are limited. Consequently, a reasonable portion of the productive workforce is unemployed.

Unemployment is therefore, a global phenomenon and the rates appear to be worrisome. For instance, in the United Kingdom, statistics show that unemployment stands at 20.5% (Office for National Statistics, 2012). In the Eurozone, the figure stands at 24.4% (Eurostat, 2012). In the United States of America, unemployment is estimated at 18% (Bureau of Labour Statistics, 2012). In China, lack of labour and illness and natural disasters accounted for 77.7% of poverty in 2003, having risen from 61.6% in 1998 (Zang, 2008). Wikipedia (n.d.)

gave unemployment rates for several countries around the globe. In Bosnia and Herzegovina, unemployment rate stood at 44.6% in 2011. In East Timor, by 2006 unemployment rate stood at 20%. Greece and Grenada had unemployment rates of 27.6% and 24.5% in 2013 and 2009 respectively. Unemployment rate for Nepal was 46% as at 2008. Honduras and Macedonia had unemployment rates of 27.8% and 28.8% in 2007 and 2013 respectively.

For developing countries of Africa, unemployment rates may be much higher. For instance, Wikipedia (n.d.) gave unemployment rates for Equatorial Guinea in 1998 as 30%. As at 2009, unemployment rate for Kenya was 42%; for Lesotho it stood at 42.7% as at 2009. For Mauritania, unemployment rate was 30% as at 2008., South Africa 25.5% as at 2012 and Senegal 48% as at 2007. Yet others are Mozambique 60%, Namibia 51.2% by 2008 and Swaziland 40.6% as at 2007. For Nigeria, as at September 18, 2013, the Nigerian Tribune (2013) gave a World Bank report which put unemployment rate at 22% while the youth unemployment rate stood at 38%. On October 11, 2013, the National Population Commission report indicated Nigerian unemployment rate rose from 21.1% in 2010 to 23.9% in 2011. According to Index Mundi (2013), Ghana’s unemployment rate stood at 11% as at February 21, 2013.

There are several reasons why people take onto careers and do work. According to Okoro (2006), people take on careers and work to earn money to take care of their basic needs such as food, clothing, shelter and health, and as well to earn respect for themselves. Where people do not work or are thrown out of work, they tend to have a low opinion of themselves. As Okoro pointed out, where people do not find work or are thrown out of work, they despise themselves and the society. They are forced to accept the way the society feels about them as worthless individuals. In Nigeria for instance, because of limited employment opportunities, many citizens have been disengaged from their employment.

The last decade has witnessed a seemingly unfavourable government policy of rightsizing, downsizing and general worker rationalization. By this policy, workers in government ministries and parastatal were laid off. Government establishments like the popular Nigerian Telecommunications (Nitel) and the Savannah Sugar Company in Numan, Adamawa State, were privatized and many workers were disengaged. In the last couple of months, the Federal Government of Nigeria privatised the Power Holding Company of Nigeria (PHCN). Many PHCN workers were laid off. Therefore, existing jobs in several sectors of the Nigerian economy are in short supply.

## **Career and Profession Changes**

Career occupations have been known to change over time. This change is occasioned by changes in the individual and the labour market (Wikipedia, n.d.). A survey report indicated several reasons for career changes. Among the reasons, downsizing or restructuring of the organization ranked highest with 54% response rate. This was followed by new challenges or opportunities that arise which respondents rate 30% (Cullen, 2008). This report shows that in this 21<sup>st</sup> century, faced with challenges of survival, individuals have to explore new opportunities for gainful employment so as to deal with personal life problems.

Equally, unemployment, occasioned mainly by worker layoffs has forced people to seek for new opportunities for gainful employment. Buttressing the findings of this report, Cherrypicked Insurance.com (2012) explained that jobs are

changing nowadays, attributable to factors such as types of business and the environments in which individuals work. Consequently, new careers and professions have emerged.

The emergence of new careers and professions has become opportunities for job seekers and for service industries like business insurance providers and risk advisors. Cherrypicked Insurance.com held that there are many professions today which were not there 10-15 years ago. These professions include specialists such as bloggers, social media managers and user experience analysts. There are also recycling coordinators, green marketers, environmental economists and consultants, and fuel cell engineers and bio-fuel developers. Others are environmental monitoring, sustainable community development and waste recycling and management specialists (UNESCO-UNEVOC, 2011). These careers and professions are fast gaining ground. They are providing citizens with opportunities for gainful employment.

