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Impact of Siwes on Electrical Technology Education Students' Skill Acquisition

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Abstract
This study investigated the impact of students' industrial work experience scheme (SIWES) on electrical technology education students' skill acquisition in Ebonyi State of Nigeria. Two research questions and two hypotheses guided the study. It was a survey research design and the entire population of electrical technology education lecturers and SIWES students were used,being a total of 56.No sampling was carried out due to the handle-ablesize of the population. A structured and face validated questionnaire was used for data collection with the computed coefficient of stability being 0.97. The research questions were answered with mean and standard deviation while the hypotheses were tested with student's t-test statistic at 0.05 level of significance. Fifteen major electrical practical skills were found to be impacted by SIWES together with twenty good work-habit, public relations and social services skills.
Keywords: electrical, technology education, Siwes, skills, acquisition, IT.

Introduction

The term SIWES is an abbreviation standing for student industrial work experience scheme which was established in Nigeria in the year 1973 by the industrial training fund (ITF). As the name implies, it is a training scheme designed to provide industrial job and occupational skills to students that need them before graduating to complement their training in the school. According to Inyiagu (2012) SIWES is an effort to bridge the gap between theory and practice of engineering, technology, science agriculture, medicine and other industrial related professional educational programme in Nigerian tertiary institutions. SIWES is a new approach to the old-time industrial attachment (IT) aimed at fully exposing students to machines, equipment, professional work methods, safety practice skills and good industrial relations. As an industrial attachment process, SIWES extends and enlarges the learning environment and resources beyond the capabilities of the school thereby enlarging the scope and quality of practical skills that students can acquire. It helps students to acquire occupationally oriented knowledge, skills and work-attitudes with immediate opportunity to apply them in real world of work. The cooperative nature of SIWES between schools and industries enhance testing the practicability of every theory learnt in school right in the industry thereby bridging the gap between theory and practice with the acquisition of specialized industrial skills.

Umar (2010) defined skill in line with the views of Okorie and Ezeji (1998) as well established habit of doing something involving the acquisition of performance capabilities in the most economics way. Skill is a specialized and well-rehearsed method or technique of carrying out a function/task which could be repeated with predictable quality, efficiency and effectiveness. This definitive level of skill acquisition can only be attained by students through collaborative and cooperative venture of SIWES between technology based schools and industries. Other experts also maintained that skill is ability to do something well (Hornby, 2005 and Leigha, 2010). It is expertise of accomplishment of task in any field, especially in a complex organized pattern of behaviour acquired through training and practice (Colman, 2003). Nnachi (2010) maintained that skill is the ability to perform well in a task as a result of exposure, training and practice. No matter the level of giftedness, skills are not acquired without training, practice and exposure of the person or individual to the job or area where the skill is needed.

A skilled person is an individual that has undergone some extensive training in his job and there by mastered the activities that lead to successful performance in the concerned profession, trade or job. As learned ability to do something well, correctly or right, skill involves mastering due to training, exposure or practice; though there could be some personality traits enhancing the rapidity of the acquisition and perfection.

Perfection in the skills impacted on electrical technology education students through SIWES are made manifest in psychomotor domain though they originated from the general foundational basic skills such as: (a) ability to reason (b) ability to re-adjustones own terms to cultural flux (c) ability to control and spend ones time with intelligence and purpose (d) ability to achieve and sustain rewarding relationship with others and (e) ability to preserve and extend ones uniqueness while participating harmoniously in the society (Olaitain, 1996:01). Perfection is the only level of skill acquisition in electrical technology that is acceptable since electrical technology practice does not condoneany mistake. Hence it is expected that SIWES by its nature will have significant impact on electrical technology education student's skill acquisition that will enable them perform both pedagogic and practical electrical tasks perfectly. The problem of this study is that the impact of SIWES on electrical technology education students have not been established to confirm whether the students can perform

their pedagogic and electrical practical tasks perfectly. Hence, this study is set out to answer the following question 'what is the impact of SIWES on electrical students skill acquisition".
The purpose of this study is therefore, to assess the impact of SIWES on the electrical technology education students' skill acquisition necessary for their perfect performance of both pedagogic and practical electrical tasks in Ebonyi State.

