

Appraisal of Students Industrial Work Experience Scheme (SIWES) in NCAM, Agricultural Engineering and NCAM Contribution

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Abstract

The study was carried out at national centre for agricultural mechanization (ncam) ilorin kwara state, nigeria. The data on siwes students used was compiled for the period 2011 to 2015 of planning monitoring and evaluation department of the centre. Results from the study revealed that from the 2011 – 2015 the polytechnics recorded the highest of statistical mean of 44.60 and universities has 32.00 there is a very strong significant difference of 0.00 between the tertiary institutions (polytechnics, universities, college of education and federal training centre). The study also revealed that more of engineering students came for siwes program then science and social science with a very high significant difference of 0.01. No much significant difference between female and male students. The statistical mean for duration of 6 months and 1 year is the highest North central has the highest mean of 63.40 followed by south west is 11.20, north west has 1.80, north east has 1.60 while south south has none (0.00). Implying that only students from the tertiary institutions within the proximity of geo – political zone where ncam is sited came for their siwes programme at the national centre for agricultural mechanization.

Keywords: SIWES; Agricultural engineering; NCAM.



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1. Introduction

Training is a key factor in enhancing the efficiency and expertise of the workforce. Training as define by Wikipedia is developing in oneself or others any skill and knowledge that relate to specific useful competencies. It has specific goals of improving one's capability, capacity, productive and performance. It also forms the core of apprenticeship and provides the backbone of content at institutes. In addition to the basic training required for a trade, occupation or profession, there is the need to continue training beyond initial qualifications to maintain, upgrade and update skills throughout working life.

Industrial Training Fund is a parastatal established in 1971 under the enabling laws of Decree 47 of 1971 by the Federal Government of Nigeria. It is to see to manpower development of students of tertiary institutions. Students Industrial Work Experience Scheme (SIWES) was established by Industrial Training Fund (ITF) in 1973. It forms part of the approved academic requirement in various tertiary institutions in the country.

The programme enables students in tertiary institutions acquire technical skills and experience for professional development. It allows the students gain insights into career options to support their choice of specialized field area to build and develop their career. For engineering students it exposes them to real practical aspect of engineering and gives them the necessary experience on how to handle equipment and machinery that are not available in their institutions.

The Scheme was introduced in tertiary institutions in 1974 to ensure acquisition of field practical knowledge and skills by students before graduation. Following the establishment of SIWES it commenced its operation in 1974 with the aim of making education more relevant and to bridge the gap between the theory and practice of engineering, technology, and science-related disciplines in tertiary institutions in Nigeria.

The objectives of SIWES were summarized by the federal government in its *Gazette* of April, 1978 as follows:

1. To provide an avenue for students in institutions of higher learning to acquire industrial skills and experiences in their course of study
2. To provide students with an opportunity to apply their knowledge in real work and actual practice thereby bridging the gap between theory and practice.
3. To make the transition from school to the world of work easier and to enhance students contacts for later job placement.
4. Prepare student for the industrial work situation they will meet after graduation.
5. Expose students to work methods and techniques in handling equipment and machinery that may not be available in their institutions.
6. Enlist and strengthen employer's involvement in the entire education process and prepare student for employment in industry and commerce.

2. Objectives of the Study

The objectives are to bring out the role of National Centre for Agricultural Mechanization (NCAM) to Students Industrial Work Experience Scheme, agricultural engineering and her contribution. The objectives of the study are as follow:

1. Categorization of SIWES based on tertiary institutions
2. Determine SIWES students based on course of study
3. Categorization of SIWES based on gender
4. Categorization of SIWES based on duration
5. Determine the Geo-political zonal distribution of SIWES students
6. Determine numbers of SIWES students that has pass through the [1-5]
7. Make suggestions on how to improve on the existing practice based on problems identified.

3. Literature Review

Aderonke [6]: examined the SIWES scheme and the incidence of occupational misfit in Nigeria and dynamics sustainable skill acquisition and utilization in Nigeria with a view to determining the viability of government or otherwise continuing investment in the scheme.