### **Seven Emerging Jobs and Careers**

A Cable News Network, CNN (2009) publication listed seven emerging jobs and careers poised for growth. These emerging jobs and careers are home stager, health informatics technician, simulator developer and green jobs worker. Others are emergency manager, career counsellor and patient advocate. The CNN publication indicated that house stagers normally carry out their functions with real estate agents and their clients to improve the appearance of their homes. Health informatics technicians use computer systems to help doctors analyze, diagnose and treat patients based on the information given to them. The data provided by the computer improve care of the patients, cut down costs and provide documentation for use in cases of litigation. Green jobs involve "clean energy economy" which is opening up opportunities in sectors like energy generation, transportation, agriculture and waste and waste water. Simulators are a new way for professionals in all industries to train, practice and prepare for exciting and potentially dangerous situations before their occurrence.

The CNN (2009) also explained that with growing wave of terrorism since the September 11, 2001 attack on the US, jobs in the anti-terrorism field have been on the increase. In view of the crucial nature of terrorism, career options in anti-terrorism lie in emergency planning. In career counselling, jobs in this area are needed more than ever before, especially now that global economy is dwindling. Everywhere people need jobs and employers need workers. Consequently, career counsellors offer job seekers career guidance and job seeking advice. Patient advocates, according to the CNN publication, take their time to ensure that patients are well informed about their health conditions such as visiting the right specialists, taking the right medication as well as educating family members on ways to care for their sick relatives. Buttressing this point, the Sacramento California State University (n.d.) explained that patient advocacy is the practice of speaking on behalf of patients to protect their rights and assist them to obtain needed information and services. Nurses, social workers and other health providers assume the role of patient advocates. Health insurance companies, hospitals and other health care centres are used as centres for patient advocacy.

### **Eight Emerging Careers and Professions**

Buhl (2012) presented eight emerging careers and professions with bright outlook in terms of immediate demand and pay. The eight careers and professions are:

1. Precision agriculture technician: These agricultural specialists, using GPs and GIS technology, assist farmers to determine how much water or pesticide to use or which crops are appropriate for the soil in various locations.
2. Mechatronics engineer: Mechatronics engineers design systems to automate industrial tasks using a variety of engineering disciplines. The pay here is excellent.
3. Energy broker: The energy broker facilitates the sale of energy commodities between his clients and other companies.
4. Logistics analysts: These experts use advanced RF ID tagging technology to analyse product delivery or supply chain processes.
5. Bio-statistician: The work of the bio-statistician is to look for patterns of disease emergence and persistence. The bio-statistician increasingly studies how various health care policies and procedures can be made more efficient and affordable.
6. Cytogenetic technologists: He looks for indicators of genetic abnormalities in foetuses and increasingly studies genetic signatures of various cancers and indicators of genetic diseases.
7. Ergonomist: Ergonomists are involved in creating products and procedures designed to lessen physical strain and injury.
8. Environmental economist: He helps protect the environment by finding out the economic impact of policy decisions relating to water, air, land, renewal energy resources.

The eight emerging careers are very important for developing countries of Africa. This is because these are areas that cover agriculture, health, engineering, commerce, energy and the environment. The possession of these specialists by developing countries will undoubtedly not only improve the employment situation of the countries but will as well serve as a springboard for a meaningful technological development.

### **Other Emerging Careers and Professions**

Worthy of discussion in this paper are other emerging careers such as data mining, emergency management specialists, experience designers and health informatics specialists/managers. According to the Sacramento California State University (n.d.), data mining is a field that involves the discovery of patterns and previously unknown information in large data sets. Consequently, careers in data mining will be in the areas of security, e-commerce and forensics. The Sacramento California State University explained that experience designers are involved in designing products, processes, services, events and environments based on group or an individual's needs, aspirations, beliefs, knowledge, skills, desires, perceptions and experience.

The emergency specialist is involved in pre- and post-disaster response measures. Pre-disaster management activities include analysing disaster risks, back-up plan to reduce the risk to minimum disaster preparedness planning, conduct public education and training and how to respond to the crisis when it happens. During an emergency, emergency professionals are involved in coordinating activities between local communities and government or government agencies to provide emergency reliefs.