Research Questions

1. What are the impact of SIWES on practical skills acquisition of electrical technology education students of Ebonyi State University?
2. What are the impact of SIWES on work habit and public relations skills acquisition of electrical technology education students of Ebonyi State University?

Hypothesis

Ho_1: There will be no statistical significant difference between the mean responses of electrical educators and those of electrical technology education studentson the impact of SIWES on the practical skill acquisition ofelectrical technology education students.
Ho_2: The mean rating of electrical educators and electrical technology education students will not be significantly different on the impact of SIWES on work-habit and public relation skills acquisition of electrical technology education students.

Methodology

Survey research design was adopted in this student with 56 population comprising five educators (lecturers) and 51 students made up of 28-3rd year students who just returned from SIWES programme and 23-4th year students who did SIWES last year. No sampling was carried out because the population was not too big to be studied. A researcher developed questionnaire was used for data collection. It was made of a four-point scale of strongly Agree (4) Agree (3) Disagree (2) and strongly Disagree (1). The instrument was validated by two TVE experts and one expert from measurement and evaluation. The result of the instrument trial test was used to compute the reliability coefficient of the instrument. The coefficient of stability obtained was 0.97.

The instrument was administered be hand with the aid of only one research assistant. Out of the 56 questionnaire copies administered 54 were correctly completed and returned representing 96.43% return. Mean and standard deviation were used to answer the research questions while student t-test statistic was used to test the hypotheses at 0.05 level of significance.

Results

The result of the data analysis for this study are presented in tables shown below in live with the research questions and hypotheses.

Research Question 1:

What are the impacts of SIWES on practical skills acquisition of electrical technology education students of Ebonyi State University?

Table 1
Mean and Standard Deviation of the Responses on the Impact of SIWES on the Practical Skill Acquisition of Electrical Technology Education Students.

S/N	Item Statement	Mean	SD	Remark
1	SIWES strongly and positively impacts on electrical technology education students (ETES) the skills of bridging the gap between theory and practice in the field of electrical technology.	3.52	0.87	Agree
2	SIWES strongly and positively impacts on electrical technology education students (ETES) the skills of converting electrical engineering designs and blue prints into practically workable industrial electrical operations and processes.	3.61	1.22	Agree
3	SIWES significantly and positively impacts on electrical technology education students (ETES) the skills of converting electric circuit theories to industrial electrical practice.	3.36	0.81	Agree
4	SIWES strongly and positively impacts on ETES the skills of converting electrical circuit diagrams to practical wiring protocols.	3.69	1.09	Agree
5	SIWES strongly and positively impacts on ETES the skills of electric motor/generator winding and re-winding which are not often obtainable in the school workshops.	3.11	1.13	Agree
6	SIWES strongly and positively impacts on ETES the skills and experiences of electrical systems trouble shooting.	3.33	0.93	Agree
7	SIWES strongly and positively impacts on ETES the practical skills and industrial experiences in light duty and heavy duty electrical machines/equipment installation which are not often obtainable in the schools.	2.78	1.01	Agree
8	SIWES strongly and positively impacts on ETES the systemicand practical skills of electrical repairs and maintenance.	3.41	1.13	Agree
9	SIWES strongly and positively impacts on ETES the professional skills of translating electrical legends from theoretical graphics into industrial practical realities.	2.87	0.91	Agree
10	SIWES strongly and positively impacts on ETES the professional skills and experiences of practically applying all the required safety precautions, rules and regulations in industrial setting.	3.54	0.79	Agree
11	SIWES strongly and positively impacts on ETES the skills and experiences in practically adhering and applying IEE regulations of London.	3.08	1.05	Agree
12	SIWES strongly and positively impacts on ETES the skills and experiences of practical applications of specialized electrical measuring instruments that are often not available in the schools.	2.89	0.72	Agree
13	Only SIWES fully impacts on ETES electrical high tension practical skills and experiences.	3.63	1.04	Agree
14	SIWES strongly and positively impacts on ETES the skills and experiences of high energy transformers and sub-station maintenance practically.	2.73	0.78	Agree
15	SIWES strongly and positively impacts on ETES the skills and experiences of industrial and domestic panels installation and maintenance practically.	3.20	1.16	Agree

Research Question 2
What are the Impactsof SIWES on work habit and public relations skills acquisition of electrical technology education students of Ebonyi State University?

