

# **Effect of industrial work experience in developing technical and vocational education undergraduates' employability skills**

**Kelechi Reko Okoye<sup>1</sup>, James Edomwonyi Edokpolor<sup>2</sup>**

<sup>1</sup>Department of Technology and Vocational Education, Faculty of Education,  
Nnamdi Azikiwe University, Awka, Anambra State, Nigeria.

<sup>2</sup>Department of Social Science Education, Faculty of Arts and Education, Benson  
Idahosa University, Benin City, Edo State, Nigerian  
jedokpolor@biu.edu.ng<sup>2</sup>

**Received:** 16 February 2021; **Accepted:** 25 February 2021; **Published:** 05 March 2021

**To cite this article (APA):** Okoye, K. R., & Edokpolor, J. E. (2021). Effect of industrial work experience in developing Technical and Vocational Education undergraduates' employability skills. *Asian Journal of Assessment in Teaching and Learning*, 11(1), 1-12. <https://doi.org/10.37134/ajatel.vol11.1.1.2021>

**To link to this article:** <https://doi.org/10.37134/ajatel.vol11.1.1.2021>

## **Abstract**

This study aims to assess the effect of industrial work experience in developing employability skills among technical and vocational education undergraduates in Nigerian universities. Data were collected from 119 undergraduates of technical and vocational education (TVE) with a pre-and post-survey instrument. When compared with a paired sample t-test, the result showed that the employability skills possess by TVE undergraduates before and after exposure to industrial work experience significantly differ. When compared with the independent sample t-test, the result showed that the employability skills possess between male and female TVE undergraduates before exposure to industrial work experience does not significantly differ. When also compared with independent sample t-test, the result showed that the employability skills possess between male and female TVE undergraduates after exposure to industrial work experience significantly differ. This study has contributed to the existing literature concerning the effect of industrial work experience in developing employability skills among technical and vocational education undergraduates. This unique contribution would provide a better insights or understanding on how industrial work experience scheme help in developing employability skills among technical and vocational education undergraduates.

**Keywords:** Employability Skills, Industrial Work Experience, SIWES, Technical Education, Vocational Education

## **INTRODUCTION**

Technical and vocational education (TVE) is referred "... to those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding, and knowledge relating to occupations in various sectors of economic and social life" (Federal Republic of Nigeria, FRN, 2013, p. 22). In Nigeria, TVE covers the following: (1) technical colleges; (2) vocational enterprise institutions (VEIs); and (3) National vocational qualification framework (NVQF). The bottom line is that TVE is intended to prepare recipients for career progression in various occupations and professions; equip recipients with the necessary knowledge and skills for job creation; and provide recipients with knowledge about business (Edokpolor & Egbri, 2017).

Despite the concept, scope, and objectives, as exemplified above, TVE still experiences a major challenge of producing employable graduates. The majority of low-level employability skills possessed by TVE graduates have impacted the increasing rates of joblessness and underemployment in Nigeria (United Nations Industrial Development Organization, 2017). Skills such as ICT literacy and numeracy, adaptability and flexibility, communication, problem-solving and critical thinking, collaboration and

teamwork, innovation and creativity, and management and leadership, to list a few are all required by TVE undergraduates to become gainfully employed upon graduation.

In Nigeria, the rates of joblessness and underemployment among young individuals, including TVE graduates are quite high. For instance, Busson (2020) reported that four out of every ten persons under the age of 35 were jobless. The National Bureau of Statistics (NBS, 2018) reported that the rates of joblessness in the second quarter of 2018 were 22.70% and increased to 23.10% in the third quarter of 2018, and rates of joblessness among youths were 36.5%. The World Data Atlas (2018) reported that the rates of joblessness have increased from 10.6 % in 2012 to 22.6 % in 2018, with annual growth rates of 16.02%. The FRN (2017) noted that the rate of joblessness is increasing simultaneously with the rate of underemployment. For instance, the NBS (2018) reported that the rates of underemployment within the age of 15 and 34 in the third quarter of 2017 were 52.6% and increased to 55.4% in the third quarter of 2018.

