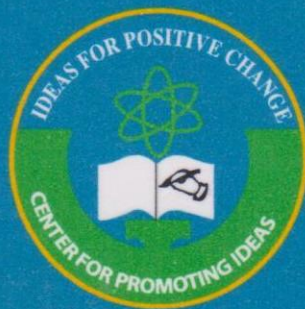


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Preparing Nigerian School Leavers for Entrepreneurial Development through Indigenous Science Skills

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Abstract

This study examined Nigerian indigenous scientific skills and school leavers/ graduates of science disciplines awareness of their existence and perception of their ability to utilize them for entrepreneurship. The study used an ex-post facto research design to select a sample of two hundred and thirty two (232) science graduates from various States of Nigeria undergoing National Youth Service in Akwa Ibom State, Nigeria. The instrument used for data collection is a researcher-developed, 22 item, structured questionnaire the "School Leavers Indigenous Scientific Skills for Entrepreneurship Rating Scale". The reliability of the instrument was established at .79 using the Cronbach alpha test of internal consistency. Two research questions and one hypothesis were formulated to guide the study. The research questions were answered using mean and standard deviation while the null hypothesis formulated for the study was analyzed and tested at .05 alpha levels using the t-test statistical tool. The results showed mainly a moderate awareness of the indigenous scientific skills among the school leavers and high preferences for the indigenous skills. There was a significant difference in preferences of male and female school leavers for the indigenous skills. The study recommended that indigenous scientific skills be introduced during early basic science classes and as training modules in higher institutions among others.

Keywords: Indigenous scientific skills, entrepreneurship, school leavers, preference, awareness

1. Introduction

1.1 Indigenous Scientific Skills in Nigeria

Indigenous science skills are multiple connections of cultural heritage, ideas, and abilities gathered over a period of time and utilized for a community's sustainability. According to (UNESCO, 2015) indigenous scientific skill involves a broad knowledge of how to live sustainably. It is the local knowledge that is unique to a given culture and a basis for decision-making at the local level on a host of raw resources/activities in rural communities. These raw resources are found in traditional languages, music, arts, drama, science, technology in African traditional cultures. (Akpomovie, 2011). These home-grown traditional scientific skills/applications sustain a community's lifestyle and promote significant contributions from indigenous people to national and global economic growth. Indigenous scientific skills can improve the technological base of traditional entrepreneurs as well as help in transferring the needed technology for the rapid transformation of localities and nations. Some of these indigenous scientific skills include leather tanning, cloth weaving, dyeing, carving, pottery, and beading. These skills find their use in most Nigerian communities' day-to-day activities and economic survival.

In Nigeria, children receive early learning and training on the vast array of indigenous scientific skills from their parents and elders at home. For instance, children are taught how to make brooms, weave mats, make beds with bamboo sticks and pick straws and grass for foam making.

These actions involve scientific skills of picking, sorting, cutting, and arranging. Children also play games that involve the moulding of pots and building of mud-houses from clay found in the locality. They carve bows and arrows from woods; they weave baskets and hats from raffia obtained from palm fronds and they dye clothes from locally sourced dye-materials obtained from leaves/flowers/barks of trees without realizing they are making use of scientific skills or that they are involved in entrepreneurial activities. According to Onwuejeogwu (1992) African children and indeed Nigerian children, cannot develop creative minds without using imagination, which cannot emerge out of emptiness, but must be built out of the raw cultural materials around them.

1.2 Learners' Knowledge of Indigenous Skills

Children begin school with prior knowledge of indigenous scientific skills they had acquired at home and are already armed with the knowledge of indigenous scientific skills they bring from home to school but these indigenous skills are rarely integrated and utilized alongside basic science skills they acquire in school. Many indigenous scientific skills students possess as they come from home have been left untapped and under-utilized during science classroom teachings and activities. This affects the way learners perceive and access these skills. Formal education systems have disrupted the practical everyday life aspects of indigenous knowledge and replaced them with abstract knowledge and academic ways of learning. Today, there is a grave risk that much indigenous skills and knowledge are being lost and along with it, valuable knowledge about ways of living sustainably.

