INTEGRATION OF SOFT SKILLS INTO SCIENCE EDUCATION FOR SOCIO-ECONOMIC AND POLITICAL RECONSTRUCTION IN THE 21ST CENTURY NIGERIA

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Abstract

The goal of science education is the development of mental, physical, and social competencies required to promote entrepreneurship and career opportunities for socio-economic and sustainable development in the 21st century. The exploration of science process skills should be harnessed with soft skills to produce proficient, and skilled graduates who can utilize the opportunities gained to succeed in careers and ventures. This paper therefore discusses the process skills and entrepreneurship opportunities in some selected concepts in sciences, chemistry, and computer science, as well as the advanced soft skills required to accomplish any chosen enterprise. Promoting soft skills right from the science interactive classrooms should develop productive individuals who will be employable, self-reliant, and self-employed and, in the long run, contribute to national economic growth. The challenges in the course which include inaccessibility to capital, inadequate technical know-how, lack of or poor infrastructural facilities, and inconsistency in government policies should be overcome to triumph. It is therefore recommended that career or entrepreneurship prospects in science curriculum, development, and implementation should be strongly emphasized, and the Nigerian educational system should be designed to produce more job creators rather than job seekers, there should be intense clamour and emphasis on capacity building in human resources, ICT software development with digital content creation, and the government should ensure stable economic policies.

Keywords: 21st century, science education, socioeconomic, soft skills, political reconstruction

Introduction

The term 21st Century Skills refers to a broad set of knowledge, skills, work habits and character traits that are believed by educators, school reformers, college professors, employers and others to be critically important to success in today's world. 21st Century Skills are also referred to as the skills that are required to enable an individual to face the challenges of the 21st Century world that is globally active, digitally transforming, collaboratively moving forward, creatively progressing, seeking competent human resources and adopting changes. The 21st-century skills are essentially the outcome of experiential learning that is imbibed through observing, understanding, practicing and experiencing. Kuckertz & Wagner (2010), and Wagner (2010) in UNESCO 2010 stressed that students need seven survival skills to be prepared for the 21st Century life, work and citizenship. They are: (i) critical thinking and problem-solving skills, (ii) Collaboration and Leadership Skills, (iii) Agility and Adaptability Skills, (v) Effective oral and written communication skills, (vi) Accessing and Analyzing Information, (vii) Curiosity and Imagination.

Components of 21st Century Skills

Based on the historical development of the 21st Century Skills, it can be stated that 21st Century Skills broadly consist of three main skill sets or **3Ls- L**earning Skills, **L**ife Skills and **L**iteracy Skills.

1. Learning Skills- are required for the acquisition of new knowledge. It includes the **4Cs** such as **C**ritical Thinking, **C**reativity & Innovation, **C**ollaboration and **C**ommunication.
2. Life Skills- are skills that help in creating and gaining new knowledge through reading, media, and digital resources. It includes **I**nformation Literacy, **M**edia/Digital Literacy and **T**echnology Literacy.
3. Literacy Skills- are skills required for successfully leading everyday life. It includes **FLIPS** such as **F**lexibility and Adaptability, **L**eadership and Responsibility, **I**nitiative and Self-Direction, **P**roductivity and Accountability**, S**ocial and Cross-Cultural interaction, according to Intuitive of Academic Unit (2020).

Learning is complete and holistic only when a student can effectively perform and fulfil his/her responsibilities and duties towards self, school, family, society and above all, the nation. The 21st-century skills are key to the empowerment of individual children and adolescents to deal with the issues and concerns related to their lives as stressed by OECD (2013a). These skills are so important for the development of their independence in home, school and community environments. The Organization for Economic Cooperation and Development (OECD) further justifies the need for 21st-century skills as follows:

- Because of rapid economic and social change
- Schools have to prepare students for jobs that have not yet been created
- Prepare students for technologies that have not yet been invented, and to
- Prepare students for the challenges that have not yet known will arise.