There is an emerging career in the field of medicine. According to the Articlean (n.d.), there is a steadily growing demand for students with essential skills and knowledge for career in the field of medical billing and coding. This field is contrasted with other careers in that while such careers present uncertain future prospect for students in terms of employment, careers in medical field and coding is fast gaining ground. Medical billing and coding trains individuals to be fully knowledgeable and equipped about the medical billing system, especially now that the health care system faces increasing changes, due to recent health legislation.

There is a knowledge career developing in the information and communication arena. According to Holgate (2012), a knowledge broker sits in-between knowledge producers such as scientists and knowledge users such as policy makers or people working in the health sector. A knowledge broker is known by several names: technology transfer officer, liaison officer, innovations broker and knowledge translator. Holgate explained that knowledge brokers are often found in establishments at the interface of policy and research, health care and research and business and research. They often play an intermediary role by creating an ongoing dialogue and exchange between researchers and stakeholders. Consequently, knowledge brokers create a two-way interaction between knowledge producers and knowledge users.

Natural disasters have plagued developing countries like Nigeria in the last couple of years. Take Nigeria as an example. In the year 2012, many communities were displaced by flood water. A lot of farm produce was destroyed. The government's disaster management agency set to work to bring relief to the displaced communities. After the 2012 flood disaster, the disaster management agency predicted more flood water in 2013. A vital career in emergency management is therefore, gaining ground in many developing countries.

In Nigeria, some of the careers and professions that are fast gaining ground are bus drivers, cook, cleaner and refuse collector. Others are fireman/fire fighter, florist and hair dresser. Yet others are life guard, postman, taxi driver, translator and window cleaner (Woodward, 2013). More than three decades ago, these jobs were held in low esteem. With the economic recession of the early 1980s and 1990s however, coupled with non-availability and loss of job opportunities, a lot more citizens are now taking on to these jobs for a useful living.

With growing emphasis on re-greening the economy after the oil boom of the 1970s, many agricultural tools and implements have been fabricated. This has opened new frontiers in career development in many developing countries. For instance, Odigboh (1991) fabricated a bitter leaf processing machine with has helped in eliminating the rigours that were associated with the practice. Similarly, Ajayi (1991) fabricated a thresher for locust bean. Cocoa pod processing machine was also fabricated by Faborode and Oladosu (1991). A manually operated electrostatic planter was fabricated by Ahmed and Gupta (1994). A maize dehusker-sheller was fabricated by Ademosun and Adesuyi (1995). These farm implements and many others not mentioned in this paper have opened up career opportunities for citizens for gainful employment. The maize dehusker-sheller, for instance, has eased maize shelling in many rural communities of Africa which, for many years, was done manually

There is an emerging career in solid waste management. Waste, according to Agbede and Ajagbe (2004), refers to any unavoidable material arising from domestic and industrial activities for which there is no economic demand and which must be disposed of. Solid wastes, on the other hand, refer to

all wastes resulting from human and animal activities. They are usually discarded as unwanted or useless (Sridhar, 1999). In the words of Berry and others in Omotosho (2009), solid wastes refer to any physical property material such as garbage, rubbish, trash and junks. Consequently, all types of land-use, whether residential, commercial, industrial, recreational or institutional generate their own type, amount, and composition of solid waste (Olokesusi, 1996).

Solid waste generation varies in patterns and forms. According to Omotosho (2009), the patterns are point source, line source and area source. Point source solid waste generation deals with generation centres where large or uniquely different solid waste is generated. It also involves generation from all points, houses, stores, industries and offices which contribute to the total solid waste volume. Omotosho added that in the line source solid waste generation, each mode and artery of a transportation system is a line source of solid waste (street, residential, expressways and rail lines). Area source solid waste generation involves family apartment areas, commercial areas and recreational areas.

In order for solid wastes to be properly management, they need to be carefully and adequately disposed of. According to Agbede and Ajagbe (2004), solid waste disposal involves an integrated approach consisting of three processes, namely, storage, collection and disposal. Common methods of refuse waste disposal include sanitary landfills, incineration and composing (Beyene, 1999).

