



NIGERIAN ONLINE JOURNAL  
OF  
EDUCATIONAL SCIENCES  
AND TECHNOLOGY

NIGERIAN ONLINE JOURNAL OF  
EDUCATIONAL SCIENCES  
AND TECHNOLOGY (NOJEST)

nojest@unilag.edu.ng

**THEORY AND PRACTICE OF  
ENTREPRENEURIAL SKILLS IN INTEGRATED  
SCIENCE AS PANACEA FOR SUSTAINABLE  
DEVELOPMENT**

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**To cite this article:**

Agoro, A. A. & Ahmed, A. A. (2020). Theory and practice of entrepreneurial skills in integrated science as panacea for sustainable development. *Nigerian Online Journal of Educational Sciences and Technology (NOJEST)*, 1 (2), 91-98

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## THEORY AND PRACTICE OF ENTREPRENEURIAL SKILLS IN INTEGRATED SCIENCE AS PANACEA FOR SUSTAINABLE DEVELOPMENT

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<b>Article Info</b>	<b>Abstract</b>
<p><i>Article History</i></p> <p>Received: 012 March 2020</p> <p>Accepted: 21 June 2020</p> <hr/> <p><i>Keywords</i></p> <p>entrepreneurial skills, integrated science, theory, practical</p>	<p>Entrepreneurial skills are major indicators used to identify youths' ability to negotiate their existence within the labour market as employees or as self-reliant entrepreneurs by the creation of viable means of livelihood. Some of these skills include risk-taking, being creative and innovative. However, a seeming disparity between the theory and practice of entrepreneurial skills has been the focus of scholars' attention. Therefore, this study investigated the relationship between the theory and practice of entrepreneurial skills as taught in Integrated Science in Oyo state, Nigeria. Also, the study determined if gender differences existed between the theory and practice of entrepreneurial skills in Integrated Science. This study was ex-post facto research of survey type which involved the participation of 120 students. One research question was raised and answered using meanwhile only the hypothesis was tested at 0.05 significant levels using multiple regression. The instrument used was a researcher-designed questionnaire on the Entrepreneurial Skills Developed Assessment Questionnaire (ESDAQ). Findings of the study revealed that there was a significant difference in entrepreneurial theory and practical skills as taught in Integrated Science. The study concluded that the practice is central to the inculcation of the theory in Entrepreneurial skills acquisition. The study recommended among others that government should provide necessary laboratory equipment such as mass-spectrometer, ultraviolet-spectroscopy, infrared-spectroscopy, electric-oven, fume-cupboard etc. so as impact full practical skills to the students.</p>

### Introduction

Science education is currently undergoing transformational changes throughout the globe and one of these is a pedagogical shift from the transmission of philosophy of teaching to one where the learners actively construct scientific knowledge (Richard, 2017). Skill is thought of as a quality of performance that does not depend solely upon a person's fundamental, innate capacities but must be developed through training, practice and experience (Adeyemo, 2009). Although skills depend essentially on learning, it also includes the concepts of efficiency and economy in performance (Adeyemo, 2009). The word "entrepreneur" is derived from the French root 'entreprendre', meaning, "to undertake" (Bula, 2012). Skills are an enabler of a disruptor, and a disruptor can be regarded as an entrepreneur. An entrepreneur is an individual or a group who creates something new which could be a new idea, product, institution, market, or a new set of possibilities that changes the normative ways to something more unique and valuable (Heidi, Christopher, & Emma, 2018). An entrepreneur is a process that makes it Entrepreneurship.

Entrepreneurship is an individual's ability to turn ideas into action by a process that includes creativity, innovation and risk-taking, as well as the ability to plan and manage projects to achieve set objectives (European Commission, 2006). Therefore, entrepreneurial skills are skills needed and possessed by an individual to succeed in business. Entrepreneurial skills are the basic skills necessary to enable a person to start, develop, finance and succeed in a home enterprise (Adeyemo, 2009). Also, entrepreneurial skills 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 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 or definitions characterise entrepreneurial skills like the ability to have self-belief, boldness, passion, empathy, readiness to take expert advice, desire for immediate result, visionary and ability to recognize opportunity (Salgado-banda, 2005).

According to Adeyemo (2009), two fundamental issues are raised when a new skill is to be acquired. The first is the conditions that promote the acquisition and the second is the change that will occur when the skill is acquired. The initial conclusion of early researchers was that skills are best acquired through Stimulus-Response learning theory as proposed by Pavlov and Thorndike. But recent scholarship shows that such a theory would predict the development of a relatively stereotyped chain of response instead of the flexible pragmatic behaviour that characterizes skilled performance (Legge, 1970). Pragmatism in skill learning demands that organisms more often learn guiding principles and programmes rather than specific responses, thus, to acquire an entrepreneurial skill, a hierarchy of behavioural 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. Science process skills are the terminal skills for solving problems or doing science experiments (Richard 2017). These are skills that incorporate or involve the use of different basic science process (Rambuda & Fraser, 2004; Aziz & Zain, 2010; Ozgelen, 2012; Mutlu & Temiz, 2013). According to Padilla (1990), students cannot excel at skills they have not experienced or allowed to practice. Mastery of science process skills in Integrated can only occur after consistent practical sessions which can enhance entrepreneur skill. This will allow for the development of formal thinking patterns. Padilla (1990) further avers that students need multiple opportunities to work with these skills in different content and context areas.