Issues and Current State of Affairs

It is an undisputed fact that there are abundant resources in Nigeria that are untapped by human and natural resources. Despite these opportunities, Nigeria is one of the poorest and underdeveloped countries in the world. Currently, the unemployment index for youth according to the National Bureau of Statistics (NBS), as of Q1 of 2023 is 42.59%. However, the fundamental idea that was set to guide the educational system of Nigeria is premised on the principle that education is to teach individuals how to think and act and to develop and perform skills of their choice for self-development, benefit and be relevant to the immediate society. The current state of affairs shows that teeming graduates are unmatched with available job opportunities. This is at variance with the aims and objectives of Nigerian Education as contained in the National Policy on Education. This unwelcomed trend of mass unemployment is attributed to ineffective methodology by teachers, inadequate content, and inadequate equipment and materials in our laboratory. Our curriculum should primarily prepare Nigerian graduates with some requisite skills to function well in the dynamic & transition economy. There is a need for the production of both technical and entrepreneurial skills, such that individuals can play a critical role in the modern day's knowledge-driven economy.

Challenges

- Lack of financial capability by the researcher to develop the innovation to market place.
- Market factor: Generally low patronage for locally made goods/technologies. Nigerians prefer foreign goods and technologies to locally made ones.
- Low level of funding of R&D activities in Nigeria.
- Political Instability and unfavourable policies.
- Macroeconomic government policies.
- Weak linkage between academia and industries.
- Transparency and accountability of government.
- Inaccessibility to capital.
- Inadequate technical know-how.
- No government regulations to protect the indigenous entrepreneurs in the country.
- Lack of appropriate legal framework for the protection and commercialization of innovations.

Opportunities

According to Bolarinwa in Ezendu (2008) and Jongur et al, (2009), great opportunities could also be attached to 21st-century skills among which included:

- Creation of jobs and wealth to reduce poverty, and improve the national economy.
- Development of job skills
- Opportunities for skills acquisition.
- Promotion of entrepreneurship culture.
- Effective utilization of local resources
- Reduction of the unemployment rate
- Promotion of science and technology as well as technology transfer.
- Provides for capital formation.

Features of 21st Century Skills

Critical Thinking & Problem-Solving: Critical Thinking is the capability of objective analysis of information and includes the following qualities such as fairness and open-mindedness, activeness and being informed, willingness to question or to entertain doubts, being independent, recognizing and assess values, peer pressure and the media influences, while **Problem Solving** is the skill of identifying the relevant piece of information when faced with a mass of data, discarding information that may not be useful to give new information and finally, relating one set of information to another in a different form by using experiences, relating new problems to ones we have previously solved. Both skills enable the students to think holistically, develop problem-solving skills, make them to reason accurately, judge and make informed decisions (Olugbemi, 2017).

Creativity & Innovation: These are the skills to explore and create fresh ways of thinking. **Creativity** refers to a new way of seeing or doing things and includes four components: such as fluency (generating new ideas), flexibility (shifting perspective easily), originality (conceiving of something new), and elaborating (building on others) ideas. **Innovative Skills** mean skills for thinking creatively to develop something new, unique, improved or distinctive.

Collaboration: This is the ability to effectively work together with others. This skill involves working together while taking action respecting others' needs and accepting the finals. Collaboration helps to develop interest and fun in the teaching-learning process. It effectively broadens the cultural, social and environmental concerns better.

Communication: This refers to the ability to express oneself appropriately, opinions, desires, needs, apprehensions and so on, verbally and non-verbally.

Information Literacy, Media Literacy & Technology Literacy: These skills involve the ability to access information (traditional or digital), media and technology, to understand and critically evaluate different aspects of content and information and to create and communicate effectively.

Flexibility and Adaptability: Flexibility refers to a person's ability to change his actions and steps taken according to a new situation, and efficiently face an unprecedented situation, without compromising on ethics and values while **Adaptability** can be defined as creating modifications or changes in oneself to suit the new environment. For students, these can be understood as the skills needed to be flexible and adaptive to the situations around them and find the best possible solution to go forward despite adverse conditions.

Leadership and Responsibility: Leadership is the ability to lead a team and be capable of effective team management about real-world challenges. These skills teach a child how to: support the development of key personal qualities such as perseverance, being committed and responsible, resilience and self-confidence and how to foster a commitment to life-long learning. **Responsibility/Citizenship** means being a good and effective/ sensitive citizen. Be aware of the important social and national issues that may have an impact on their daily lives both as human beings and as students, be aware of the fundamental duties and rights that embed the core democratic values of a nation and strive to live by them.

