

## IMPACT OF INDUSTRY-BASED TRAINING ON EMPLOYABILITY SKILLS OF AUTOMOBILE TECHNOLOGY STUDENTS IN COLLEGES OF EDUCATION IN NORTH CENTRAL NIGERIA

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### ABSTRACT

*Industry-Based Training (IBT) plays an essential role in bridging the gap between theoretical knowledge and practical competencies in technical and vocational education. This study examined the impact of industry-based training on the employability skills of automobile technology students in six selected Colleges of Education in North Central Nigeria. Specifically, the study examined the extent to which IBT influences employability skills, determined the relationship between the duration of IBT and students' proficiency in technical and soft skills, and assessed the effectiveness of IBT facilities, workshops, and tools used for training. The study adopted a descriptive survey research design. The population comprised 112 automobile technology students, from which 24 respondents were sampled. Data were collected using a structured questionnaire titled Industry-Based Training and Employability Skills Questionnaire (IBTESQ). Descriptive statistics (mean and standard deviation) and Spearman Rank Correlation were used for analysis. Findings revealed that IBT significantly enhances students' employability skills, a positive relationship exists between IBT duration and skill proficiency, and the facilities and tools used for IBT moderately enhance skill acquisition. The study concludes that effective implementation of IBT improves students' technical competence and workplace readiness. It recommends improved industry partnerships, longer training duration, and provision of modern workshop facilities in Colleges of Education.*

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### INTRODUCTION

Technical and Vocational Education and Training (TVET) is widely recognized as a critical driver of national development, industrial productivity, and workforce competitiveness.

Globally, TVET systems are designed to equip learners with occupational competencies, practical skills, and work attitudes necessary for employment and self-reliance. The UNESCO (2016) emphasizes that effective TVET systems must align educational outcomes with labour market demands to facilitate smooth school-to-work transition. Similarly, the International Labour Organization (2019) notes that strengthening workplace learning mechanisms significantly enhances youth employability and reduces skills mismatch. In Nigeria, technical education is positioned as a strategic component of the national education system. Colleges of Education offering Automobile Technology programmes are mandated to produce competent technical teachers and middle-level manpower capable of performing effectively in automotive workshops, service centers, and related industries. The National Commission for Colleges of Education (2020) prescribes minimum standards requiring industrial training as an integral part of technical education programmes to ensure that graduates acquire both pedagogical competence and occupational proficiency.

Automobile Technology has undergone rapid transformation due to advancements in digital and electronic automotive systems. Modern vehicles incorporate electronic fuel injection systems, computerized engine control modules, onboard diagnostic systems (OBD II), anti-lock braking systems (ABS), hybrid propulsion systems, and advanced driver-assistance systems. These innovations require technicians to possess advanced diagnostic reasoning, computer interfacing skills, and system integration competence. The International Labour Organization (2020) reports that technological transformation in industrial sectors has increased the demand for higher-order technical and problem-solving skills, particularly in engineering-related occupations. Consequently, Automobile Technology graduates must demonstrate both theoretical understanding and industry-relevant practical expertise.

Industry-Based Training (IBT), also known as industrial attachment or work-integrated learning, is a structured educational strategy designed to bridge the gap between classroom instruction and real-world industry practice. IBT exposes students to authentic workplace environments where they engage in hands-on activities under professional supervision. According to UNESCO (2016), work-integrated learning enhances experiential knowledge acquisition by allowing students to apply theoretical concepts to practical tasks in real settings.

Empirical studies in Nigeria further reinforce the importance of industry exposure. Okoye and Edokpolor (2021) found that industrial work experience significantly improves employability competencies among Technical and Vocational Education undergraduates. Similarly, Nguwap and Umoru (2022) reported that work-based learning positively influences students' employment prospects by strengthening their practical and workplace skills. In the same vein, Inuwa and Abubakar (2023) established that competency developed through Students Industrial Work Experience Scheme (SIWES) significantly predicts employability outcomes among Nigerian graduates.

