

## SKILLS' COMPETENCY IN STUDENTS INDUSTRIAL WORK EXPERIENCE SCHEME: A PREDICTOR OF EMPLOYABILITY OF CHEMISTRY INTO CHEMICAL INDUSTRIES IN KANO STATE, NIGERIA

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### Abstract

*The study investigated Skills Competency in Students Industrial Work Experience Scheme (SIWES): A predictor of employability skills of chemistry graduates into chemical industries in Kano State, Nigeria using correlational and ex-post factor research designs. The population for the study consisted of 450 Undergraduate Chemistry Students in 300 level in three public Universities in Kano State, Nigeria during the 2022/2023 academic session. The sample of the study consisted of 160 male and 160 female students. Two research questions guided the study; two null hypotheses formulated and tested at  $P \leq 0.05$  level of significance. Purposive sampling technique was used in selecting one Federal University from the population, then simple random sampling technique involving balloting method in selecting the other State-owned University. Student Industrial Work Experience Scheme Employability Skills Acquisition Test (SIWESAT) was the instrument used for data collection. The instrument was validated by experts and pilot tested with the reliability coefficient of .88. Pearson Correlation Analysis was used to answer research questions while null hypotheses were tested using Regression analysis. Among the findings of the study revealed that: There is no relationship between performance in SIWES and employability skills acquisition in industrial chemistry. Based on the findings, it was therefore recommended that, SIWES and industrial based supervisors should exposed students to different aspects of employability skills concepts such as effective communication, leadership qualities, self-management among others prior to commencement of the programme with attendance made mandatory. The study concludes among other that, performance in SIWES is not a predictor to employability skills acquisition.*

**Keywords:** *Employability Skills, Predictor, SIWES.*

### Introduction

The industrial training fund (ITF) established students industrial work experience scheme (SIWES) in the year 1973 with an outlined objectives. Among the missional and visional objective is to provide opportunities to undergraduate and tertiary institutes graduate especially those with ordinary and higher national diploma to gain industrial skills and experience.

Henceforth, the SIWES is designed to prepare graduate of mono and poly technics students for industrial work and to support manpower by increasing the workforce with least payment. In addition, SIWES students are meant to have industrial experience in terms of physical activities, laboratory management, equipment maintenance, qualitative leadership experience, academic qualification and

excellent performance. Therefore, SIWES is conditioned to be a transitional training ground, in which students are transformed from theoretical learner with mere or virtual laboratory practical into a real situation and largescale production for environmental development. Moreover, SIWES developed all the three domains of learning especially the psychomotor and cognitive.

In Nigeria, our students have been enjoying SIWES programme for quite number of years but the succulent part of its objective were forsaken long ago (ITF, 2016). However, researches were conducted stating lots of its benefits. Obasi (2015) said that the industrial training brings several reimbursements to humanity beyond classroom setting. Indeed, owing to the belief that the benefits cannot be acquire through bare teaching and mere experimental experience obtained from schools. The SIWES programme used to gives students opportunity to be part of actual work situation, outside the classroom. Similarly, SIWES has been a cause of concern to education and economic planners, particularly with respect to graduate employment (Akanwa, et al., 2018). Consequently, the needs for reinvestigating the reasons why nowadays the students attending SIWES programme shows less expected skills or even none is acquired during attending the industrial training. In fact, research have shown that the problems laid in the hands of implementation officers (Akinremi, et al., 2018). Nawaya and Jemimah (2019) pushed the blames towards the trainers; while Auru and Wakili (2020) identified the trainees' learning attitude, despite the availability of learning aided electronics materials that guide and promote meaningful learning and imitations. Consequently, the predecessors' findings have not commensurate the initial target for the establishment of SIWES, especially in the side of chemical industries.

Certainly, the need to investigate, test, and reaffirm if the skills' competency exists in undergraduate students attending SIWES to the satisfaction of Kano chemical industries management for employment is still clinging. Thereafter, this paper investigated on the skills' competency in student industrial work experience scheme as a predictor of employability of chemistry graduate students into chemical industries in Kano State, Nigeria. Hence literature shows that through implementation of SIWES, the educational challenges especially skill-acquisition are drastically way down and the national vision and mission has practically actualized. Similarly, it predicted the employability skills, psychomotor skills and academic performance of the students.

In this regard, Zachariah and Yabuwat (2016) explained the hopefulness of the Nigerian government on trained SIWES graduates self-reliant and capacitation to bring positive impact of economic standard. Especially if attention was paid well to the collaboration between industries and the tertiary institutions within the country. Indeed, before, SIWES experience was a pre-requisite for the award of Diploma, Nigerian Certificate in Education, NCE and Degree certificates in the country. The studies conducted by Folorunsho (2018) and Olumoko (2017) showed that SIWES influenced students' academic performance and enhances competency of students in their academic activities. The research goes to the extent that, the realization and acceptability of SIWES has being described as the lasting solutions for boosting performance.