Initiative and Self-Direction: Initiation skill involves the ability to begin a task independently. It helps the child to build his/her path of development. Self-direction is a skill to work with integrity on self-motivation and taking initiative.

Productivity and Accountability: Productivity in the student can be understood as the fulfilment of any task within a given period while **Accountability** can be understood as feeling responsible for any task done**.** Developing these skills in a student helps him/her to work effectively and also makes him/her reliable for his/her actions.

Social and Cross-Cultural interaction: These are the skills to communicate, and work collaboratively and effectively in diverse social and cultural environments.

Curriculum: Why a need for 21st-century skills inclusion?

There are four major and primary needs for soft skills in the modern world. They are the socio-cultural perspective, Economic perspective, Technology and Government policies.

1. Socio-cultural Perspective: As the global population continues to grow, migration, urbanization and increasing social and cultural diversity are reshaping countries and communities. In many parts of the world, variations and inequalities in living standards and life chances are widening, thereby resulting in conflict, instability and inertia, and intertwined with populist politics, eroding trust and confidence in the government itself.

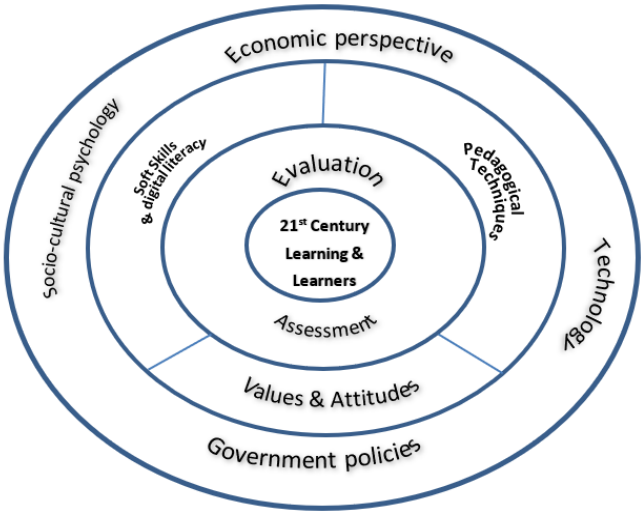
2. Economic Perspective: Scientific knowledge is for the creating new opportunities and solutions that can enrich our lives, while at the same time fueling disruptive waves of change in every sector, (OECD, 2013, 2015a, 2015b & 2017a). Unprecedented innovation in science and technology, especially in biotechnology and artificial intelligence, is raising fundamental questions about what it is to be human. It is time to create new economic, social and institutional models that pursue better lives for all. Financial interdependence at local, national and regional levels has created global value chains and a shared

economy, but also pervasive uncertainty and exposure to economic risk and crises. Data is being created, used and shared on a vast scale, holding out the promise of expansion, growth and improved efficiency while posing new problems of cyber security and privacy protection.

3. Technology Perspective: This gives students ample opportunities to explore the arts, and increase their communication and collaboration. With the advantage of technology, students can link, interact, and work together to solve problems online, and then improve their digital literacy skills, information processing and literacy, providing avenues for self-regulated or individualized learning. They become more proficient through this engagement with the spirit of self-efficacy or competencies in their career and ventures. However, for businesses and ventures to succeed in the current age, digital transformation is very crucial (OECD, 2017b).

4. Government Policies Perspective: The United Nations Education, Scientific, and Cultural Organization (UNESCO) has recommended a minimum of 26 per cent budgetary allocation benchmark for education. Despite this advocacy, most of the African countries, with no exception of Nigeria, still allocate far below the threshold suggested by UNESCO (Olugbemi, 2017). The government and higher institutions of learning can ensure high quality and standards without limiting autonomy or hindering innovation. If this agenda is met, the learners will be assisted in developing their creativity and critical thinking skills that are requisite to navigate the challenges and opportunities in the quick-changing world they live in as advocated by OECD (2017b).

