



RESEARCH ARTICLE

EFFECTS OF INDUSTRY – ACADEMIA COLLABORATION IN ENHANCING SKILLS DEVELOPMENT AND EMPLOYABILITY OF METALWORK STUDENTS IN LAGOS STATE TECHNICAL COLLEGES

Ogunbote Shefiu¹, Dawodu, Rasheed Adegbenro¹ And Adegunle, Felix Omotayo¹

1.Department Of Technology Education, College Of Information And Technology Education,
Lagos State University Of Education, Oto/Ijanikin, Lagos State Nigeria.

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Abstract

This study investigated the effects of industry-academia collaboration in enhancing skills development and employability of metalwork students in Lagos State Technical Colleges. A descriptive survey design was used, involving 51 participants—31 industry managers and 20 metalwork teachers. Since the population size was small, all the participants were included without sampling. Data were collected using a structured 24-items questionnaire titled Effects of Industry–Academia Collaboration in Enhancing Skills Development and Employability of Metalwork Students in Lagos State Technical Colleges (EIACESDEMWS). It used a 4-point scale: Strongly Agree (4) to Strongly Disagree (1). The researchers with support from three assistants, administered and successfully retrieved all copies of the questionnaire. Two research questions and two hypotheses, tested at a 0.05 significance level, guided the study. Mean and standard deviation were used to answer the research questions, while t-tests were used to test the hypotheses. A mean score of 2.50 or above indicated agreement. For hypotheses testing, p-values ≤ 0.05 indicated significant differences. Findings revealed no significant difference in responses from industry managers and teachers regarding collaboration strategies for skill development and employability improvement. This suggests a shared understanding of the importance of partnership between schools and industry. The study recommends stronger industry participation, especially in training and retraining technical teachers in modern metalwork technologies, and ensuring the provision of adequate tools and equipment to support practical skill development in technical colleges.

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Introduction: -

In today's rapidly changing industrial landscape, aligning educational outcomes with industry expectations is more critical than ever. This is particularly important in technical and vocational education, where students need practical, up-to-date skills to thrive in the job market. In regions like Lagos State, Nigeria, a notable challenge persists: the gap

between what students learn in school and what industries actually need. This disconnect often leaves graduates underprepared for employment, contributing to high rates of joblessness and economic stagnation. Industry-academia collaboration has emerged as a solution to bridge this gap. As Keyton (2020) explains, collaboration involves individuals or organizations working together toward a shared goal. In this context, partnerships between technical colleges and industries aim to improve students' skills and make them more employable. These collaborations allow industries to influence curriculum design, provide internships, and share real-world problems that help shape students' learning (Smith & Jones, 2023; Oluwole & Adesanya, 2022). Abu (2014) adds that these partnerships help technical institutions stay current by introducing students to advanced equipment and methods that may be beyond the schools' capacities.

Such collaborations also promote innovation and problem-solving by engaging students in real-life projects (Ahmed, Fattanin, Alli & Enam, 2022). They offer opportunities for professional development, enabling teachers to remain up-to-date with current industry trends (Johnson, Adeyemi & Bello, 2020). Internships and apprenticeships allow students to gain valuable hands-on experience, expand their networks, and increase their employability (Obi & Hassan, 2021). Buligina and Sloka (2016) describe this model as a blend of academic learning and industry exposure, which strengthens practical skills and aligns school training with workplace demands.

Without such collaboration, schools often struggle to keep pace with evolving industry needs. Students may graduate without the skills necessary for modern workplaces. As Anindo, Mugambi & Matula (2016) emphasize, school-to-work transitions are smoother when students are trained in environments that mirror real industry conditions. Industry input also ensures that technical curricula are relevant and responsive to labor market demands (Nungse, Ugwoke, Ogbuanya & Shetima, 2020). When companies participate in curriculum reviews, students receive training that prepares them to contribute meaningfully to the workforce from day one.

The National Policy on Education (FRN, 2013) acknowledges the importance of these collaborations by requiring technical college curricula to include both theory and practice, including production units that simulate industrial settings. This combination ensures students are well-prepared, not just academically but practically.

