



Understanding and Acquisition of Entrepreneurial Skills: A Pedagogical Re-Orientation for Classroom Teacher in Science Education

Sunday Adeniyi ADEYEMO¹✉

¹Dr., University Of Lagos, Department of Science and Technology Education, Akoka-NIGERIA

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ABSTRACT

The understanding and acquisition of entrepreneurial skills, most especially in teacher education is a minimum requirement for a competent teacher. This paper gives illumination of basic concepts, procedures, stages and essential indices for acquiring entrepreneurial skills in globalised teaching enterprise by teachers and students alike. It also provides justification for inclusion and acquisition of entrepreneurial skills in teacher education and the essential pedagogical strategies that can be used by classroom teachers. This will ultimately promote employability of science education students in globalised economy.

Keywords: Understanding Entrepreneurial Skills; Acquisition of Entrepreneurial Skills; Pedagogical Re-Orientation for Science Teachers.

INTRODUCTION

Skill as basic ability is the means by which man adjust to life. A person's attitude and work functions are required and necessary antidotes suggesting the suitable skills performance and acquisition of same by going through a given work sample. In the work place, skill is what the workers give in exchange for numeration. If the skill (or the cluster of skills popularly referred to as aptitudes) given is satisfactory, the worker gets satisfaction and the employer gets satisfactoriness in correspondence. This process, if sustained culminates in promotion, retaining and prolonged tenure that leads to productivity (Lofquist & Darwist, 1967; Adeyemo, 2003).

On retirement from active working life, man's repertoire of skills will no longer be relevant to help him to adjust to life. He needs new skills on how to enjoy his leisure and adjust in his new way of life. This situation is the same for a handicapped person, a widow or indeed any person whose way of life has changed radically. Hence man's rehabilitation in these contexts requires new skills with special consideration to his aptitudes and work functions. In this case of youth, whole adjustment in the world of work will rest solely on

✉ Corresponding Author email: doc_adeyemo@yahoo.com

skill developed and used first at school and later at work; the economic, moral and political time of the nation will in time to come and depend on it and these will from time to time determine its survival (Lofquist & Darwist, 1967; Adeyemo, 2003).

In a classroom situation, skill is the ability to perform some tasks creditably. Up to a point, the more practice in the doing of specific task the faster and better they can be done. It is associated with know-how while speed and accuracy are some of its traits and characteristics. Children who love to paint with crayon and water color often develop unusual perspective and excellent representation of nature. McCarthy (1972) has identified six scales and eighteen skills that can be sorted grouped to describe various aptitudes in children for placement, when the promotion and remediation is a highly treasured experience which every good teacher must possess.

Acquisition and reinforcement of skills and aptitudes through science laboratories and workshop practice and other curricular and extracurricular activities represent the most natural ways of stimulating science education and real life work which lead to high productivity.

These considerations underscore the need to focus skill development and assessment in our teacher education and in-service training programmes, more especially in the science based teaching subject areas of physics, chemistry, biology, integrated science, agricultural science, introductory technology, wood work, metal work, electrical electronics, home economics, clothing and textiles etc.

This paper therefore attempts to explore briefly the concepts of skills, entrepreneurial skills and how they are related with special considerations of their acquisition and roles in science teacher education and society at large.

DEFINITION OF ENTREPRENEURIAL SKILL

Skill is thought of as a quality of performance which does not depend solely upon a person's fundamental, innate capacities but must be developed through training, practice and experience. Although skill depends essentially on learning, it also includes the concepts of efficiency and economy in performance. Modern concepts of skill stress the flexibility with which a skilled operator reaches a given end on different occasions according to precise circumstances. However, it must be reiterated that even though basic human capacities are not sufficient to produce skills, they form the necessary basis of their development; skills represent particular ways of using capacities in relation to environmental demands, with human being and external situation together forming a functional system.

There are many fields on what make someone an entrepreneur and what an entrepreneurial skill is. An entrepreneur can be defined the one who organizes, manages and assumes the need of a business enterprise. It can be defined as a person who have decided to take control of his/her future and becomes self employed whether by creating his own unique business or working as a member of a team at a multi level vocation. He is a person who has possession of an enterprise or venture and assumes significant accountability for the inherent risks and the outcome. He is an ambitious leader who combines land, labour and capital to create and market new goods or services (Stephen et al., 1991)

Therefore, entrepreneurial skills are skills needed to have to succeed in business, most especially in teaching. Entrepreneurial skills are the basic skills necessary to enable you start, develop, finance and succeed in your home enterprise.

Surprisingly, intimately related to classroom activities as the concept of skill may be and necessary as its measurement, assessment and general evaluation may be to the affairs of the school system, little is done about it in science teacher education while its records

are seldom kept in continuous assessment in schools. Whereas, the national policy on education (FME, 1981) enjoins teachers to make instruction concept-centered, activity based and work related. This fact underlines the needs to focus on acquisition of entrepreneurial skills in school instruction for the benefit of school and society.

