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PHYSICS EDUCATION AND ENTREPRENEURSHIP PROGRAMME

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ABSTRACT

Entrepreneurship is reaching new areas in which the concept of business is more or less unfamiliar and remote. This paper focuses on the teaching, and learning of physics for development of entrepreneurship skills among students. The aim is to gain a deeper understanding of the entrepreneurship directed educational approach in a programme targeted at learners in physics. It examines the concepts of entrepreneurship and physics education for entrepreneurship. Problems facing the teaching of physics are highlighted and possible recommendations made. Promoting entrepreneurial skills in Physics education will, no doubt, give physicists from developing countries the attitudes and skills that they need to bring their innovations to the market place. It is therefore very imperative to start teaching Physics in schools to bring-out in our students creativity and innovations with which they are endowed with.

INTRODUCTION:

Physics is an underpinning discipline to other sciences, technology and engineering. It involves the study of interactions of matter at the fundamental level from subatomic to cosmic scales, including many materials and phenomena of great importance to human culture. The science of nature or of natural objects; that branch of science which treats of the laws and properties of matter and the forces acting upon it; especially that department of science which treats of the cause (as gravitation, heat, light, magnetism, electricity e.t.c) that modify the general properties of bodies, natural philosophy. Physics is pivotal to economic, intellectual, social and cultural development of a nation. Ajibade (1993) submits that education is a means by which any nation could permanently close the door to poverty and ignorance and at the same time opens that of

prosperity in terms of economic buoyancy, social advancement and civilization. Aghenta (1992) and Ajayi (1998) agreed that the primary purpose of education is to impact knowledge, skills

attitudes and ability to transmit certain values. The aim of education should therefore be to teach us rather how to think, than what to think - rather to improve our minds, so as to enable us to think for ourselves, than to load the memory with the thought of other men.

The concept of entrepreneurship

Many definitions of entrepreneurship can be found in the literature describing business processes. The earliest definition of entrepreneurship used it as an economic term describing the process of learning the risk of buying at certain prices and selling at certain prices. Early this century, the concept of innovation was added to the definition of entrepreneurship. This innovation could be process innovation, market innovation, product innovation, factor innovation and even organizational innovation. An entrepreneurship is therefore a person who perceives the (market) opportunity and then has the motivation, drive and ability to mobilize resources to meet it. Entrepreneurship, according to Onuoha (2007), is the practice of starting new organizations or revitalizing nature organizations, particularly new business generally in response to identified opportunities. Schumpeter (1950) defined an entrepreneur as a person who is willing and able to convert a new idea or invention into a successful innovation. The acts of entrepreneurship are often associated with true uncertainty, particularly when it involves bringing in something really novel to the world, whose market never exits.

Characteristics of an entrepreneur

Considerable effort has gone into trying to find the major characteristics of entrepreneurs. A vast literature studying the entrepreneurial personality found that certain traits seem to be associated with entrepreneurs.

- Mc Clelland (1961) primarily motivated by an overwhelming need for achievement and strong uses to build.|

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- Collins and Moore (1970) tough, pragmatic people driven by needs of independence and achievement. They seldom are willing to submit to authority.|

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- Bird (1992) mercurial, that is prove to insight, brainstorms, deceptions, ingenious and resourcefulness. They are coming opportunistic, creative and unsentimental.|

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Other characteristics of entrepreneur include:|

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- The entrepreneur has an enthusiastic vision, the driving force of an enterprise.|

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- The entrepreneur‘s vision is usually supported by an interlocked collection of specific ideas not available to the marketplace.|

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- The overall blueprint to realize the vision is clear, however details may be incomplete, flexible, and evolving.|

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- The entrepreneur promotes vision with enthusiastic passion.|

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- With persistence and determination, the entrepreneur develops strategies to change the vision into reality.|

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- The entrepreneur takes the initial responsibility to cause a vision to become a success.|
- An entrepreneur is usually a positive thinker and a decision maker.|

Advantages of entrepreneurship

Every successful entrepreneur brings about benefits, not only for himself/herself, but for the municipality, region or country as a whole. The benefits that can be derived from entrepreneurial activities include:

1. Enormous personal financial gain.

2. Self-employment, own bossing, offering job satisfaction and flexibility of the work force.

3. Employment for others.

4. Development of more Industries especially in rural areas or regions disadvantaged by economic changes, for example due to globalization effects.

5. Encouragement of the processing of local materials into finished goods for domestic consumption as well as for export.

6. Income generation and increased economic growth.
7. Health competition thus encourages higher quality products.
8. More goods and services available.
9. Development of new market.

10. Promotion of the use of modern technology in small-scale manufacturing to enhance higher productivity.

Physics education and entrepreneurship.