The high rates of joblessness and underemployment suggest that young individuals possessed low-level skills to become employable upon graduation. To surmount this precarious situation, there is a need to strengthen the link between TVE and the workplace to support the development of employability skills among undergraduates. It, therefore, implies that effective implementation of industrial work experience would play an important role in equipping TVE undergraduates with the skills to become employable after graduation. The federal government of Nigeria (FGN) together with the national universities commission (NUC) and the industrial training fund (ITF) introduced the students' industrial work experience scheme (SIWES) into the university curriculum to equip undergraduates with the skills to become employable upon graduation.

Despite the expected contribution of industrial work experience (hereinafter referred to as SIWES) in developing employability skills, the rates of joblessness and underemployment are still high and alarming. Many factors may undoubtedly contribute to this precarious situation. One factor, in particular, “gender gap”, implies that a significant difference might exist between the possessions of employability skills among male and female TVE undergraduates after exposure to SIWES. However, it seems that the employability skills possessed by TVE undergraduates after exposure to SIWES would be high among male than female TVE undergraduates, and as such, determines which group of gender would become gainfully employed upon graduation.

This study aims to provide empirical data on the effect of industrial work experience in developing employability skills among TVE undergraduates in Nigerian universities. Based on this objective, the following research questions were answered in the study. First, do significant differences exist between the mean scores of TVE undergraduates on employability skills possess before and after exposure to SIWES? Second, do significant differences exist between the mean scores of male and female TVE undergraduates on employability skills possess before exposure to SIWES? Third, do significant differences exist between the mean scores of male and female TVE undergraduates on employability skills possess after exposure to SIWES? The present study, therefore, intends to: (1) assess whether a significant difference would exist between the mean scores of TVE undergraduates on employability skills possess before and after exposure to SIWES; (2) assess whether a significant difference would exist between the mean scores of male and female TVE undergraduates on employability skills possess before exposure to SIWES; and finally (3) assess whether a significant difference would exist between the mean scores of male and female TVE undergraduates on employability skills possess after exposure to SIWES.

## **LITERATURE REVIEW**

### **Concept and Relevance of Industrial Work Experience**

What can we call an experiential activity that helps to link formal education with practical work? Intuitively, it may make great sense to simply call it “industrial work experience”. A review of the pertinent literature, has, however, suggests that “industrial work experience” is not among the most commonly accepted programs. Instead, a variety of alternative programs have been developed. Examples of such programs designed to effectively deliver TVE include (1) cooperative education (Cedercreutz & Cates, 2010), (2) internships (Hynie, Jensen, Johnny, Wedlock, & Phipps, 2011), (3) apprenticeships (Smits, 2006), (4) practicum (Smith, 2010), and (5) service-learning (Levesque-Bristol,

Knapp, & Fisher, 2010). While these programs may differ in the way the experience is delivered, they also share a similar philosophical belief that students benefit from the integration of industrial work experience into skills-based education.

Given this preamble, the authors described industrial work experience (alternatively, students industrial work experience scheme, SIWES) as an organized and a planned program of learning experiences designed to support the development of employability skills through learning from experience. SIWES is a learning activity that links academic learning with practical application in the workplace. It is a practical activity that brings together employers, educators, and students for mutual collaboration to equip students with employability skills. Ekpenyong (2011) stated that SIWES should not be viewed as enabling a student to fit into a job, instead, it should be directed at a student's growth as a person, develop self-efficacy, the standard of excellence, creativity, the spirit of cooperation with others, and love of work. Melacarne (2018) explained the important role of industrial work experience in developing employability skills. Melacarne averred that students can possess employability skills through participation and observation. Lave and Wenger (1991) described some constant practices of a student to highlight how learning is not merely a process of participation but involves a social aspect. It, therefore, implies that it is impossible to develop employability skills among TVE undergraduates without the support of an expert. Based on these conceptual clarifications, the SIWES could be seen as a strategy for building a solid foundation for career development. In Nigeria, SIWES is a penultimate year program that provides chances for TVE undergraduates to experience a real-life situation in industries. For example, TVE undergraduates are expected to undergo attachment for six months (i.e. approximately 24 weeks or 180 days). During the attachment, TVE undergraduates are to be supervised by their university-based supervisors and the ITF-based supervisors. The professional staff of the ITF and university-based supervisors are to visit TVE undergraduates at least two times during the SIWES attachment (ITF, 2013).