Figure 1: *Conceptual framework for a realistic science education curriculum in the 21st century (Isijola, Alfred & Adebola).*



The 21st Century Skills and Global Needs

The Learning targets, as the heart of every discipline must be relevant and purposeful in the current digital age. The Targets as well should focus majorly on the following principles:

a. **Knowledge and Understanding:** The emphasis should be on the following: phenomena, facts, principles, concepts, laws and theories, vocabulary, terminology, textual conventions, application of chemistry, and scientific investigations.

b. **Innovative Teaching Strategies**: Innovative teaching strategies required in the 21st century are, problem-solving, e-learning, brainstorming, inquiry, laboratory teaching, and programmed

instruction, etc. which must be moderated by some factors such as level of technology know-how, nature of students, and psychological and technology usage.

c. **Skills and Processes:** These should include science process skills such as observing, measuring, drawing conclusions, hypothesizing, inferring, interpreting, predicting, building mental models, scientific thinking, scientific skills such as scientific investigation, and scientific methods; the 21st-century skills inclusion such as critical thinking, problem-solving, creativity and innovation, collaboration, communication, flexibility and adaptability, and so on), practical work and decision making.

d. **Values and Attitudes:** Scientific attitudes (such as curiosity, scientific attitudes, (creativity, open-mindedness, rationality, objectivity, skepticism, perseverance/determination, parsimony) interest in science, personal integrity, willingness to communicate and make decisions, commitment to safe practice, awareness of the limitations of science, awareness of the impact of chemistry, appreciate the importance of life-long learning, appreciation of the interrelationship of chemistry and other disciplines) development and fostering the skills in students.

e. Integration/Inter-relationship with other subjects: concepts should be explained as it is related to other disciplines such as enzymes and digestion rate, response system (neuron response mechanism and electrolyte nature of cells, foods and food tests) in biology, and acceleration mechanics and rate of reaction, nuclear physic and nuclear chemistry or radioactivity) in physics.

f. **Implementation:** The implementation focuses on the roles of the science (chemistry) teachers in the context**.** The teachers should be competent and qualified, grounded with adequate tools, and instructional resources/materials. They should be sponsored periodically to attend seminars, and workshops so that they will be well-informed about the current issues and developments in the subject. Teachers should be encouraged with grants to undertake chemistry research and should be skillful in the usage of modern technologies such as electronics, e-learning, simulation and so on. in the instructional delivery., should be facilitated with mobility to embark on field study, trips, and excursions regularly.

g. **Integration/Inter-relationship with other subjects:** Concepts should be explained as it is related to other disciplines such as enzymes and digestion rate, response system (neuron response mechanism and electrolyte nature of cells, foods and food tests) in biology, and acceleration mechanics and rate of reaction, nuclear physics and nuclear chemistry (radioactivity) in physics.

h. **Assessment and Evaluation:** Assessment tools such as questionnaires (for attitude, opinion, self-concepts, self-efficacy, and interest), achievement tests, skills achievement tests, and practical, innovation will be very helpful in developing entrepreneurship skills and competencies.

Table 1: *Entrepreneurship Skills and Opportunities that can be integrated into Science Education*