The ex-post facto research design was used for the study. The population was estimated at 2,242 comprised of students from four polytechnics (849), four monotechnics (550) and (542) Industrial Training Officials of SIWES in Science, Technology and Agriculture related courses was selected through the purposive and stratify random sampling techniques. She concluded that SIWES has improved positively the level of skills utilization by employers of labour ($\chi^2 = 324, 429$; $df = 15$, $P < 0.05$) and SIWES is a good strategy for sustainable skill development in Nigeria.

Koskey [7], evaluated the Challenges facing induction training programmes for student on industrial attachment in Kenya. He took sample groups of 150 students on attachment and 25 workplace supervisors that were randomly selected from their respective sampling frames of which self-administered and researcher-administered questionnaires were used to collect data. He also used interview schedules for key informants in industry to get some data. From his result the quantitative data analysis for his study revealed that some challenges were facing induction training programmes for students on the attachment in Kenya. His five stated challenges were: Student trainees do not have free access to machines and equipment to work with; Student trainees spend a lot of money traveling from their places of residence to workplace; Industries are suspicious of students on the attachment programme; Students spend a lot of time in finding placement for the industrial attachment; and Supervision from workplace and training institution supervisors is not effective. The results of his study showed that among these challenges, four were found to be statistically significant. These were: the lack of free access to machines and equipment; the amounts of money spent on traveling to and from the workplace, the time spent on finding placement and the effectiveness of supervision by workplace and training institution supervisors: The industry being suspicious of students on the attachment was not found as a challenge. Ps-values of the statistical tests for the five stated challenges were also computed. There was agreement (no significant difference) between the two sample groups when the P - value on the stated challenges was greater than significance level of 0.05.

Ojokuku, *et al.* [8], examined the influence of Students Industrial Work Experience Scheme on Professional Development of Library and Information Science Students in South-West, Nigeria. They used facilities available at the place of the training. These are computer laboratories, internet services, e-libraries and audio-visuals. Computer laboratory and internet facilities had the greatest frequencies 207(93.7%) each. These accounted for the students' perceptions that SIWES influences professional development positively with response rate of 216 (97.7%) agreement, and that SIWES exposed them to new work methods also with response rate of 216 (97.7%) agreement. It was also discovered that SIWES provides avenue for technical skill development with response rate of 208(94.1%) in agreement.

Olusegun [9] examined the problems associated with effective implementation of SIWES for Chemical Engineering and its effectiveness in contributing to the professional development of the Chemical Engineering student. In their conclusion they deduced that with respect to Chemical Engineering, SIWES cannot be a replacement or substitute for a well-structured professional training. Consequently, the supervised Industrial Training Scheme in Engineering (SITSIE) put in place by COREN could be adopted as a format for professional training of chemical engineers.

Ukwueze [10], evaluates the extent to which SIWES has impacted on student's viability in the job market after graduation. Three research questions were used to guide the study on a sample of 600 students drawn from relevant faculties of a university and a polytechnic in south eastern Nigeria. The results show that greater level of employability skills is achievable through fruitful participation in SIWES program. In their research they concluded that study shows that those who serve in government establishment, Inclusive of organized private sector, are exposed to better opportunity for developing employability skills than those in private organizations.

Wodi and Dokubo [11], Evaluates the extent to which the agencies involved in the operation and management of SIWES function to achieve the objectives of the programme. In their sample 240 students, 18 staff from Rivers State Polytechnic Bori, Federal Government College of Education Technical Omoku, Rivers State College of Education Rumuolumini - Port Harcourt, Rivers State University of Science and Technology, Nkpolu - Oroworukwo, Port Harcourt and University of Port Harcourt were randomly selected from 5 institutions involved in SIWES in Rivers State, also 2 staff of ITF from Area Office Port Harcourt were involved. They data collection two

sets of 25 item questionnaires for the students' supervisors/staff to find out the extent of their involvement in SIWES were used. The four point modified like scale and mean percentages were used to analyze their data.

Their findings revealed Lack of adequate supervision, none signing of necessary materials like ITF Form 8 and students log-books at their places of attachment, difficulties of students in getting placement, unnecessary delay in the payment of students and supervisors allowance.