Table 2
Mean and Standard Deviation of the Responses on the Impact of SIWES on Work-habit and Public Relations Skills Acquisition of Electrical Technology Education Students.

S/N	Item Statement	Mean	SD	Remark
16	SIWES strongly and positively impacts on electrical technology education students (ETES) good work-habit of punctuality and appropriate clocking-in and clocking-out.	2.89	1.06	Agree
17	SIWES strongly and positively impacts on electrical technology education students (ETES) the good work-habit of remaining at ones duty post after clocking-in.	2.81	1.14	Agree
18	SIWES strongly and positively impacts on electrical technology education students (ETES) the danger of truancy and neglect of ones duties.	3.06	0.59	Agree
19	SIWES strongly and positively impacts on electrical technology education students (ETES) the skills of showing respect for superordinate in the work-places.	3.71	1.16	Agree
20	SIWES strongly and positively impacts on electrical technology education students (ETES)the skills of diligence, dedication and ardent hard working required in electrical work-places.	2.54	1.02	Agree
21	SIWES strongly and positively impacts on electrical technology education students (ETES) the skills of friendly and good relationship with co-workers in the industry.	2.85	1.05	Agree
22	SIWES strongly and positively impacts on electrical technology education students (ETES) the good work-habit of humility, respect and obedience to the administrator.	2.99	0.94	Agree
23	SIWES strongly and positively impacts on electrical technology education students (ETES) the good-work skills of accepting and executing delegated assignments and responsibilities.	2.62	1.12	Agree
24	SIWES strongly and positively impacts on electrical technology education students (ETES) the skills of learning practically on the job and perfecting under a proven skilled master, supervisor or manager.	3.59	1.08	Agree
25	SIWES strongly and positively impacts on electrical technology education students (ETES) positive habit of public relations in the industry.	2.73	1.12	Agree
26	SIWES strongly and positively impacts on electrical technology education students (ETES) good habits of conflict resolution in the work-place.	3.34	1.01	Agree
27	SIWES strongly and positively impacts on electrical technology education students (ETES) good habits of workshop management and proper house-keeping.	3.31	0.68	Agree
28	SIWES strongly and positively impacts on electrical technology education students (ETES)the proper habits of store keeping and tool handling.	3.54	1.20	Agree
29	SIWES strongly and positively impacts on electrical technology education students (ETES)the good ethics of proper dressing code and modesty in the industrial electrical workshop.	3.62	1.17	Agree
30	SIWES strongly and positively impacts on electrical technology education students (ETES) the good skills of entrepreneurship, so that they can become entrepreneurs in the nearest future.	2.95	0.91	Agree
31	SIWES strongly and positively impacts on electrical technology education students (ETES)the good habits of co-operating and harmonious relationship with co-workers, other students and associates.	3.02	1.06	Agree
32	SIWES strongly and positively impacts on electrical technology education students (ETES) good work-place eating habits that discourages drunkenness and drug addiction.	3.32	0.77	Agree
33	SIWES strongly and positively impacts on electrical technology education students (ETES) the good habits of community service and statesmanship.	3.17	0.97	Agree
34	SIWES strongly and positively impacts on electrical technology education students (ETES) the skills of industrial inquiry, research and development.	3.11	1.13	Agree
35	SIWES strongly and positively impacts on electrical technology education students (ETES) the skills of industrial first-aid treatment to accident victims and other good social services.	2.88	1.02	Agree

Hypothesis 1

Ho_1: There will be no statistical significant difference between the mean responses of electrical educators

and those of electrical technology education students on the impact of SIWES on the practical skill acquisition of electrical technology education students.

Table 3.

Two-tailed t-test of Difference between the Mean Responses of Electrical Lecturers and those of Electrical Students on the Impact of SIWES on Practical Skills Acquisition of Electrical Technology Education Students.