Metalwork, a key area within technical education, exemplifies the value of such partnerships. From fabrication to modern welding and machining, metalwork requires hands-on practice with specialized tools. Industry-academia collaboration provides access to this training and ensures students are competent in emerging technologies. According to Golden (2009), students need both practical and theoretical skills to navigate the complexities of modern metalwork practice.

In metalwork, tasks such as forging, welding, casting, and machining demand not just manual skills but also the ability to think critically and work efficiently. Mbah & Elobuiké (2016) define skills as capabilities that allow individuals to perform specific tasks effectively; these are essential in today's technical fields. Okorie (2010) adds that skill development also involves communication, teamwork, and other soft skills that contribute to workplace success. Olabiyi, Aiyelabowo & Keshinro (2013) note that mastering these skills requires ongoing, structured learning and practical exposure. Skill development is not just about performing tasks but it is about becoming competent enough to meet industry expectations. Bodnar (2020) and Magbagbeola (2020) stress the importance of blending theory with hands-on training, delivered by qualified instructors in well-equipped environments. Without this, students may lack the confidence or ability to perform effectively in real-world jobs.

In Nigeria, skill development is vital for building a productive workforce and competing globally (Audu, Yusri & Muhammad, 2013). It is a continuous process that must evolve with industry changes. While employability was once seen as an individual's responsibility, it is now understood as a shared goal involving both education systems and industry (Fugate, Kinicki & Ashforth, 2004; Rothwell & Arnold, 2007).

Today, employability encompasses much more than technical ability. Di Fabio (2017) describes it as including self-awareness, adaptability, and career management traits necessary in a competitive, unpredictable job market. Bach and Sulikova (2019) emphasize that transferable skills are those skills that bridge school and work together which are central to employability. Amadi (2013) reinforces that these competencies enable graduates to contribute effectively in their workplaces and sustain long-term careers. The industry-academia collaboration is not just beneficial but it is also essential. For metalwork students and other technical learners in Lagos and beyond, such partnerships offer a pathway to real-world readiness, self-reliance, and sustainable employment.

Literature Review

Collaboration between industry and academia is vital for bridging the gap between theory and practice in technical education. According to Audu, Umar & Idris (2013), such partnerships help align educational content with real-world demands. In metalwork education, Billett (2011) stresses the value of hands-on training through industry support, allowing students to gain exposure to current tools and techniques. He also notes that active industry input in curriculum design ensures programs reflect actual job requirements. Manwaring, Holloway & Coffey (2020) propose a framework that promotes industry participation in curriculum review and staff development, enabling educators to create relevant, industry-aligned courses. Supporting this, Ogbuanya & Tongshuwal (2020) found that collaborative seminars, workshops, and teacher involvement in industrial production boost skill acquisition.

Likewise, Ojo (2019) reported no significant difference between technical teachers' and supervisors' views on collaboration in motor vehicle mechanics, suggesting a shared commitment to improving training quality. On employability, Adewale & Olufemi (2021) observed that employer involvement in curriculum design and student internships significantly enhances graduate employment outcomes. Agrawal (2014) and Andrews & Higson (2008) also found that such collaboration provides students with relevant experience and job-ready skills. Okoli, Igwe & Elmo (2019) linked project-based learning with better job placement, while Edeh, Mbah & Chigozie (2023) emphasized that a skilled workforce is crucial for utilizing modern technologies effectively. This study explores how industry-academia collaboration improves both skill development and employability for metalwork students in Lagos State Technical Colleges.

