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Assessing the Role of Industry Partnership on Metalwork Crafting for Effective Skill Development of Technical College Students in Ondo State, Nigeria.

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Abstract
The study focused on assessing the impact of industry partnership on metalwork crafting for effective skill development of Metalwork students in Technical Colleges in Ondo State, Nigeria. Descriptive survey research design type was adopted. The study was guided by four research questions and two null hypotheses tested at .05 level of significance. The population for the study was 49 comprising 20 technical college teachers, 7 principals and 22 industrial based supervisors in Ondo State, Nigeria. The entire population was used for this study. Structured questionnaire containing a total of 27 items was the instrument for data collection. The instrument was faced validated by three experts and reliability coefficient of 0.89 was obtained using Cronbach Alpha reliability method. Data collected were analyzed using SPSS version 23. Mean was used to answer the research questions while ANOVA was used to test the null hypotheses at .05 levels of significance. It was found that preparing skill training programmes that will suit the school academic calendar, industry personnel participating in special lectures, narrowing the gap through periodic meeting on technological innovations were among the strategies for improving school- industry partnership in skill development of technical education students for effective skill development in Ondo State, Nigeria. In conclusion,there is difficulties in balancing academic and industry demands. Based on the findings and conclusion, recommendations were made which included: industry should understand the collaboration with school on SIWES and industry exposure to achieve quality skill development and institutions should ensure that good communication exist with the industries.

Keywords: Industry Partnership, Skill Development, Metalwork Crafting, Technical Colleges, Career Readiness

1. Introduction

The objective of the National Policy on Education (2004) among others is the acquisition of appropriate skills, abilities, and competencies, both mentally and physically as equipment for the individual to live and contribute to national development through high level relevant manpower training. The Federal Republic of Nigeria (FRN) recognized technical education as that aspect of education which leads to the acquisition of practical and applied skills as well as basic scientific knowledge (FRN, 2004). Technical education stands out for its strong link to industry needs and its focus on teaching skills that make students job-ready. The expected contributions of Technical education to the social and economic development of the Nigerian nation cannot be quantified. Technical education is primarily driven to train skill craft individual for self-employ and industry in general. Technical College is viewed as an institution where vocational training is given to students. These skills will enable them to gain entry into various occupations like Automobile, Electrical/Electronic, and Mechanical Engineering Craft (Epenyong, 2011). (Macdelyn Mosalagae & Bekker, 2021) defined Technical College as the principal vocational institution that gives vocational training intended to prepare students for entry into various occupations as craftsmen and technicians. Technical College can be described as an institution where students are trained in various occupations to acquire employable skills that will enable them to function well in the occupation in the world of work (Ibrahim and Godfrey,2024). The description above depict that technical college are geared towards training for skill acquisition in different occupations. One of the skills craft in technical colleges is metalwork crafting.

Metalwork crafting is a specialized phase of technical education that prepares students for occupation process of shaping, cutting, joining, and assembling metal materials to create various objects, structures, and products. Okeme (2011) defined metalwork technology as the study of all aspects of metalworking such as bench, sheet, art, metal jewelry, metal finishing, forging, casting, machines, heat treating, material testing, welding, and other fasting methods in metal manufacturing. In this context, metalwork technology involves the study where metals are redesigned and reconstructed for modern objects used at home and the industries. According to Anya and Kelly (2017), metalwork technology is one of the courses in technical colleges that are aimed at training skilled labor for self-reliance. Ibrahim and Omego (2024) described metalwork as a studies aim to produce skilled craftsmen for self or paid employment in the world of work. According to the National Board for Technical Education (NBTE, 2013) Metalwork technology is a field of study that teaches individual how to make use of metal to produce different product for daily needs (Ehimen and Ezeora, 2018**).** Metalwork

craftsmen perform tasks such as handling complex tools and equipment, selecting suitable metals, and following safety protocols to operate machinery safely. According to the National Board for Technical Education (NBTE, 2013) metalwork process involves complex tasks. Such tasks are taught in step-by-step procedures to enable students8 to acquire the required skills for machine operation (Ibrahim and Omego,2024). The craft requires attention to detail, precision, and creativity, as well as knowledge of metal properties and safety. In spite of the recognition given to technical education, technical skills gap exist between graduates especially metalwork crafting students and the labour market demands that continues to be a major problem in Ondo state. Employers

have continued to express their concern and worry over the quality of graduates of technical education programmes (Nkondola and Deuren, 2017). According to Anya (2015), the step-by-step procedure will facilitate their rate of acquisition of practical skills.

