

# **RE – ENGINEERING MICROBIOLOGY FOR SELF – EMPLOYMENT AND SELF PRODUCTIVITY IN NIGERIA**

**By**

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## **Abstract**

*Graduate employment in Nigeria is soaring day by day which in turn has led to idleness that has given rise to increased poverty, hunger and diseases whose consequences have manifested in social ills such as armed robbery, theft, prostitution and drug abuse. This therefore, shows the need now to produce graduates capable of self – employment and self – productivity in Nigeria. The paper highlights on the way through which microbiology course taught in the Nigerian universities can be re – engineered to produce graduates capable of self – employment and self – productivity in Nigeria. Among other suggestions, the paper suggested that in the cause of the teaching/learning, teachers should make the students to realize that any skill they acquire can be a potential skill for self – employment and self – productivity in the individual as such teaching/learning should lay emphasis on hands – on – activities rather than over dependence upon theory.*

Productivity and employment according to Obadadan and Odusola (2000) are issues that are central to the social and economic life of every nation where they collectively constitute a vicious cycle that explains the endemic nature of poverty in developing countries. Continuous improvement in productivity is considered the surest way to breaking the vicious cycle. On the other hand, the global economic recession of the 1980s and 1990s have resulted in increase in unemployment which is now considered as a world wide problem affecting both the developed, the developing and underdeveloped nations. Oladekomo (2004) explained that in Nigeria unemployment as a national problem did not manifest until the end of the civil war. Even then it remained at a tolerable level until when the economic recession of the 1980s struck Nigeria in 1981. Therefore, it could be said that there was no clearly identifiable and focused national policy on unemployment before the 1980s. Policy options towards reversing the trend of increasing unemployment then focused on generating more employment opportunities in the country especially in the urban areas and the structural transformation of the rural areas to stop rural – urban migration. However, the first innovative, comprehensive, composite and integrated package on national crusade against unemployment begin an with the introduction of Directorate of Food, Roads and Rural Infrastructure (DFRRI) and the National Directorate of Employment (NDE) in 1986.

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Standing (1983) described unemployment as the state of worklessness experienced by persons who are members of the labour force who perceive themselves and are perceived by others as capable of work. Gbosi (1997) defined unemployment as a situation in which people who are willing to work at the prevailing wage rate are unable to find jobs. The definition of unemployment by the International Labour Organization (ILO) is said to be more encompassing where it considered the unemployed as a member of the economically active population, who are without work but available for and seeking for work, including people who have lost their jobs and those who have voluntarily left work (World Bank, 1998). Nwachuku (2012) revealed that the Nigerian unemployment report 2011 prepared by the National Bureau of Statistics (NBS) shows that unemployment rate in Nigeria increased to 23.9 percent in 2011 compared with 21.1 percent in 2010 and 19.7 percent in 2009. The report also shows that the rate is higher in the rural areas (25.6 percent) than the urban areas (17.1 percent) and that persons aged 0 to 14 years constituted 39.6 percent, those aged between 15 and 64 (the economically active population), constituted 56.3 percent, while those aged 65 years and above constituted 4.2 percent.

Graduate unemployment (GU) pose enormous challenges to developing and underdeveloped nations constituting peculiar problems to labour market and the general economy of the countries. A study conducted by Fajana (2000) identified some of the major factors responsible for graduate unemployment in Nigeria to include global economic recession, long period of initial unemployment among graduates, faulty manpower planning and expansion of educational facilities that have unduly raised the expectations of Nigerian youths, continued proportionality of expatriates in employment, the institution of NYSC, the collective bargaining process, graduate attitude to some type of jobs, attitude to jobs in other locations as well as search behavior of employers and job seekers, use of capital intensive technology, wide rural – urban migration, formal – informal sectors differentials.

In order to curb the menace of graduate unemployment in Nigeria, the Nigerian government sees the need to change, reform or restructure its national policy on education from education for employment and development to education for value re – orientation, poverty eradication, job creation, wealth generation and using education to empower the people which collectively are regarded as the critical targets of the National Economic Empowerment and Development Strategies (NEEDS) signed into action by the federal government in March 2004. So the national policy on education in Nigeria among other things is now aimed at education for self – employment and self productivity. It is against this background that this paper highlights on the various ways through which the microbiology course taught in Nigerian universities can be re – engineered to produce graduates capable of self – employment and self – productivity in Nigeria.

## **The Scope and Relevance of Microbiology**

The world around us is full of organisms and agents like viruses, bacteria, protozoa and fungi, too small to be seen with the naked eye. A microbiologist immerses himself in the study of these microbes that live in widely diverse habitats, ranging from hot springs, to the cold arctic region, to the human body and many other living things, also to the depth of the sea and ocean. Microbiology therefore, is a valuable science because microbes affect every aspect of life both negatively and positively (Rama, 2009). As such, Prescott, Harley and Klein (2005) defined microbiology as the study of organisms and agents too small to be seen clearly by the unaided eye that is to say it is the study of microorganisms which employ techniques such as sterilization and the use of culture media required to isolate and grow these microorganisms.