In many cities in Africa, notably Lagos and Ibadan in Nigeria, markets, industrial areas, residential areas and streets are littered with hydrocarbon, agricultural and industrial waste materials. Lagos, in particular, has been considered as one of the dirtiest cities in the world (Omotosho, 2009). In many places, waste collection bins and other containers are not available. The so-called "pure water" leather, and soft drink cans and other paper wraps, are thrown about after use. In Lagos, Ibadan, Bauchi and Yola, Nigerian roadsides and markets are packed with heaps of solid waste (Agbede & Ajagbe, 2004; Omotosho, 2009). In other cases, government waste disposal agencies and private individuals find it extremely difficult to dispose of the wastes. The government waste disposal agencies in particular, often complain of non-availability or inadequacy of implements such as trucks and shovels. Therefore, in order for wastes to be adequately disposed of, they need to be adequately collected.

In spite of the difficulty involved in solid waste management, a viable career is emerging. Take for instance, glass. In Bida, Niger State of Nigeria, workers do not use raw materials to produce glass. Instead, they use glass waste. Broken glass is collected by women around localities in large quantities. The broken glass is sold to local manufacturers who recycle it. This way, women are gainfully employed (Hodge in Agbede et al., 2004). Aside from this, Gonah et al. (2001) designed and fabricated a glass waste processing machine which was also used for processing limestone, gypsum, trona and barite, among others. This glass waste processing machine was also useful to small scale glass manufacturers.

Another important emerging career that is fast gaining ground is metal waste management. Metal scraps of aluminium (tin cans of soft drinks and electric cables), steel, bronze and other metals are collected from the locality and taken for recycling. According to Siyanbola et al. (2012), collected scraps of aluminium and bronze are melted in earthen furnaces and locally fabricated crucibles using firewood for fuel. The molten aluminium and bronze is used to produce other articles. In the words of Siyanbola and others, the aluminium casting factory in Saki South-western Nigeria

and bronze casting factory in Benin South-south Nigeria present good employment opportunities especially for the youth.

It is worthy of note that in big cities and towns in Nigeria (for example, Yola, the capital of Adamawa State), there are sites where motor cars and other vehicles which appear to have outlived their road usefulness, are dismantled and the parts broken up into pieces. The metal debris is then packed together and evacuated to other metal factories for recycling. This opportunity presented by this development constitutes a brisk business for many youths. A lot of young people are now involved in the trade.

Research (Siyabola et al., 2012) has shown that certain trades such as aluminium casting in South-western Nigeria are facing the dearth of apprentices. Apprenticeship scarcity was accentuated by each and quick access to commercial motorcycles and tricycles. This new trade appears to be quick means for citizens to make money. However, even if commercial motorcycling is emerging as a strong occupation for citizens, the citizens need to be supported in whichever way possible. It is common knowledge that many cities in Nigeria are littered with commercial motorcycles. In North-eastern Nigeria, made in India tricycles constitute a formidable means of transportation. This trade too has eased employment problems for a sizeable portion of the citizenry.

#### **IMPLICATIONS OF EMERGING CAREERS AND PROFESSIONS FOR TVET**

The term “technical and vocational education and training (TVET)” has evolved into its present form over time. It has been variously known and described by several terms and concepts. These include industrial arts, vocational education, apprenticeship training, occupational education, vocational education and training, career and technical education, technical education and technical/vocational education. From a lay man’s position, the terms relatively mean the same thing. More often than not, the use of the term is based on a geographical area, and it is estimated that because of the crucial nature of this type of education all over the world, 80% of all occupations are of this type of education (UNESCO-UNEVOC & UNESCO-UIS, 2006).

The proceedings of the Second UNESCO International Conference on Technical and Vocational Education (UNESCO, 1999) defined technical and vocational education and training (TVET) to include the aspects of the process of education “involving, in addition to general education, the study of technologies and related science, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life.” Manabete et al. (2005) saw technical and vocational education (TVE) as that type of education that is geared towards skill development with a view to exposing and integrating individuals into the society as effective, functional and self-reliant people. Rupert in Uloko (2008) defined TVE as the education or training which prepares learners to “earn a living for themselves or to increase their earnings in an occupation where technical information and the laws of science and technology as applicable to modern design, production, distribution and services are essential for success.”(p. 64).