A skill is a developed ability in performing a specific task. Skill according to Nungse, Ugwoke, Ogbuanya, & Shetima.(2020) is manual dexterity to carry out a task with determined results often within a given amount of time, energy or both. Skills acquisition is one of the surest ways through which young people can find their way into the labor market either in the public or private sectors(Ibrahim and Omego 2024) While Jing, Hu., and Zhao. (2023) defined skill as the ability to perform expertly and facilitate performance during employment. Advances in technology with sophisticated metal products have rendered metalwork skills inadequate for work in the metal process industry; therefore sophisticated skills are required. According to Ehimen and Ezeora, (2018) with the seemingly rapid growth in metal users in Nigeria today, there is need to improve skills of the workforce needed for metal industry. This is because metal products are coming with new devices as a result of technological advancements (Lima, Pantovic, Clingo, Fischer, Jalene, Landers, Mari, and Poston 2023). It is a known fact that the training, acquisition and utilization of relevant skills by the people are indispensable for economic growth, national development and technological advancement. Therefore, it is essential for schools to collaborate with industries for optimal school-industry skill matching. Metal work crafting and industry partnerships will provide students with practical work experience.

School-Industry Partnership is a collaboration relationship between educational institution and a specific industry. The students benefit from learning, and the industry benefits from the student's work and perspectives (Zukarnain, Husain, Hassan, Kamaruzaman, Zin, and Aziz, 2020). According to Heckman (1993) argues School-Industry Partnership for the benefits of having industry – based training to solve the general problems of school – based training systems. While Rossi (2010) stressed that industry through collaboration with schools could be made to meaningfully contribute to the training of students in appropriate and contemporary skills that relate to their interest. This is crucial for building the skills students need to thrive in their future careers. Nungse, Ugwoke, Ogbuanya, & Shetima.(2020) asserted that School-industry collaboration is between formal education and industry sector to create enabling training environment for students to acquire on the job experiences, Knowledge, skills and appropriate attitude to work. According to Nkondola, Kumwenda, Irene, Millinga and Mwinuka (2019) Partnership with industry can enhance responsiveness of training to the labour market demands through encouraging mutual participation of technical institutions and industries in supporting and the provision of training. Many benefits will be obtained from the cooperation between both parties, such as exposure latest technology to students in training centers more effectively and producing skilled workers to meet the industry requirement (Raihan, 2014). As stated by Hayadi, Mohd, Mohammad, Rafeizah and Zulkifli (2021) the collaboration between industries and training centers is essential to realized the objective of vocational education which is to develop a job-ready graduate.

Institution need to make adequate preparation for psychomotor, affective and cognitive skills that will match the school-industry by visiting industries to acquired experience and knowledge. Granting industry visit to various schools for relevant exposure in practical work and granting technical students SIWES opportunity are a few among industry strategies required for employment in the industry upon graduation from school (Amadi, 2013).

Therefore partnership with industry, educational institution can ensure that their programs are relevant, effective, and aligned with industry needs, ultimately benefiting students. The benefits of industry partnership include among other collaborative innovation, workforce development, real-world applications, up-to-date curriculum, increase student engagement and motivation, improved job prospects and career readiness, competences, and workforce development. Those papers have discussed about the importance of the partnership between educational institution and industry. The partnerships aim at enhance education that foster innovation and develop efficient workforce. This is to ensure that institution programs are relevant and aligned with industry needs through various form such as internships, mentorship, and research. Therefore, the partnership between technical education institution and industry plays an important role in developing the metalwork crafting education.

More also industry partnerships influence students career readiness that prepared students for workforce and success in their chosen careers. This influence encompasses various aspects of metalwork crafting such as technical skills, soft skills, career awareness, job search skills, employability, and self-awareness in technical college. By focusing on career readiness, students can set themselves up for success and achieve their full potential in the workforce. Kurdve,Bird, and Laage-Hellman (2020) affirmed that Scholars have suggested that the industry should start cooperating with students to get to know the academic side and experience collaborating with academia to foster collaboration and promote future projects .