Acquisition of entrepreneurial skills through the theories of integrated science is significant to a developing country like Nigeria. Even though many studies in entrepreneurial skills have been done in the last three decades in general, there is a paucity of studies that have investigated the link between the theory and practice of entrepreneurial skills in integrated science in Oyo state, Nigeria. Acquiring entrepreneurial skills in integrated science is necessary especially in this time of unemployment.

There is a gap between theory and practice. The theoretical perspectives should be able to translate into action capable of solving the challenge of unemployment and over-dependence on the developed nations of the world. Currently, the demands in the world of work are constantly and rapidly changing. This has made many workplaces adopt new dimensions and magnitudes of job skills for their prospective employees. Advancement in the employment sector has compelled entrepreneurs to suggest many skills for becoming a full entrepreneur and however, the way such skills should be taught is a matter for debate. This has developed debates among entrepreneurial scholars and writers broadly divided into the advocates of the learning-by-going approach and the supporters of conventional classroom-based discussions approach of hypothetical questions.

During the last decades, much has been learned about the circumstances that lead young people into situations of vulnerability and on ways of improving their life chances. Lack of access to meaningful education and gainful employment opportunities, channels for exploring their talents and engaging more fully with their communities often combine to push youth towards the margins of society and increase the likelihood that they will fall into the poverty trap. Therefore, this study investigates the theory and practice of entrepreneurial skills in integrated science as a panacea for sustainable development.

### **Research Questions**

1. What are the theoretical, practical and entrepreneurial Skills in Integrated Science for Sustainable development?

### **Research Hypotheses**

HO1: There is no statistically significant relationship among theoretical, practical and entrepreneurial skills in integrated science for Sustainable development.

### **Method**

Ex-post facto research design under the survey research type will be employed for this study. This type of research design involves the collection of data to accurately and objectively describe phenomena that have occurred. The target population for this study comprises all the 150 students in the Department of Integrated Science, Faculty of Education, Ekiti State University (Affiliation with Emmanuel Alayande College of Education (EACOED) Oyo). The Faculty of Education, Ekiti State University and Department of Integrated Science were purposively selected, random sampling was used to select a total of one hundred and twenty (120) students. A researcher designed questionnaire was designed and developed for the study. The questionnaire was titled Theoretical, Practical, Entrepreneurial Skills Development Assessment Questionnaire (TPESDAQ) was used for data collection.

The instruments have three sections: 'A', and 'B'. Section 'A' sought information on the personal data of the respondents on gender, and level. Section 'B' contains items about Theoretical, Practical, Entrepreneurial Skills Development. The items were structured on a Likert scale: Strongly Agree; Agree; Disagree and Strongly Disagree. The response categories were assigned numerical values of 4, 3, 2, and 1 respectively. The questionnaires were subjected to face validation by experts in the Department of Integrated Science, University of Ado-Ekiti. Reliability coefficient  $r$  of 0.84, 0.74 and 0.73 were determined for the instruments using Cronbach Alpha.

An official letter was written to the HOD for approval to involve the students in the study. The approved copy of the letter was shown to the selected students for their cooperation to do the research. The students were not coarse to participate in the study. Thereafter, a questionnaire was administered to the students immediately and was retrieved. A total of 150 copies of the questionnaires were administered and 120 copies were retrieved and valid. This gives an 80% return rate. The data generated from the questionnaire were analyzed using percentage, and hypothesis tested using Pearson Product moment Correlation (PPMC) at a .05 level of significance. Statistical Package for Social Sciences (SPSS) version 25 was used for data analysis.