S/N	Item Statement	$\overline{X_L}$	$\overline{X_S}$	t-cal	Remark
1	SIWES strongly and positively impacts on electrical technology education students (ETES) the skills of bridging the gap between theory and practice in the field of electrical technology.	2.91	2.88	0.47	NS
2	SIWES strongly and positively impacts on electrical technology education students (ETES) the skills of converting electrical engineering designs and blue prints into practically workable industrial electrical operations and processes.	3.67	3.59	0.48	NS
3	SIWES significantly and positively impacts on electrical technology education students (ETES) the skills of converting electric circuit theories to industrial electrical practice.	3.52	2.88	1.41	NS
4	SIWES strongly and positively impacts on ETES the skills of converting electrical circuit diagrams to practical wiring protocols.	2.47	3.32	1.87	NS
5	SIWES strongly and positively impacts on ETES the skills of electric motor/generator winding and re-winding which are not often obtainable in the school workshops.	3.44	3.38	0.49	NS
6	SIWES strongly and positively impacts on ETES the skills and experiences of electrical systems trouble shooting.	2.64	3.10	1.13	NS
7	SIWES strongly and positively impacts on ETES the practical skills and industrial experiences in light duty and heavy duty electrical machines/equipment installation which are not often obtainable in the schools.	3.43	3.64	0.61	NS
8	SIWES strongly and positively impacts on ETES the systemic and practical skills of electrical repairs and maintenance.	3.41	3.63	0.63	NS
9	SIWES strongly and positively impacts on ETES the professional skills of translating electrical legends from theoretical graphics into industrial practical realities.	3.66	3.58	0.49	NS
10	SIWES strongly and positively impacts on ETES the professional skills and experiences of practically applying all the required safety precautions, rules and regulations in industrial setting.	3.21	2.44	1.66	NS
11	SIWES strongly and positively impacts on ETES the skills and experiences in practically adhering and applying IEE regulations of London.	2.87	3.11	0.68	NS
12	SIWES strongly and positively impacts on ETES the skills and experiences of practical applications of specialized electrical measuring instruments that are often not available in the schools.	2.69	2.55	0.56	NS
13	Only SIWES fully impacts on ETES electrical high tension practical skills and experiences.	2.00	1.80	0.75	NS
14	SIWES strongly and positively impacts on ETES the skills and experiences of high energy transformers and sub-station maintenance practically.	3.52	.26	1.05	NS
15	SIWES strongly and positively impacts on ETES the skills and experiences of industrial and domestic panels installation and maintenance practically.	3.40	3.24	0.88	NS

Key:

X_L = mean responses of electrical lecturers (n, =5)

X_S = mean responses of electrical student ($N_S = 49$)

Df = Degree of Freedom = $N_1+N_2 - 2 = 5+49-2 = 52$

t-table = 2.01 for 50@ two-tail

$p<0.05$

NS = Not significant difference in means

S = Significant difference in means

Hypothesis 2

Ho_2: The mean rating of electrical educators and electrical technologyeducation students will not be significantly different on the impacts of SIWES on work-habit and public relation skills acquisition of electrical technology education students.

Table 4

Two-tailed t-Test of Difference between the Mean Response of Electrical Lecturers and those of Electrical Students on the Impact of SIWES on Work-Habit and Public Relations Skills Acquisition of Electrical Technology Education Students