Microbiology has both basic and applied aspects. Many microbiologists are interested primarily in the biology of the microorganisms themselves. They may focus on a specific group of microorganisms and be called virologists (viruses), bacteriologists (bacteria), phycologists or algologists (algae), mycologists (fungi), or protozoologists (protozoa). Others are interested in microbial morphology or particular functional process and work in fields such as microbial physiology, microbial ecology, microbial cytology, microbial genetics, microbial taxonomy and molecular biology. Of course a person can be thought of in both ways (e.g, as a bacteriologist who works on taxonomic problems). Many microbiologists have a more applied orientation and work on practical problems in fields such as medical microbiology, food and dairy microbiology and public health microbiology (basic research is also conducted in these fields).

Prescott et al. (2005) further outlined the current occupations of professional microbiologists as follows:

- **Medical Microbiology** This is one of the most important and active fields of microbiology, which deals with the diseases of humans and animals. Medical microbiologists identify the agent causing an infectious disease and plan measures to eliminate or control it. Frequently they are involved in tracking down new, unidentified pathogens such as the hantavirus, the SARS virus and many others. These microbiologists also study the ways in which microorganisms cause diseases.
- **Public Health Microbiology** This is closely related to medical microbiology. Public health microbiologists try to control the spread of communicable diseases. They often monitor community food establishments and water supplies in an attempt to keep them safe and free from infectious disease agents.
- **Immunology** Immunologists are concerned with how the immune system protects the body from pathogens and the response of infectious agents. It is also one of the fastest growing areas in sciences; for example techniques for the production and use of monoclonal antibodies have developed extremely rapidly. Immunology also deals with practical health problems such as the nature and treatment of allergies and autoimmune diseases like rheumatoid arthritis.

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- **Agricultural Microbiology** This is concerned with the impact of microorganisms on agriculture. Agricultural microbiologists try to combat plant diseases that attack important food crops, work on methods to increase soil fertility and crop yields and study the role of microorganisms living in the digestive tracts of ruminants such as cattle. Currently there is a great interest in using bacterial and viral insect pathogens as substitutes for chemical pesticides.
- **Food and Dairy Microbiology** These microbiologists try to stop microbial spoilage of food and the transmission of food borne diseases such as botulism and salmonellosis. They also use microorganisms to make food such as cheese, yoghurts, pickles and beer. In the future microorganisms themselves may become a more important nutrient source for livestock and humans.
- **Industrial Microbiology** Industrial microbiologists use microorganisms to make products such as antibiotics, vaccines, steroids, alcohols and other solvents, vitamins, amino acids and enzymes. Microorganisms can even leach valuable minerals from low – grade ores.
- **Microbial Ecology** This is concerned with the relationships between microorganisms and their living and nonliving habitats. Microbial ecologists study the contributions of microorganism to the carbon, nitrogen and sulfur cycles in soil and in freshwater. The study of pollution effects on microorganisms is also important because of the impact these organism have on the environment. Microbial ecologists are also employing microorganisms in bioremediation to reduce pollution effects.
- **Microbial Genetics and Molecular Biology** These focuses on the nature of genetic information and how it regulates the function of cells and organisms. The use of microorganisms has been very helpful in understanding gene function. Microbial geneticists play an important role in applied microbiology by producing new microbial strains that are more efficient in synthesizing useful products. Genetic techniques are used to test substances for their ability to cause cancer.
- **Genetic Engineering** More recently the field of genetic engineering has arisen from work in microbial genetics and molecular biology and will contribute substantially to microbiology, biology as a whole and medicine Engineered microorganisms are used to synthesize useful products faster and in a more efficient manner. New genes can now be inserted in plants and animals; for example, it may be possible to give corn and wheat nitrogen fixation gene so they will not require nitrogen fertilizer.

## **Microbiology for Self – Employment and Self Productivity**

In order to re – engineer the microbiology course taught in Nigerian universities to produce graduates capable of self – employment and self productivity in Nigeria, the following can be taken into consideration:

- 1) The national policy on university education should include entrepreneurship course as a compulsory course to be offered by all students.
- 2) The entrepreneurship course should not be offered as a general studies education (GSE) course to be offered by all students of a particular level (e.g all level I, II,

III or IV students) as introduced in the 2011/2012 academic session of some higher institutions of Nigeria but as a departmental course for example entrepreneurship course in microbiology. The incorporation of the course as a departmental course will make the students to view it as an important course in their studies, career development and preparation for self – employment after graduation.