**Result**

1. What are the theoretical, practical and entrepreneurial Skills in Integrated Science for Sustainable development?

**Table 1:** Theoretical, Practical and Entrepreneurial Skills in Integrated Science

S/N	Theoretical Skills	Mean	Decision
1.	Theoretical skills can motivate me to become an entrepreneur	3.15	Accepted
2.	With my theoretical knowledge in integrated science, I can set up alone	3.22	Accepted
3.	Theoretical knowledge can make me establish a patent medicine shop	3.17	Accepted
4.	Theoretical knowledge in integrated science can make me self-employed	3.23	Accepted
5.	Theoretical skills help me to attain entrepreneurial skills in Integrated science	3.41	Accepted
6.	Does the education system have a positive effect on developing enterprising entrepreneurs?	3.33	Accepted
	<b>Average Mean</b>	<b>3.25</b>	
S/N	Practical Skills	Mean	Decision
1.	Practical skills in integrated science can make me generate income	2.71	Accepted
2.	Practical skills in integrated science can spur my creativity	3.37	Accepted
3.	Practical skills in integrated science can make me self-employed	2.64	Accepted
4.	Practical skills in integrated science can make me become a chemist	2.87	Accepted
5.	Do you have an idea of establishing your own business?	3.12	Accepted
6.	Do you think that the current labour market situation encourages one to undertake his/her own business enterprise/ activity?	2.96	Accepted
	<b>Average mean</b>	<b>2.95</b>	Accepted
S/N	Entrepreneurial skill	Mean	Decision
1.	Entrepreneurial skill can help me to start a business	3.53	Accepted
2.	Entrepreneurial skill reduces the rate of unemployment	2.58	Accepted
3.	Both theoretical and practical knowledge can promote entrepreneurial skills development	2.69	Accepted
4.	Entrepreneurial skill depends essentially on learning	2.97	Accepted
5.	Entrepreneurial skill is the ability of an individual to create an enterprise	3.13	Accepted
	<b>Average mean</b>	<b>2.98</b>	

Table 1 above revealed that theoretical skills have an average mean of 3.25, practical skills an average mean of 2.95 and entrepreneurial skill has an average mean of 2.98. the average mean is greater than 2.50, this implies that the theoretical, practical and entrepreneurial skills in Integrated Science can help in achieving Sustainable development.

HO1: There is no statistically significant relationship among theoretical, practical and entrepreneurial skills in integrated science for Sustainable development.

Table 2: Multiple Regression Analysis of Theoretical, Practical and Entrepreneurial skills

Model summary					
R= .712					
R <sup>2</sup> =.612					
R <sup>2</sup> (Adjusted) = .527					
Standard Error of Estimate =2.15					
F=13.72, P <0.05					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	.615	1.619		.380	.706
Practical	.792	.195	.583	4.070	.000
Theoretical	.065	.380	.019	.172	.015

a. Dependent Variable: Entrepreneurial skill

The table revealed that theoretical and practical skill had a positive correlation with entrepreneurial skills (R=.712). The Adjusted R Square value of .612 indicated that that theoretical and practical skills jointly contributed 52.7% to the entrepreneurial skills for sustainable development. This implies that the remaining 47.3 % is due to residuals, that is, those variables not included in this study. Analysis of Variance (ANOVA) of multiple regression data showed that the Adjusted R square value was significant (F=13.72,  $p < .05$ ). The result of relative contributions of the independent variables to the prediction of entrepreneurial skills revealed that theoretical and practical skills contributed differentially. However, practical skills ( $\beta = .0.792$ ;  $t = 4.070$ ;  $p > 0.05$ ) and theoretical ( $\beta = .065$ ;  $t = .172$ ;  $p > 0.05$ ) are potently significant positive contributors to the prediction of the entrepreneurial skills. The study revealed that there is a significant relationship among theoretical, practical and entrepreneurial skills in integrated science for Sustainable development.

## Discussion

That is, the theory taught in integrated science assist in developing entrepreneurial skills in practice. This is following the purpose of education as stated in the National Policy on Education (2013) which says “Education is to teach one to think intensively and to think critically.” Education must enable one to sift and weigh evidence to discern the true from false, real from unreal and facts from fiction.

Bereiter and Scardamalia (2000), Bowden and Manto (2002) observe that an important challenge of higher education is to encourage students to apply knowledge to solve problems and to tackle problems at a higher level. It is when students are given sound theoretical skills, that they can put them into practice in their work. People who lack theoretical skills may not succeed in their work as those with a sound theoretical background. Theoretical skills are so important because if practical is not going as expected, theoretical skills can be applied to guide the practical work.

This is following the observation of Schreiner (2012) which stated that “improvisation in imparting integrated science information to the novice chemist can make the student become

an entrepreneur”. Also, Eraut (2000), asserted that working life requires practical and situational knowledge, professional experience and judgment. Edgar-Dale’s (2005) cone of experience or learning shows that learners only remember 10% of what they read, 20% of what they say and 90% of what they say and do. It is through practice that learners can understand integrated science concepts and enhance their entrepreneurial skills. People who lack practical skills cannot be successful entrepreneurs.

### Conclusion

The study concluded that students are encouraged to see the latent entrepreneurial talents within them and enable them to spot and exploit business opportunities. Having been armed with theoretical, practical and entrepreneurial skills to develop the confidence that is necessary to succeed outside school.

### Recommendations

Based on the outcome of the study, it was recommended that Government should provide necessary laboratory equipment such as mass-spectrometer, ultraviolet-spectroscopy, infrared-spectroscopy, electric-oven, fume-cupboard etc. so as impact full practical skills to the students.

Government should consistently provide enough money for the school laboratories to replace some chemicals that are outdated or expired, and students should be encouraged to offer science subjects at both undergraduate level and postgraduate level.

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