

LIBRARY AS A TOOL FOR PROMOTING INNOVATION AND ENTREPRENEURSHIP IN SCIENCE AND TECHNOLOGY EDUCATION FOR SELF-RELIANCE IN NIGERIA

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Abstract

This paper highlighted the role of the library in promoting innovation and entrepreneurship in science and technology for self reliance for national development. For a country to attain any meaningful development, this study observed that it must have an adequate pool of scientifically and technologically skilled manpower to fill to development aspirations and to boost its economic resources. The role of the library in promoting innovation entrepreneurship science and technology education for self-reliance was obscure. It further indicated that there is a tight link between strong economic productivity of a nation and its scientific and technological skills of its workforce. The paper emphasized on the need for entrepreneurship education through curriculum review with capacity that could provide entrepreneurial business and economic studies, numerical skill, scientific and technical skills which can produce a successful entrepreneur. The paper recommended appropriate science and technology education initiative striving at conducive and healthy political and economic environment to transform learners to be innovative, critical thinkers who can translate any business opportunities into viable businesses.

Keywords: Library, Innovation, Entrepreneurship Sciences, Technology, Education, Self-Reliance, Nigeria.

In the world over, every country in the quest to develop and to attain the level of technological advancement, it needs, the labour workforce to meet and fulfill the nation's development aspirations and to boost its economic resources. Nigeria with abundant human and natural resources needs an adequate pool of scientific and technological manpower to harness its rich and abundant natural resources for national development. For this to be effectively achieved, there is the need to emphasize on effective teaching and meaningful learning of science and technology in the country.

This is meant to suggest that the country's educational curriculum from all levels of education must be tailored more realistically towards science and technology education. The National Academy of Science (NAS) (2014) as observed by Mogari (2014) pointed out that there is a tight link between strong economic productivity of a nation and the scientific and technological skills of its workforce. It is further maintained that economic growth and enhanced productivity are indices of employment creation and poverty eradication. It is for this reason that the United Nations commissioned the Millennium Project in 2002 to develop a concrete plan of action for countries to achieve the Millennium Development Goals (MDG) with the aim to among other factors eradicate or minimize poverty. The project set out a series of time – set targets, hence, the 2013 Millennium Development Goals indicated that:

1. There has been progress made towards meeting targets set for 2015,
2. That poverty rate has been halved globally;
3. That over 60% of ordinary workers in developing countries still live in US\$4 performance day, and
4. That in sub-sahara, 27% of the people are undernourished (MDG,) 2013 as observed by Mogari (2014)

The country strategic paper (CSP) 2013 – 2017 noted that the Nigeria is noted for the followings:

1. That it is richly endowed with natural resources
2. That it is the largest oil producer in Africa and the 11th in the World
3. It imports food stuffs and other commodities;
4. It has a high manpower rate, especially in the north;
5. It has a high unemployment rate which is rife among the youth. (CSP 2013 as to observe by Mogari 2014).

There are enormous potential and opportunities in Nigeria to sustain sound economic growth and development that could in turn eradicate or minimize socio-economic challenges that are facing the country. It is noted that the Country Strategic Paper (CSP) had adopted two strategic measures: (1) Millennium Development Goals devoted to education, where measure 2 center on Vision 2020 for example, singles out human capital development and youth employment as critical if Nigeria is to have inclusive sustainable growth, (Mogari 2014). Heibert and Grouws (2007), Anthony and Walshaw, (2009) Kersting, Givvin, Sotelo and Stigler (2010) opine that for Nigeria to achieve her goals of development she certainly has to prioritize and emphasize the teaching of science and technology. Since teaching plays a critical role in learning, it is believed that quality science and technology knowledge and skills are highly needed for development of the agenda of a country. It is not in doubt that a nation that is endowed with appropriate knowledge and skills has a better chance to provide meaningful and decent employment which can easily adjust to a dynamic and fast –growing knowledge

– based economy that could play a major role in its economic growth and development. This paper therefore profiles the role of the library as crucial in promoting innovation and entrepreneurship in science and technology education for self reliance in Nigeria.

Conceptualizing Library, Science and Technology for Innovation and Entrepreneurship

Library and Education

There is a strong correlation between library and education, they constitute significant components in teaching and learning in education. The library provides the relevant resources in various formats to sustain teaching and learning by students and teachers in a classroom setting. The quality of teaching by teachers and high academic performance by students depend significantly on the availability and utilization of library resources to meet users needs. It can therefore be argued that, the quality of (workforce) responsible for teaching/ learning, learning and research can significantly impact positively on the quality of education. Library could be defined as the collection of book and non-book materials that are carefully selected, organized, arranged, and retrieved and disseminated to meet the various needs of library users. It is also viewed as a repository of knowledge upon which learning, teaching and research depend. Krushan (1982).

defined library as: an organized collection of books and periodicals or any other graphic or audio-visual materials, and the services of staff to provide and facilitate the use of these materials which are required to meet the information, research, educational or recreational needs of its users.

