

---

## **Refocusing the Relevance of Science, Technology and Mathematics (STM) Education to Development of Entrepreneurial Skills: The Nigerian Situation**

---

By

DR. CHRISTY O. NWACHUKWU  
*Madonna University,  
Okija.*

UCHE P. NWACHUKWU  
*KPMG.*

**And**

CHIKE P. NWACHUKWU  
*Nnamdi Azikiwe University,  
Awka.*

### **Abstract**

*The paper examined the relevance of Science, Technology and Mathematics (STM) education to development of entrepreneurial success for a Nigerian citizen. A historical overview of the interconnectivity of science, technology, mathematics, and entrepreneurial activities was highlighted. The present status and problems of STM education in Nigeria were highlighted to bring out the theoretical relevance to entrepreneurship which actually has not been practically attained. Remedial strategies were suggested.*

Relevance according to Longman Dictionary means ‘being directly connected with the subject being discussed or considered’. This implies that this paper will attempt to bring out the direct connection between Science, technology and mathematics (STM) education to development of entrepreneurial activities.

Nigeria is rich in human and natural resources, yet, is one of the poorest and undeveloped countries of the world. The climax is that there are many graduates of the nation’s education system who are roaming about as unemployed job- seekers. This is contrary to the goal of Nigerian education FRN (2004) of ..... a self-reliant nation.

This indicates that the policies and the practices in the schools have some yawning gaps (Offorma, 2005). In reality, products from good STM education ought to have acquired sufficient entrepreneurial skills that will make them self-reliant, prepare them to enter into jobs and progress in them STM should prepare them to be self-employed in various enterprises.

The scientific, vocational, and technical education is not effectively implemented. The delivery in this area of specialization should be practical but, it is theorized because of lack of competence by the teacher or, lack of equipments. Thus students graduate without any hands –on, and minds-on experience (Nwagwu in Offorma 2005). This state of affairs tends to obscure the relevance of STM education in development of entrepreneurial success of the nation. Such constructs as, curiosity, open –mindedness, creativity, aptitude among others, which are often used in connection with STM education and activities, are also relevant and applicable to entrepreneurial activities

It is against this background that this paper theoretically discusses the relevance of STM education to the successful development of entrepreneurial activities in Nigeria.

### **Historical Overview of STM Relevance to Entrepreneurship**

Science and technology have been instrumental in shaping and improving the destiny of humanity. Science tries to explain things. Technology is what has enabled human beings to raise themselves above animals; not only to build houses, supply food, health, travel and communications but arts, sculpture, music and literature (Mutasa and Wills, 1995). Hence, the purpose of technology is the application of human knowledge for the betterment of human life. Technology is cultural activity and every society is technological and scientific in varying degrees. Mathematics is the language of science and the tool for technologies.

Africans developed Arithmetic, Algebra, Geometry, Trigonometry and other advanced mathematical sciences (Diop. 1974; Dubois, 1965). They employed these in the construction of pyramids, mathematical calculations relating to the flooding of Nile, and in the division of land along the Nile valley-the most precious land that existed at the time.

The Egyptians possessed considerable knowledge of Chemistry and the use of metallic oxides is evident from the nature of colours applied to their glass and porcelain. They were even acquainted with the influence of acids upon colour. Hence they were able in the process of dyeing or staining cloth, to bring out certain changes in the hues by the same method adopted in our own cotton works. (Sweeting and Edmond 1989).

Amongst a host of technological inventions were metal tools – copper and iron and latter steel, boat and ship design. The sale of sails was one of Egypt’s industry. Also, there existed the art of shaving; use of wigs, wearing of kilts and sandals, musical

instruments, chairs, beds, cushions, jewelry. There was smelting of iron for producing good quality carbon steel using furnaces of temperatures up to 1,800°C.