### **Concept and Relevance of Employability Skills**

Employability skills are frequently used interchangeably with work skills in skills development literature. Employability skills are classified as a core subject and career skills required to gain employment (OECD, 2016). Employability skills are predominately conceptualized as the skills considered relevant by industry, and required by young youths to secure employment (Holmes, 2017; Jackson, 2016, 2018). Employability skills include the ability to obtain employment and to successfully transit between or within organizations and positions. Skills such as the ability to generate new and worthwhile thoughts and implement them into existing products or services; ability to work with teams on business projects; ability to communicate effectively with others; ability to think critically and solve problems; ability to adapt to a constantly changing environment; and many others are required by TVE undergraduates to become employable upon graduation. Specifically, employability skills can be represented as creativity and innovation skills, teamwork and collaboration skills, communication skills, critical thinking and problem-solving skills, flexibility and adaptability skills, to list but a few.

From the above conceptual clarification, employability skills are important to graduates as they could help them to become employable upon graduation. However, Chbani and Jaouane (2017) reiterated that every year, about 78% of graduates are employed in many organizations, and this could be attributed to the possession of employability skills. Tejan and Sabil (2019) added that these graduates are employable because they possess the skills needed by employers.

### **Employability Skills Developed Before and After Exposure to Industrial Work Experience**

Current studies (e.g. Chottum, Kunchai & Khampirat, 2018; Khampirat, Pop & Bandaranaike, 2019; Sa-Nguanmanasak & Khampirat, 2019) have assessed employability skills development before and after students' exposure to work experience and found that there was a significant improvement in employability skills development after students' exposure to work experience. Lim, Foo, Yeo, Chan and Loh (2020) and Sambell, Devine, Lo and Lawlis (2020) also reported a significant improvement in the development of employability skills after students' exposure to work experience. While the effect of work experience in developing employability skills has been established, most specific employability

skills are yet to be studied. However, it seems logical that the same effect of work experience would exist in the development of employability skills. Given the processes involved in developing employability skills, such as reflecting upon employability skills developed, thinking about employability skills developed, and putting employability skills developed into practice, implies that industrial work experience appears to be important in developing employability skills among TVE undergraduates. As Kolb (1984) rightly postulates, learning is a social process by which skills are acquired via work experience.

## **Gender and Employability Skills Developed Before and After Exposure to Industrial Work Experience**

Social feminist theorists (e.g. Fischer, Reuber, and Dyke, 1993; Carter and Williams, 2003) have provided substantial evidence that gender plays a crucial role in understanding differences in developing employability skills. Studies by Sa-Nguanmanasak and Khampirat (2019) reported that there was no significant difference in the mean scores between male and female TVE students' employability skills possession before exposure to work experience. Pop and Khampirat (2019) found higher mean scores on female students than the male students only in desirability and feasibility skills. Cifre, Vera, Sánchez-Cardona and de Cuyper (2018) found a significant difference in employability skills possession among male and female students and suggested that gender differences in employability skills possession require extensive research.

From the foregoing, empirical evidence exists to suggest that female students are more likely to possess low skills than male students, which may hinder their employability upon graduation (Bandura, 1992). A past study theorized that social plaques hinder female students during skills development processes (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001). This assumption supports the study by Chopra, Khan, Mirsafian, and Golab (2020) who found that male students seem to be more exposed to career socialization in work experiences than female students. This finding suggests that differences in career socialization may explain the difference between male and female TVE undergraduates in developing employability skills after exposure to work experience. The social feminist theory proposes that differences between male and female students' employability skills development are due to differences in career socialization processes (Carter & Williams, 2003). Social feminist theory also postulates that due to gender differences in ongoing career socialization, male and female students' skills development tend to differ (Fischer, *et al.*, 1993).

## **Experiential Learning and Employability Skills Development**

Kolb (1984) is generally considered the driven force behind experiential learning theory. Kolb saw the workplace as a potential learning environment that can foster skills development via meaningful career development opportunities. Kolb defined experiential learning as a process by which skills are developed via learning-by-doing. He postulated that skills are developed among people via combinations of internal (theory and practice) and external (experience, reflection, thought, and experimentation) processes. Dewey (1938) averred that experience is an important component of learning; meaning people learn skills when they see and touch what they learn. Essentially, developing employability skills among students is derived from the work experience they are exposed to and the prior knowledge and experiences they bring to the learning context.