In fact, libraries form a vital part of the world's system of communication and education; and they make available knowledge that has been accumulated through the ages to peoples in all walks of life in other works. The main users of the library include teachers, scholars, scientists, government officials and business executives. In today's changing world in response to the advent of Information Communication and Technology, the role of the library in the 21st century needs to be adjusted to cater for the learning and knowledge centre for the users as well as the intellectual community for their respective communities where people and ideas interact both in virtual and real environment to expand learning and facilitate the creation of new knowledge (Keystone 1999).

Science and Technology

Knowledge is essentially crucial in one's everyday living. A man decision in life is informed by the level of knowledge one acquires. A more knowledgeable person tends to make a better or quality decision than others with lesser knowledge. It is not in doubt that the level of knowledge and intelligence one acquires puts him in a relative advantage over the others and puts him in a more relative position in life. Furthermore, knowledge and skills help one cope with the challenges experienced in one's daily life. The encountered challenges and demands necessitate responsive actions from one and the quality of the response tends to depend on what one knows about the encountered challenges and demands placed on him. For one to have a better knowledge of posed challenges encountered and demands, one has to carefully observe, critically think about what confronts him. The body of knowledge generated through this process which include concepts, laws, principles, theories and facts about how the world we live in function could be defined as science. National Academy on Science (2014) perceived science as an active process which entails observing, inferring and experimenting.

On the other hand, for a man to overcome the challenges he experiences and to address the enormous demands placed on him, he devices ways and means by closely scrutinizing what confronts him in order to better understand these challenges, as this will enable him to cope with the appropriate solution, strategy or device. In essence, this will require applied knowledge to generate new knowledge or device that will help deal efficiently with the challenges and demands being encountered. The newly developed knowledge or device is a resource that can be used against difficulties confronting one. Therefore, the resource which is used to overcome challenges one experiences to address the demands placed on him is what could be termed as technology (Mogari 2014). Technology could be referred to as the study and development of resources needed in order to function better in the society. These resources could however with time better the way of life of the people in the society.

Science and Technology for Innovation and Entrepreneurship

Science and Technology over the ages have directly affected human life. Weararratna (2010) observed that the effective use of science and technology is behind the socio economic development of numerous countries. Chetty (2012) opine that the developments in science and technology are fundamentally altering the way people live with profound effects on economic development. On the same vain Aslam (2010) opined that science and technology have extraordinary use that has totally changed human lifestyle and that have also helped to compete with the challenging world.

There is a significant relation between science, technology, innovation, and entrepreneurship. For people to live a better life, they need to have a good knowledge of these elements. An understanding of these basic elements will help them deal

adequately with the challenges and demands they come across and to overcome their daily challenges. Science generates ideas, theories, concepts, laws, principles after critically analyzing an object or phenomenon. Technology uses the developed ideas, thoughts, theories and so on to improve or function better in life. Innovation then focuses on converting the developed ideas or thoughts into tangible products with a better value, which can be used to enable people live or function better in the society. Entrepreneurship finally turns or uses the new or improved products for financial returns or gain in the available market opportunities. For better and improve resources for human lives, there is need for emphasis on creating learning opportunities to facilitate and optimize innovation and entrepreneurship education.

Science and Technology Education for Innovation Entrepreneurship Entrepreneurship Education

Education is very critical to socio – economic development of any country like Nigeria. It develops capacity, provides required knowledge and skills, broadens sense of awareness and enhances confidence and sense of judgment (Organization for Economic Co-operation and Development, 2008). Kromberg (2006) observed that school curriculum provides basic entrepreneurial, business and economic studies, numeracy skills, literacy skills and scientific and technical knowledge which cannot produce a successful entrepreneur. To be a successful entrepreneur, Kromberg maintained that one has to possess the following characteristics: self-belief, self-confidence, to be self-starter, to trust his ability, to show determination, courage and tenacity. Sinkovec (2013) maintained that a key factor for a successful entrepreneur must consider financial literacy that include business planning and management; social skills that includes team working, risk taking, desire to innovate and creativity, and technical skills encapsulate problem solving, ability to identify and access appropriate work opportunity. It is further noted that entrepreneurship education should provide relevant attitude, knowledge, skills in order for one to behave and act in an entrepreneurial way and promote creativity, innovation and self – employment. Training to be an entrepreneur should also put emphasis on self-reliance, independent thinking, emotional intelligence and a strong value system (Kromberg 2006).

Lets talk Science (2014) noted that science is at the centre of an innovative culture and practice since it is the means through which one understands and interacts with his own environment. Innovation entails translating ideas or thoughts into tangible resources that can generate values. On the other hand, an entrepreneurship through innovation and creativity – (new way of doing things) turns ideas into product that can be useful in people's lives.

Adejoh (2014) observed that education is meant to serve the society and since the society is dynamic, goals change from time to time and to cater for the needs,

challenges and development that occur in society: Entrepreneurship education taking a cue from current global trends should aim at helping the learners acquire appropriate knowledge, attitudes, skills, abilities and competencies that will enable him/her contribute to the development of the society.