Statement of the Problem

Metalwork graduates from technical colleges are expected to acquire the necessary skills to thrive in various industries and professional settings. However, many technical colleges in Lagos State face significant challenges in equipping students with industry-relevant competencies. Despite the recognized benefits of industry-academia collaboration, these partnerships remain underutilized due to issues such as limited resources, inadequate infrastructure, and weak policy frameworks (UNESCO, 2015). Research highlights several key barriers to effective industry-aligned training in Nigeria's technical colleges. Okoye & Okwelle (2014) emphasize the lack of essential equipment and funding, while employability (Adewale & Olufemi, 2021) point to outdated curricula, inadequate collaboration frameworks, and insufficient engagement with industry stakeholders. Similarly, Okoli, Igwe, & Elmo (2019) argue that the absence of exposure to modern production methods hinders the development of employable skills among graduates. To bridge the gap between theoretical knowledge and practical application, stronger collaboration between industries and academia is essential. This study explores how effective partnerships can enhance skill development and improve employability among metalwork students in Lagos State Technical Colleges.

Purpose of the Study

This study aims to investigate the effects of industry-academia collaboration in enhancing skills development and employability of metalwork students in Lagos State Technical Colleges. Specifically, the study seeks to:

1. Identify industry-academia collaboration strategies that can enhance the skills development of metalwork students in Lagos State Technical Colleges.
2. Identify industry-academia collaboration strategies that can improve the employability of metalwork students in Lagos State Technical Colleges.

Research Questions

The study is guided by the following research questions:

1. What industry-academia collaboration strategies can enhance the skills development of metalwork students in Lagos State Technical Colleges?
2. What industry-academia collaboration strategies can improve the employability of metalwork students in Lagos State Technical Colleges?

Hypotheses

The following null hypotheses were tested at the 0.05 level of significance:

H₀₁: There is no significant difference between the mean responses of industrial managers and metalwork teachers regarding strategies to enhance collaboration between technical colleges and industries for the skills development of metalwork students in Lagos State, Nigeria.

H₀₂: There is no significant difference between the mean responses of industrial managers in metalwork industries and metalwork teachers regarding strategies to improve collaboration between technical colleges and industries for enhancing the employability of metalwork students in Lagos State, Nigeria.

Methodology

This study investigates the effects of industry-academia collaboration in enhancing skills development and employability of metalwork students in Lagos State Technical Colleges. Descriptive survey research design was adopted, which involves using a representative sample to describe opinions, beliefs, and attitudes about a particular phenomenon (Manjunatha, 2019). The study population consisted of 51 participants, comprising 31 industrial managers and 20 metalwork technical college teachers in Lagos State. Due to the manageable population size, no sampling was conducted.

A structured questionnaire titled Effects of Industry–Academia Collaboration in Enhancing Skills Development and Employability of Metalwork Students in Lagos State Technical Colleges (EIACESDEMWS) was developed for data collection. The questionnaire employed a four-point scale: Strongly Agree (SA) – 4, Agree (A) – 3, Disagree (D) – 2, Strongly Disagree (SD) – 1. It comprised 24 items aligned with the research questions and was face-validated by three experts, achieving a Cronbach’s Alpha reliability coefficient of 0.78, indicating high reliability. Data collection was conducted by the researcher with the assistance of three research assistants. All the 51 copies of the questionnaire were successfully retrieved. For data analysis, mean (X) and Standard Deviation (SD) were used to answer the research questions, while t-test statistics were employed to test the hypotheses at the 0.05 level of significance. The decision criteria were as follows: a mean score of 2.50 or higher was considered as agreement (strong or moderate), while a score below 2.50 was considered disagreement. For the t-test, a p-value ≤ 0.05 led to the rejection of the null hypothesis, whereas a p-value > 0.05 resulted in its retention.

Findings

Research Question 1: What industry-academia collaboration strategies can enhance the skills development of metalwork students in Lagos State Technical Colleges?

1)

Table 1: Mean and Standard Deviation of Respondents on Industry-Academia Collaboration Strategies for Enhancing Skill Development of Metalwork Students in Lagos State Technical Colleges.