Carl Jung's contribution led to the development of the experiential learning cyclical model (see Jung, 1931), which was later built upon by Kolb in 1984, with four dimensions, which directly relate to SIWES. The cyclical model of experiential learning starts with concrete experiences (feelings; students skills acquired in a theoretical context) that are subsequently reflected upon (reflective observation; practical skills learning via observation). Reflection on previously acquired skills creates the basis for theory formulation and conceptualization of abstract (thinking; student independent investigations and linking TVE with workplace); which implies that the thinking component of experiential learning is used to guide future practices (doing; putting the skills acquired into practice in the workplace). This would lead to the acquisition of new skills, where the end (i.e., active experimentation) becomes the first (i.e., concrete experience) again and again. It implies that during SIWES attachment, the TVE undergraduates reflect on previously acquired skills, thereby providing the chance for abstract thinking,

as well as, testing previously acquired skills in a practical context, which established the acquisition of the skills that are required by the TVE undergraduates to become employable upon graduation.

## Social Cognitive Learning and Employability Skills Development

Bandura (1986) is globally recognized as a postulator of the social cognitive theory. He postulated that people acquire employability skills via observing others' behaviors. The theory describes a system, known as the 'reciprocal causality model', meaning that the development of employability skills occurs from an interplay between personal and environmental factors. Personal factors (e.g., self-efficacy) and environmental factors (e.g., workplace model) impact employability skills development. Bandura (1989) proposes that observation learning takes two forms: modeling and imitation. In modeling, a student acquires the employability skills of a model in the workplace through vicarious reinforcement. In imitation, a student is directly reinforced for copying the employability skills of a model in the workplace. Bandura (1989) explains how influential a workplace model will depend on relationships with a student, their personality traits, and how a student perceives them. This, therefore, means that TVE undergraduates' level of employability skills development during SIWES attachment may strongly be influenced by their ability to observe, remember, and later practice in such a way similar to a model they have observed over time. TVE undergraduates' may likely imitate behaviors of a model who seems competent, so a manager may serve as a model during SIWES attachment, depending on the age and interests of TVE undergraduates. In this sense, a TVE undergraduate who has observed manager overtime during SIWES attachment can develop skills to become employable upon graduation.

## RESEARCH METHOD

### Participants

A total of 119 students of TVE from two universities participated in the survey study; 61 (51%) students were male, and 58 (49%) were female. The convenience sampling method was used to select these groups of students who have participated in SIWES. Pre-SIWES survey study was first conducted at the time these students were in their penultimate year (i.e. 300 Level). Post-SIWES survey study was conducted when these students were in the final year of their Bachelor of Education (B.Ed.) degree programs in industrial technical, home economics, business, and agricultural science.

**Table 1.** Demographic characteristics of the survey participants.

Demographics	Categories	Frequencies	Percentages (%)
Gender	Male	61	51
	Female	58	49
Program of study	Agricultural education	14	12
	Home economics education	36	30
	Business education	44	37
	Industrial technical education	25	21

### Measures

A structured questionnaire was used for the pre-and-post-SIWES survey, consisting of 10 items, ranging from 1 = Strongly Disagree to 5 = Strongly Agree. Section A of the questionnaire asked participants to respond to their gender and program of study. Section B of the questionnaire asked participants to respond to the items generated using a 5-point Likert type. Samples of the questionnaire items are: "I can generate new and worthwhile ideas to improve on existing products or processes of production (creativity and innovation skills)", "I can communicate clearly with and convince others in a business transaction (communication skills)", "I can collaborate with teams on a business project and assume shared responsibility (collaboration and teamwork skills)", "I can reason and solve problems conventionally and innovatively (critical thinking and problem-solving skills)", "I can access information through ICT (ICT literacy and numeracy skills)", "I can work effectively in an environment of changing conditions and adapt to the situations at hand (flexibility and adaptability skills)", and "I can manage resources effectively and efficiently (management and leadership skills)".

