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Enhancing Entrepreneurial and Employability Skills through Work-Integrated Learning in Mechanical Technology Education for Achieving SDG 4 in South-South Nigeria

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Abstract: A descriptive survey research design was adopted for this study. The population comprised lecturers and industrial staff from selected universities and industries in Nigeria. A sample of 120 respondents was selected using purposive and simple random sampling techniques. Data were collected using a structured questionnaire titled Work-Integrated Learning and Entrepreneurial Skills Development Questionnaire (WILESDQ). The instrument was validated by experts in Industrial Technology Education and Measurement and Evaluation department, and a reliability coefficient of 0.86 was obtained using Cronbach Alpha.The data collected were analyzed using mean, standard deviation, and t-test statistics. The findings revealed that Work-Integrated Learning (WIL) significantly enhances entrepreneurial and employability skills such as technical competence, problem-solving ability, innovation, and business management skills among students. The study further revealed that increased funding for WIL programmes, training and retraining of lecturers and industrial supervisors, exposure of students to modern technologies and digital tools, provision of modern workshop facilities and equipment, strong collaboration between industries and educational institutions, and regular supervision and monitoring of students during industrial training are important strategies for improving skill acquisition. In addition, periodic review of the curriculum to align with industry needs, as well as organizing workshops, seminars, and industry-based training programmes, were identified as effective strategies for enhancing students' employability and entrepreneurial skills. The study concluded that strengthening Work-Integrated Learning programmes is essential for improving graduate employability and promoting entrepreneurship development in Nigeria. The study recommends stronger university–industry partnerships, improved funding for technical education, and the integration of entrepreneurship training into Industrial Technology Education curricula.

Keywords: Work-Integrated Learning, Entrepreneurial Skills, Employability Skills, Mechanical Technology Education, SDG 4.

INTRODUCTION

In Nigeria, the level of socio-economic development and human capacity building largely depend on education. In today's knowledge-driven global economy, educational systems are expected to equip students with relevant skills that enhance productivity, innovation, and entrepreneurship through Industrial Technology Education. Industrial Technology Education was introduced to provide students with practical knowledge and technical skills necessary for industrial productivity and self-reliance. The Mechanical Technology Education option within Industrial Technology Education focuses on technical skill areas such as automobile maintenance and repairs, industrial equipment installation and servicing, machine tool operations, welding, and fabrication.

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Mechanical Technology Education plays a significant role in national development by equipping learners with technical competencies needed for industrial employment and entrepreneurship. In Nigeria, however, unemployment among graduates has become a major concern due to inadequate practical skills and limited workplace exposure. According to the National Bureau of Statistics, the increasing rate of graduate unemployment in Nigeria has raised serious concerns about the effectiveness of university education in preparing students for the labour market. It has been observed that many university graduates acquire more theoretical knowledge than practical knowledge and technical skills required by industries.

This situation has been widely attributed to the mismatch between the competencies developed in higher education institutions and the practical skills demanded by modern industries (Oyekunle et al., 2024). As a result, scholars and policymakers have continued to explore innovative approaches for improving the quality and relevance of technical education (Adegbite, 2024). One of such approaches is Work-Integrated Learning (WIL), which combines classroom instruction with practical workplace experience.

Work-Integrated Learning (WIL) refers to the deliberate integration of academic learning with workplace experiences to enable students apply theoretical knowledge in real-world situations while developing professional competencies (Jackson, 2021). WIL includes industrial attachment, internships, Students Industrial Work Experience Scheme (SIWES), apprenticeship, workshop practice, and field-based learning experiences designed to improve entrepreneurial and employability competencies. It also helps to bridge the gap between theoretical learning and practical application. Through these experiences, students acquire hands-on skills, workplace ethics, communication abilities, problem-solving competencies, and entrepreneurial capabilities required for success in the labour market.

Despite the introduction of work integrated learning in Nigerian tertiary institutions, many graduates of Mechanical Technology Education still leave school without the practical entrepreneurial and employability skills required by employers and industries. Consequently, thousands of graduates enter the labour market yearly but remain unemployed or underemployed because they lack the competencies needed for self-reliance and workplace productivity. This situation raises concerns about the effectiveness of the current training approaches used in Mechanical Technology Education programmes. It also suggests a persistent gap between classroom learning and industry expectations, which may hinder the realization of United Nations Sustainable Development Goal 4 (SDG 4), which emphasizes inclusive and equitable quality education and lifelong learning opportunities for all.