In a developing country like Nigeria, the term technical and vocational education (TVE) has been commonly used. While adopting the definition of the proceedings of the Second UNESCO International Conference on Technical and Vocational Education and Training (UNESCO, 1999), the Nigerian National Policy on Education (FRN, 2004) further saw

TVE as a means of preparing for occupational fields and for effective participation in the world of work. It also saw TVE as an aspect of lifelong learning and a method of alleviating poverty. Consequently, the Nigerian National Policy on Education gave the broad goals of TVE as follows:

1. To provide trained manpower in the applied sciences, technology and business particularly at craft, advanced and sub-professional levels.
2. To provide the technical knowledge and vocational skills necessary for agricultural, commercial and economic development.
3. To give training and impart the necessary skills to individuals who shall be self-reliant economically.

In view of what technical and vocational education represents whether locally or globally, the implications of emerging careers and professions for TVET, according to Balfanz et al. (2013) are several. First, TVET teachers must be able to 1) make teaching and learning more rigorous, engaging and relevant; 2) they must be able to ensure that more students in colleges are career-ready; 3) they must work hard to increase graduation rates, especially lower performing students; 4) providing opportunities for the youth to learn about and experience careers; and 5) smoothing the transition to post secondary schools.

This shows that teachers need to be deeply involved in shaping the career prospects of students. They need to assist students in middle school and high school to develop career-related and technical skills. In a world where employment opportunities are slim, teachers and school managers need to design programmes that will meet the career aspirations of students. The teachers need to assist students to prepare to enter a particular occupation such as one in auto repair, business or health (US Dept of Labour, 2012-13).

The United States (US) Department of Education (2013) presented four core principles that demonstrated the implications of emerging careers for technical and vocational education and training. These principles are alignment, collaboration, accountability and innovation. That is, there is need for effective alignment between high-quality TVET programmes and labour market needs to equip students with 21<sup>st</sup> century skills and prepare them for in-demand occupations in high growth industry sector. Similarly, there is need for collaboration among secondary and post-secondary institutions, employers, and industry partners to improve the quality of TVET programmes. More so, there is need for meaningful accountability for improving academic outcomes and building technical and employability skills in TVET programmes for all students based on common definitions and clear metrics for performance. Finally, there is need for increased emphasis on innovation supported by systematic reform of state policies and practices to support TVET implementation of effective practices at the local level.

The Management and Training Corporation, MTC (2010) identified six areas for a successful TVET programme for emerging careers and professions. These areas are relevance to the labour market, access for trainees and quality of delivery. Others are standardization, inclusion of soft skills and funding for the system. What all these entail is that the kind of training TVET needs to provide should reflect the needs of the labour market. In other words, TVET needs to train individuals who can be gainfully employed and contribute to societal development. Similarly, as TVET programmes are designed to accommodate the emerging careers and professions, the programmes should be easily accessed by trainees. It would

not pay if citizens, especially of developing countries, are unable to access training in emerging careers and professions provided by TVET. Furthermore, it is necessary for TVET to provide quality instructional delivery for emerging careers and professions so as to achieve optimum results. The quality of the delivery will be related to instruction, competencies and certification of the competencies.

While effort is geared towards increasing access to training provided by TVET, it will also be necessary to standardize the training. In centralized TVET administration, the training will be standardized and uniformly provided. Similarly, because of the value employers place on possession of relevant skills for gainful employment, the training that TVET needs to provide should include training for skills acquisition for various types of work. More so, for TVET to effectively provide the atmosphere conducive for training in the emerging careers and professions, funding must be well secured and uninterruptedly provided. If however, funding is provided in short supply or is interruptedly provided, TVET's mission in accomplishing its goals in the emerging careers and professions will be defeated.

In the area of emerging agricultural careers, TVET institutions will be required to explore and exchange information on innovative teaching and learning methods. TVET will also be required to design programmes on clean water and clean water technology, renewable water and sustainable campus management programmes. The curricula will be required to be updated and modified to accommodate refuse recycling, renewable energy and clean water technology (UNESCO-UNEVOC, 2013). Similarly, there will be need for curriculum modification in the area of medical billing and coding. Institutions are expected to update their medical billing curriculum, drawing assistance from billing companies. The curriculum, when updated and modified is expected to provide students with vast knowledge that will be needed at the marketplace. The instruction process of the curriculum will be expected to provide students with skills that they will need to do well on the job (Articlean, n.d.).

