POTENTIALS REQUIRED BY ELECTRICAL ELECTRONICS TECHNOLOGY EDUCATION GRADUATES FOR ENTREPRENEURSHIP DEVELOPMENT OF SMALL SCALE SOLAR POWER INSTALLATION COMPANY

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Abstract
This study was set to ascertain potentials required by electrical electronics technology education graduates for entrepreneurship development of small scale of solar power Installation Company. The study was essential due to the current issue of unemployment among graduates of tertiary institutions and a challenge to the society in the area of epileptic power supply in Nigeria. Three research questions and three null hypotheses guided the study. A survey research design was adopted while the population was 46 graduates of electrical electronics technology education in Anambra state. Instrument for data collection was structured questionnaire which was made up of three sections according to the research questions that guided the study. The questionnaire has a total of 28 item statements designed in 4 point response categories of very highly needed, highly needed, moderately needed, and not needed with numerical values of 4, 3, 2 and 1 respectively. Mean with standard deviation were used to answer the three research questions while t-test was used to test the three null hypotheses at .05 level of significance. The findings of the study showed that ability integrate different employee to work harmoniously as a group to achieve organizational objective among others are the management skills required for self employment. Also, it was found that ability to vary the output voltage, current and power from the solar panel and batteries among others are the technical skills required. Recommendation were made which include youths should be encourage to embark on self actualization skills through identified skills.

Introduction

Entrepreneurship development is a vehicle that facilitates prosperity among individuals, firms, regions, and nation. Ifeanacho (2013) explained the concept of entrepreneurship development as a gradual growth of creative, economic and social venture. It involves setting up an individual to explore opportunities successfully through making profitable or suffering loss of invested capital. Entrepreneurship development can be acquired through education. According to Onoh (2006), education trains the mind, moderates character and sharpens the inmate ability of persons who are eager to attain self-actualization and economic independence. Onoh further explained that education also polishes, brushes and shines its benefactors to become useful citizens on their communities.

There are lots of business enterprises that are being engaged by individuals, group of people or association, industries and government with the aim of maximizing profit. These business enterprise ranges from small scale to medium scale and from medium

scale to large scale. In Nigeria economy, the small scale enterprise are the most common form of business, the growth of any economy (either industrialized or not) depends largely on how well managed the small scale industries are. These small scale enterprises include the agricultural firms for food production, solar electric power firms for electric power generation and the likes.

Electrical power is the engine room of all the development. Onyebuenyi and Alio (2017) noted that no nation can be classified as developed without adequate supply of infrastructural facilities which includes electricity; the supply of electricity is accountable for slow pace of development especially when the supply is poor, inadequate and epideptic in nature. Subsequently, due to the fact that source of conventional means of energy generation (coal, fossil fuel and gas) are fast depleting most homes and industrialized countries have started resorting to the use of solar energy as a renewable sources of energy. Solar power is the conversion of sunlight into electricity; by using photovoltaics (en.m.wikipedia.org). Solar energy is radiant light and heat from the sun that can be harnessed using a range of ever-evolving technologies like solar photovoltaic and solar thermal energy (International Energy Agency 2011). Solar energy system has not only emerged as a renewable energy source but it has generated large job opportunities in the state and the Nation at large in the design, harvesting, installation and maintenance of solar energy system (Oluka and Onyebuenyi, 2017).

Solar power installation involves the assempledge of solar power Component which include solar panel, charge controller, battery, inverter and etc for efficient and effective performance. Olubunmi (2015) in Oluka and Onyebuenyi (2017) pointed out that many jobs can be created through solar installation and running of solar energy system. , National Directorate of Employment (NDE, 2012) submits that there is need for capacity building at industrial, institutional and personal levels for acquiring technical, organizational and managerial skills for increased development in renewable energy. These abilities are one of the goals of electrical electronics technology education.