Beyond technical skills (hard skills), modern industries increasingly emphasize transferable or soft skills. The International Labour Organization (2019) highlights that communication skills, teamwork, adaptability, and work ethics are critical determinants of workplace success. Research by Adegbite and Hoole (2024) demonstrated that work-integrated learning significantly enhances communication, analytical reasoning, and adaptability among engineering students. Furthermore, Jamilu, Paris, and Sambo (2024) found that structured industrial placements in Colleges of Education improved students' teamwork and problem-solving abilities, although limited industry collaboration reduced overall effectiveness.

In the Nigerian context, collaboration between technical institutions and industry remains a key determinant of effective skill acquisition. Ogbekor and Osuyi (2024) emphasized that strong institutional–industry partnerships significantly improve skills acquisition in motor vehicle mechanics programmes. However, weak collaboration mechanisms often limit exposure to modern automotive tools and technologies. Obi and Ojo (2025) further noted that while vocational training enhances employability among Nigerian youths, systemic challenges such as inadequate facilities and inconsistent supervision reduce training effectiveness.

In North Central Nigeria, concerns have emerged regarding the employability readiness of some Automobile Technology graduates. Employers have reported deficiencies in modern diagnostic competence, electronic troubleshooting skills, professional communication, and workplace ethics. Shehu, Garba, and Ahmed (2022) observed that inadequate supervision and insufficient hands-on industrial exposure negatively affect the school-to-work transition of automobile technology graduates in Northern Nigeria.

Despite the policy mandate of the National Commission for Colleges of Education requiring industrial training, questions remain about the extent to which Industry-Based Training effectively enhances employability skills in Colleges of Education. Variations in duration, supervision quality, training facilities, institutional ownership, and timing within the academic programme, prior student experience, and satisfaction levels may influence skill acquisition outcomes.

Given the increasing technological sophistication of the automotive sector and the rising emphasis on employability competencies, it is imperative to empirically examine the impact of Industry-Based Training on the employability skills of Automobile Technology students in Colleges of Education in North Central Nigeria. This study therefore investigates the extent to which IBT enhances technical and soft skills and examines moderating variables that may influence its effectiveness.

### **Statement of the Problem**

Industry-Based Training is incorporated into the curriculum of Automobile Technology programmes in Colleges of Education with the expectation that exposure to real industry environments will enhance students' practical competence and employability. The intended outcome is that graduates will possess contemporary diagnostic skills, technical proficiency, and professional workplace behaviours aligned with modern automotive industry standards.

However, despite this curricular provision, evidence suggests that some graduates continue to exhibit deficiencies in essential employability skills. Employers have reported gaps in practical diagnostic ability, limited proficiency in computerized automotive tools, weak communication skills, inadequate teamwork orientation, and poor professional work ethics. These deficiencies suggest a possible mismatch between institutional training outcomes and labour market expectations. Shehu et al. (2022) found that insufficient hands-on industrial exposure undermines job readiness among automobile technology graduates. Jamilu et al. (2024) also reported that limited internship opportunities and weak industry partnerships reduce the effectiveness of work-integrated learning programmes in Nigerian Colleges of Education. Furthermore, Ogbekor and Osuyi (2024) identified inadequate institutional–industry collaboration as a major barrier to effective technical skill development.

In addition, inconsistencies in IBT implementation across institutions raise further concerns. Differences in attachment duration, supervision mechanisms, availability of modern automotive facilities, and evaluation procedures may influence the level of skills acquired.

Gender-based participation disparities and varying levels of student satisfaction may also affect employability outcomes.

Although prior studies have examined work-based learning in general technical education contexts, there is limited empirical evidence specifically investigating the impact of Industry-Based Training on the employability skills of Automobile Technology students in Colleges of Education in North Central Nigeria. It remains unclear whether IBT significantly enhances both technical and soft skills, and whether moderating variables such as duration, supervision quality, facilities, institutional type, timing, prior experience, and satisfaction influence its effectiveness.

Therefore, the problem of this study is to determine the extent to which Industry-Based Training influences the employability skills of Automobile Technology students in Colleges of Education in North Central Nigeria and to examine the factors that moderate this relationship.