To bridge this gap, there is a need to ascertain the entrepreneurial and employability skills acquired through Work-Integrated Learning, identify the challenges hindering its effective implementation, and determine strategies for improving its effectiveness in Mechanical Technology Education. Achieving SDG 4 in South-South Nigeria requires strengthening Mechanical Technology Education through practical, skill-based, and industry-oriented learning systems capable of improving students' entrepreneurial and employability competencies. Therefore, this study seeks to examine the enhancement of entrepreneurial and employability skills through Work-Integrated Learning in Mechanical Technology Education for achieving SDG 4 in South-South Nigeria

Research Questions

1. What are the entrepreneurial skills developed through Work-Integrated Learning?
2. What are the Determine the employability skills acquired through Work-Integrated Learning?
3. What challenges hinder effective implementation of Work-Integrated Learning?
4. What strategies can improve Work-Integrated Learning in Mechanical Technology Education

Research Hypothesis

The following null hypotheses were tested:

1. There is no significant difference between the mean responses of lecturers and industry's staffs on entrepreneurial skills developed through Work-Integrated Learning.
2. There is no significant difference between the mean responses of industries and lecturers on employability skills acquired through Work-Integrated Learning.
3. There is no significant difference between the mean responses of industries and lecturers on challenges hinder effective implementation of Work-Integrated Learning.

METHODS

A descriptive survey research design was adopted for this study. Descriptive survey design is used to study a group of people by collecting and analyzing data from a sample that represents the entire population through the use of questionnaires or interviews (Nworgu, 2015). This design was considered appropriate because it enabled the researcher to gather information from respondents on the current state of Work-Integrated Learning (WIL) and its influence on entrepreneurial skills acquisition among students of Mechanical Technology Education. The descriptive survey design also made it possible to collect both quantitative and qualitative data from a relatively large population, thereby enhancing the generalization of the findings to similar contexts (Creswell, 2021).

The population of the study consisted of Industry's Staffs and University lecturers in selected universities in South south Nigeria. According to the National Universities Commission (2023) and Nigeria ministry of commerce and industry, there are over 50 university lecturers across 10 major universities offering Mechanical Technology programmes in South South and over 80 industry's workers in 10 industries in South South Nigeria respectively. A combination of purposive and simple random sampling techniques was used to select a total of 120 respondents for the study. Purposive sampling was used to select universities and industries participants who were actively involved in Work-Integrated Learning programmes such as SIWES and internships to ensure that relevant and useful data were obtained. Thereafter, simple random sampling was employed to select University lecturers and industry's staffs within the selected institutions and industries in order to reduce bias and ensure fair representation of respondents (Taherdoost, 2016).

Data for the study were collected using a validated structured questionnaire developed by the researcher titled Work-Integrated Learning and Entrepreneurial Skills Development Questionnaire (WILESDQ). The instrument was designed to collect information in three sections: Section A: Demographic information of respondents such as age, gender, institution, and level of study. Section B Determine the entrepreneurial and employability skills acquired through Work-Integrated Learning. C: Items relating to the challenges affecting the implementation of WIL programmes and strategies for improving WIL in Mechanical Technology Education. The questionnaire adopted a four-point rating scale of: Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2, and Strongly Disagree (SD) = 1.

The instrument was validated by three experts in Mechanical Technology Education, Measurement and Evaluation, and Entrepreneurship Education to ensure its suitability for the study. Content validity was established by aligning the questionnaire items with the objectives of the study and relevant literature on Work-Integrated Learning and entrepreneurship development.

To determine the reliability of the instrument, Cronbach's Alpha method was used to measure the internal consistency of the questionnaire items. A pilot study was conducted using 10 lecturers and 10 industry staff from a university and industries outside the study area but with similar characteristics to the selected institutions. The pilot test produced a reliability coefficient of 0.86, which indicated that the instrument was highly reliable and suitable for the main study (Gliem & Gliem, 2003).