Electrical electronics technology education is a programme of study that is offered in tertiary institution like college of education, polytechnics and universities (Oluka, 2016). The programme is given to the undergraduates of such institutions to equip them to face the challenges of employment or unemployment that comes after their graduation. Onoh (2013) stated that graduates of technology programmes must posses some degree of competencies in managerial, technical and financial accounting competencies to become successful entrepreneur. This was supported by Obi (2010) who posited that these skills are teacheable and are thereby improved upon when the individual is in practice after undergoing well supervised training.

Managerial skills according to Osuala (2004) acquisition of management skills through entrepreneurship education are indispensable towards producing a self-relaint nation, with dynamic economicy. Managerial skills involves efficient and effective use of all the available resources which include human, materials and financial resources in order to achieve a desirable task. It also involves the manager's knowledge and ability to work with people (customer and employee).

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2. What are the financial accounting skills required by electrical electronics technology education graduate for entrepreneurship development of small scale of solar power Installation Company?
3. What are the technical skills required by electrical electronics technology education graduates for entrepreneurship development of small scale of solar power Installation Company?

Research Hypothesis

The following null hypotheses were tested at .05 level of significance.

H01: there is no significant difference between the male and female electrical electronics technology education graduate on managerial skills required by electrical electronics technology education graduates for entrepreneurship development of small scale solar power Installation Company.

H02: there is no significant difference between the male and female electrical electronics technology education graduate on financial accounting skills required by electrical electronics technology education graduates for entrepreneurship development of small scale solar power Installation Company.

H03: there is no significant difference between the male and female electrical electronics technology education graduate on technical skills required by electrical electronics technology education graduates for entrepreneurship development of small scale solar power Installation Company.

Research Method

A survey design was adopted for this study. The study was carried out in Anambra state. The population for the study comprises of 46 graduates of electrical electronics technology education which includes 29 male graduates and 17 female graduates. There was no sampling because of the manageable size of the population. The instrument for data collection was a structured questionnaire which was dully validated with a reliability index of .78 obtained using Cronbach Alpha reliability coefficient. Mean with the standard deviation were used to answer the research question while t-test was used to test the hypotheses. In answering the research question any mean score of 2.5 and above were regarded as required while items with mean score below 2.5 were regarded as not required. In testing the null hypothesis it would not be rejected if the t-calculated was less than t-critical value at .05 level of significance otherwise it would be rejected.

Results

The results are represented in table according to research questions and hypothesis.

Research Question 1

What are the managerial skills required by electrical electronics technology education graduates for entrepreneurship development of small scale of solar power Installation Company?

Table 1
Mean rating with standard deviation of the respondents on the managerial skills required by electrical electronics technology education graduates for entrepreneurship development of small scale of solar power Installation Company

S/N	Managerial skills	Mean	SD	RMK
1	Ability to identify problem and solve it	3.52	0.60	Required
2	Ability to assist the subordinate as a coach and counselor	3.47	0.60	Required
3	Ability to be innovative/change on formulation of policy	3.28	0.83	Required
4	ability to develop effective communication among the employee	3.5	0.60	Required
5	Ability to identify and assessing alternative in decision making	3.39	0.71	Required
6	Ability to integrate different employee to work harmoniously as a group to achieve organizational objective	3.13	0.87	Required
7	Ability to understand how managerial style influences organizational effectiveness	3.28	0.92	Required
8	Ability to design organization structure to accommodate organizational needs	3.34	0.99	Required
9	Interpersonal managerial skill	3.15	0.94	Required
10	Time management	3.07	0.99	Required
	Grand mean with standard deviation	**3.31**	**0.80**	**Required**

Result on Table 1 revealed that all items lettered 1 to 10 are managerial skills required by electrical electronics technology education graduates for entrepreneurship development of small scale solar power installation company evidence to this is the grand mean of 3.31.

Hypothesis one

There is no significant different between the mean ratings of male and female graduate of electrical electronics technology education on managerial skills need of electrical electronics technology education graduates for entrepreneurship development of small scale solar power installation company.