## **Validity and Reliability**

Four lecturers verified and established the content of the research instrument. Two of these lecturers were from TVE, and the other two were from measurement and evaluation disciplines. A reliability test was applied to ascertain the internal consistency of the instruments (Cronbach, 1951). Coefficients alpha provides the overall reliability for the instruments and confirmed that the instruments can be used with confidence to measure the degree to which undergraduates of TVE possess employability skills before ( $\alpha = .71$ ) and after ( $\alpha = .76$ ) their exposure to SIWES. The reliability test also confirmed that the instruments can be used with confidence to measure whether there is a difference between the mean scores of male ( $\alpha = .72$ ) and female ( $\alpha = .67$ ) TVE undergraduates' employability skills possessed before their exposure to SIWES. The reliability test further confirmed that the instruments can be used with confidence to measure whether there is a difference between the mean scores of male ( $\alpha = .60$ ) and female ( $\alpha = .76$ ) undergraduates' of TVE employability skills possessed after their exposure to SIWES. Coefficients alpha obtained to meet the minimum value of .60 thresholds for adequate reliability test measure on internal consistency, as recommended by Creswell and Creswell (2017).

## **Human Ethics Approval**

The authors obtained an ethical clearance approval for data collection, with written permission from the institution's research directorate (reference number: A14632), where the study was conducted.

## **Data Collection and Analyses**

The questionnaires were personally administered to the respondents (i.e. TVE undergraduates), by the authors with the help of two trained research assistants before (pre) commencement and after (post) completion of SIWES attachment. The data collected from the respondents were analyzed with paired and independent-sample *t*-test by using the Statistical Package for Social Sciences (SPSS) version 23.0. The paired and independent-sample *t*-test was used to analyze the different hypotheses formulated for the study. The probability values were used in taking decisions on the hypotheses. For instance, when the probability value of a test is less than or equal to a significant value (0.05), the authors dismiss the null hypothesis (*H<sub>0</sub>*). When the probability value of a test is higher than a significant value (0.05), the authors accept the null hypothesis (*H<sub>0</sub>*).

## **RESULTS**

### **Research Hypothesis 1:**

*There is no significant difference between TVE undergraduates' employability skills developed before (pre) and after (post) exposure to SIWES.*

The paired sample *t*-test was used to determine whether there is a difference between the mean scores of the TVE students' employability skills developed before and after exposure to SIWES ( $n = 119$ ). In support, the paired sample *t*-test results in Table 2 demonstrated that there was a significant difference between the mean scores of the TVE undergraduates' employability skills possessed before and after exposure to SIWES, specifically for all the ten employability skills, namely: creativity/innovation ( $t = -27.672, p = .000$ ), communication ( $t = -34.556, p = .000$ ), collaboration/teamwork ( $t = -24.490, p = .000$ ), critical thinking/problem solving ( $t = -26.634, p = .000$ ), ICT literacy/numeracy ( $t = -34.054, p = .000$ ), leadership/administration ( $t = -26.634, p = .000$ ), social/cross-cultural ( $t = -28.740, p = .000$ ), desirability/feasibility ( $t = -27.877, p = .000$ ), flexibility/adaptability ( $t = -28.285, p = .000$ ), and lifelong learning/self-direction ( $t = -26.247, p = .000$ ). The results, therefore, demonstrated that TVE undergraduates acquire all the employability skills after their exposure to SIWES.

**Table 2.** Comparing TVE undergraduates' employability skills developed before and after exposure to SIWES.

Ratings of Employability Skills Development								
S/N	Items	Before (Pre) SIWES		After (Post) SIWES		<i>t</i>	<i>p</i>	Decision
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
1.	Creativity/Innovation Skills	1.49	.502	3.44	.577	-27.672	.000	<i>Sig.</i>
2.	Communication Skills	1.96	.201	3.62	.487	-34.556	.000	<i>Sig.</i>
3.	Collaboration/Teamwork Skills	1.43	.497	3.36	.607	-24.490	.000	<i>Sig.</i>
4.	Critical Thinking/Problem Solving Skills	1.44	.498	3.38	.567	-26.634	.000	<i>Sig.</i>
5.	ICT Literacy/Numeracy Skills	1.87	.333	3.67	.471	-34.054	.000	<i>Sig.</i>
6.	Leadership/administration Skills	1.49	.502	3.43	.576	-26.634	.000	<i>Sig.</i>
7.	Social/Cross-Cultural Skills	1.41	.494	3.41	.543	-28.740	.000	<i>Sig.</i>
8.	Desirability/Feasibility Skills	1.37	.506	3.45	.532	-27.877	.000	<i>Sig.</i>
9.	Flexibility/Adaptability Skills	1.45	.517	3.42	.517	-28.285	.000	<i>Sig.</i>
10.	Lifelong Learning/Self-Direction Skills	1.44	.515	3.49	.595	-26.247	.000	<i>Sig.</i>