In school, students are introduced to basic scientific skills of observation, classification, recording, measurement, interpreting data, analyzing and hypothesizing. These skills prepare learners to take part in classroom activities that can enable them develop value-laden entrepreneurial attitudes to achieving lifelong careers. If learners are effectively engaged with indigenous scientific skills in the school, they develop areas of interest early and improve upon what they already know. When this happens, learners are then able to engage in classroom and out-of-school activities. This facilitates and broadens learning experiences and builds capacities for entrepreneurship, self-reliance and community sustenance. Iloka (2010) posited that with the right approach to instruction and working environment, school leavers can be encouraged to establish local industries with their knowledge of indigenous scientific skills.

1.3 Nigeria National Policy and Entrepreneurial Skills Development

The importance of entrepreneurial skills is stressed in the National Policy on Education (FRN, 2013) that science education should be aimed at producing school leavers who should be engaged in small-scale business activities. If they are properly engaged to utilize with the prior knowledge they bring from home they should be able to access and process locally available raw materials into finished goods for the market. In implementing this policy therefore, stakeholders should aim at increasing students' knowledge and participation in indigenous science skill methods and activities starting from the primary to tertiary school levels, in order to adequately develop their potentials. Promoting the use of indigenous scientific skills in the school curriculum will promote the development of intellectual and practical skills needed for survival. School leavers especially those of science disciplines can use locally available indigenous scientific skills to equip themselves with the capacity to be self-employed thereby empowering themselves to participate effectively in profit making entrepreneurial activities. Sadly, science graduates in Nigeria are not well prepared to face the world of work because they lack entrepreneurial skills. Eze and Ikem-Nwosu, (2013) found that students are not helped to develop their indigenous scientific skills needed for processing local raw materials into finished goods. This has led to the decline of students' interest in the indigenous skills that could be beneficial in acquiring dexterity for self-sustenance.

1.4 Career and Indigenous Entrepreneurial Skills

Career specific skills help students to transfer knowledge and skills to the world of work and for problem-solving. Entrepreneurship activities help learners arrange resources in a variety of ways to enable them work, plan and achieve intended goals for market-valued products (Ifeakor, 2006). There is therefore need for the introduction of skills training components into the curriculum to encourage school leavers to embrace self employment as a priority. Activity-oriented learning that involves indigenous entrepreneurial skills training gives learners the opportunities to experience fun, creativity, and excitement in what they are doing. These activities stimulate innovativeness in young graduates especially those in science disciplines. Science school leavers' exposure to actual practice of indigenous skills practical hands-on activities can encourage entrepreneurship.

Nations like South Korea, India, and China are realizing the importance of integrating indigenous scientific skills in their science and technology curriculum in order to develop a vibrant and growing economy. They do this by introducing new skills and ideas into the school curriculum to improve the skills learners already possess. This equips the graduates with relevant entrepreneurial skills to make them become potential entrepreneurs. Science graduates who have some level of scientific skills need to be encouraged to acquire formal science process skills. This will enable them derive the know-how to manage business plans and be able to invest in productive ventures employing appropriate indigenous scientific skills.

1.5 School Leavers and Entrepreneurial Activities

Nigerian schools system does not give priority to indigenous scientific skills training. This is not considered important in teaching for knowledge; hence, the high output of science school leavers with inadequate knowledge of indigenous science skills. Nwana (2011) lamented the poor attitude of the Nigerian public towards students who attend vocational and technical institutions. These students are looked down upon as students who are not intelligent enough to gain admissions into regular secondary schools. This makes the students feel inferior to their counterparts and they end up abandoning their life pursuits to seek admission in regular secondary schools. They leave their courses without acquiring reasonable levels of skills useful to them and to the society (Ker, Ekoja, & Ango, 2010). This has led to unemployment among university graduates, other tertiary level graduates, school leavers and other vulnerable members of society (Ichayesi & Nafukho, 2011). So much emphasis is being placed on certification of science and technology education in Nigeria to the detriment of skill development. Emenyonu and Ogunsola (2012) and Eze and Ikem-Nwosu (2013) observed that courses which should be taught as hands-on, minds-on practical courses are taught theoretically without skills application and this makes the learners unable to benefit maximally from their education. This undermines the graduate's potentials to apply the knowledge acquired in school. The situation is worrisome as it is affecting school leaver's participation in entrepreneurship.