Table 2
T-test summary for significance difference between male and female graduates of electrical electronics technology education on managerial skills required by electrical electronics technology education graduates for entrepreneurship development of small scale solar power installation company.

Responses	N	X	SD	Df	t-cal	t-crit	Remark
Male	29	2.80	0.78	44	0.967	1.96	Not rejected
Female	17	2.16	0.60				

The t-test analysis of data in table 2 revealed that t-calculated value (0.967) is less than the critical t-value of 1.96 therefore there is no significance difference between male and female graduate of electrical electronic technology education and as such the hypothesis is not rejected.

Research Question Two

What are the financial accounting skills required by electrical electronics technology education graduates for entrepreneurship development of small scale solar power Installation Company?

Table 3

Mean rating with standard deviation of the respondents on the financial accounting skills required by electrical electronics technology education graduates for entrepreneurship development of small scale of solar power Installation Company

S/N	Financial accounting skill items	Mean	SD	Remark
1	Ability to communicate financial information	3.15	0.85	Required
2	Ability to understand the use of accounting software package for organizational transaction	3.07	0.99	Required
3	Understanding the managerial accounting	3.5	0.79	Required
4	Ability to calculate profit and loss	3.36	0.78	Required
5	Ability to make financial decision/judgment	3.47	0.60	Required
6	Understanding the cost structure in order to complete effectively/improve profit	3.31	0.90	Required
7	Understanding of taxation	3.28	0.80	Required
8	Ability to keep record and inventory of tools and equipment	3.57	0.55	Required
9	Ability to use feedback from customers and clients for performance improvement	3.39	0.71	Required
	Grand mean with SD	**3.34**	**0.77**	**Required**

Table 3 shows that all the responses in the item 1 to 9 have mean response between 3.07 to 3.57 and grand mean of 3.34 indicating that all the respondents generally agreed to the strategies that business studies agreed to financial accounting skills of electrical electronics technology education graduate are needed for entrepreneurship development of small scale of solar power installation company.

Hypothesis Two

There is no significant difference between the male and female graduate of electrical electronics technology education on financial accounting skills for entrepreneurship development of small scale of solar power Installation Company.

Table 4: t-test analysis of mean rating of the financial accounting skills required by electrical electronics technology education graduate for entrepreneurship development of small scale power Installation Company.

Response	N	X	SD	DF	t-cal	t-crit	Decision
Male	29	3.02	0.95	44	1.123	1.96	Not rejected
Female	17	2.70	0.82				

The data presented in Table 4 showed a computed t-value of (1.123), which indicated that t-calculated is less than t-critical value of 1.96 hence the null hypothesis, is not rejected. Therefore there is no significant difference between male and female graduates of electrical electronics technology education on accounting skills required for entrepreneurship development of small scale power Installation Company.

Research Question 3

What are the technical skills of electrical electronics technology education graduates for entrepreneurship development of small scale solar power Installation Company?

Table 5

Mean with standard deviation on the technical skills required by electrical electronics technology education graduates for entrepreneurship development of small scale solar power Installation Company

S/N	Technical skills needed	Mean	SD	RMK
1	Mathematical skills	3.39	0.63	Required
2	Computer skill for creating design and testing photovoltaic cell	3.52	0.60	Required
3	Welding, soldering and brazing skill	3.57	0.64	Required
4	Ability to assemble the solar power component such as solar panel, charge controller battery inverter and etc	3.31	0.80	Required
5	Ability to vary the output voltage, current and power from the solar panel and batteries	3.34	0.81	Required
6	Ability to maintain and repair the equipment	3.55	0.68	Required
7	Ability to perform diagnostic test/fault	3.44	0.72	Required
8	Ability to perform with operational tools equipment and machine	3.52	0.60	Required
9	Safety skill	3.18	0.86	Required
	Grand mean with SD	3.42	0.70	Required

Results in Table 5 revealed all the 9 items had their mean ratings ranging from 3.18 to 3.57 indicating that technical skills represented by items are need by electrical electronics technology education graduate for entrepreneurship development of small scale solar power Installation Company. Evidence to this is the grand mean of 3.36.