N=51 Industrial Based Manager (31) Metalwork Teacher (20)

S/N	Items Statements	Industrial			Metalwork		
		Managers			Teachers		
		Mean	SD	Decision	Mean	SD	Decision

1. Partnering with school in							
	research/Development activities	3.90	.30	Agreed	3.60	.50	Agreed
2. Organising workshop/seminars							
	by industries on contemporary						
	issues in the industry	3.84	.45	Agreed	3.75	.44	Agreed
3. Encouraging joint development							
	projects initiation between						

school and industry	3.90	.40	Agreed	3.50	.83	Agreed
4. Narrowing the gap between theory and practical through excursion						
/Field trip/SIWES	3.74	.68	Agreed	3.60	.60	Agreed
5. Improving collaboration between school and industry through periodic meetings on new technology						
innovation	3.58	.77	Agreed	3.75	.55	Agreed
6. Upgrading the curriculum to meet the labour market demand through industry participation	3.77	.49	Agreed	3.60	.82	Agreed
7. Provision of internship and on-the- job training by the industry	3.65	.76	Agreed	3.55	.64	Agreed
8. Exposing metalwork teachers to industry practices to update them knowledge and skills	3.61	.76	Agreed	3.60	.60	Agreed
9. Assessment of training facilities /Equipment to ensure adequate background requirement in industry	3.48	.89	Agreed	3.60	.75	Agreed
10. Curriculum review and design with industry participation	3.87	.34	Agreed	3.75	.44	Agreed
11. Granting industry visit to technical colleges for relevant exposure in practical	3.87	.43	Agreed	3.45	.83	Agreed
12. Allowing industry representatives in planning with management of technical colleges skill development activities.	3.80	.40	Agreed	3.65	.88	Agreed
Cluster Mean	3.75	.56	SA	3.62	.59	SA

Table 1: highlights the impact of industry-academia collaboration strategies on skill development in metalwork in Lagos State technical colleges. The data shows strong agreement between industrial managers and metalwork teachers on all listed items, as reflected in the responses from the two major stakeholders—industrial managers and metalwork teachers. The results revealed that industrial managers had a cluster mean score of 3.75 with a standard deviation of 0.56, indicating a strong agreement on the effectiveness of industry-academia collaboration strategies. The low standard deviation suggests a high level of agreement among respondents. Similarly, metalwork teachers

reported a cluster mean of 3.62 and a standard deviation of 0.59, which also falls within the "strongly agree" category. This confirms a shared perception among academic personnel regarding the value of collaboration with industry in enhancing students' practical skills. These strategies are perceived as critical in bridging the gap between classroom instruction and real-world industrial expectations.

Research Question 2: What industry-academia collaboration strategies can improve the employability of metalwork students in Lagos State Technical Colleges?

Table 2: Mean and Standard Deviation of Respondents on Industry-Academia Collaboration Strategies for Improving Employability of Metalwork Students in Lagos State Technical Colleges.

N=51 Industrial Based Manager (31) Metalwork Teacher (20)

S/N	Items Statements	Industrial Managers			Metalwork Teachers		
		Mean	SD	Decision	Mean	SD	Decision
13. Irrelevance of the							
	programme curriculum	3.70	.70	Agreed	3.55	.63	Agreed
	to the needs of industry						
14. Rigidity of the system							
	due to resistance to	3.41	.92	Agreed	3.60	.68	Agreed
	change						
15. Lack of modern							
	equipment and facilities	3.77	.50	Agreed	3.75	.55	Agreed
	for collaboration						
	implementation						
16. Lack of appropriate							
	skills by the metalwork	3.68	.60	Agreed	3.50	.83	Agreed
	teachers						
17. Skill mismatch between							
	skills acquired in the						
	technical colleges and the	3.36	.91	Agreed	3.75	.55	Agreed
	industry requirement						
18. Limited industry							
	engagement with	3.42	.92	Agreed	3.50	.89	Agreed
	technical colleges						
19. Lack of fund for							
	collaboration implementation	3.80	.48	Agreed	3.80	.52	Agreed

20.Obsolete teaching						
methods and learning	3.77	.50	Agreed	3.70	.57	Agreed
facilities						
21.Non upgrading of the						
curriculum to meet the	3.84	.45	Agreed	3.75	.44	Agreed
labour market demand						
22.Lack on the job						
training for metalwork	3.48	.8	Agreed	3.55	.83	Agreed
teachers						
23.Materials for practical						
demonstration and	3.94	.25	Agreed	3.75	.44	Agreed
training is limited or						
not available						
24.Lack of preparation of						
skill training programme	3.74	.51	Agreed	3.65	.59	Agreed
that will suit employability						
Cluster Mean	3.66	.63	SA	3.65	.65	SA