The high rate of unemployment among science graduates show to a large extent the poor entrepreneurial skills acquired in school. Obioma (2011) discovered that school leavers lacked saleable skills; hence, unemployment rate continues to increase. According to Okezie, Odii and Njoku(2013) Nigeria has produced an array of unemployable and unemployed youths. This is due to the fact that there are very few skilled teachers to impart the required entrepreneurial skills and competencies needed for entrepreneurial activities (Onwuachu & Okoli, 2010). This has hampered the ingenuity and participation of most science graduates as they roam the streets in search of 'white collar' jobs. They find it difficult and impracticable to handle their own business or be gainfully employed for their own sustenance or make contributions towards their community's development.

1.6 Indigenous Entrepreneurial Preferences and Gender

Gender is an important factor in science education especially with increasing emphasis on ways of boosting manpower for technological development as well as increasing the population of females in science and technology fields (Longe & Adedeji, 2003). Male supremacy and gender stereotyping are factors among others identified to influence occupational choices in Nigeria (Nwagbo & Chikelu, 2011). Various resources that emphasize acquisition of skills such as extracting palm kernel oil from the seeds of palm fruits, making short and long brooms, raffia bags, carpets and shoes from palm fronds, dyes and gums are available and could be locally sourced to enhance students' skill acquisition. Students' preference for these skills is antecedent to the skills the students are exposed to by their parents, seniors' siblings, or teachers. Boys are usually taught how to make long and round baskets while girls are taught handkerchiefs and dressmaking as well as making round baskets (Eze & Ikem-Nwosu, 2013). Olurode (2007) also posited that in Nigeria, male students are engaged early in fishing, hunting and carving while women did gardening and tended the home. These traditional practices /skills acquired are all beneficial in one way or the other for productively engaging learners for future sustainable livelihoods.

1.7 The Problem

UNESCO (2015), advocates for economic sustainability through encouraging and engendering the utilization of cultural ideas and resources. Nigeria as a nation has a variety of cultural resources and skills that have been passed down from generation to generation. This heritage may be on the verge of extinction as they are not being taped formally by the school and the curriculum. Some students in both primary and secondary institutions have acquired these indigenous skills from home and only require that it be refined and directed towards attainable objectives.

In this era of vast unemployment among school leavers, the Federal Government of Nigeria has strived to put in place strategies for entrepreneurship development in schools to enable school leavers become self-reliant. With the existence of indigenous scientific skills in Nigerian, it may be expedient that the Nigerian school system harnesses these skills and resources for entrepreneurial development. This study therefore examines some existing Nigerian indigenous scientific skills and school leavers of science disciplines' perception of their ability to utilize these skills for entrepreneurship.

1.8 Objectives of the Study

The study examined the awareness of and the preference of Nigeria school leavers for indigenous scientific skills for entrepreneurship. Specifically, the study intended to achieve the objectives below.

1. To identify the awareness level of graduate school leavers of available indigenous scientific skills for entrepreneurship.
2. To determine the indigenous scientific skills school leavers prefer for entrepreneurship.
3. To determine the differences in the indigenous scientific skills preferred by male and female school leavers.

1.9 Research Questions

1. What is the level of awareness of graduate school leavers of the indigenous scientific skills available for entrepreneurship development?
2. What indigenous scientific skills are preferred by school leavers for entrepreneurship?

1.10 Research Hypothesis

There is no significant difference in the indigenous scientific skills preferred by male and female school leavers for entrepreneurship.