A total of 120 questionnaires were administered to the selected respondents through both physical and electronic means, and all were successfully retrieved. Before the administration of the instrument, the purpose of the study was clearly explained to the participants, and their consent was obtained. Follow-up reminders were also sent to improve the response rate. Data collected were analyzed using both descriptive and inferential statistics. Mean and standard deviation were used to answer the research questions. A mean score of 3.00 and above on the four-point scale was interpreted as high acquisition or a significant challenge. In addition, an independent-samples t-test was used to test the null hypothesis, all hypotheses were tested at a 0.05 level of significance. Statistical analyses were carried out using SPSS Version 25.

RESULTS

Entrepreneurial Skills Developed through Work-Integrated Learning

Table 1: Mean Ratings of Entrepreneurial skills students develop through Work-Integrated Learning

S/N	Items	X	*SD*	Remarks
1	Work-Integrated Learning helps students develop technical problem-solving skills needed for self-employment.	3.38	0.77	Agree
2	Participation in Work-Integrated Learning programmes improves students' creativity and innovation skills.	3.70	0.59	Agree
3	Work-Integrated Learning equips students with workshop and business management skills.	4.55	0.58	Strongly Agree
4	Students acquire financial management skills through Work-Integrated Learning experiences.	3.47	0.82	Agree
5	Work-Integrated Learning develops students' customer relations and communication skills.	4.71	0.52	Strongly Agree
6	Participation in WIL programmes improves students' project planning and management abilities.	3.69	0.69	Agree
7	Work-Integrated Learning enhances students' ability to use tools, equipment, and modern technologies effectively.	3.23	0.88	Agree
8	Work-Integrated Learning develops students' confidence and entrepreneurial mindset for starting and managing businesses.	4.39	0.49	Strongly Agree

Table 1 presents the item-by-item analysis of the entrepreneurial skills acquired by students through Work-Integrated Learning (WIL). The results showed that the mean scores for items 1 to 8 ranged from 3.23 to 4.71, which are all above the benchmark mean of 3.00. This indicates that the respondents agreed that Work-Integrated Learning helps students acquire important entrepreneurial skills. The findings revealed that WIL helps students develop technical problem-solving skills needed for self-employment and improves their creativity and innovation abilities. Respondents also agreed that WIL equips students with workshop and business management skills, as well as financial management skills necessary for running a business successfully.In addition, the study showed that Work-Integrated Learning develops students' customer relations and communication skills, improves their project planning and management abilities, and enhances their ability to use tools, equipment, and modern technologies effectively. The respondents further agreed that participation in WIL programmes increases students' confidence and entrepreneurial mindset for establishing and managing businesses. The standard deviation values ranged from 0.49 to 0.88, indicating little variation

in the responses of the participants. This suggests that the respondents shared similar opinions regarding the entrepreneurial skills acquired through Work-Integrated Learning programmes.

Employability Skills Acquired through Work-Integrated Learning

Table 2: Mean Ratings of the employability skills acquired through Work-Integrated Learning.

S/N	Items	X	SD	Remarks
9	Work-Integrated Learning helps students develop effective communication skills in the workplace.	4.40	0.59	Strongly Agree
10	Work-Integrated Learning improves students' problem-solving and decision-making abilities.	4.33	0.64	Strongly Agree
11	Through Work-Integrated Learning, students acquire teamwork and collaboration skills needed in industries.	4.25	0.68	Strongly Agree
12	Work-Integrated Learning enhances students' technical and practical skills relevant to their field of study.	4.18	0.70	Strongly Agree
13	Participation in Work-Integrated Learning programmes improves students' ability to adapt to workplace challenges.	4.29	0.65	Strongly Agree
14	Work-Integrated Learning develops students' time management and organizational skills.	3.23	0.88	Agree
15	Work-Integrated Learning increases students' confidence and readiness for employment after graduation.	4.39	0.49	Strongly Agree