Physics education provides the knowledge and understanding about how the physical world works. Through training in physics, one develops within himself/herself the analytical skills required for problem solving and problem management. This is because physics learning is not just about facts but also the science process. The fundamental principle of entrepreneurship as a field of study is that it deals with the organization of knowledge in each and every subject in such a way that it commands more area of self-employment and job creation that is with systems of ideals and values that are not ordinarily treated as part of the normal curriculum. The function of entrepreneurial studies at the school level is to enable students to discover, whilst undertaking their normal/regular course of studies, what other relevant work experience, other than those in paid employment of government and other existing agencies, are going on in society or what additives or modifications can be done to existing agencies in our society for the betterment of all. Therefore, any teaching and learning of physics devoid of entrepreneurship gives far little thought to disorderliness of creative freedom, which calls for innovation and creativity. The essence of physics education is problem-solving. Physicists are very good at solving problems, real and imaginary (that is, even when it is not clear what the problem is).

The essence of physics education and entrepreneurship programme is;

1. Problem identification.
2. Problem modification.
3. Problem solving.

The result is physicists are empowered not only with excellent training and the problem-solving skills needed to prosper in high-Tec businesses, but to use their creativity and innovative minds to strike out on their own in an innovative business venture. Promoting entrepreneurial skills in physics education is designed to give physicists from developing countries the attitudes and skills that they need to bring their innovations to the market place. It is therefore very imperative that physics should be taught in schools to bring out in learners innovations and creativity, as earlier stated that education should teach us rather how to think, than what to think-rather to improve our mind, so as to enable us to think for ourselves than to load our memory with the thought of other men.

Problems facing the teaching of physics for entrepreneurship

Many problems facing the teaching and learning of physics have been identified by scholars. Some identified problems are;

1. **Physics Curriculum**: Many school science curriculums are relatively static and remote from exciting contemporary developments, and unrelated to important contemporary issues such as medicine, energy and the environment. (Hussaini, 2008).

2. **Poor Teaching Methods**: Science teaching, as observed by scholars, do not encourage, to any appreciable and significant extent, the development and sustenance of process skills, among science students in general and among physics students in particular.

3. **Inadequate Training of Teachers**: For a physics teacher to effectively teach in a way that will lead to the development of desirable level of techno-scientific literacy and creativity, he/she must be well-groomed, be of sound knowledge in physics and he/she must obtain the relevant professional teaching qualification(s) along with required specialization knowledge of instructions.

4. **Inadequate Laboratory Facilities:** Physics, being a physical science, requires a great number of experiments and demonstration, for its concepts to be fully understood and for creativity and innovations to be geared in intending students but apparatus/equipment for the required experiments and demonstrations are just not there.

5. **Lack of Instructional Materials**: Instructional materials specifically designed to aid the teaching of physics in order to remove ambiguity are scarce. This has made physics to be labeled as a difficult, dry and dull subject. Such perceptions of physics appear universal, which has led to low enrolment of students in the subject.

6. **Lack of Basic Social Amenities**: Without basic amenities, innovations and creativity cannot come from the mind. In other words, an innovative and creative mind is definitely not an hungry mind or a mind deprived of good shelter and health facilities. Lack of these basic social amenities makes the mind to be unsettled and hence blot-out innovation and creativity thought from the mind.

Recommendations:

- Bajah (1975) observed that for any curriculum development with an ambition of positive by changing the society to be successful. A number of factors are agent of change. Such|

  factors include the universities, the parents, the teachers and the government. For instance, University physics department can organize a physics curriculum developments, with physics scholars providing academic leadership, those in education can give guidance in the methodology to be adopted while secondary school teachers can form the link between the project and the students who are consumers.

- The methods of teaching physics should be activity-oriented. It is widely accepted among physics educators that physics should be taught using methods such as guided-discovery, demonstration, laboratory, inquiry and project methods among others. The use of these methods is now fully recognized as being potent in physics teaching. The usage of these methods should therefore be enforced on physics teachers.|

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- The training programme of a prospective physics teacher should be expanded to allow more sufficient exposure to relevant subject matter content and to include existing innovation and creative opportunities the society can gained from each subject matter content.|

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- Improvisation should be encouraged among physics teachers and students for inadequate laboratory facilities and lack of instructional materials to be resolved. Improvisation is the practice of acting, singing, talking and reacting in response to the stimulus of one's immediate environment and inner feelings. This can result in the invention of new thought patterns (ideas), new practice, new structures or symbols and/or new ways to act.|

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- Provision of basic social amenities, Access to uninterrupted electricity, all-encompassing good health programme and government policies that would boost the standard of living of the generality of people would no doubt gear-up people towards innovations creativity and hence entrepreneurship.|

Conclusion

The essence of physics education is problem-solving. Physicists are very good at solving problems even when it is not clear what the problem is. Promoting entrepreneurial skills in physics education is designed to give physicists from developing countries the attitudes and skills that they need to bring their innovations to the market place. It is therefore very imperative to start teaching physics in schools to bring out in our students creativity and innovations with which they are endowed with.

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