### **Statement of the Problem**

In spite of the many years of existence of SIWES and the continuing participation of Chemistry students in the scheme, doubts are still being expressed over the competencies and skills levels of graduates of Chemistry from tertiary institutions in Nigeria (Simisaye, et al., 2018). This raises questions as to whether SIWES is an effective platform for equipping Chemistry students with the competencies and skills they so much require. It is important therefore, to conduct an empirical study to generate feedback on some aspects of the scheme from Chemistry undergraduates' students (Ibegbulam, et al., 2017). It is against this background the research sought to assess students industrial work experience scheme (SIWES) as predictor of employability skills in industrial chemistry among the undergraduate students in Kano State, Nigeria.

### **Purpose of the Study**

The main purpose of this study was to assess students industrial work experience scheme (SIWES) as predictor of employability skills in industrial chemistry among the undergraduate students in Kano State, Nigeria. The specific objectives of the study are to:

1. determine the relationship between performance in SIWES and employability skills acquisition in industrial chemistry among undergraduate students in Kano State, Nigeria.
2. ascertain the relationship between performance in SIWES and employability skills acquisition in industrial chemistry among male and female undergraduate students in Kano State, Nigeria.

### **Research Questions**

The study to provide answers to the following research questions.

1. What is the relationship between performance in SIWES and employability skills acquisition in industrial chemistry among undergraduate students in Kano State, Nigeria?
2. What is the relationship between performance in SIWES and employability skills acquisition in industrial chemistry among male and female undergraduate students in Kano State, Nigeria?

### **Hypotheses**

The following null hypotheses were formulated and tested at  $P \leq 0.05$  level of significance.

HO<sub>1</sub>: There is no significant relationship between performance in SIWES and employability skills acquisition in industrial chemistry among undergraduate students in Kano State.

HO<sub>2</sub>: There is no significant relationship between performance in SIWES and employability skills acquisition in industrial chemistry among male and female undergraduate students in Kano State, Nigeria.

### **Methods**

The study was conducted using two designs that is, correlational and ex post factor. The correlational design was used and determined the chemistry undergraduate students' performance and skills' competency during SIWES. Secondly, from the result of performance and competency, the nature with which are were related to the real work field in the Kano chemical industries after the employment was also determined. The relations includes mutual, reciprocal and complemented. Then, the ex post factor, which hinged to previous knowledge and performance the student has during SIWES training. The study used this research design and predicted the up-coming performance when they get into or expose to real activity. Study recorded the performance of the graduate that were able to reminiscent or retro play of their past in relation to chemical industry training. The study was conducted in three universities, all situated in Kano State. Among the three university, one was a Federal (BUK), while the other were ADUSTECH and YUMSU. Then, out of the 450 population of 300 level Chemistry students of the session 2022/2023, 155 were purposively selected from the Federal University while 165 were randomly selected from one of the remaining two Universities.

**Results**

The result obtained from Research Question 1 is summarized in Table 1.

**Table 1: Pearson Correlation Analysis for Industrial Chemistry Performance in SIWES and Employability**

Model	r	R <sup>2</sup>	Adjusted R <sup>2</sup>	Estimated Std. Error
1	.108	.012	.009	1.2412

The Table 1 presented a Pearson correlation analysis between performance in SIWES and employability skills acquired on industrial chemistry. The analysis revealed that the correlation coefficient (r) obtained was .108 is weak positive relationship between the students’ performance in SIWES and employability skills. Then the test model revealed that the coefficient of determination of the variations in employability skills (R<sup>2</sup>) was .012 and it implies that the selected performance in SIWES is only accounting for 1.2% of the variation in the students’ employability skills. And the adjusted standard error was found to be 1.2412. Thus, leads to the analysis of hypothesis 1 (H<sub>01</sub>), which was captured in Table 2.

**Table 2: Linear Regression Analysis for Industrial Chemistry Performance in SIWES and Employability Skills on Gender based**

Model	Unstdz. Coefficient		Stdz Coefficient		
	B	Std. Error	Beta	t	Sig. Remark
Constant	74.731	1.857	40.247	0.000	S
Employability Skills	0.073	0.038	0.108	1.942	0.053 NS

Prediction Significant at P ≤ .05

The Table 2 summarized the linear regression relationships existed between industrial chemistry performance in SIWES and employability skills acquisition. The analysis revealed that the P-value obtained was .053 which is greater than the alpha value of .05 level of significance. And this indicated that the null hypothesis one, is therefore retained. Thereafter, the researchers looked into research question two and answered as shown in the Table 2.

What is the relationship between performance in SIWES and employability skills acquisition in industrial chemistry among the male and female undergraduate students in Kano State, Nigeria?