- 3) The course tutor e.g for microbiology should be a microbiologist with qualification in entrepreneurship who is capable of teaching the basic concepts of entrepreneurship as well as familiarize students with various self – employment opportunities available in their field of study. The course tutor should also be able to help the students in designing business of their choice within the self – employment opportunities in their field of study. The designed business should be validated by a professional entrepreneur educator and a professional in the field of study that relates to the business in question so as to assess the workability of the business as a small scale business, the financial cost of the business, market outlet of the business, economic gain of the business and its sustainability. Thereby, okaying it as worthy of setting up or not.
- 4) When designing a business the students should be mandated to design a business in a group of 5 people and above so as to prevent repeated business design by single individuals, reduce financial cost of setting individual businesses and strengthen the manpower capacity of the business.
- 5) The student industrial work experience scheme (SIWES) should be mandated to be undertaken by all students in all disciplines, with the duration of the scheme now extended from 3 months to 6 months in the 2011/2012 academic session of the Nigerian universities, the scheme can now be utilized to serve two objectives the initial objective of giving the student practical working experience relating to the students field of study and now conducting it under organizations carrying out the type of design business of his choice in a large scale. Thereby, making students to be acquainted with the business and learn it practically from professionals in the field. Thus, saving the government the cost of establishing student entrepreneurship centers for practical learning experience which may not be adequate to cater for the teeming number of students, as well as save the cost of paying wages to personnel at the centers as it is the case nowadays.
- 6) Success stories of business entrepreneurs should be included in the curriculum especially in the student field of study so as to motivate the student to develop interest towards self – employment and self productivity. For example, students can be told about Alhaji Aliko Dangote who started as a small business entrepreneur and now in this 2012 was considered as the richest person in Africa with huge national and international businesses. They can also be told about Mr. Cosmos and his wife Madam Charity of the Coscharis Motors who started as small business entrepreneurs sailing vehicle spare parts but now owners of giant motor company operating both nationally and internationally.
- 7) Students with best business design from each faculty should be given certificates of recognition at graduation and cash award by the federal government to

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immediately set up their own business after graduation. For other graduates, the federal government should set – up a bank called the Enterprise Bank which will be saddled with the responsibility of giving loans to students to set up their own businesses where the bank should also serve as the graduates bank for the business in question and the loan be paid with little interest for all businesses across the board based on the capital given. The Enterprise Bank should also put in place a consulting firm responsible for monitoring the progress and sustainability of the businesses they sponsor. Best business enterprise from each state should be identified by the Enterprise Bank and be given national recognition and if possible cash award by the state government where the businesses are established

### **Suggestions**

- The federal government should see education as the bed rock of all other developments and an agent through which all other developmental goals of Nigeria can be attained. As such should be given its rightful share in the yearly budgetary allocation of at least 26% of the GDP as proposed by UNESCO.
- Conducive teaching/learning environment should be provided at all levels of the educational system in Nigeria through the provision of infrastructure, teaching aids as well as consumables and equipments necessary for the teaching/learning of science and technology so as to produce competent pupils from the grass root (basic schools) capable of passing through the secondary schools to the universities and other tertiary institutions of learning who can either be employable or self – employed as situation warrants.
- During the teaching/learning of science in general and microbiology in particular teachers should make the students to realize that any skill they acquire in the course of the teaching/learning can be a potential skill for self – employment and self – productivity in the individual as such the teacher should always lay more emphasis on hands – on – activities rather than overdependence upon theory.
- Professionals in various disciplines in universities and tertiary institutions should be motivated and adequately sponsored to train in enterprise education so as to serve as entrepreneur tutors in their various disciplines.
- Teachers in general, science and technology teachers in particular should be encouraged to attend workshops, seminars, conferences, and study tours both nationally and internationally to up date their knowledge and skills that will enable them meet up with the global challenges of producing competent, world – class scientists, technologists, and engineers capable of moving Nigeria scientifically, technologically and economy forward to greater heights.
- Nigerians should cultivate the culture of patriotism, hard work and honesty in all spheres of life so as to move the nation up to greater development.

### **Conclusion**

Microbiology is a large discipline with many different specialties having a great impact on fields such as medicine, agriculture and food sciences, ecology, genetics, biochemistry and molecular biology. Therefore, the role of microbiologists in national

development can not be said to be over emphasized. And this shows the need to produce microbiologists in universities. But with the issue of mass student enrollment into universities as well as mass student graduation out of universities and the global economic recession resulting to mass graduate unemployment in Nigeria, there is therefore the need to re – engineer the microbiology taught in our universities to attain the desired motive of education for self employment in Nigeria. In this paper, the various points highlighted towards re – engineering microbiology for self employment and self productivity when employed are capable of producing self – employed and self – productive microbiologists capable of moving the country economically forward.

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