The great advances that have been made in technology over the last hundred years or so have been met with a corresponding decrease in the technological skills possessed by individuals and their communities. In Anambra State of Nigeria for instance, men and women were capable of making farming implements and women were able to brew, weave and dye cloths, make clay and earthenware bowls, among others. Men were blacksmiths able to make guns, matchets, various other tools. Nowadays, it is difficult to find individuals with such skills in the communities. Technology now belongs to large corporations and people have become increasingly jobless, job-seekers and indeed marginalised.

The narrative so far highlights the relevance of STM, to development of entrepreneurship, and the interconnectivity of these different disciplines. An entrepreneur uses mathematical measurements and calculations; uses either, or all of contents, processes, and products of science and technology to manipulate his or her entrepreneurial activities

### **The Present Status of STM Education in Nigeria,**

Studies reveal that inadequacy of content stereotyped and ineffective methodology, obsolescence among many of the teachers, paucity of facilities, equipment and materials, as well as socio-cultural lapses have continued to characterize STM education in Nigeria. (Oriafo 2002),

The present trend of mass unemployment in Nigeria shows that the STM being taught in schools do not prepare Nigerian graduates to function well in the nation undergoing transition from rural economy to modern economy. The courses which should be taught as hands-on and minds –on practical courses are taught theoretically, hence, the learners do not benefit maximally from their education. They therefore, cannot perform according to expectation (Nwachukwu 2010).

### **Problems Confronting STM Education**

The problems include lack of funds to purchase equipments; lack of adequate textbooks, overcrowded classrooms/ laboratory, timetable, lack of cooperation from administrators, the pressure of external certificate examinations etc. Others are lack of proper monitoring and feedback mechanisms poor preparations of teachers who teach the new programmes, lack of motivation among teachers, the rapid rate in which teachers are transferred from one school to another or out of the profession, the use of archaic teaching methods, poor implementation procedures, overwhelming number of activities demanded by the new curricula, shortage of qualified S.T.M. teachers, lack of clear cut goals, scanty and non-usage of research reports on the performance of the programmes.

## **The Concept of Entrepreneurship**

The word entrepreneur is defined by Longman Dictionary as, someone who starts a company, arranges business deals, and takes risks in order to make a profit. Also, the term entrepreneurship has been described by Ugiagbe and Umunna (2002) as the process of bringing together creative and innovative ideas and coping with the management and organizational skills in order to combine people, money, and resources to meet an identified need, and thereby create wealth. This may be undertaken by one person or a group of persons. Fenemigho (2008) stated that creativity and management strengths are provided by entrepreneurial skills which combine strengths, skills and competence to produce goods or services.

Steinhof and Burgess in Offorma (2005:14) also described an entrepreneur as a person who organizes, manages, and assumes the risk of a business or enterprise. In addition, he or she recognizes a money-making opportunity and sets up a business to exploit it. That was why Anyakoha (2001:263) indicated that entrepreneurship occurs when an individual develops a new venture, a new unique way of giving the market place a product or service. Again, Oyeniyi (2003) views an entrepreneur as one who undertakes to supply goods or services to the market for profit. Furthermore, Ezeudu (2008) summed entrepreneurship as the process of owing and managing a business enterprise with the hope of making profit.

Bolarinwa (2001) indicated that entrepreneurship elements are combination of motivation, vision with judgment, communication, determination, optimism, courage, endurance and the power of creating cooperation which funds market opportunities. In line with the above, Ojukwu (2001) described entrepreneurship development as a programme of human capital development inputs aimed at increasing the supply of adequately trained entrepreneurs who are motivated to make a success out of business. Actually, the views expressed above highlight some similarities between STM skills and entrepreneurial skills. Such constructs as creativity, open-mindedness, curiosity, aptitude among others, can be rightly associated with both STM and Entrepreneurship. Therefore, a good graduate of STM education ought to have developed sufficient entrepreneurial skills to enable him or her cope up with eventualities of life.

## **Conclusion**

The paper showed that from ancient times STM activities had been associated with entrepreneurial activities of early man. It therefore follows that a well planned and implemented STM education of today will play a big role in the development of entrepreneurship in the recipients thereby enabling them live better fulfilled lives.