Table 2: Illustrates how industrial-academia collaboration strategies contribute to improve employability in metalwork in technical colleges in Lagos State. The data indicate that both industrial managers and metalwork teachers agree with all the listed items, as reflected in mean values 2.50 as the cut-off point. This consensus is further supported by the grand mean score's industrial managers (3.66) and metalwork teachers (3.65) have mean scores that fall within the range of 3.50–4.00, indicates strong agreement.

This suggests that both groups strongly agree that the identified industry-academia collaboration strategies are effective in improving the employability of metalwork students in Lagos State Technical Colleges of 3.66 for industrial managers and 3.65 for metalwork teachers. Additionally, the standard deviations for both groups are relatively low (0.63 and 0.65), indicating a high level of consensus among respondents within each group. The low variability also strengthens the reliability of the mean scores as representative of the groups' perspectives.

Hypothesis 1: There is no significant difference between the mean responses of industrial managers and metalwork teachers regarding strategies to enhance collaboration between technical colleges and industries for the skills development of metalwork students in Lagos State, Nigeria.

Table 3: A t-test analysis comparing the mean responses of industrial managers and metalwork teachers on enhancing collaboration between technical colleges and industries for metalwork students' skills development in Lagos State, Nigeria.

Group	Mean	SD	N	df	t-cal	t-crit (2 tailed)	Decision
Industry Managers	3.75	.56	31				
				49	0.78	±2.01	Accept
Metalwork Teachers	3.62	.59	20				

An independent samples t-test was conducted to compare the mean responses of industrial managers and metalwork teachers. The results are shown in Table 3. Since the t-calculated (0.78) is less than the t-critical (± 2.01) at the 0.05 level of significance, therefore we fail to reject the null hypothesis that states "There is no significant difference between the mean responses of industrial managers and metalwork teachers regarding strategies to enhance collaboration between technical colleges and industries for the skill development of metalwork students in Lagos State, Nigeria." The analysis revealed that the difference in mean responses was not statistically significant, $t(49) = 0.78$, $p > .05$. Therefore, the null hypothesis was retained. Therefore, there is no significant difference between the mean responses of industrial managers ($M = 3.75$, $SD = 0.56$) and metalwork teachers ($M = 3.62$, $SD = 0.59$) regarding strategies to enhance collaboration between technical colleges and industries. This implies that both groups have similar views on the strategies that can enhance collaboration between technical colleges and industries for the skills development of metalwork students in Lagos State, Nigeria.

Hypothesis 2: There is no significant difference between the mean responses of industrial managers in metalwork industries and metalwork teachers on strategies for improving collaboration between technical colleges and industries to enhance the employability of metalwork students in Lagos State, Nigeria.

Table 4: t-test analysis of the mean difference between the responses of industrial managers and metalwork teachers on strategies for enhancing collaboration between technical colleges and industries for improving metalwork students' employability in Lagos State, Nigeria.

Group	Mean	SD	N	Df	t-cal	t-crit (2 tailed)	Decision
Industry Managers	3.66	.63	31				
				49	0.055	± 2.009	Accept
Metalwork Teachers	3.65	.65	20				

The t-calculated=0.055 and t-critical ($df=49$, two-tailed at $\alpha=0.05$) = ± 2.009 . The results revealed that the mean response of industrial managers ($M = 3.66$, $SD = 0.63$, $n = 31$) was very similar to that of metalwork teachers ($M = 3.65$, $SD = 0.65$, $n = 20$). An independent samples t-test showed that the difference in means was not statistically significant, $t(49) = 0.06$, $p > .05$. Therefore, Since $|t\text{-cal}| < t\text{-crit}$, the null hypothesis, which states that "There is no significant difference between the mean responses of industrial managers in metalwork industries and metalwork teachers on strategies for improving collaboration between technical colleges and industries to enhance the employability of metalwork students in Lagos State, Nigeria". Therefore, the null hypothesis was not rejected. These findings suggest that both groups hold similar perceptions regarding effective strategies to improve collaboration between technical colleges and the metalwork industry, which could enhance the employability of students.