4. Methodology

Secondary Data was used for the study; it was compiled from record of SIWES students from the year 2011 to 2015. The period of 2011 to 2015 was used because from 2010 down there was no much record of the number of students that came for SIWES programme in the Centre

The data collated was based on institution, course of study, duration, gender and geo – political zone. Descriptive statistics; frequencies mean, ANOVA, DUCAN and Students T- Test statistical analysis was used. The Students T- Test statistical analysis was used to analysis categorization of SIWES based on gander because the population variant is only two which does not give room for comparisons under ANOVA and Ducan.

5. NCAM Contribution to Sives Prgramme

The National Centre for Agricultural Mechanization (NCAM) is situated at Ifelodun Local Government Area (LGA) of Kwara State, Nigeria. It was established with Decree No. 35 of 1990, with the mandate of accelerating transformation of the agricultural sector of the economy through agricultural mechanization to increase the quality and quantity of agricultural products. NCAM is providing practical training and enabling environment for the SIWES students to come to the Centre to do their SIWES programme. The mandate of Centre is to carry out adoptive, adaptive and innovative research. And the mandate is as follow:

1. To encourage and engage in adaptive and innovative research towards the development of indigenous machine for farming and processing techniques;
2. To design and develop simple and low-cost equipment which can be manufactured with local materials, skill and facilities;
3. To standardize and certify in collaboration with the Standards Organization of Nigeria (SON), agricultural machines, equipment and engineering practices in use in Nigeria;
4. To bring into focus mechanical technologies and equipment developed by various institutions, agencies or bodies and evaluate their suitability for adoption;
5. To assist in the commercialization of proven machines, equipment, tools and techniques;
6. To disseminate information on methods and programmes for achieving speedy agricultural mechanization;
7. To provide training facilities by organizing courses and seminars specially designed to ensure sufficiently trained manpower for appropriate mechanization;
8. To promote co-operation in agricultural mechanization with similar institutions in Nigeria, and with international bodies connected with agricultural mechanization.

As one of her mandate, NCAM is contributing immensely in the training and development of SIWES/IT students who come to the Centre to undertake their mandatory SIWES programme. No Nation can achieve meaningful progress technologically without encouraging its youth to acquire necessary practical skills. These skills enable SIWES students to harness available resources to meet the needs of the country.

The Centre comprises of five technical/scientific departments with other supporting departments. The technical/scientific departments are core Agricultural Engineering options and they are;

1. Farm Power & Machinery Engineering (FPM) Department;
2. Processing & Storage Engineering (PSE) Department;
3. Land & Water Engineering (LWE) Department;
4. Agro – Industrial Development & Extension (AIDE) Department;
5. Engineering & Scientific Services (ESS) Department.

These departments are man by PhD in Agricultural Engineering in the various options of the profession. Because of the importance of the SIWES programme, the programme is specifically put under Planning Monitoring and Evolution department to supervise and coordinate the activities of the students on SIWES in the Centre. It deployed and redeploy students to the department them to go round the five technical/scientific departments. This is to enable them acquire practical experience in all the field of agricultural engineering.

They are assign assignment to carry out welding and fabrication of prototype agricultural machines. Their logbooks are checked and signed weekly by the HOD of the departments. A written report on all the activities carried out during the SIWES programm must be submitted to Planning, Evaluation and Monitoring (PME) department to ascertain their understanding of the use of lathe, cutting, shaping machines. The use of gas welding, arc welding, riveting and drilling, Also coming to NCAM enable them to build valuable networks and contacts for professional development. They gain additional skills in areas such as communication, team building, problem solving and analytical reasoning among their peers from other Tartary institutions.

Accommodations are provided for those that wants to stay in the Centre premises or those that are from far places. Apart from the Industrial Training Fund paying the SIWES students, the Centre also pay them as a sort of encouragement.

6. Results and Discussion

Table-1. from the Descriptive Statistical analysis for Tertiary Institution it was observed that the statistical mean of students that came from the Polytechnic between 2011 and 2015 recorded the highest (44.60) and Universities (32.00) as compared to those from College of Education (2.00) and Federal Training Centre (0.40). **Table 1.1.**, using the ANOVA, it shows that there is a very strong significant difference (0.00) between the tertiary institutions.