A. Chemistry Education	B. Computer Science Education
❖ Production of ethanol from palm wine, cassava, potatoes and other stem tubers ❖ Caustic soda production from cocoa and palm husks ❖ Starch production from yam, cassava and other starch foods ❖ Production of margarine from fats ❖ Production of sugar and salts from sugarcane extracts and seawater ❖ Production of pulp and paper from gmelina plants ❖ Production of school Chalk production from Gypsum & Kaolin, ❖ Production of slaked lime from limestone ❖ Production of fibres from plant and banana plant peels, etc ❖ Production of water treatment chemicals ❖ Laundry and toilet soaps such as detergents, black soap, toilet soaps, washing soaps etc ❖ Cosmetics production ❖ Drinking water production ❖ Production of Household chemicals such as disinfectants, bleaching solutions et cetera ❖ Toothpaste ❖ Shoe polish production ❖ Battery manufacturing ❖ Production of distilled water ❖ Bleaching agents from minerals ❖ Alum/coagulants from local resources(leaves) ❖ Bio-fertilizers from bamboo/rice husks ❖ Rodenticides (Rat poisons) from selected leaves ❖ Insecticides from plant extracts ❖ Production of herbicides from minerals and selected elements ❖ Production of matches from sulphur and other elements ❖ Production of Paints from local materials ❖ Production of indicators and pH paper from plant or flower extracts ❖ Production of perfumes ❖ Battery charging	❖ Web Designer ❖ Computer Repair Service Provider ❖ System Analyst ❖ Web Developer ❖ Game Developer ❖ Social Network Provider ❖ Search Engine Optimization Consultant ❖ Computer Cleaning Service Owner ❖ Computer Set-up Service Provider ❖ Computer Training Service Provider ❖ Computer Accessory Seller ❖ Smartphone Accessory Manufacturer ❖ WiFi Café Operator ❖ Pod Caster ❖ Desktop Publisher ❖ Social Media Manager ❖ Data Recovery Service Provider ❖ Domain Reseller ❖ Web Host ❖ Computer Backup Service Provider ❖ Computer Refurbishers ❖ YouTube Personality ❖ 3D Printer ❖ Tech Rentals Provider ❖ Tech Fair Founder ❖ E-commerce Seller ❖ Affiliate Marketer

Table 2: *Procedures for Inclusion of Soft Skills into Curriculum: Chemistry Education & Computer Science Education as Templates:* **Chemistry Education**

Contents: Students should be able to learn	**Historical & Description of the Processes Involved**	**Skills Required in their Application**	**Entrepreneurial Opportunities**
	Discovery that a continuous flow of electricity is generated when using certain fluids (electrolytes) as conductors to promote a chemical reaction between metals or electrodes. Invention of electric battery capable of mass production of light and power. Invention of rechargeable battery, based on lead-acid chemistry. Discovery of a carbon filament in an oxygen-free bulb glowed but did not burn up. Discovery that wires carrying an electric current attracted or repelled one another. Discovery that a copper disc can provide a constant flow of electricity when revolved in a strong magnetic field. Electrolysis of brine, formulation of laws that govern the electrolysis of aqueous solutions, Solvay process & production of industrial soda using CO_2, brine and ammonia	**Century Skills:** 1. Critical thinking 2. Problem solving skills, 3. Collaboration and Leadership Skills 4. Agility and Adaptability Skills 5. Effective oral and written communication skills 6. Accessing and Analyzing Information 7. Curiosity and Imagination. **Entrepreneurship Skills:** 1. Creativity 2. Open-mindedness 3. Critical Thinking 4. Discovery 5. Brainstorming 6. Intellectual honesty 7. Demonstration 8. Curiosity 9. Imagination **Process Skills:** 1. Experimentation 2. Classification 3. Communicating 4. Reporting 5. Hypothesizing 6. Observing 7. Inferring 8. Estimation 9. Measuring 10. Concluding **Job Competencies** 1. Be ICT literate 2. Mental ability 3. Guidance skills 4. Ability to be creative/innovative 5. Problem solving skills	Power and light generation: Mass production of portable power sources enabled a vast range of applications-from automobiles to radios. The nickel-metal hydride battery provided a high energy density and absence of toxic metals. Nowadays used in mobile phones and laptops computers. Exploring the electric light bulb to replace polluting combustion processes for mass lighting in homes, workplaces, and public spaces. Electric generators in both developing and industrialized countries have transformed vastly on transport, work and leisure. Electrolysis of brine was the starting point for the manufacture of organic compounds like solvents, pesticides and plastics.