*M* = Mean, *SD* = Standard Deviations

### Research Hypothesis 2:

*There is no significant difference between male and female TVE undergraduates' employability skills possess before (pre) exposure to SIWES.*

The independent sample *t*-test was used to determine whether there is a difference between the mean scores of male and female TVE undergraduates' employability skills possessed before exposure to SIWES. Comparison of the mean scores in Table 3 indicated that there was no significant difference ( $p > .05$ ) between the mean scores of male and female TVE undergraduates on the possession of employability skills before exposure to SIWES, specifically for six employability skills, namely: communication ( $t = 1.051, p = .296$ ), collaboration/teamwork ( $t = 1.055, p = .294$ ), critical thinking/problem solving ( $t = 1.431, p = .155$ ), ICT literacy/numeracy ( $t = 0.371, p = .711$ ), social/cross-cultural ( $t = 1.269, p = .207$ ), and desirability/feasibility ( $t = 1.727, p = .087$ ). Contrarily, the comparison of the mean scores in Table 3 demonstrated that there was a significant difference ( $p < .05$ ) between the mean scores of male and female TVE undergraduates on the possessions of employability skills before exposure to SIWES, specifically for four employability skills, which include: creativity/innovation ( $t = 2.536, p = .013$ ), leadership/administration ( $t = 2.160, p = .033$ ), flexibility/adaptability ( $t = 2.250, p = .026$ ), and lifelong learning/self-direction ( $t = 2.876, p = .005$ ). The results, therefore, demonstrated that there was no difference in the mean scores of male and female TVE undergraduates' employability skills possess after exposure to SIWES.

**Table 3.** Comparing male and female TVE undergraduates' employability skills developed before exposure to SIWES.

Ratings of Employability Skills Development								
S/N	Items	Males (n = 61)		Females (n = 58)		<i>t</i>	<i>p</i>	Decisions
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
1.	Creativity/Innovation Skills	1.59	.496	1.36	.485	2.536	.013	<i>Sig.</i>
2.	Communication Skills	1.98	.128	1.95	.223	1.051	.296	<i>Ns</i>
3.	Collaboration/Teamwork Skills	1.48	.504	1.38	.489	1.055	.294	<i>Ns</i>
4.	Critical Thinking/Problem Solving Skills	1.49	.504	1.36	.485	1.431	.155	<i>Ns</i>
5.	ICT Literacy/Numeracy Skills	1.87	.340	1.84	.365	0.371	.711	<i>Ns</i>
6.	Leadership/administration Skills	1.56	.501	1.36	.485	2.160	.033	<i>Sig.</i>
7.	Social/Cross-Cultural Skills	1.46	.502	1.34	.479	1.269	.207	<i>Ns</i>
8.	Desirability/Feasibility Skills	1.43	.499	1.28	.451	1.727	.087	<i>Ns</i>
9.	Flexibility/Adaptability Skills	1.49	.504	1.29	.459	2.250	.026	<i>Sig.</i>
10.	Lifelong Learning/Self-Direction Skills	1.51	.504	1.26	.442	2.876	.005	<i>Sig.</i>

*M* = Mean, *SD* = Standard Deviations

### Research Hypothesis 3:

*There is no significant difference between male and female TVE undergraduates' employability skills possess after (post) exposure to SIWES.*