Table 1.2 shows the Duncan method, this grouped the institution into two. The Federal Training Centre and College of Education falls in the same group, while Universities and Polytechnic are in the same group

Table-1. Descriptive Statistics for Tertiary Institution

	Number of Years (N)	Mean	Std. Deviation	Std. error
Col. of Education	5	2.00	1.581	0.707
Fed. Training Centre	5	0.40	0.548	0.245
Polytechnic	5	44.60	21.571	9.647
University	5	32.00	15.346	6.863
Total	20	19.75	23.056	5.155

Table-1.1. ANOVA for Tertiary Institution

	Sum of Squares	Df	Mean Square	F	Sig.
Tertiary	7285.350	3	2428.450	13.81	0.00
Error	2814.400	16	175.900		
Total	10099.750	19			

Table-1.2. Duncan

Type of tertiary institution	Year N	Subset for alpha = 0.05	
		1	2
Fed. Training Centre	5	0.40	
Col. of Education	5	2.00	
University	5		32.00
Polytechnic	5		44.60

Means for groups in homogeneous subsets are displayed.

Table 2.0; shows the categorization of SIWES students based on course of study. The table revealed that from the year 2011-2015 NCAM receives more of engineering students for SIWES program then Science and Social Science. **Table 2.1:** ANOVA it shows a very significant difference of 0.01.

Table 2.1; Duncan analysis grouped the courses into two putting Science and Social Science in the same group and Engineering in a group. Indicating that, engineering students are mostly from Universities and Polytechnic, while College of Education and Federal Training Centre are Science and Social Science discipline.

Table-2.0. Descriptive Statistics for Course of Study

	Number of Year (N)	Mean	Std. Deviation	Std. Error
Engineering	5	52.00	28.965	12.954
Science	5	19.00	7.314	3.271
Social science	5	8.00	2.739	1.225
Total	15	26.33	25.133	6.489

Table-2.1. ANOVA for Course of Study

	Sum of Squares	Df	Mean Square	F	Sig.
course of study	5243.333	2	2621.667	8.739	0.01
Error	3600.000	12	300.000		
Total	8843.333	14			

Table-2.2. Duncan for Course of Study

Course of Study	Number of Year N	Subset = alpha 0.05	
		1	2
Social Science	5	8.00	
Science	5	19.00	
Engineering	5		52.00

Means for groups in homogeneous subsets are displayed.

Table 3.0: shows the categorization of SIWES students based on gender. It revealed the statistical mean of female and male students between the years 2011-2015. The females have 44.20 and male has 34.80. The implication of this is that more female students are now going into agricultural engineering studies and are showing interest in acquiring technical skill like their male counterpart.

Table 3.1: student T test was used because the population variant is two it does not give room for comparison under Duncan analysis. The student T test shows that there is no significant difference between the man and female students.

Table-3.0. Descriptive statistics for Gender

Gender	Number of Year	Mean	Std. Deviation	Std. Error Mean
Male	5	34.80	35.65	15.94
Female	5	44.20	17.64	7.89

Table-3.1. Student T test for gender of students

		t	df	Sig. (2-tailed)
Number of students	Equal variances assumed	-.528	8	0.61

Table 4; is showing the categorization of SIWES based on duration (6 weeks, 3 months, 4months, 5 months, 6 months and 1 year). The students on 6months duration recorded the highest mean of 24.40 while and 4 months (19.60) 1 year (17.40) follows respectively. The least duration were recorded for students on 6 weeks (0.20).