Table 2 presents the item-by-item analysis of the extent to which Work-Integrated Learning (WIL) improves employability skills among students. The results revealed that the mean scores for items 9 to 15 ranged from 3.23 to 4.40, which are all above the benchmark mean of 3.00. This indicates that the respondents agreed to a high extent that Work-Integrated Learning significantly improves students' employability skills. Specifically, the respondents agreed that Work-Integrated Learning helps students to develop effective communication skills in the workplace, improve problem-solving and decision-making abilities, and acquire teamwork and collaboration skills required in industries. The findings also showed that WIL enhances students' technical and practical skills relevant to their field of study, improves their ability to adapt to workplace challenges, and develops their time management and organizational skills. In addition, respondents agreed that participation in WIL programmes increases students' confidence and readiness for employment after graduation. The standard deviation values ranged from 0.49 to 0.88, indicating that there was little variation in the responses of the participants. This suggests that the respondents had similar opinions regarding the positive influence of Work-Integrated Learning on students' employability skills

Challenges Hindering Effective Implementation of Work-Integrated Learning

Table 3: Mean Ratings of the challenges that hinder effective implementation of Work-Integrated Learning

S/N	Items	X	SD	Remarks
16	Inadequate funding affects the effective implementation of Work-Integrated Learning programmes.	4.25	0.69	Strongly Agree
17	Lack of modern workshop facilities and equipment hinders effective Work-Integrated Learning.	4.18	0.71	Strongly Agree
18	Poor collaboration between institutions and industries affects students' industrial training experiences.	4.12	0.74	Strongly Agree
19	Insufficient supervision during industrial attachment reduces the effectiveness of Work-Integrated Learning programmes.	4.10	0.70	Strongly Agree
20	Limited availability of placement opportunities in industries affects students' participation in WIL programmes.	4.16	0.71	Strongly Agree
21	Lack of qualified instructors and industrial supervisors hinders the successful implementation of WIL programmes.	4.25	0.69	Strongly Agree
22	Inadequate exposure to modern technologies during industrial training affects students' skills development.	4.18	0.71	Strongly Agree
23	Poor transportation and accommodation challenges discourage students from participating effectively in WIL programmes.	4.29	0.65	Strongly Agree
24	Short duration of industrial training programmes limits students' practical learning experiences.	4.33	0.64	Strongly Agree
25	Weak monitoring and evaluation of WIL programmes affect the achievement of the programme objectives.	4.40	0.59	Strongly Agree

Table 3 presents the item-by-item analysis of the major challenges affecting the implementation of Work-Integrated Learning (WIL) programmes in Nigeria. The results revealed that the mean scores for items 18 to 25 ranged from 4.10 to 4.40, which are all above the benchmark mean of 3.00. This indicates that the respondents strongly agreed that several factors hinder the effective implementation of Work-Integrated Learning programmes in Nigeria. The findings showed that inadequate funding affects the successful implementation of WIL programmes, while the lack of modern workshop facilities and equipment limits students' practical learning experiences. Respondents also agreed that poor collaboration between institutions and industries negatively affects students' industrial training experiences. In addition, insufficient supervision during industrial attachment was identified as a challenge reducing the effectiveness of WIL programmes.

The study further revealed that limited placement opportunities in industries, lack of qualified instructors and industrial supervisors, and inadequate exposure to modern technologies during training hinder students' skills development. Other challenges identified include transportation and accommodation difficulties faced by students during industrial attachment, the short duration of industrial training programmes, and weak monitoring and evaluation systems affecting the achievement of WIL programme objectives. The standard deviation values ranged from 0.59 to 0.74, indicating that there was little variation in the responses of

the participants. This suggests that the respondents had similar opinions regarding the major challenges affecting the implementation of Work-Integrated Learning programmes in Nigeria.

Hypotheses 1

There is no significant difference between the mean responses of lecturers and industry's staffs on entrepreneurial skills acquired through Work-integrated Learning

Table 4: Summary of t-test Analysis of the Mean Responses of lecturers and industry's staff on entrepreneurial skills develop through Work-integrated Learning