Hypothesis three

There is no significant difference between the male and female graduates of electrical electronics technology education on technical skills needed for entrepreneurship development of small scale of solar power Installation Company

Table 6
T-test analysis of mean ratings on the technical skills electrical electronic technology education graduates for entrepreneurship development of small scale of solar power Installation Company

Response	N	X	SD	Df	t-test	t-crit	Decision
Male	29	3.39	0.66				Not
Female	17	3.44	0.74	44	0.195	1.96	Rejected

The t-test analysis of data in table 6 revealed that t-calculated value (0.195) is less than the critical t-value of 1.96 therefore there is no significant difference between male and female graduate of electrical electronics technology education and as such the hypothesis is not rejected.

Discussion of Findings

The findings in Table 1 revealed that all the items are managerial skills required by electrical electronics technology education graduates for entrepreneurship development of small scale solar power Installation Company. The findings are in consonance with Oluka (2016) states that management competencies involves the process of planning, organizing, leading and controlling both human (personal) and material resources in the enterprise.

Findings in Table 3 also revealed that all the financial accountings skill listed was needed by electrical electronics technology education graduates for entrepreneurship development of small scale of solar power Installation Company. This is in consonance with Osuala (2002) financial accounting is the process of recording, classifying selecting and reporting financial data of an organization to the users for objective assessment and decision making.

Result in Table 5 also revealed that all the 9 technical skills items are required by graduates of electrical electronics technology education for entrepreneurship development of small scale solar power installation company this is in consonance with Oluka (2016) technical competency is the ability of graduates to innovate, or initiate new product or ideas, act positively and decisively with available fact to carryout task and functions to a standard.

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Conclusion

The study investigated the potentials required by electrical electronics technology education graduates for entrepreneurship development of small scale solar power Installation Company. Result shows that all 25 items were required potentials of electrical electronics technology education graduates for entrepreneurship development of small scale solar power Installation Company. The three null hypotheses were analyzed using t-test as result there is no significant different between the responses of male and female graduate. It is therefore requested that these potentials be integrated into the curriculum by curriculum planners and developers, and enforced by educational administrators for proper teaching and learning targeted towards self employment.

Recommendations

Based on the findings, the following recommendations were made.

1. The curriculum of electrical electronics technology education program should be totally restructured to bring about expansion in the teaching area through the inclusion of course in Applied Entrepreneurship development.

2. Youths should be encouraged to embark on self actualization/rehace through identified skills.

3. Government should provide

Employment in Enugu State, *British Journal of Education*. 4.(8) 117-125, (www.eajournals.org)

Onoh B.C.E.C (2013). *Fundamental of Entrepreneurship studies.*Enugu, Cheston Agency press, Ltd.

Onoh, B.E.C (2006). *Entrepreneurship Education needs of self employed artisans and craftsmen in Enugu Urban.* Unpublished Ph.D. thesis. Department of Vocational Teachers Education, University of Nigeria, Nsukka.

Onyebuenyi P. N and Alio A. N (2017). Optimization of Solar Energy for Sustainable Power Supply in Enugu State. *Preceedings of the Paper Presented at the1st Annual National Conference of Centre for Technical and Vocational Education, Training and Research (CETVETAR)*. University of Nigeria, Nsukka. 3rd – 6th May, 2017.

Osuala E.C (2002). *Business management.* Onitsha: Cape publisher international Ltd.

Osuala, E.C (2004). *Principles and Methods of Business and Computer Education*. Enugu cheston Agency press Ltd.

Solar Energy. Retreived from www.en.m.wikipedia.org/solar_energy on 12/11/2016.