Table-4.0. Descriptive statistics for Duration of SIWES

Duration	Number of Year (N)	Mean	Std. Deviation	Std. Error
6 Weeks	5	0.20	0.447	0.200
3 Months	5	9.60	3.578	1.600
4 Months	5	19.60	10.784	4.823
5 Months	5	7.80	11.756	5.257
6 Months	5	24.40	21.571	9.647
1 Year	5	17.40	9.450	4.226
Total	30	13.17	13.473	2.460

Table-4.1. ANOVA for Duration of SIWES

	Sum of Squares	Df	Mean Square	F	Sig.
Duration of SIWES	1975.767	5	395.153	2.884	0.04
Within Groups	3288.400	24	137.017		
Total	5264.167	29			

Table-4.2. Duncan

Duration of SIWES	Number of Year (N)	Subset for alpha = 0.05	
		1	2
6 Weeks	5	.20	
5 Months	5	7.80	7.80
3 Months	5	9.60	9.60
1 Year	5		17.40
4 Months	5		19.60
6 Months	5		24.40

Table 5: is showing the categorization of SIWES students based on Geopolitical. The table reveals that the highest number of students that were admitted during the period under review 2011-2015 came from the North-Central (63.40) followed by South-West (11.20). The North West, South East and South East has almost the same mean while none came from South-South (0.00)

Table 5.1: ANOVA table show a very significant difference (0.00) between the North Central zone and other zones.

Table 5.2: Duncan grouped the South West, North West, South East, North East and South South together while North Central is only it's group.

Table-5.0. Descriptive Statistics for Geo - Political Zones

	N	Mean	Std. Deviation	Std. Error
North Central	5	63.40	23.628	10.567
North East	5	1.00	1.732	.775
North West	5	1.80	2.168	.970
South East	5	1.60	2.074	.927
South West	5	11.20	6.834	3.056
South South	5	.00	.000	.000
Total	30	13.17	24.932	4.552

Table-5.1. ANOVA for Geo-Political Zones

	Sum of Squares	Df	Mean Square	F	Sig.
Geo-political zones	15558.167	5	3111.633	30.259	0.00
Error	2468.000	24	102.833		
Total	18026.167	29			

Table-5.2. Duncan

Geo-political zones	N	Subset for alpha = 0.05	
		1	2
South South	5	.00	
North East	5	1.00	
South East	5	1.60	
North West	5	1.80	
South West	5	11.20	
North Central	5		63.40
Means for groups in homogeneous subsets are displayed.			

7. Conclusion

From the statistical analysis of the data on SIWES students the following conclusion are drawn it was observed that students that came from the Polytechnic between 2011 and 2015 recorded the highest (44.60) and Federal Training Centre (0.40) with a very significant difference of 0.01

On the course of study NCAM receives more of engineering students for SIWES program then Science and Social Science. During the years under review (2011-2015) the females has 44,20 and male has 34.80 The implication of this is that more female students are now going into agricultural engineering studies and are also showing interest in acquiring more technical skill like their male counterpart. Students on 6 months duration has the highest mean and are from universities while 1 year are polytechnic students.

The least duration were recorded for students on 6 weeks (0.20). Geo-political zones of SIWES Students that came for their programme in the Centre. The North Central has the highest mean (63.40) followed by South West (11.20) and none from South South with a very significant difference of 0.00 between the North Centre Zone and other Geo – Political Zones.

The sharp difference in Geo – Political Zones of student that came for their SIWES programme in the Centre could be that students from the tertiary institutions within the Geo – Political Zone and proximity of where National Centre for Agricultural Mechanization (NCAM) is sited.

Or students from the South South are not aware of the existent of National Centre for Agricultural Mechanization (NCAM). It could also be the distance of the institutions in the South South Geo – Political Zones to National Centre for Agricultural Mechanization (NCAM). In all, a total of 395 students have done Students Industrial Work Experience Scheme (SIWES) programme at National and Centre for Agricultural Mechanization (NCAM) Ilorin between 2011to 2015. The disciplines are Engineering, Science and Social Science, with Engineering having the highest (260).

Recommendation

There should be more information on the existence of National Centre for Agricultural Mechanization (NCAM) to the tertiary institutions across the Geo – Political Zones that are not aware it exists. This can be by way of sending flyers.

It is recommended that government should devote sufficient financial resources to assist the Centre to sustain the skill acquisition programme (SIWES) and other related trainings in the Centre. More hostels is required to accommodate the teeming students on SIWES in the Centre.

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