## CONCLUSION

The term "career" has been seen as an occupation or a profession that usually involves special training or formal education. It is seen as a person's life work. It is a lifelong work which an individual has taken onto for a useful living. In the 21<sup>st</sup> century, existing careers and professions appear to be saturated. This has forced unemployment rates to rise tremendously. Poverty and unemployment have remained the bane of most developing economies. Consequently, it has been argued that technological knowledge production has been concentrated in industrialized countries. Developing nations like Ghana and Nigeria are lagging behind in this stride.

But rather than struggle to "catch up" with the industrialized nations, developing countries need to look inwards, build on their indigenous knowledge systems and develop viable career occupations for citizens (Siyabola et al., 2012). What this means is that African countries and indeed developing countries can do a lot to assist their people to create employment for citizens. It does not always pay for African nations to look to industrialized nations to train them on skills and then create employment opportunities for their people. There is need to encourage local employment initiatives with a view to having national goals realized.

Similarly, in developing countries, health challenges have become very serious, even with governments' efforts at overcoming them. The challenges concern cases of malaria,

cholera, sleeping sickness, diarrhoea, river blindness and other water related health hazards. There is high mobility and morbidity among infants in developing countries due mainly to biological agents like pathogenic bacteria, virus, and parasitic protozoa, transmitted through the ingestion of contaminated water and food, water contact and insect vectors (Mumah & Ozi, 1997).

Many developing countries, in spite of the abundance of human and material resources, often look to the West for solutions especially to health problems. However, if these countries can take bold steps to recognise and develop their own indigenous knowledge and skills, many citizens will be gainfully employed not only in the health sector, but also in other sectors of the economy, and can contribute meaningfully to national development. Consequently, it has been suggested that a synergy needs to be created between traditional medical practice and Western medicine (Manabete & Umar, In print).

In order for TVET to enhance the emerging careers and professions, the following recommendations are made:

1. Need for partnership. There is need for international partnership and networking and for public-private partnership. This partnership will close the gap between TVET and market opportunities.
2. There is need for capacity building and development for both teachers and students. Teacher training will provide the teachers with the opportunity to "embed academics into the technical curriculum, integrate academic and technical content, reinforce and augment core-content learning career and technical education classes and help students apply their knowledge (American Institutes of Research, 2013).
3. A viable curriculum framework for emerging careers and professions needs to be developed so as to inculcate knowledge, skills, values and attitudes.
4. TVET needs to focus attention on sustainable growth and development for the emerging careers and professions.
5. TVET should be able to encourage women to actively take part in viable careers and jobs and then train them in areas like renewable energy sources and the green jobs. Countries like Thailand, India and Bangladesh targeted women for active participation in eco-tourism and renewable energy jobs (International Consultation Meeting, 2013).

It is important to further stress that TVET on the whole, should be able to provide both economic and social benefits to the emerging careers and professions. As the European Centre for the Development of Vocational Training (n.d.) pointed out, TVET should be able to provide economic benefits in the areas of economic growth, labour market outcomes, employees' productivity, employment opportunities, earnings and professional status and career development. Similarly, TVET should be able to provide social benefits to the emerging careers and professions in areas like crime reduction, social cohesion, health, life satisfaction and individual motivation.

For developing nations, it is expected that the benefits will reduce unemployment and raise the standard of living of citizens. For this to occur, however, governments and all stakeholders in the TVET system must make concerted effort to provide the enabling environment for the emerging careers and professions to thrive.