However there are a lot of challenges in industry partnerships with metalwork crafting in technical college. None engagement of industrial experts in curriculum development, teaching and assessing practical skills is a setback in skill development in metalwork crafting in technical education. According to Smith,(2010) in Australia they have established skills councils composed of experts from the industry which prepare training packages based on employers' skills

demands for the colleges to use for developing curriculum and training students. This development can assist policy maker in Ondo state educational sector. Employers' engagement in curriculum development is important to provide their views and preferences to ensure relevance, validity and currency of programmes by embedding in curriculum relevant knowledge, value and skills related to current demands of the industry (Laguador & Ramos, 2014).

Therefore to enhance the capacity of metalwork crafting in technical institutions to deliver training that is responsive to the labour market demands, partnership in innumerable forms with the industry is imperative. Hence the study is to examine how school partnership with industry will help the students of metalwork crafting develop skills that are industrial based.

2. Statement of the Problem

Collaborations between technical college and industries are common to foster innovation and skill development. However the Participants of these collaborations face several challenges related to these collaborations. Technical institution and Industries work in different environments and value different priorities. Current literature shows that the challenges due to the organisational differences in these collaborations lead to the most significant challenges. Therefore, an effective technical education programme needs a functional and favorable partnership with relevant industries which the students will work after graduation to develop the needed skills. Skill development is a dire tool for entrepreneurship and workable development. The researcher was worried on the quality of skills imparted into the metalwork students that do not meet the standard of skill demand in the industry. This mismatch has contributed to unemployment, poverty and low economic growth in the State. With the school industry partnership, metalwork students will be provided with the prospect of getting the appropriate training with relevant and related equipment, material and environment. This will reduce or even eliminate the gap between the classroom experience and industry skill demand. Hence, it becomes pertinent to determine the benefits and challenges in school-industry partnership in skill development of metalwork students in technical college in Ondo State, Nigeria.

3. Purpose of the study

1. To examine the benefits of industry partnerships in metalwork crafting in technical colleges.
2. To determine the influence of industry partnerships on students' career readiness in metalwork crafting.
3. To identify the challenges of industry partnerships in metalwork crafting in technical colleges.

4. Research Questions

1. What are the benefits of industry partnerships in metalwork crafting in technical college?
2. How do industry partnerships influence students' career readiness in metalwork crafting in technical college?
3. What are the challenges of industry partnerships with metalwork crafting in technical college?

5. Significance of the Study

This study will provide insight into the benefit, career readiness and challenges of school-industry partnerships on metalwork crafting. The findings will benefit educators, industry partners, and policy makers seeking to enhance the quality and relevance of metalwork crafting in technical college education.

6. Method

The study adopted a descriptive survey research design. According to Gall, Gall and Borg (2007), a survey research design is meant to describe a single snapshot of data collected from a sample to represent the population to which the findings of the data analysis can be generalized. The study was conducted in the 7 Technical Colleges in Ondo State. The participants were 49 respondents. It comprised of 20 Technical College Teachers, 7 Principals and 22 Industrial based Supervisor in Ondo state. The entire population was used for this study. The instrument was face validated by three experts, two experts from Adekunle Ajasin University, Akungba-Akoko and one industrial based supervisor from Ondo State. The experts were requested to determine the suitability of the instrument in the areas face validation. The experts made corrections and suggestions which made the questionnaire items reliable and appropriate for the study. To ascertain the internal consistency of the instrument, copies of the questionnaire were administered to the Department of Vocational and Technical Education, Ekiti State University, Ado Ekiti and industrial based supervisors through research assistants. Reliability of .89 was established using Cronbach alpha coefficient.