Adejoh (2014) sees science education as a discipline that is concerned with education through the study of science. It is preoccupied with how best scientific knowledge, attitudes and skills can be inculcated into the populace to enable them to be useful (functional) to themselves and other societies. The National Policy on Education (2004) states the objectives of science Education in Africa to include:

1. To rationalize curricula and render it more relevant for African environment.
2. To establish scientific literacy among the populace so as to minimize or abandon colonial exploitation
3. To debunk myths and superstition so as to rationalize people's ideas and practices in the African environment.
4. To demystify science and encourage more youths to pursue science related endeavours.
5. To effect change in philosophy, methodology and materials in science classroom.
6. Through the use of local materials the learner should be able to enquire into natural phenomena and rationalize his traditional practices (Gbamanja 1991:39) as cited in Adejoh (2014)

Uwa and Iji (2011:318) as cited in Adejoh (2014) stated that the aim of technology education is to provide manpower in the field of sciences. In this field, individuals are formally prepared for the world of work. Technology education therefore is aimed at providing the following services:

- a. Providing vocational orientation, basic technological literacy for everyday living and to stimulate creativity.

Science and Technology Education Programme

Science and technology courses should be taught with the sole aim of arousing and inculcating among learners a sense of curiosity and self discovery- Lessons taught should make learners to always want to know more, to be eager to acquire a deeper understanding of what is happening around them; to always wonder what scientific ideas and principles underlie a particular process unfolding in their mist or have been used in making a particular object, and to enable a learner who happens to be watching an object or a phenomenon to look at it with a scientific mind where he analyzes and interprets the object or phenomena according to the scientific concepts, knowledge and principles. This may very well make learners see and appreciate the role and importance of science in their everyday life Adejoh (2014).

In order to produce scientifically literate learners, science and technology programmes should be designed to include the following:

1. The programme should be learner – centred, activity based.
2. It should be goal –oriented and be able to facilitate intellectual development.
3. It should empower and adequately educate learners to have high order of thinking and reasoning skills.
4. It should enable learners to be creative, innovative and lateral thinkers
5. The programme should ensure that science and technology knowledge is more meaningful and fun to learn by directly relating it with what transpires in the learners’ everyday life (Davison and Miller, 1998).
6. That the learners’ knowledge is inextricably connected to the context in which that knowledge was developed (Lave 1985).
7. The programme should emphasize more on practical lessons than theories.
8. Learners should be given group works in separation.
9. The curriculum designs should be subjected to periodical reviews to accommodate and update new developments.
10. For science and technology to be easier and enjoyable to learn, it should fit with the daily experiences of the learners and be handy when dealing with challenges they come across in their everyday situation, Adejoh (2014).
11. Let talk Science (2014) provides a mind – on and hands-on experiences: Japan and Finland teaching and learning models.
12. Learners should be exposed to field excursions or visits to industries so as to have potentials to provide learners with real life experiences of what they learn in class.
13. Government at all levels should encourage science and technology education by providing the necessary financial and other resources to promote science and technology education.

Library and Information Science Education

There is evidence that a well–designed and effectively taught library and information science education programme has the capacity to improve and develop libraries and teachers in the profession. Successful teaching is a function of teacher content knowledge, pedagogical knowledge and pedagogical context knowledge. Teachers (Librarians) with limited knowledge may not be equipped enough to simplify aspects of contents so that learners can learn them with ease and also make the content interesting and relevant by relating it to real life context Mogari, Kriek, Stols and Ogonnaya (2009). This implies that one cannot be effective in teaching with some inadequacies. In other words, one cannot simply teach well what he/she does not learn well. Hence, teachers (librarians) with relevant qualification tend to be more effective in their teaching and cannot impact more positively on learners’ academic performance

and achievements. It is therefore postulated that quality science and technology teaching is a function of teacher's performance which in turn depends on teachers' ability and competency as well as the quality of a teacher education programme the teacher was subject to. It is argued that the quality of a teacher qualification depends on the quality of a teacher development programme. Hence, it is believed that less rigorous teacher (librarian) education programmes are most likely to produce inept and inefficient teachers (librarian). Thus, science and technology education for innovation and entrepreneurship will be fruitless unless teacher education is able to produce teachers and librarians who are competent enough to teach effectively in order to induce meaningful learning.

Conclusion

It is now quite evident that a knowledge economy that is informed by the extent of excellence in science and technology teaching and learning is really critical for sustainable national development and economic growth in the modern world. An appropriate science and technology education initiative striving at a conducive and healthy political and economic environment has the capacity to transform learners to be creative, innovative and lateral thinkers who develop new measure, improve means of production, and explore new opportunities and risk taking in order to find possible markets for their businesses. Science and technology also can transform learners to become more knowledgeable about their environments and to use their scientific experiences and to explore the available opportunities to change the amount for the better. Teacher education provides enabling opportunity to produce competent teachers and librarians to facilitate sound education in science and technology in order to produce innovative and entrepreneurial learners. A country with a well-endowed natural and human resources such as Nigeria should develop science and technology education programme that should promote innovation, creativity and entrepreneurship in its learners so that they can be self-reliant and self-employed thereby helping to eradicate or minimize unemployment in Nigeria.

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