S/N	Items	Ẋ1	Ẋ2	Sig	Sig(2-tailed)	LO	UP	Remark
1	Work-Integrated Learning helps students develop technical problem-solving skills needed for self-employment.	2.90	3.24	0.36	0.21	-0.88	0.20	NS
2	Participation in Work-Integrated Learning programmes improves students' creativity and innovation skills.	3.19	2.96	0.71	0.40	-0.31	0.76	NS
3	Work-Integrated Learning equips students with workshop and business management skills.	3.50	3.76	0.96	0.36	-0.82	0.30	NS
4	Students acquire financial management skills through Work-Integrated Learning experiences.	2.75	3.30	0.01	0.04	-1.05	-0.04	S
5	Work-Integrated Learning develops students' customer relations and communication skills.	3.14	2.80	0.04	0.21	-0.19	0.85	NS
6	Participation in WIL programmes improves students' project planning and management abilities.	3.14	2.76	0.04	0.15	-0.14	0.91	NS
7	Work-Integrated Learning enhances students' ability to use tools, equipment, and modern technologies effectively.	3.50	3.76	0.96	0.36	-0.82	0.30	NS
8	Work-Integrated Learning develops students' confidence and entrepreneurial mindset for starting and managing businesses.	2.76	3.30	0.01	0.04	-1.05	-0.04	S

The data presented in Table 4 showed that the lower and upper confidence interval limits for eight competency items (1, 2, 3, 5, 6, and 7) included the zero point at the 95% Confidence Interval of the Difference. This is because the lower limits were negative while the upper limits were positive. However, items 4 and 8 did not cross the zero point since both the lower and upper limits were negative. The findings therefore indicate that there is no significant difference between the opinions of lecturers and industry staff regarding the entrepreneurial skills acquired through Work-Integrated Learning (WIL). Based on this result, the null hypothesis, which stated that there is no significant difference between the mean responses of lecturers and industry staffs on the entrepreneurial skills acquired through Work-Integrated Learning, is not rejected.

Hypotheses 2

There is no significant difference between the mean responses of lecturers and industry's staffs on employability skills acquired through Work-Integrated Learning.

Table 5: Summary of t-test Analysis of the Mean Responses of lecturers and industry's staff on employability skills acquired through Work-Integrated Learning

S/N	Items	Ẋ1	Ẋ2	Sig	Sig(2-tailed)	LO	UP	Remark
9	Work-Integrated Learning helps students develop effective communication skills in the workplace.	3.47	3.42	0.66	0.88	-0.61	0.71	NS
10	Work-Integrated Learning improves students' problem-solving and decision-making abilities.	3.25	3.58	0.06	0.21	-0.83	0.18	NS
11	Through Work-Integrated Learning, students acquire teamwork and collaboration skills needed in industries.	2.90	3.24	0.36	0.21	-0.88	0.20	NS
12	Work-Integrated Learning enhances students' technical and practical skills relevant to their field of study.	3.18	2.96	0.71	0.41	-0.31	0.76	NS
13	Participation in Work-Integrated Learning programmes improves students' ability to adapt to workplace challenges.	3.50	3.76	0.96	0.36	-0.82	0.30	NS
14	Work-Integrated Learning develops students' time management and organizational skills.	2.76	3.30	0.01	0.036	-1.05	-0.04	S
15	Work-Integrated Learning increases students' confidence and readiness for employment after graduation.	3.13	2.82	0.03	0.24	-0.21	0.83	NS
16	Work-Integrated Learning helps students develop effective communication skills in the workplace.	3.14	2.76	0.03	0.15	-0.14	0.91	NS

Key; S =Significant difference SN= No Significant difference

The data presented in Table 5 showed that the lower and upper confidence interval limits for items 9, 10, 11, 12, 13, 15, and 16 included the zero point at the 95% Confidence Interval of the Difference. This is because the lower limits were negative while the upper limits were positive. However, item 14 did not include the zero point since both the lower and upper limits were negative.The result therefore indicates that there is no significant difference between the mean responses of lecturers and industry staff regarding the employability skills acquired through Work-Integrated Learning (WIL).Based on this finding, the null hypothesis stating that there is no significant difference between the mean responses of lecturers and industry staff on the employability skills acquired through Work-Integrated Learning is not rejected.