The purpose of this study is to determine the impact of industry-based training on the employability skills of automobile technology students in Colleges of Education in the North Central States of Nigeria. Specifically, the study seeks to:

1. Examine the extent to which industry-based training (IBT) influences the employability skills of automobile technology students in Colleges of Education (COEs) in North Central Nigeria.
2. Determine the relationship between the duration of (IBT) and students' proficiency in technical and soft skills.
3. Assess the effectiveness of (IBT) facilities, workshops, and tools used for automobile technology education in Colleges of Education.

### Research Questions

The following research question guided the study

1. How does industry-based training (IBT) influence the employability skills of automobile technology students in Colleges of Education in North Central Nigeria?
2. What is the relationship between the duration of (IBT) and students' proficiency in technical and soft skills?
3. How effective are the facilities, workshops, and tools used (IBT) in enhancing students' skills acquisition?

The following null hypotheses were formulated and was tested at 0.05 level of significance:

- H<sub>01</sub>:** There is no significant difference in the mean influence of industry-based training (IBT) on the employability skills of automobile technology students in Colleges of Education in North Central Nigeria.
- H<sub>02</sub>:** There is no significant difference in the relationship between the duration of (IBT) and students' proficiency in technical and soft skills.
- H<sub>03</sub>:** There is no significant difference in students' skills acquisition based on the facilities, workshops, and tools used during (IBT).

## Methodology

The study adopted a descriptive survey research design to examine the impact of industry-based training (IBT) on the employability skills of automobile technology students in Colleges of Education in North Central Nigeria. The study was conducted in **six (6)** Colleges of Education offering Automobile Technology programmes located in four selected states in North Central Nigeria, specifically Benue, Nasarawa, Plateau, and the Federal Capital Territory (FCT). The population for the study consists of 112 respondents comprising **88 automobile technology students** and 24 lecturers / **industry supervisors**. A sample of 24 students was selected using the simple random sampling technique to ensure that each member of the population had an equal chance of being selected. Data for the study were collected using a structured questionnaire titled *Industry-Based Training and Employability Skills Questionnaire (IBTESQ)*. The instrument contained items organized into three sections covering the influence of IBT on employability skills, the relationship between the duration of IBT and students' proficiency in technical and soft skills, and the effectiveness of IBT facilities, workshops, and tools in enhancing skills acquisition. The questionnaire items were structured on a four-point Likert scale of Strongly Agree, Agree, Disagree, and Strongly Disagree. The instrument was subjected to face and content validation by experts in automobile technology education and measurement and evaluation from Rev. Fr. Moses Orshio Adasu University, Makurdi to ensure clarity and relevance of the items. The reliability of the instrument was determined using the Cronbach Alpha method, which yielded a reliability coefficient of 0.82, indicating that the instrument was reliable for the study.

The questionnaire was administered directly to the respondents by the researcher and retrieved after completion to ensure a high response rate. Data collected were analyzed using mean and standard deviation to answer research questions one and three, while Spearman Rank Correlation was used to determine the relationship between the duration of industry-based training and students' proficiency in technical and soft skills. A criterion mean of 2.50 was used as the decision rule for interpreting the responses.

## Results

### Research Question 1

**How does industry-based training influence the employability skills of automobile technology students?**

**Table 1: Influence of IBT on Employability Skills**

S/N	Item	Mean	SD	Decision
1	IBT improves students' practical automobile repair skills	3.58	0.61	Agree
2	IBT enhances students' diagnostic and troubleshooting abilities	3.46	0.64	Agree
3	IBT develops teamwork and communication skills	3.33	0.72	Agree
4	IBT increases students' confidence in handling automotive tools	3.50	0.59	Agree
5	IBT prepares students for employment in automobile industries	3.63	0.56	Agree

**Grand Mean = 3.50**

The results in Table 1 show that industry-based training has a positive influence on the employability skills of automobile technology students in Colleges of Education in North Central Nigeria. The item mean scores ranged from **3.33 to 3.63**, all of which are above the

criterion mean of **2.50**, indicating that respondents agreed that industry-based training improves their practical repair skills, diagnostic abilities, teamwork, communication skills, and confidence in handling automotive tools. The **grand mean of 3.50** indicates a high level of agreement among respondents, suggesting that industry-based training significantly enhances the employability skills of automobile technology students.