When examining the vast literature on skills, various definitions of entrepreneurial skills emerge. Here are some samples:

Entrepreneurial skill can be defined as the ability to create something new with value by devoting the necessary time and effort, assuming the accompanying financial, psychic and social risks, and receiving the resulting rewards of monetary and personal satisfaction and independence (Hisrich & Peters, 2002).

Entrepreneurial skill is the ability to of an individual to exploit an idea and create an enterprise (Small or Big) not only for personal gain but also for social and developmental gain (Olagunju, 2004).

Formal descriptions/definitions characterize entrepreneurial skills as ability to have self-belief, boldness, tenacity, passionate, empathy, readiness to take expert advice, desire for immediate result, visionary and ability to recognize opportunity (Salgado-banda, 2005).

Kilby (1971) states that the array of possible entrepreneurial skills encompasses the perception of economic opportunity, technical and organizational innovations, gaining commands over scarce resources, taking responsibilities for internal management and for external advancement of the firm in all aspects (of teaching enterprise)

ACQUISITION OF ENTREPRENEURIAL SKILLS

Two fundamental issues are raised when a new skill is to be acquired. The first is the conditions which promote acquisition and the second is the change that will occur when the skill is acquired. The initial conclusion of early researchers was that skill is best acquired through S.R learning theory proposed by Pavlov and Thorndikee “But recent thinking is that such a theory would predict the development of relatively stereotyped chain of response instead of the flexible pragmatic behavior that characterizes skilled performance (Legge, 1970). Pragmatism in skill learning demands that organisms more often learn guiding principles and programmes rather than specific responses. The stimulus response theory no doubt, provides the best description of learning in simpler organisms but in an emphasis on planning and strategy would appear more appropriate”. When an adult human being sets out to learn a new skill, he usually begins with a communicable program of instruction. Another person either verbally or by exemplification, communicates what he is supposed to do. Valid as the argument that mere knowledge of strategy does not guarantee successful performance a learner of a new skill does not jump into operation without first receiving the necessary verbal instruction. Skilful elaboration and execution of the instruction serves to get the act safely done. The instruction, perhaps given in bits, units, modules or stages, must be fused together to form a skilled performance.

To acquire an entrepreneurial skill, a hierarchy of behavioral units needs to be constructed. This idea was pointed out as far as 1897 by Bryan and Harter (Rae, 2007)

when they demonstrated the successive levels of skill involved in telegraphy. The rate at which skill is acquired is a function of knowledge of result i.e. feedback (Holding 1965). The feedback can be intrinsic or artificial with the artificial being either concurrent or terminal. The concurrent and the terminal feedback can be immediate or delayed with each being either verbal or non verbal.

The process of acquisition and development of entrepreneurial skill is concerned with four main stages and these are (Pleshette, 2009):

1. To objectively analyze and identify the current and foreseeable skills needs to the business, in terms of management, administrative and technical skills and the relative importance of these.
2. To identify the entrepreneur's own personal goal and objectives and accurately analyze and evaluate his or her own skills and resources in relation to these.
3. To produce a realistic personal development plan for the potential entrepreneur.
4. To monitor the on-going performance of the entrepreneur once the business has started and progress made towards developing the new skills that had been previously identified as necessary for the success of the business. This applies both to the entrepreneur's personal needs and to the process of assisting employees to develop new skills that will also benefit the business.

TEACHER AS AN ENTREPRENEUR IN SCHOOL ENVIRONMENT

It is important for any one preparing a business or an enterprise to remember that he should not just look at those skills which are needed just only in the classroom setting but also that which will be required for societal growth at large. Hence for a teacher to operate successfully as an entrepreneur in teaching enterprise, the following entrepreneur traits/skills are essential.

- He must have requisite technical knowledge and expertise.
- The wisdom to seek out and listen to the advice of those who know what he/she doesn't know.
- Ability to learn from his mistakes.
- Self discipline.
- Ability to make quality decision: The talents to analyze complex situation and draw conclusions that will make the business succeed.
- Hard work: being capable of doing the work and enjoying it.
- Concentration: sticking it out through distraction to get the work done.
- Technical ability: the expertise to produce the goods and services of your business.
- Communication skills: the ability to express yourself and to understand others so that ideas can be shared.
- Motivation: the mental and physical drive to succeed, to accomplish chosen tasks on your own terms.
- Organizational skills
- Decision making skills
- Financial skills
- Students management skills
- Publicity/marketing skills
- Supervision/management skills

From the ongoing therefore, science teacher must possess the following must-have

skills to function properly as an entrepreneur and thereby developing to this globalized education market that is highly competitive and ever changing.