S/N	Item Statement	$\overline{X}_L$	$\overline{X}_S$	t-cal	Remark
16	SIWES strongly and positively impacts on electrical technology education students (ETES) good work-habit of punctuality and appropriate clocking-in and clocking-out.	3.08	2.86	1.03	NS
17	SIWES strongly and positively impacts on electrical technology education students (ETES) the good work-habit of remaining at ones duty post after clocking-in.	3.10	2.94	0.87	NS
18	SIWES strongly and positively impacts on electrical technology education students (ETES) the danger of truancy and neglect of ones duties.	3.52	3.26	1.05	NS
19	SIWES strongly and positively impacts on electrical technology education students (ETES) the skill of showing respect for superordinate in the work-places.	3.40	3.24	0.88	NS
20	SIWES strongly and positively impacts on electrical technology education students (ETES)the skills of diligence, dedication and ardent hard working required in electrical work-places.	2.98	3.10	0.82	NS
21	SIWES strongly and positively impacts on electrical technology education students (ETES) the skills of friendly and good relationship with co-workers in the industry.	2.41	2.38	0.78	NS
22	SIWES strongly and positively impacts on electrical technology education students (ETES) the good work-habit of humility, respect and obedience to the administrator.	3.21	3.01	0.62	NS
23	SIWES strongly and positively impacts on electrical technology education students (ETES) the good-work skills of accepting and executing delegated assignments and responsibilities.	3.54	3.12	1.10	NS
24	SIWES strongly and positively impacts on electrical technology education students (ETES) the skills of learning practically on the job and perfecting under a proven skilled master, supervisor or manager.	3.44	3.38	0.49	NS
25	SIWES strongly and positively impacts on electrical technology education students (ETES) positive habit of public relations in the industry.	2.64	3.10	1.13	NS
26	SIWES strongly and positively impacts on electrical technology education students (ETES) good habits of conflict resolution in the work-place.	3.43	3.64	0.61	NS
27	SIWES strongly and positively impacts on electrical technology education students (ETES) good habits of workshop management and proper house-keeping.	3.41	3.63	0.63	NS
28	SIWES strongly and positively impacts on electrical technology education students (ETES)the proper habits of store keeping and tool handling.	3.66	3.58	0.49	NS
29	SIWES strongly and positively impacts on electrical technology education students (ETES)the good ethics of proper dressing code and modesty in the industrial electrical workshop.	3.04	3.68	1.49	NS
30	SIWES strongly and positively impacts on electrical technology education students (ETES) the good skills of entrepreneurship, so that they can become entrepreneurs in the nearest future.	3.74	3.65	0.51	NS
31	SIWES strongly and positively impacts on electrical technology education students (ETES)the good habits of co-operating and harmonious relationship with co-workers, other students and associates.	3.32	3.30	0.66	NS
32	SIWES strongly and positively impacts on electrical technology education students (ETES) good work-place eating habits that discourages drunkenness and drug addiction.	3.64	3.44	0.73	NS
33	SIWES strongly and positively impacts on electrical technology education students (ETES) the good habits of community service and statesmanship.	3.78	3.46	1.01	NS
34	SIWES strongly and positively impacts on electrical technology education students (ETES) the skills of industrial inquiry research and development.	3.21	2.98	1.02	NS
35	SIWES strongly and positively impacts on electrical technology education students (ETES) the skills of industrial first-aid treatment to accident victims and other good social services.	3.52	2.88	1.41	NS

Key:

$\overline{X}_L$ = mean responses of electrical lecturers ($N_L = 5$)

$\overline{X}_S$ = mean responses of electrical students ($N_s = 49$)

Df = Degree of freedom = $N_1+N_2 - 2 = 5+49-2 = 52$

t-table = 2.01 for 50@ $P<0.05$:Two-tailed

NS = Not significant Different in mean

S = Significant difference in means

Findings

Based on the analyzed data, the following two groups of findings were made:

1. SIWES strongly and positively impacted 15 practical skills on ETES.
2. SIWES strongly and positively impacted 20 work-habit and public relations skills on electrical technology education students (ETES).

Discussion

The findings of this study have shown that SIWES is very important and infact very imperative in all round skills acquisition of electrical technology education students. Clearly shown are the facts that SIWES does not only enhance practical skills acquisition of the students but also strongly and positively impacts on the students the skills of good work-habit, public relations and social services necessary for full development of the individual and the society.

Hence in the first group of findings fifteen specific practical electrical industrial skills were all agreed unanimously byboth lecturers and students to be impacted by SIWES. The skills of bridging the gap between theories taught in the classroom and the usual field and industrial practice is generic and tops the impacts of SIWES. This is in line with Inyiagu (2012) who posited that one of the cardinal objectives of SIWES and any other industrial attachment scheme is to provide students the opportunity to apply theoretical knowledge in real work situations thereby bridging the gap between classroom work and actual practice. Each specific finding in the first group dealt with specific aspect of electrical practical skill impacted by SIWES with all their mean above 2.5 (Agreed) and all $\overline{X}_L$ and $\overline{X}_S$ being not significantly different.

The second group of findings comprised general skills of good work-habit, public relations and social services which Kanu (2010) and Ogwa (2010) claimed to be very important factors in the over-all development of any nation. Twenty specific skills in these areas were found to be impacted by SIWES as agreed to by both lecturers and students with all their means being above 2.5 (Agreed) and all $\overline{X}_L$and $\overline{X}_S$ being not significantly different.

Recommendation

Based on the findings of this study, the following recommendations were made:

1. Federal Government of Nigeria should promulgate laws compelling companies and industries to always accept all SIWES students posted to them and expose them to all their practical undertakings.
2. Institutions of higher learning should confirm that students acquire all these skill and more before graduating through appropriate assessment strategies after SIWES.

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