### **Way Forward / Suggestions for Improvement**

- \* Teacher mediation enhances the completion rate for both the STM and the entrepreneurial courses. Hence, it is very essential that serving teachers/ educators/ instructors / facilitators, be trained on the new technologies so as to update and upgrade their knowledge. This can be organized through workshops, study tours, on –the –job training to familiarize the teachers with the new technologies so as to counteract the possible adverse effect of environment of globalization.
- \* The childhood/ home orientation of an individual highly influences the person’s outlook in life. There is need for proper value and attitude orientation of individuals by parents and adults. Children should be taught and encouraged to be versatile.
- \* The National Universities Commission has developed an entrepreneurial curriculum and made the course compulsory in universities. This is a step in the right direction. Again, the entrepreneurial curriculum should be extended to all levels of education. This will have the effect of initiating the children into entrepreneurial consciousness early in life.
- \* In addition, long vacation or weekend programmes can be organized for out-of–school children and small business operators to equip them with the entrepreneurial skills so as to make them self- reliant.
- \* Students’ Industrial Work Experiences (SIWE) should be well organized to enable students acquire the useful entrepreneurial skills and attitudes. Hence, more emphasis should be laid on skill acquisition/ practicalized knowledge than on certificates.

### **References**

- Anyakoha, E.U. (2001). Promoting entrepreneurship education in home economics programmes. Challenges and strategies”. In Okeke, E.A.C., & Egonu, D.U. (eds.), *Educational alternative for Nigeria*. 2,262-270.
- Balorinwa, K.O. (2001). Incorporating entrepreneurship education into business education curriculum.: An equilibrium way for sustainable poverty alleviation in Nigeria.
- Diop, C.A. (1974). *The African origin of civilisation*, Lawrence Hill and Company New York.
- Dubois, W.E.B. (1965). *The world and Africa.*, International Publishers, New York.

- Ezeudu, E.O. (2008). *Restructuring our science, technology and mathematics (STM) Education for entrepreneurship*. Proceedings of the 49th annual conference of science teachers association. 268-272.
- Federal Republic of Nigeria (2004). *National Policy on Education*. NERDC Lagos.
- Fenemigho; E.A.(2008). Entrepreneurship: the antidote to resource management in the Nigerian Economy. "*Knowledge Review*". 17 (5), 62-67.
- Mutasa, N.G. & Wills, G.M. (1995): *Modern practice in education and science*. Gaborone Publishers Botswana.
- Nwachukwu, C.O. (2010); Tackling the challenges of skills acquisition in Nigerian chemistry education for growth and productivity: A theoretical approach. *Nigerian Journal of Research and Production*. 16(1): 1-8.
- Offorma, G.C. (2005). *Curriculum for wealth creation*. Paper presented at the seminar of the world council for curriculum and instruction held at Kano, October 25.
- Ojukwu, K.O. (2001) Entrepreneurship development in business education: Critical success factors in starting small biasness enterprises. *Business Education Journal* 3 (3), 103.
- Oriaifo, S.O. (2002). Refocusing science, technology and mathematics (STM) education in Nigeria in Oriaifo, S.O., Nwaokolo, P.O. & Otubolu, P. (Eds.) *Effective teaching: A Book of Readings*; Agbor, Kmensuo Educational Publishers.
- Oyeniya, O.A. (2003). Promotion of entrepreneurship through vocational education in Nigerian colleges of education. *Ore Science Educational Journal (OSEJ)* 2(1): 156-158.
- Sweeting, E. & Edmond, L.(1989): *African history: An illustrated handbook*. Islington Council, London.
- Ugiagbe, F.E.S. & Umunna, L. (2002): Entrepreneurship. A necessary tool for self-reliance in vocational and technical education in Nigeria. *Refocusing education in Nigeria (eds.)*" Oriaifo, S.O. Nwokolo, P.O. E. & Igborgbor, G.C. Benin City. Da-Syra Influence, 114-119.