The science teachers will need a broad array of entrepreneurial skills to succeed in today science education market. They must possess basic skills necessary to enable them function effectively and thereby increase the employability level of their school products. There are a number of qualities and skills they need to have, including personal attributes, educational skills, business skills and management capabilities. Why they may not have all of them right now, there are five basic skills they really must have to function effectively as an entrepreneur in and outside the school environment. These five skills are:

- *Sales and marketing skills*: they are the most important skills teachers must have in their day to day activities. They must be keen to think on how to reach their audience using the best teaching approach and the organization who will eventually employ their products. This entails understanding the concept of marketing in changing the perception of their students towards science education as a big enterprise.
- *Financial of know how*: the teachers should develop their ability to make money as teaching is a big business. Therefore the most important skill he must have is ability to handle money well. Hence, the teacher should teach the students how best to be self employed to the best of their ability.
- *Self motivation skill*: as an entrepreneur, the teacher does not have the luxury of the bosses to tell him what he needs to be done. He should be motivated and see himself as manager of his class and resources at his disposal. He needs to be smart enough to know when he needs to go ahead and when to stop his day to day activities. Therefore science teachers must have the extra drive and commitment to ensure that he is taking necessary steps to make his dream a reality as a manager of a teaching enterprise.
- *Time management skill*: the ability to plan your day and manage time is particularly important for a school business. Simply put, science teachers must be a good time manager and prioritize task as an effective entrepreneur.
- *Administrative skills*: if you can hire an assistance that will organize your office space, file your papers and mails, then you are lucky. However, most start up entrepreneurs cannot afford such luxuries. Hence as a science teacher you need to possess a great deal of administrative skills to succeed as a manager of human resources.

SCIENCE TEACHERS AND ENTREPRENEURIAL SKILLS

The impact of modern science in the society and business world has raised the problem of acquainting science teachers/students with the social implications of science teaching. The science teachers of modern world need to understand and appreciate the dependence of a modern society in science and the changes in the social structure that have been brought about by the achievement of science and technology. They should not only be able to appreciate and wonder at the modern marvels of science in business world but should also understand the social use of entrepreneurial skills in their day to day science affairs in the classroom, outside the classroom and in the society at large. This in a nut shell is what a science teacher can do and must do with entrepreneurial skills. The science teachers are not necessary to open schools or any business related to science education but need to understand and acquire the basic entrepreneurial skills that will make them function effectively in the school setting (Das, 2006).

Of course, teaching science is a dynamic enterprise and so any teaching procedures centre around three pivotal factors; the pupils, the teachers and the subject. According to (Adeyemo, 2003; Grayson, 1997; Ivowi, 1993, Nneji, 1995), in science teaching

enterprise/ business, the raw materials are the pupils (science students), the factory is the school environment, the teachers are the managers/entrepreneur of resources using a specified blue print (science curriculum). The interaction among these three major factors justifies why the science teacher must possess requisite entrepreneurial skills that will facilitate transactions in the classroom business climate. The outcome is to bring out a refined and disciplined product (i.e. science graduates) at any level. Based on this, science teachers need some essential entrepreneurial skills that will increase their efficiency and effectiveness in knowledge delivery and management of resources in the school environment. These include: instructional leadership skills, management skills, communication skill, collaboration skill, vision development skills, change management skills, analysis skills, process skills, evaluation skills and parsimony/economy skills.

Also there is a little debate about the fact that good science teachers must also be a good manager of resources in the learning environment- hence, there is an urgent need to ensure they possess minimum entrepreneurial skills to enable them function effectively in the classroom, laboratories and general school settings. Again, with the acquisition of entrepreneurial skills, science teachers will know more about finance administration and be able to navigate successfully through difficult political waters filled with competing interests and demand for resources especially in Nigeria (Adeyemo, 2003; Yager, 1996; Nwosu, 1995)

What are the pedagogical strategies needed to promote entrepreneurial skills in teacher education?

PEDAGOGICAL STRATEGIES REQUIRED IN PROMOTING ENTREPRENEURIAL SKILLS IN SCIENCE EDUCATION

In the journal of psychology of teaching several pedagogical strategies could be used but in this article, pedagogical strategies are discussed. These include

- **Classroom Assessment Techniques (CATS):** Odubunmi (1983), stresses the use of ongoing classroom assessment as a way to monitor and facilitate students' entrepreneurial skills. An example of a CAT is to ask students to write a "Minute Paper" responding to questions such as "What was the most important thing you learned in today's class? What question related to this session remains uppermost in your mind?" The science teacher selects some of the papers and prepares responses for the next class meeting.

This strategy if well utilized is capable of developing entrepreneurial skill such as risk taking, as it will empower student to try new methods as opposed to the traditional approach they are used to in learning situations. This is because the use of novel teaching approaches such as programmed instruction in developing countries such as Nigeria is risk taking. This is because there is no guarantee of appreciable success most especially as there is no regular power supply, acute water shortage and so on.