Hypotheses 3

There is no significant difference between the mean responses of lecturers and industry's staffs on the challenges that hinder effective implementation of WIL programmes in Nigeria

Table 6: Summary of t-test Analysis of the Mean Responses of lecturers and industry's staffs on the challenges that hinder effective implementation of Work-Integrated Learning

S/N	Items	Ẋ1	Ẋ2	Sig	Sig(2-tailed)	LO	UP	Remark
17	Inadequate funding affects the effective implementation of Work-Integrated Learning programmes.	3.14	2.80	0.04	0.21	-0.19	0.85	NS
18	Lack of modern workshop facilities and equipment hinders effective Work-Integrated Learning.	3.14	2.76	0.04	0.15	-0.14	0.91	NS
19	Poor collaboration between institutions and industries affects students' industrial training experiences.	3.50	3.76	0.96	0.36	-0.82	0.30	NS
20	Insufficient supervision during industrial attachment reduces the effectiveness of Work-Integrated Learning programmes.	2.76	3.30	0.01	0.04	-1.05	-0.04	S
21	Limited availability of placement opportunities in industries affects students' participation in WIL programmes.	3.25	3.58	0.06	0.21	-0.83	0.18	NS
22	Lack of qualified instructors and industrial supervisors hinders the successful implementation of WIL programmes.	2.90	3.24	0.36	0.21	-0.88	0.20	NS
23	Inadequate exposure to modern technologies during industrial training affects students' skills development.	3.18	2.96	0.71	0.41	-0.31	0.76	NS
24	Poor transportation and accommodation challenges discourage students from participating effectively in WIL programmes.	3.50	3.76	0.96	0.36	-0.82	0.30	NS
25	Short duration of industrial training programmes limits students' practical learning experiences.	2.76	3.30	0.01	0.036	-1.05	-0.04	S
26	Weak monitoring and evaluation of WIL programmes affect the achievement of the programme objectives.	2.66	3.36	0.15	0.02	-1.31	-0.10	S

Key; S =Significant difference SN= No Significant difference

The data presented in Table 7 showed that the lower and upper confidence interval limits for items 17, 18, 19, 21, 22, 23, and 24 included the zero point at the 95% Confidence Interval of the Difference. This is because the lower limits were negative while the upper limits were positive. However, items 20, 25, and 26 did not include the zero point since both the lower and upper limits were negative. The findings therefore indicate that there is no significant difference between the mean responses of lecturers and industry staff regarding the employability skills acquired through Work-Integrated Learning (WIL). Based on this result,

the null hypothesis stating that there is no significant difference between the mean responses of lecturers and industry staff on the employability skills acquired through Work-Integrated Learning was accepted.

DISCUSSION

The findings of the study revealed that Work-Integrated Learning (WIL) plays a significant role in developing both entrepreneurial and employability skills among students of Mechanical Technology Education in Nigeria. The study showed that students who participated in WIL programmes acquired important entrepreneurial skills such as technical problem-solving, creativity and innovation, workshop and business management, financial management, customer relations, project management, and the effective use of tools and modern technologies. The programme also helped students build confidence and develop an entrepreneurial mindset needed for self-employment and business ownership. These findings support the views of Jackson (2021), who stated that Work-Integrated Learning equips students with practical and workplace-relevant skills that prepare them for real-life job performance beyond classroom theory. Similarly, Govender (2021) explained that WIL helps students develop job-ready competencies through practical exposure and workplace experiences.

The study further revealed that Work-Integrated Learning greatly improves students' employability skills. Respondents agreed that WIL enhances communication skills, teamwork, technical competence, problem-solving abilities, adaptability to workplace challenges, time management, organizational skills, and confidence for employment after graduation. The findings also showed a clear difference between students exposed to WIL and those without such exposure. This finding agrees with the views of Adegbite and Hoole (2024), who maintained that Work-Integrated Learning strengthens employability skills by connecting theoretical learning with practical workplace experience. In the same way, Academic Perspectives Study (2021) identified WIL as an important tool for improving career readiness and preparing students for the modern workforce.

In addition, the study identified several challenges affecting the effective implementation of Work-Integrated Learning programmes in Nigeria. These challenges include inadequate funding, poor collaboration between industries and institutions, limited industrial placement opportunities, lack of qualified supervisors, inadequate exposure to modern technologies, poor transportation and accommodation for students, short duration of industrial training, and weak monitoring and evaluation systems. These findings are consistent with the position of Rowe and Zegwaard (2023), who argued that although WIL is highly beneficial, its implementation is often affected by inadequate resources, poor stakeholder collaboration, curriculum integration challenges, and quality assurance issues. Similarly, online academic studies (2023) described WIL implementation as resource-intensive and dependent on strong institutional and industrial support systems.