2. Methods

2.1 Research Design

The study used an ex-post facto research design. The population for the study comprised all 2,380 graduate school leavers from different institutions doing their one year compulsory national youth service in Akwa Ibom State, Nigeria.

2.2 Sample and Sampling Technique

The subjects for the study comprised of youth coppers posted to Akwa Ibom State Nigeria during the 2015/16 service year. Youth coppers are graduates from Nigerian tertiary institutions who have just completed their school and are posted all over Nigeria for one year national service. In Akwa Ibom State, they are two thousand three hundred and eighty (2,380) (National Youth Service Corps Office, Uyo Akwa Ibom State).

Accidental sampling technique was used to select a sample of two hundred and thirty two (232) science graduates from various States of Nigeria undergoing National Youth Service in Akwa Ibom State.

2.4 Instrument used for the Study

The instrument used for data collection is a researcher-developed, 22 item, structured questionnaire the 'School Leavers Indigenous Scientific Skills for Entrepreneurship Rating Scale'. Section A of the instrument measures the level of awareness of eleven (11) indigenous skills on a 5-point rating scale of Very Aware (VA=5), Aware (A=4), Not Sure (NS=3), Unaware (U=2), Very unaware (VU=1) while section B measured the level of preference for these skills with a scale of Strongly prefer (SP=5), Prefer (P=4), Not sure (NS=3), Not preferred (NP=2) and Strongly not preferred (SN=1). The validity of the instrument was determined using two experts of test and measurement in the Faculty of Education, University of Uyo their inputs were used in the final version of the instrument. The reliability of the instrument was established using Cronbach's Alpha test of internal consistency. This yielded an *r* value .79.

2.5 Data Collection and Analysis

Data was collated and mean and standard deviation was determined for the subjects' responses to the level of awareness and preferences for the indigenous scientific skills.

Decisions on level of awareness and preferences of the indigenous scientific skills were made based on the decision rule of: a mean below 2.50 is regarded as low; 2.50 to 3.00 is moderate while above 3.00 is high. Research questions were answered using mean and standard deviation while the null hypothesis formulated for the study was tested at .05 alpha levels.

3.0 Results

3.1 Research Question 1: What is the level of awareness of graduate school leavers for the indigenous scientific skills available for entrepreneurship?

Table 1 below presents the indigenous scientific skills investigated. Based on the decision rule, the results reveals that graduate school leavers have high awareness of leather tanning, beading and extraction of oil from palm fruits as indigenous scientific skills for entrepreneurship development; low level of awareness for spurning cotton for textiles, while they have moderate levels of awareness for the other indigenous scientific skills that can equally be developed for entrepreneurship.

3.2 Research Question 2: What indigenous scientific skills are preferred by school leavers for entrepreneurship?

Table 2 presents the mean, standard deviation, and decision on preference level of graduate school leavers for the indigenous scientific skills investigated for entrepreneurship. The result shows that graduate school leavers have high preference for leather tanning for foot wares/bags/drum making, cloth weaving from cotton, fabric dyeing, beading for bags/hairstyling/jewelers, mat making from palm fronds, forging for blacksmithing and spurning cotton for textiles but they have moderate preference for woodcarving for furniture/souvenirs and pottery for ornaments, tiles and ceramics.

Hypothesis: There is no significant difference in the indigenous scientific skills preferred by male and female school leavers for entrepreneurship.

Table 3 present the mean, standard deviation, calculated and critical t-values of male and female science graduate school leavers' preferences for indigenous scientific skills for entrepreneurship. The result of the test of the hypothesis at .05 alpha level of significance and 230 degrees of freedom, shows that female graduate school leavers have a significant ($t\text{-cal.} > t\text{-crit.}$) higher mean preferences for leather tanning, cloth weaving, fabric dyeing and beading than their male counterparts. On the other hand, the male graduate school leavers also have significant higher mean preferences for forging for blacksmithing and extracting oil from palm fruits than the female school leavers do. For these indigenous skills preferences, the null hypothesis is rejected as there is a significant difference in their mean preferences based on gender. However, there was no significant difference ($t\text{-cal.} < t\text{-crit.}$) in mean preferences of male and female school leavers for wood carving for furniture/souvenirs, pottery for ornaments, tiles and ceramics, mat making from palm fronds, spurning cotton for textiles and rubber latex for plastics/tyres, hence, the null hypothesis is not rejected in respect of those indigenous skill items.