	Amalgam as a restorative material, use of nitrous oxide and ether as general anaesthetics for dental extractions. Investigation on the cause of widespread brown staining of teeth (fluoride in drinking water) due to the absence of dental care. Discovery of aniline from benzene and aniline purple. Fermentation is caused by specific microorganisms which led to the formulation of the germ theory of diseases (wonder in providing the basis for biotechnology & anti-microbial chemotherapy). Discovery of vulcanization of natural rubber by heating with sulphur, treating cellulose nitric acid to produce plastics, Bakelite made from phenol and formaldehyde, synthesis of synthetic fibre, nylon, by co-polymerization of hexamethylene dioamine and adipic acid. The use of an adsorption column for the separation of plant pigments marked the birth of chromatography, then	6. Planning skills 7. High achievement drive 8. Practical experiences 9. Production skills 10. Communication skills 11. Income generation and self-empowerment 12. Human Relations skills 13. Competitive skills **Instructional Strategies** 1. Inquiry method 2. Practical activity based 3. Problem solving 4. Field trip/excursion 5. Guided discovery 6. Conventional/Lecture method 7. Science Technology Society 8. Demonstration method 9. Learner-centred method 10. Assignment/homework	The development of safe and effective materials for dental restoration and anaesthetic painful procedure. Water fluoridation and the development of fluoride – containing toothpastes have contributed to huge improvements in oral health. Development of dyestuffs Studies for microorganisms and the physiological effects of chemicals and work on the structural modification of natural products and synthetic chemicals. Finding applications in clothing, products from containers and appliance casings to non-stick pans, and thermal and electrical insulators. The pioneering studies by a range of scientists, including botanists, physicists and physical chemists, led to the development of extremely powerful sets of techniques for separating chemical species, identifying them and measuring their concentrations,

	developed into a family of 2- and 3-dimensional techniques involving combinations of gas, liquids and solid phases.		linking to an evolved analytical and separation sciences (In clinical and environmental sciences).

Table 3: *Procedures for Inclusion of Soft Skills into Curriculum: Chemistry Education & Computer Science Education as Templates:* **Computer Education**

Contents: Students should be able to learn	**Historical and description of the processes involved**	**Skills required in their application**	**Entrepreneurial opportunities**
Computer Hardware	Knowing the major parts or components of computer hardware	Ability to identify computer hardware and its functions	Selling of computer hardware
Computer Software	Knowing how to identify and write software and types of computer software	Ability to design a set of instructions, data or programs used to operate computers and execute specific tasks.	Sales of software such as Google, Firefox etc.
Computer Applications	A vital in a computer as it is an end-user program that enables the users to do many things in a system	Ability to design and develop a series of system software which is used to run in the operating system.	Enhancing productivity in various fields such as documents, spreadsheets, databases publications etc.
Developing problem-solving skills	Keeping ideas on track. Ideas always help much in improving the skills, gain more knowledge and more command over things	Ability to improve on problem-solving skills, by identifying, and defining the problem, examining possible solutions, acting on resolving the problem and looking for lessons to learn	Efficiently designing packages for problem-solving e.g., Avast, Norton, Microsoft Defender, etc. (Antivirus package)

Nexus of Science Education and Entrepreneurship

Science education has a crucial role to play in helping to find answers to various human and socio-economic problems as well as making society more scientifically literate. The science process skills which are mental tools are functional in the discovering and acquiring of scientific knowledge. It, however, includes conversion, making process, production, rebirth, and transfiguration, et cetera (Roger, 2003 & Jack, 2013). Entrepreneurship skills are significant for occupational survival skills, which are also equivalent to science process skills. They include; observation, classification, measurement, counting of numbers, recording, communication, predicting, hypothesizing, inference, experimentation, research, interpretation of data, controlling variables and generalizing (Valentino, 2000). These skills could further be grouped into three separate groups: Process skills, Reasoning skills and Critical Thinking skills. Process skills help gather information about the world. Reasoning skills help learners to make sense of the information they gather by fostering open-mindedness, curiosity, logic and a data-based approach to

understanding the world, Critical Thinking skills require students to apply information in new situations and in solving problems. The development of science process skills could lead to the acquisition of the skills that successful entrepreneurs use to start their ventures. Entrepreneurship skills are the basic skills necessary to enable individuals to start, develop, finance and succeed in their enterprises (Jain,2010).