- **Cooperative Learning Strategies:** The proponents of this strategy argue that putting students in group learning situations is the best way to foster the development of entrepreneurial skills. "In properly structured cooperative learning environments, students perform more of the active, entrepreneurial skills with continuous support and feedback from other students and the teacher" (Okebukola, 1984: 8).

This will invariably develop entrepreneurial skills in the teaching and learning of science in both teachers and students by giving them ample opportunity to seek out wisdom from their colleagues and to listen to the opinions of those who know some basic

science concepts and principles. Again it will develop in them ability to learn from their mistakes.

- **Case Study /Discussion Method:** this approach involves a science teacher presenting a case (or story) to the class without a conclusion. Using prepared questions, the teacher then leads students through a discussion, allowing students to construct a conclusion for the case. This strategy will develop entrepreneurial skill in science teachers and their students as it will give them opportunity to: evaluate all reasonable inferences, consider a variety of possible viewpoints or perspectives, remain open to alternative interpretations, accept a new explanation, model, or paradigm because it explains the evidence better, is simple, or has fewer constituencies or covers more data, accept new priorities in response to a re-evaluation of the evidence or reassessment of our real interests and do not reject unpopular views out of hand.

- **Using Questions:** this strategy identifies ways of using questions in the classroom:
 - *Reciprocal Peer Questioning:* Following lecture, the teacher displays a list of question stems (such as, "What are the strengths and weaknesses of..."). Students must write questions about the lecture material. In small groups, the students ask each other the questions. Then, the whole class discusses some of the questions from each small group.
 - *Reader's Questions:* Require students to write questions on assigned reading and turn them in at the beginning of class. Select a few of the questions as the impetus for class discussion.

- **Conference Style Learning:** The teacher does not "teach" the class in the sense of lecturing. The teacher is a facilitator of a conference. Students must thoroughly read all required material before class. Assigned readings should be in the zone of proximal development. That is, readings should be able to be understood by students, but also challenging. The class consists of the students asking questions of each other and discussing these questions. The teacher does not remain passive, but rather, helps "direct and mould discussions by?

- Posing strategic questions and helping students build on each others' ideas" (Grayson, 1997).
- **Use Writing Assignments:** Screen (1976) sees the use of writing as fundamental to developing skills. "With written assignments, an instructor can encourage the development of dialectic reasoning by requiring students to argue both [or more] sides of an issue.
- **Dialogues:** Odubunmi (1983) identify two methods of stimulating useful discussions in the classroom:
 - *Written dialogues:* Give students written dialogues to analyze. In small groups, students must identify the different viewpoints of each participant in the dialogue. Must look for biases, presence or exclusion of important
 - Evidence, alternative interpretations, misstatement of facts, and errors in reasoning. Each group must decide which view is the most reasonable. After coming to a conclusion, each group acts out their dialogue and explains their analysis of it.
 - *Spontaneous Group Dialogue:* One group of students are assigned roles to play in a discussion (such as leader, information giver, opinion seeker, and disagree). Four observer groups are formed with the functions of determining what roles are being played by whom, identifying biases and

errors in thinking, evaluating reasoning skills, and examining ethical implications of the content.

- **Ambiguity:** Scott (1998) advocates producing much ambiguity in the classroom. Don't give students clear cut material. Give them conflicting information that they must think their way through.

The usefulness of each method under each of the groups will depend on the teacher's ability to make appropriate selection for a lesson topic. Generally, the following factors should guide the science teacher when choosing a method for a lesson.

- The experience and competency of the teacher.
- The previous experience, maturity and ability of the students.
- The availability of the teaching aids, instructional materials and equipments.
- Time available for preparation and for workshop practice.

However, the teachers should master the purpose which each method serves in a learning situation in order to know when best to employ each.

CONCLUSION

Understanding and acquisition of essential entrepreneurial skill are necessary strategies and tools in science teacher education and these will improve stimulating factors for the development of managerial competencies in teachers. Nothing in life is more important to an individual than developing the key leadership and personal management skills that are keys to being an entrepreneur in teaching enterprise. Teachers as decision makers should understand while students have had problems in being entrepreneurial and what economic, educational and political changes in order to foster the development of entrepreneurial skills of students. Students in schools have to realize that in order to succeed in the work places of the future; they have to prepare themselves for the entrepreneurial path ahead regardless of their chosen discipline in teacher education colleges or faculties. In effect, teachers have to be able to find out for themselves whether they act entrepreneurially, where their strengths and weaknesses regarding entrepreneurial skills are and what they themselves can do to improve them in globalised teaching enterprise. This will automatically increase the employability level of our products in science teacher education colleges and institutions.

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