**Table 3: Correlation Coefficient Analysis for Industrial Chemistry Performance in SIWES and Employability Skills on Gender based Using PPMCC**

Variables	SIWES Performance		Employability Skills		
	Gender	Male	Female	Male	Female
SIWES Performance	Male	1.000	0.173	0.370	0.025
	Female	0.173	1.000	0.255	-0.122
Employability Skills	Male	0.370	0.255	1.000	-0.093
	Female	0.025	-0.122	-0.093	1.000

Table 3 present the summary of PPMCC on the relationship between performance in SIWES and employability skills acquisition in industrial chemistry among male and female students. The results show that the matrix of relationship among all variables depicts a good fit. The relationships between male performance in SIWES with male and female Employability Skills are .370 and .025, indicating a weak positive and negative relationships respectively; while male performance in SIWES with female performance in SIWES is .173 indicating a weak positive relationship. However, female Performance in SIWES with male and female Employability Skills are .255 and -.122, indicating a weak positive and negative relationships respectively; while male employability skills with female employability skills is -.093 indicating a weak negative relationship. Thus, hypothesis 2 was then analyzed and result is shown in Table 4.

**Table 4: Multiple Regression Analysis for Industrial Chemistry performance in SIWES and Employability Skills Gender wise**

SIWES Performance	Model	Gender	Unstdzed Coefficient		Stdzed Coefficient		Remark	
			B	Std. Error	Beta	t		P
Male	Employability Skills	Male	0.229	0.045	0.370	5.05	0.000	S
		Female	0.418	0.052	0.025	0.80	0.425	NS
	Constant		62.955	3.430		18.35	0.000	
Female	Employability Skills	Male	0.157	0.492	0.255	3.18	0.002	S
		Female	-0.733	0.057	-0.122	-1.29	0.199	NS
	Constant		76.043	3.723		20.43	0.000	

Prediction Significant at  $p \leq .05$

Table 4 presents the summary of multiple regressions between the performance in SIWES and employability skills acquisition in industrial chemistry among male and female undergraduate students. The analysis revealed that, male performance in SIWES predicts male employability skills with P-value

of .000; similarly, female performance in SIWES predicts male employability skills with P-values of .002 which are less than .05 level of significance. Thus, the null hypothesis two, is therefore rejected. However, male performance in SIWES do not predicts female employability skills with P-value of .425; similarly, female performance in SIWES do not predicts female employability skills with P-value of .199 which is greater than .05 level of significance. Thus, the null hypothesis two, is therefore retained.

### Discussion of Results

The results revealed that the undergraduate students performance obtained in SIWES do not predict the employability skills with which a graduate can be observed into chemical industry. Because mostly the relations are complimentary in nature. It means that, after spending the six months mandatory SIWES period, students' employability skills is still lacking. This shows that, ITF with over 50 years of discharging its responsibilities which is principally to train students by transforming them into technically skilled work force thereby enhancing their employability skills status has not been quiet successful as shown by this study. The findings of the study is similar to Nawayya and Jemimah (2019) findings which revealed that students were employed and posted to the industries that have little or nothing to do with their areas of specializations and most knowledge gained by these students were not converted into workable ideas. Hence, ITF need to reform and re-strategize its training programmes on major areas such as students' placement, funding and cooperation with the industry/employers. These are the areas presently constituting severe challenge to the success of the entire programme. However, this is contrary to the findings of Imeokparia and Edigbonya (2017) which revealed that Business graduates employability skills is high. This is due the fact that, the two studies differ in research designs adopted and the instruments used in eliciting information from the students.

The results also revealed that both the undergraduate male and female students' performance in SIWES do not predict female students' employability skills acquisition in industrial chemistry. However, male and female students' performance in SIWES predicts male students' employability skills acquisition. This findings can be explained further; numerous studies have been conducted to examine the influence of gender on students' satisfaction. While some researchers (Sax, et al., 2015; Umbach & Porter, 2017) found that gender has significant influence on student's satisfaction levels. Others (Dirkin, et al., 2015; Carey, et al., 2022) found no significant difference between male and female students regarding satisfaction. In a study on accounting students' evaluation of internship experiences from a skills perspective, gender was not significant on most items, though the study observed a significant gender difference on knowledge on external auditing (Warinda, 2018).

Findings of this study therefore, collaborates with the study of Adebisi (2015) whose findings identify over 50 entrepreneurship-based courses offered in polytechnics in Osun State, Nigeria. Similarly, findings in the study of Joseph, et al. (2017) revealed that technical college students acquired various skills during industrial attachment. The findings also show that there is no significant difference in the responses of male and female students on the extent to which they encounter diverse challenges while on industrial attachment. This could be as a result of challenges faced by the students before placement into SIWES programme. Findings of this study and that of Adebisi (2015) and Joseph, et al. (2017) are similar because the studies involve the acquisition of either entrepreneurial or employability skills.

### Conclusion and Recommendations

From the findings and discussion, the following conclusions were drawn:

1. There is no relationship between performance in SIWES and employability skills.
2. There is relationship between male performance in SIWES and male employability skills; similarly, there is relationship between female performances in SIWES with male employability skills.

However, there is no relationship between male performance in SIWES and female employability skills; similarly, there is no relationship between female performance in SIWES and female employability skills.

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

1. SIWES and industrial based supervisors should expose students to different aspects of employability skills concepts such as effective communication, leadership qualities, among others prior to the commencement of the programme with attendance made mandatory.
2. At the end of SIWES programme, industrial based supervisors should evaluate the performance of both male and female students based on the employability skills such as problems solving, team work among others, they have acquired during the programme.

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