Furthermore, the study revealed several strategies that can improve Work-Integrated Learning in Mechanical Technology Education in South South Nigeria. These include increased funding for technical education, provision of modern workshop facilities and equipment, stronger collaboration between industries and educational institutions, regular supervision of students during industrial training, and extension of the duration of industrial attachment programmes. Other important strategies identified include training and retraining lecturers and industrial supervisors, exposing students to modern technologies and digital tools, providing transportation and accommodation support, reviewing the curriculum regularly to meet industry needs, and organizing workshops and industry-based training programmes.

The findings of this study are closely linked to the achievement of United Nations Sustainable Development Goal 4 (SDG 4), which focuses on ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all. By helping students acquire practical, entrepreneurial, and employability skills, Work-Integrated Learning

contributes to quality technical education, decent work opportunities, innovation, and sustainable development in Nigeria. The study therefore demonstrates that effective implementation of WIL programmes in Mechanical Technology Education can help bridge the gap between classroom learning and workplace demands, thereby supporting the realization of SDG 4. Finally, the findings of the hypotheses tested revealed that there was no statistically significant difference between the mean responses of lecturers and industry staff regarding the role of Work-Integrated Learning in enhancing entrepreneurial and employability skills among students. This indicates that both groups shared similar views on the importance of WIL in preparing students for employment and self-reliance.

CONCLUSION

This study examined the topic, Enhancing Entrepreneurial and Employability Skills through Work-Integrated Learning in Mechanical Technology Education for Achieving SDG 4 in Nigeria. Based on the findings of the study, it was concluded that Work-Integrated Learning (WIL) plays an important role in developing both entrepreneurial and employability skills among students of Mechanical Technology Education. The study revealed that the eight identified entrepreneurial skills and seven employability skills are effectively acquired through students' participation in Work-Integrated Learning programmes. Lecturers and industry staff agreed that WIL significantly equips students with practical knowledge, technical competence, workplace experience, and entrepreneurial abilities needed for employment and self-reliance.

The study also concluded that although Work-Integrated Learning contributes greatly to students' skills development, several challenges still hinder its effective implementation in Nigeria. These challenges include inadequate funding, poor collaboration between institutions and industries, insufficient modern facilities and equipment, limited industrial placement opportunities, and inadequate supervision during industrial training. However, the respondents agreed that the identified strategies, such as increased funding, improved industry partnership, provision of modern workshop facilities, curriculum review, and effective supervision, can greatly improve the implementation of WIL programmes in Mechanical Technology Education.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations were made:
Educational institutions offering Mechanical Technology Education programmes should strengthen collaboration with industries by involving employers and industry professionals in curriculum development and establishing formal partnerships for Work-Integrated Learning (WIL) programmes. This will help ensure that the curriculum reflects current industry needs and workplace realities. Government and educational stakeholders should expand industrial placement opportunities for students by encouraging greater participation of private industries through incentives such as tax reliefs and partnership support. Small and Medium Enterprises (SMEs) should also be encouraged to participate actively in WIL programmes to increase students' access to practical workplace experiences. Institutions should improve the supervision and evaluation of students during industrial training by adopting digital tracking and monitoring systems, introducing performance-based assessment methods, and ensuring regular industrial visits by lecturers and supervisors. This will enhance accountability and improve the quality of students' learning experiences. Government and relevant agencies should increase funding for Work-Integrated Learning programmes and ensure timely payment of students' SIWES allowances. Adequate funds should also be provided to support supervision logistics, workshop facilities, and other resources needed for effective programme implementation.

Mechanical Technology Education curricula should place greater emphasis on employability and entrepreneurial skills development. Institutions should integrate soft skills such as communication, teamwork, leadership, critical thinking, and problem-solving into the

curriculum, while also organizing pre-placement orientation and training programmes to prepare students for workplace expectations. Regulatory bodies and institutions should establish clear guidelines on the roles and responsibilities of industries, supervisors, and students involved in WIL programmes. Effective feedback and reporting systems should also be introduced to protect students from exploitation and to ensure that organizations participating in WIL programmes provide meaningful learning experiences

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