Discussion of Findings

Results from Research Question One show that industrial managers reported a cluster mean of 3.75 ($SD = 0.56$), while metalwork teachers had a mean of 3.62 ($SD = 0.59$). Both scores fall within the "strongly agree" range on the four-point scale, indicating strong support for industry-academia collaboration strategies. The low standard deviations suggest a high level of consensus among respondents. This shared perception reinforces the value of collaboration in bridging the gap between classroom instruction and real-world industry expectations. Despite the agreement on its importance, findings suggest industries provide limited support for the training and retraining of technical teachers, particularly in emerging metalwork technologies. This may be due to the lack of clear government policy mandating industry involvement in technical education. Banka & Okwori (2019) stressed that continuous teacher training is essential for professional development, innovation, and effective skills delivery. In Research Question Two, industrial managers and teachers again strongly agreed on the impact of collaboration on student employability, with mean scores of 3.66 and 3.65 respectively.

Both groups recognized the importance of strategies such as SIWES, internships, curriculum alignment, industry-led workshops, and mentorships. These are seen as key in preparing students for labor market demands. This aligns with Audu, Umar & Idris (2013), who advocate for more industry and NGO involvement in technical education funding and infrastructure. Manwaring, Holloway & Coffey (2020) support stronger curriculum collaboration, while Osuyi & Owenbiugie (2015) highlight industry reluctance to accept students for industrial training. Additionally, findings

confirm that industry involvement in curriculum development remains low in Lagos, echoing concerns by Nunge et al. (2020) and Ojo (2019) about the exclusion of industries from TVET curriculum planning processes.

Conclusion: -

Collaboration between industry and academia is vital for enhancing the quality and relevance of technical education in Lagos State. Addressing the existing challenges and adopting best practices will better equip students for successful careers in the metalwork industry, ultimately contributing to the region's economic development. This study revealed a lack of adequate collaboration between technical colleges and industries in key areas such as the training and retraining of technical teachers on emerging technologies, the provision of teaching and learning facilities, support for students' industrial work experience schemes, and participation in curriculum development for employability in the metalwork sector. Given the rapid advancement of technology, it is crucial to integrate industry-relevant innovations into the curriculum and teaching materials to keep students updated with evolving trends.

The findings highlight that industry involvement in curriculum design enhances students' learning experiences, improves skill acquisition, and boosts confidence. Exposure to real-world practical training leads to better examination performance and increases job readiness among graduates. Furthermore, industry partnerships provide students with insights into various career pathways, making them more competitive in the job market.

Recommendations: -

To strengthen industry-academia collaboration in metalwork technology education, the following recommendations are proposed:

1. There should be a stronger industry participation, especially in training and retraining technical teachers in modern metalwork technologies, and ensuring the provision of adequate tools and equipment to support practical skill development in technical colleges
2. Providing adequate materials for practical training.
3. Promoting collaborative seminars, conferences and workshops to enhance students work force readiness.
4. The Federal and State Ministry of Education should mandate industry participation in curriculum planning and review to align technical education with current industry standards.
5. Technical colleges should establish formal collaborations with industry stakeholders to ensure curriculum relevance and increase training opportunities.
6. The Public and Private sectors should boost funding and resource allocation to technical colleges to modernize facilities and equipment, ensuring students have access to the latest technologies.
7. There should be clear and comprehensive policy framework to guide industry-academia collaboration, including incentives for industry participation and regular curriculum updates.
8. Regular Professional Development Programmes should be implemented to equip technical teachers with the latest industry knowledge and teaching methodologies.

By implementing these recommendations, technical colleges in Lagos State can be significantly improved in terms of equipment, training materials, curriculum review in line with market demand, skill development programme among others to ensure that metalwork graduates are better prepared for employment in the metalwork industry.

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