### Research Question 2

**What is the relationship between IBT duration and students' proficiency in technical and soft skills?**

**Table 2: IBT Duration and Skill Proficiency**

Variable	N	R	p-value	Decision
IBT Duration & Skill Proficiency	24	0.62	0.001	Significant

The result in Table 2 shows the relationship between the duration of industry-based training (IBT) and students' proficiency in technical and soft skills. The analysis using Spearman Rank Correlation produced a correlation coefficient of  $r = 0.62$  with a **p-value of 0.001**, which is less than the **0.05 level of significance**. This indicates that there is a **positive and statistically significant relationship** between the duration of IBT and students' proficiency in technical and soft skills. This means that students who spend more time in industry-based training tend to develop higher levels of technical competence and employability skills such as teamwork, communication, and problem-solving. The finding suggests that longer exposure to industrial environments provides students with greater opportunities to practice and improve their skills, thereby enhancing their overall employability.

### Research Question 3

**How effective are the facilities, workshops, and tools used in IBT?**

**Table 3: Effectiveness of IBT Facilities and Tools**

S/N	Item	Mean	SD	Decision
1	Industrial workshops contain relevant automobile equipment	3.21	0.75	Agree
2	Modern diagnostic tools are available for training	3.04	0.81	Agree
3	Students are allowed to operate industry equipment	3.17	0.73	Agree
4	Industrial supervisors provide adequate practical guidance	3.29	0.68	Agree
5	Training facilities support skill acquisition	3.25	0.70	Agree

**Grand Mean = 3.19**

The results in Table 3 indicate that the facilities, workshops, and tools used during industry-based training contribute to students' skill acquisition. The item mean scores ranged from **3.04 to 3.29**, all of which are above the criterion mean of **2.50**, indicating that respondents agreed that the available facilities and tools support their learning during industrial training. However, the **grand mean of 3.19** suggests that the facilities and tools are **moderately effective** in enhancing students' skill acquisition. This implies that although the available industrial facilities assist students in developing practical skills, there is still a need for

improvement in the provision of modern automotive equipment and training resources to further strengthen the effectiveness of industry-based training.

### **Discussion of Findings**

The findings revealed that industry-based training significantly improves the employability skills of automobile technology students. This implies that exposure to real industrial environments helps students acquire practical competencies such as vehicle diagnostics, repair techniques, teamwork, and communication skills. This finding supports the view of Aina (2021), who reported that industrial training enhances students' practical skills and work readiness.

The study also found a significant positive relationship between the duration of IBT and students' proficiency in technical and soft skills. This suggests that longer industrial training periods provide students with more opportunities to practice and master automotive skills. The finding aligns with Yorke (2019), who emphasized that extended workplace training improves students' employability competencies.

Furthermore, the results indicated that facilities, workshops, and tools used during IBT moderately enhance skill acquisition among students. Although the facilities contribute positively to training outcomes, there is still a need for improvement in terms of modern automotive equipment and advanced diagnostic tools. This finding corroborates the study by Ogbuanya and Bakare (2023), which highlighted that inadequate industrial facilities limit the effectiveness of technical training programmes. Overall, the results demonstrate that industry-based training is an essential component of automobile technology education as it bridges the gap between theoretical instruction and practical industry experience.

### **Conclusion**

The study examined the impact of industry-based training on the employability skills of automobile technology students in Colleges of Education in North Central Nigeria. The findings revealed that IBT significantly enhances students' practical skills, improves their workplace competencies, and positively relates to the duration of training exposure. The facilities and tools available during IBT were found to moderately support students' skill acquisition. Therefore, effective implementation of industry-based training programmes is essential for producing competent graduates capable of meeting the demands of the modern automobile industry.

### **Recommendations**

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

1. Colleges of Education should strengthen partnerships with automobile industries to provide students with better industrial training opportunities.
2. The duration of industry-based training should be extended to allow students to gain deeper practical experience.
3. Government and educational institutions should provide modern workshop facilities and diagnostic equipment to enhance skill acquisition.
4. Industrial supervisors should provide structured mentorship to guide students during their training period.

5. Curriculum developers should integrate more practical industry-oriented components into automobile technology programmes.

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