## REFERENCES

- Ademosun, O. C. & Adesuyi, S. A. (1995). Effect of the major machine and operational parameters on the performance of a maize dehusker-sheller. *Journal of Agrosearch*, 1 (1), 7-16.
- Agbede, O. A. Ajagbe, W. O. (2004). Solid waste management in South Western Nigeria. *International Journal of Environmental Issues*, 2 (1 & 2), 92-100.
- Ahmed, S. & Gupta, C. P. (1994). A manually operated electrostatic planter for small seeds. *Agric Mechanization in Asia-Africa and Latin America*, 25 (2), 29-31.
- Ajayi, O. A. (1991). Design of thresher for locust bean. *Agric. Mechanization in Asia, Africa and Latin America*, 22 (3), 21-24.
- American Institutes of Research (2013). *How career and technical education can help students be college and career ready: A process*. Washington DC.
- Articlean (n.d.). Emerging professions in medical field. Retrieved on September 27, 2013, from <http://articlean.com/emerging-professions-in-medcal-field/>.
- Balfanz, R., Bridgeland, J. M., Bruce, U. & Hornig Fog, J. (2013). Building a graduation: Progress and challenge in ending the high school drop out epidemic. Retrieved from <http://www-americaaspromise.org/OurWork/Gradnation/Building-a-Grad>.
- Beyene, G. (1999). Managing solid waste in Addis Ababa. Paper presented at the 25<sup>th</sup> WEDC Conference on Integrated Development for Water Supply and Sanitation, Addis Ababa, Ethiopia.
- Buhl, L. (n.d.). Eight emerging careers in 2013. Retrieved on September 27, 2013, from <http://career-advice-monster.com/job-search/company-industry-res>.
- Bureau of Labour Statistics (2012). Employment and unemployment among youth summary. Retrieved January 12, 2013, from <http://bis.gov/news.release/youth.or0.htm>.
- Cable News Network (2009). Seven emerging jobs poised for growth. Retrieved on September 27, 2013, from <http://edition-cnn.com/2009/LIVING/worklife/08/04/cb.7.emerging...>
- Cherrypicked Insurance.com (2012). Emerging careers and jobs in the 21<sup>st</sup> century. Retrieved September 27, 2013, from <http://www.cherrypickedinsurance.com/news/useful-information/e...>
- Cullen, L. T. (2008). Top reasons why we change jobs. *Time*, May 28. Retrieved February 10, 2012. Dictionary.com (2012). Career. Retrieved February 10, 2012.
- European Centre for the Development of Vocational Training (n.d.). The benefits of vocational education and training. Retrieved from [http://www.cedefop.europa.eu/EN/Files/5510\\_en.pdf](http://www.cedefop.europa.eu/EN/Files/5510_en.pdf).
- Eurostat (2012). Unemployment statistics: Main statistical findings, Brussels, Belgium: European Commission. Retrieved January 12, 2013, from [http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php/Unemployment\\_statistics](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Unemployment_statistics).
- Faborode, M. O. & Oladosu, G. A. (1991). Development of cocoa pod processing machine. *The Nigerian Engineer*, 26 (4), 26-30.
- FRN (2007) *National policy on education*. Lagos: NERDC Press.
- Gettings, C. (2012). What is the difference between career and vocation? Retrieved on July 13, 2013, from <http://workarow.com/what-is-the-difference-between-career-vocation>.
- Gonah, C. M., Yaro, S.A., Abede, A. A. & Yawas, D. S. (2001). Design and fabrication of glass waste processing machine. *Journal of Engineering Technology and Industrial Applications*, 1 (4), 311-216.
- Hamm, T. (2010). Vocation, career, and job: Which do you have? Retrieved on July 13, 2013, from <http://w.w.w.csmonitor.com/Business/The-Simple-Dollar/2010/100>.
- Holgate, S. A. (2012). Emerging professions: Knowledge broker. Retrieved on September 27, 2013, from [http://sciencecareers.science.mag.org/career\\_magazine/previous\\_is](http://sciencecareers.science.mag.org/career_magazine/previous_is)
- Horst, B. (n.d.). Job, career, vocation: The difference is in the calling. Retrieved on July 13, 2013, from [http://w.w.w.goshen.edu/news/bulletin/02march/job\\_career.php](http://w.w.w.goshen.edu/news/bulletin/02march/job_career.php).
- Index Mundi (2013). Ghana unemployment rate. Retrieved on November 7, 2013, from [http://www.indexmundi.com/ghana/unemployment\\_rate.html](http://www.indexmundi.com/ghana/unemployment_rate.html).
- International Consultation Meeting (2013). *Transforming TVET for meeting the challenges of the green economy*. Bonn-Germany.
- Macleans, R. & Lai, A. (2013). The future of technical and vocational education and training: Global challenges and possibilities. *International Journal of Training Research*, 2-15.