4.0 Discussion of Findings

4.1 Awareness creation

Analysis of data in Table 1 showed mainly moderate awareness of indigenous scientific skills which is indicative of the fact that these skills are not taught as part of the school curriculum and therefore not encouraged in schools even though school leavers come to school with prior knowledge of these indigenous scientific skills. Many concepts in science requiring indigenous scientific skills application hardly integrate these skills for entrepreneurship activities. This finding agrees with Eze and Ikem-Nwosu (2013) that pupils are not helped to develop indigenous skills that use local raw materials to produce finished goods. Science teaching should integrate indigenous skills right from primary school on concepts requiring entrepreneurial activities but this has not been so. This may be due to lack of inclusion of indigenous scientific skills in the science curriculum used for classroom teaching. It may also be due to the lack of knowledge and mastery of indigenous scientific skills by the teachers.

4.2 Graduate school leavers' preferences

Data analyzed and presented in Table 2 showed the preferences shown for each indigenous scientific skills that are available for entrepreneurship development. As indicated, most of the indigenous skills are preferred by the school leavers although there is no conscious institutional effort made to create awareness or integrate these skills in the curriculum.

This is an indication that these indigenous skills are still popular and their utility in stimulating job creation could be enhanced if effort is made to integrate them into the school system. Many indigenous scientific skills that students learnt at home have been left untapped and under-utilized during science classroom teachings activities. This affects the way learners perceive and access science knowledge, learning, and skills. Only a few related skills like cloth weaving from cotton, fabric dyeing and rubber latex for plastics/tyres are given very little attention during theory classes. This agrees with the findings of Onwuachu and Okoli (2010).

4.3 Male and Female School Leavers' preference for Indigenous Scientific Skills for Entrepreneurship

Analysis of data presented in Table 3 shows that female graduate school leavers have higher mean preferences for leather tanning, cloth weaving, fabric dyeing, and beading than their male counterparts do. On the other hand, the male graduate school leavers also have higher mean preferences for forging for blacksmithing and extracting oil from palm fruits than the female school leavers do. Eze and Ikem-Nwosu (2013) noted that boys are taught how to make long and round baskets, raffia bags, carpets, mats, and shoes using palm leaves and fronds while girls are taught handkerchiefs and dressmaking as well as making round baskets specifically. Olurode (2007) also posited that in Nigeria, male students are engaged early in fishing, hunting and carving while women did gardening and tended the home. Sustainable activities were also linked with traditional practices. The significant difference in preferences to indigenous scientific skills by the male and female graduates may not be unconnected with socio-cultural inclinations where females are naturally associated with skills in beading, cloth-weaving and dyeing and males with more masculine skills of blacksmithing and oil extractions. However, proper integration of these skills into the formal education curriculum could significantly narrow down the preferences of both male and female graduates for the indigenous scientific skills.

Conclusion

Based on the findings of this study, there is need to provide science school leavers with adequate entrepreneurial skills by creating awareness, integrating indigenous scientific skills that will make them become potential entrepreneurs and small scale business managers into the formal education curriculum. This could be done by introducing them to new skills and improving the skills they already possess. This would improve the economic wellbeing of the graduates and their family as well as empowering the graduates to contribute to the socio-economic development of their society.

Recommendations

Based on the findings of this study, the following recommendations are made.

1. Indigenous scientific skills using locally available raw materials should be introduced during early basic science classes.
2. Community experts on crafts should be invited as resource persons to teach indigenous skills for entrepreneurship during basic science practical classes that require entrepreneurship knowledge.
3. Local entrepreneurship centres should be established and used as resource bases for field trips at the secondary level and skill development centres at the tertiary education levels'.
4. Curriculum planners should introduce indigenous scientific skills training modules for science teachers and students' to use during practical classes.
5. Adequate time for quality interaction should be created for the learning and upgrading of indigenous scientific skills that meet modern demands of society.