The independent sample *t*-test was used to determine whether there is a difference between the mean scores of male and female TVE undergraduates' employability skills possessed after exposure to SIWES. The comparison of the mean scores in Table 4 indicated that there was a significant difference ( $p < .05$ ) between the mean scores of male and female TVE undergraduates on the possession of employability skills after exposure to SIWES, specifically for all the ten employability skills, namely: creativity/innovation ( $t = 5.742, p = .000$ ), communication ( $t = 6.254, p = .000$ ), collaboration/teamwork ( $t = 4.016, p = .000$ ), critical thinking/problem solving ( $t = 2.902, p = .004$ ), ICT literacy/numeracy ( $t = 4.328, p = .000$ ), leadership/administration ( $t = 4.190, p = .000$ ), social/cross-cultural ( $t = 6.432, p = .000$ ), desirability/feasibility ( $t = 6.323, p = .000$ ), flexibility/adaptability ( $t = 4.460, p = .000$ ), and lifelong learning/self-direction ( $t = 6.013, p = .000$ ). The results, therefore, demonstrated that there was a significant difference between the mean scores of male and female TVE undergraduates' employability skills possess after exposure to SIWES.

**Table 4.** Comparing male and female TVE undergraduates' employability skills developed after exposure to SIWES.

Ratings of Employability Skills Development								
S/N	Items	Males (n = 61)		Females (n = 58)		<i>t</i>	<i>p</i>	Decision
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
1.	Creativity/Innovation Skills	3.69	.467	3.14	.576	5.742	.000	<i>Sig.</i>
2.	Communication Skills	3.85	.358	3.36	.485	6.254	.000	<i>Sig.</i>
3.	Collaboration/Teamwork Skills	3.56	.501	3.14	.634	4.016	.000	<i>Sig.</i>
4.	Critical Thinking/Problem Solving Skills	3.52	.504	3.22	.622	2.902	.004	<i>Sig.</i>
5.	ICT Literacy/Numeracy Skills	3.84	.373	3.48	.504	4.328	.000	<i>Sig.</i>
6.	Leadership/Administrative Skills	3.64	.484	3.22	.594	4.190	.000	<i>Sig.</i>
7.	Social/Cross-Cultural Skills	3.67	.473	3.12	.462	6.432	.000	<i>Sig.</i>
8.	Desirability/Feasibility Skills	3.70	.460	3.16	.489	6.323	.000	<i>Sig.</i>
9.	Flexibility/Adaptability Skills	3.64	.484	3.22	.531	4.460	.000	<i>Sig.</i>
10.	Lifelong Learning/Self-Direction Skills	3.79	.413	3.21	.614	6.013	.000	<i>Sig.</i>

*M* = Mean, *SD* = Standard Deviations

## DISCUSSION

This study is among the few to investigate whether a significant difference exists between TVE undergraduates' employability skills possess before and after exposure to SIWES. The present study showed that a significant difference exists between TVE undergraduates' employability skills possess before and after exposure to SIWES. These results support hypothesis 1, which implies that TVE undergraduates acquire employability skills after their exposure to SIWES. This finding is consistent with an existing study by Khampirat, *et al.*, (2019) on practical skills learning, which proved that there is a significant improvement in employability skills acquired by TVE undergraduates after exposure to work experience. One major reason behind this finding could be that industrial work experience makes a TVE undergraduate more work-ready and employable, by creating an environment for skill acquisition and the application of knowledge (Batt, 2015). Another interpretation of this finding is that the more exposure of TVE undergraduates to industrial work experience, the more it would likely equip them with employability skills and better prepare them for the workplace (Turner, Amirnuddin, & Singh, 2019).

The study sought to also investigate whether a significant difference exists between male and female TVE undergraduates' employability skills possess before exposure to SIWES. The study showed that there was no significant difference between male and female TVE undergraduates' employability skills possess before exposure to SIWES. These results support hypothesis 2, implying that male and female TVE undergraduates possessed the same level of employability skills. That is neither do the

employability skills possessed by male TVE undergraduates are inherently superior to the employability skills possessed by female TVE undergraduates before their exposure to SIWES. The major reason behind this finding could be that male and female TVE undergraduates have not been exposed to experiential or socialization processes (Carter & Williams, 2003; Fischer, Reuber, & Dyke, 1993). Another interpretation of this finding is that male and female TVE undergraduates' have not yet experienced the support of an expert in the world of work or involve in any social aspects of participation or observation (Lave & Wenger, 1991).