- Manabete, S.S., James, T.G. & Tika, T.J. (2005) The vision and mission of technical/vocational education in national integration and cohesion in the 21<sup>st</sup> century: The North-East experience. *Knowledge Review*, 11(3), 78-84.
- Manabete, S. S. & Umar, B. (In print). Indigenous technology for sustainable development in West Africa. *Journal of Education and Practice*, ISSN (Paper) 2222-1735 ISSN (Online) 2222-288X.
- Management and Training Corporation, MTC (2010). *Principles and strategies of a successful TVET program*. Centerville: MTC Institute.
- Mumah, S.N. & Ozigi, M. A. (1997). Contemporary environmental problems facing developing countries. *Proceedings of the 5<sup>th</sup> National Engineering Conference*, 4 (1), 137-141.
- Nigerian Tribune (2013). Nigeria's unemployment rate hits 22%. Retrieved on November 7, 2013, from <http://www.tribune.com.ng/news2013/index.php/en/component/k2/item/21832-nigeria%26E2%2580%?>
- Odigboh, E. U. (1991). Bitter leaf processing machine (prototype). *Engineering Focus*, April-June, 33-36.
- Office for National Statistics (2012). Statistical bulletin: Labour market statistics, December 2012. Retrieved January 12, 2013, from <http://www.ons.gov.uk/ons/rel/us/labour-market-statistics/december-2012/statistical-bulletin.html> lab-Young-people-in-the-labour-market.
- Olokesusi, F. (1996). Sustainability and solid waste management in metropolitan Lagos: The imperative for a new paradigm. *Urban Management and Urban Violence in Africa*, 1, 315-324.
- Okoro, O.M. (2006). *Principles and methods in vocational and technical education*. Nsukka: of Nigeria Publishers.
- Omotosho, O. (2009). An assessment of waste management and private sector participation (PSP): A case of Lagos Mainland Local Government of Lagos State. *Knowledge Review*, 18 (1), 1-5.
- Punch (2013). Nigeria's unemployment rate rises to 23.9%-NPC. Retrieved on November 7, 2013, from <http://www.punching.com/business/business-economy/Nigerias-unemployment-rate-rises-to-23.9-n>.
- 123test (2013). Professions. Retrieved on September 27, 2013, from <http://www.123test.com/professions/>.
- Sacramento California State University (n.d.). Cool careers and emerging trends. Retrieved on September 27, 2013, from <http://www.csus.edu/careercenter/students/CoolCareers-Emerging..>
- Siyanbola, W.O., Egbetokun, A.A., Oluseyi, I., Olamide, O.O., Aderemi, H.O. & Sanni, M. (2012). Indigenous technologies and innovation in Nigeria. Opportunities for SMEs. Retrieved from <http://www.SciRP.org/journal/ajibm>.
- Sridhar, M. K. C. (1999). Waste management in Lagos and Oyo States: Problems and prospects. A keynote address delivered at a workshop on waste management at Pastoral Institute, Ibadan.
- The Free Dictionary (n.d.). Career. Retrieved September 27, 2013, from <http://www.thefreedictionary.com/career>.
- The Free Dictionary (n.d.). Vocation. Retrieved September 27, 2013, from <http://www.thefreedictionary.com/vocation>.
- Uloko, M. E. (2008). Emerging issues in vocational education in Nigeria. *Knowledge Review*, 17 (3), 64-69.
- UNESCO (1999). *Proceedings of the Second International Conference on Technical and Vocational Education*. Paris.
- UNESCO-UNEVOC (2011). *Transforming TVET for meeting challenges of the green economy*. Bonn: UNESCO Consultative Meeting publication.
- US Department of Education, Office of Vocational and Adult Education (2012). *Investing in America's future: A blueprint for transforming career and technical education*. Retrieved on September 27, 2013, from <http://www2.ed.gov/about/offices/list/ovae/pi/cte/transforming-career-technical-education-pdf>.
- US Department of Labour (2012-13). Occupational outlook handbook. On career and technical teachers. Retrieved on September 3, 2013, from <http://www.bls.gov/ooh/education-training-and-library/career-and-Wikipedia> (n.d.). Career. Retrieved on September 27, 2013, from <http://wikipedia.org/wiki/career>.
- Wikipedia (n.d.). Profession. Retrieved on September 27, 2013, from <http://en.wikipedia.org/wiki/Profession>.
- Wikipedia (n.d.). List of countries by unemployment rate. Retrieved on October 18, 2013, from

[http://en.wikipedia.org/wiki/List\\_of\\_countries\\_by\\_unemployment\\_rate](http://en.wikipedia.org/wiki/List_of_countries_by_unemployment_rate).

Woodward (2013). Professions and occupations. Retrieved on September 27, 2013, from <http://www.vocabulary.cl/Basic/Professions.htm>.

Zang, X. (2008). Role of impact evaluation in national policy: China perspective, January 16.