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Tables

Table 1: Graduate School leavers' responses to level of awareness of indigenous scientific skills

n =232

S/NSchool leavers awareness level of Indigenous Scientific Skills	Mean	SD	Decision on awareness level
1 Tanning leather for drum making	3.31	1.80	High
2 Cloth weaving from cotton	2.83	1.34	Moderate
3 Fabric dyeing	2.94	1.41	Moderate
4 Wood carving for furniture/souvenirs	2.58	1.50	Moderate
5 Pottery for ornaments, tiles, ceramics	2.84	1.41	Moderate
6 Beading for bags and jewellery	3.09	1.38	High
7 Mat making from palm fronds	2.94	1.57	Moderate
8 Forging for blacksmith	2.59	1.43	Moderate
9 Spurning cotton for textiles	2.20	1.34	Low
10 Rubber latex for plastics/tyres	2.59	1.48	Moderate
11 Extracting oil from palm fruits	3.55	1.47	High

Table 2: Science graduate school Leavers' preference for Indigenous Scientific Skills for Entrepreneurship
n=232

S/N	Indigenous Scientific Skills	Mean	SD	Decision on preference level
1	Leather tanning for foot wares/bags/drum making	3.79	1.67	High
2	Cloth weaving from cotton	3.35	1.43	High
3	Fabric dyeing	3.16	1.33	High
4	Wood carving for furniture/souvenirs	2.92	1.47	Moderate
5	Pottery for ornaments, tiles, ceramics etc	3.00	1.47	Moderate
6	Beading for bags/hairstyling/jewellery	3.69	1.38	High
7	Mat making from palm fronds	3.07	1.44	High
8	Forging for blacksmithing	3.21	1.45	High
9	Spurning cotton for textiles	3.08	1.37	High
10	Rubber latex for plastics/tyres	3.12	1.43	High
11	Extracting oil from palm fruits	3.39	1.45	High

Table 3: t- test Analyses of Male and Female Science Graduates' preference for Indigenous Scientific Skills for Entrepreneurship

S/N	Indigenous Scientific Skills	N	Gender	Mean	SD	t-cal	t-crit	Decision at 0.05 alpha level
1	Leather tanning for foot wares/bags/drum making	117	Male	3.25	1.776	5.27*	1.96	*Significant
		115	Female	4.34	1.344			
2	Cloth weaving from cotton	117	Male	2.93	1.530	4.72*	1.96	*Significant
		115	Female	3.78	1.190			
3	Fabric dyeing	117	Male	2.83	1.398	3.87*	1.96	*Significant
		115	Female	3.49	1.180			
4	Wood carving for furniture/souvenirs	117	Male	3.09	1.508	1.85	1.96	Not significant
		115	Female	2.74	1.409			
5	Pottery for ornaments, tiles, ceramics etc	117	Male	3.11	1.419	1.16	1.96	Not significant
		115	Female	2.89	1.526			
6	Beading for bags/hairstyling/jewellery	117	Male	2.82	1.337	12.69*	1.96	*Significant
		115	Female	4.58	.662			
7	Mat making from palm fronds	117	Male	3.24	1.507	1.82	1.96	Not significant
		115	Female	2.90	1.360			
8	Forging for blacksmithing	117	Male	3.45	1.534	2.64*	1.96	*Significant
		115	Female	2.96	1.320			
9	Spurning cotton for textiles	117	Male	2.97	1.310	1.20	1.96	Not significant
		115	Female	3.19	1.432			
10	Rubber latex for plastics/tyres	117	Male	3.18	1.368	0.63	1.96	Not significant
		115	Female	3.06	1.488			
11	Extracting oil from palm fruits	117	Male	3.79	1.216	4.40*	1.96	*Significant
		115	Female	2.98	1.550			