The study sought to further examine whether a significant difference exists between male and female TVE undergraduates' employability skills possess after exposure to SIWES. The study showed that there was a significant difference between male and female TVE undergraduates' employability skills possess after exposure to SIWES. However, these results do not support hypothesis 2, which means that males and females do not possess the same level of employability skills. That is the employability skills possessed by male TVE undergraduates are higher than the employability skills possessed by female TVE undergraduates after their exposure to SIWES. One major reason behind this finding could be that the differences between male and female TVE undergraduates on the possessions of employability skills are because women do not have equal access to observe role models or participate in experiential learning (Johnsen & McMahan, 2005; Fischer *et al.*, 1993). These social plagues seem to hinder female TVE undergraduates from possessing employability skills (Edokpolor & Chukwuedo, 2018). This finding further supports the general assumption of social feminism that male and female students are exposed to different learning experiences and ways of thinking (Carter & Williams, 2003).

## **LIMITATIONS**

In this study, there were many limitations. First, because the participants were from a university only, one faculty and one department viz-a-viz business, home economics, industrial technical, and agricultural education, caution should be exercised in generalizing the results of the present study. Thus, further studies should aim at adopting proportional representative samples by extending the study to a wider scope (e.g., South-East, South-West, North-Central, North-East, and North-West), to help in providing more balanced results from all federal universities in Nigeria. Third, because the sample is homogenous, which were university students only, caution should be taken into consideration when generalizing results to students in other academic disciplines. As such, TVE undergraduates were used as respondents because they are currently in a program, which aimed at using SIWES to achieve its broad goals program, which is to equip the students with the skills to engage in entrepreneurial and lifelong learning careers upon graduation. Thus, there is a need to embark on further studies that include other categories of undergraduates from other technology or vocational education-based disciplines.

## **IMPLICATIONS**

The study aimed to assess the effect of industrial work experience in developing technical and vocational education undergraduates' employability skills. The study showed that there was a significant improvement in the employability skills acquired by TVE undergraduates after their exposure to SIWES. The study also showed that males and females possessed the same level of employability skills, which means that the mean scores of the employability skills possessed by male TVE undergraduates are not superior to the mean scores of the employability skills possessed by female TVE undergraduates before their exposure to SIWES. The study further showed that males and females do not possess the same level of employability skills. This means that the mean scores of employability skills possessed by male TVE undergraduates are higher than the mean scores of employability skills possessed by female TVE undergraduates after their exposure to SIWES. This precarious situation tends to contribute to the increasing rates of joblessness and underemployment among TVE graduates in Nigeria. These findings, therefore, have theoretical and practical implications. This study has added to skills development literature by enumerating the employability skills that can be developed via an experiential and observational learning mechanism (i.e. SIWES attachment) in Nigerian Universities. The study has also added to the extant literature by unraveling the ideological nature of employability skills development as gender divisions among TVE undergraduates in a Nigerian context. The findings

of the study have provided empirical evidence that employability skills can be developed via the use of industry-based experts who provide positive encouragement and support to TVE undergraduates during SIWES attachment. The findings of the study also have implications for policymakers and researchers on effective implementation of SIWES and employability skills development. There is a need for administrators and managers of TVE programs to strengthen their relationships with employers to eliminate the social plaques that hinder the development of employability skills by female TVE undergraduates that would result in equal opportunities for male and female TVE undergraduates on employability skills development during SIWES attachment.

## CONCLUSION

The analysis revealed that there was a significant difference between TVE undergraduates' employability skills possessed before and after exposure to SIWES. It also revealed that there was no significant difference between male and female TVE undergraduates' employability skills possess before exposure to SIWES. It further revealed that a significant difference exists between male and female TVE undergraduates' employability skills possess after exposure to SIWES. It appears based on these findings that there is a variance or discrepancy between the employability skills possessed by male and female TVE undergraduates because women do not have equal access to work experience. The authors, therefore, concluded that the effective implementation of industrial work experience will help to eliminate the social plaques that will provide equal opportunities for male and female TVE undergraduates to participate in work experience and observe role models so that they will equally possess employability skills.

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