Table 4: *Criteria for Definition of Entrepreneur*

Definitions & Attributes of Entrepreneurs	Criterion	Author/Reference
Perseverance, hardworking, autonomy, energetic, persuasiveness, flexibility et cetera	Orientation	Elemo, 2013
Assertiveness, insistence, creativity, forward-looking, critical thinking, innovation, continuity, preparedness, responsibility, open-mindedness, et cetera	Orientation	Steinhoff & Burgress,1993
Desired to achieve, hard work, nurturing quality, able to accept responsibility, reward-oriented, optimistic, excellent-oriented, an organizer, and money-oriented.	Orientation	Odo, 2001
Innovation, pro-activeness, risk-taking, autonomy & competitive aggressiveness.	Orientation	Lumpkin & Dess, 1996
Aggressiveness, analysis, defensiveness, futuristic, pro-activeness & riskiness	Orientation	Herath & Mahmood, 2013
Personality traits, skills, and knowledge that will make an entrepreneur perform his role successfully.	Competency	Man, Lau& Chan,2002
Requisite attitudes, values, beliefs, skills, knowledge, abilities, personality, wisdom, expertise (social, technical & managerial), mindset, and behavioural tendencies.	Competency	Kiggundy, 2002
Opportunity, relationship, conceptual, organizing, strategic & commitment competencies	Competency	Man, et al, 2002
Time management, communication, human resources management, marketing management, business ethics, social responsibility, leadership, decision making & financial management.	Competency	Inyang & Enuoh, 2009
The conviction that one can successfully execute the desired behaviour (successfully launch a business), is required to produce an outcome.	Self-efficacy	Bandura,1982
Initiation and development of new ventures.	Self-efficacy	Oyeku et al, 2015
Tending to become an entrepreneur later in life.	Self-efficacy	Segal, Borgia & Schoenfeld, 2005
Overconfidence in knowledge, prediction & abilities.	Self-efficacy	Heyward, Shepherd & Griffi,2006

Entrepreneurship in a clearer context is the process of becoming an entrepreneur. It is a process of creating something new with value through innovation with associated financial rewards. According to Oyeku, et.al. (2015), the following are the prominent features of entrepreneurship. The entrepreneurship traits occur naturally or can be developed; it is an innovative approach to running a business either large

or small, it entails dynamism and growth, it is driven by opportunities (rather than resources) which is need or market-driven, it also involves risk taking which are calculated, bearable, and would involve evaluation of each situation, risk factors envisaged, strategies to manage or minimize them, et cetera. Therefore, entrepreneurship-oriented teachers should not overlook students' potential in setting up business teams, embolden students to take risks in enterprising, understand the market and where technology can fit, and relate with entrepreneurs who have succeeded in businesses as role models.

Conclusion

The main focus of the inclusion of entrepreneurship skills and opportunities in the Nigerian school curriculum or educational system is to produce graduates who would be proficient, innovative, self-sufficient or self-reliant. Graduates who can explore careers, entrepreneurs and ventures to survive in society. To actualize this goal, learners should be exposed to skills-development endeavours or engagement for the realization of their competencies in the ever-changing world. The challenges of inaccessibility to capital, inadequate technical know-how, lack of or poor infrastructural facilities and inconsistency in government policies are the bottlenecks in attainment and should be overwhelming for businesses and ventures to thrive. Teachers in classroom interactive activities should match every concept with entrepreneurial opportunities that in the long run guarantee the students a bright fortune at the end of the teaching-learning adventure. The identified challenges can be overcome by the government's priority and investment in science education, imbibing the culture of solving national problems of socio-economic, security, food shortage, diseases and unemployment crisis.

Recommendations

The following recommendations are made:

- Leadership of academic institutions should provide architecture by championing entrepreneurship opportunities in academic disciplines.
- Creation of entrepreneurship culture with academic studies as well as providing opportunities for teamwork and the learners.
- The governments at all levels should support the academic institutions with funds to embark on innovation-driven programmes.
- Encouragement of research into entrepreneurship opportunities across related subjects and disciplines, most specifically chemistry.
- Symbiotic engagement or relationship between the academic institutions and industries.
- Learners should be encouraged to explore both theory and practice; and develop venture-creation skills and soft skills.
- Science exhibitions and fares can be organized through which materials produced shall be displayed, and assessed, and outstanding ones can be rewarded.
- Teachers and schools should help students to find markets for products produced. Doing this will motivate them to see the economic advantage.

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