Questionnaire titled School-Industry partnership questionnaire (SIPQ) was used for data collection. The items were rated by the respondents on a four rating point scales with responses as follows: 4.00 = Strongly Agree (SA), 3.00 Agree (A), 2.00= Disagree (D) and 1.00 = Strongly Disagree (SD). The data collected from the respondents were analyzed using Statistical Package for Social Sciences (SPSS) version 23. Mean and standard deviation were the analytical tools used to answer the research question while ANOVA was used to test the hypotheses at .05 level of significance. The responses were required or not required based on 2.50 decision rule for the research questions. The hypothesis of no significant difference was rejected for any value whose probability value $p \leq .05$. The hypothesis of no significant difference was accepted for any item whose probability value $p \geq .05$.

7. Presentation of Results

Research Question 1: What are the benefits of industry partnerships in metalwork crafting in technical college?

Table 1: Mean and Standard Deviation of Respondents on benefits of industry partnerships in metalwork crafting for Effective Skill Development in technical college.

S/N	Item statement	X	SD	Remarks
1	Helped gain practical work experience in metalwork crafting	3.21	.79	Agree
2	Influenced career goals and aspirations in metalwork crafting	3.23	.67	Agree
3	Enhanced skills and knowledge in metalwork crafting	2.57	1.56	Agree
4	Led to job opportunities or internships in metalwork crafting	3.62	.45	Agree
5	Industry partnerships helped improve the quality of metalwork crafting	2.97	1.26	Agree
6	Influenced curriculum development in metalwork crafting	3.00	.91	Agree
7	Provided resources and equipment for metalwork crafting	3.17	1.17	Agree
8	Enhanced the credibility of metalwork crafting program	3.81	.10	Agree

Table 1 shows that respondents generally agreed that industry partnerships provide substantial benefits for effective skill development in metalwork crafting in technical colleges, as all the items recorded mean scores above the benchmark of 2.50. The findings indicate that industry partnerships enhance the credibility of metalwork programmes, provide opportunities for job placements or internships, and help students gain practical work experience, while also influencing career aspirations, curriculum development, and access to modern resources and equipment. Although the enhancement of skills and knowledge recorded the lowest mean score, it still reflected agreement among respondents, suggesting that industry partnerships contribute positively to students' skill acquisition.

Research Question 2: How do industry partnerships influence students' career readiness in metalwork crafting in technical college?

Table 2: Mean and Standard Deviation of Respondents on do industry partnerships influence student's career readiness in metalwork crafting for Effective Skill Development in technical college.

S/N	Item statements	X	SD	Remarks
9	Helped skills and knowledge development aligned with industry needs	3.00	.91	Agree
10	Provided opportunities to apply theoretical concepts to real-world projects	2.97	1.26	Agree
11	Influenced understanding of industry standards and expectations	3.07	.95	Agree
12	Helped build professional networks in the metalwork crafting industry	3.21	.79	Agree
13	Prepared the workforce in terms of soft skills (e.g., communication, teamwork, problem-solving	3.88	.34	Agree
14	Influenced teaching practices and curriculum development	3.89	.86	Agree
15	Helped stay current with industry trends and technologies	3.23	.67	Agree
16	Enhanced ability to prepare students for the workforce	3.21	.79	Agree
17	Provided opportunities for faculty professional development and training	2.93	1.36	Agree
18	Impacted student motivation in metalwork crafting	3.23	.67	Agree
19	With educational institutions addressed workforce development needs	2.97	1.26	Agree

Table 2 indicates that respondents agreed that industry partnerships positively influence students' career readiness in metalwork crafting for effective skill development in technical colleges, as all the items recorded mean scores above the accepted benchmark of 2.50. The results show that industry partnerships strongly prepare students for the workforce through the development of relevant soft skills, influence teaching practices and curriculum development, and help students stay current with industry trends and technologies. Respondents also agreed that such partnerships enhance students' understanding of industry standards, provide opportunities to apply theoretical knowledge to real-world projects, build professional networks, support faculty professional development, and improve student motivation.

Research Question 3: What are the challenges of industry partnerships with metalwork crafting in technical college?

Table 3: Mean and Standard Deviation of Respondents on the challenges of industry partnerships in metalwork crafting for Effective Skill Development in technical college.

S/N	Item statements	X	SD	Remarks
20	Balancing industry partnership requirement with academic responsibilities	3.23	.67	Agree
21	Handle conflicts between industry partner expectations and academic goals	3.21	.79	Agree
22	Adapting to industry-specific tools and equipment	3.17	1.17	Agree
23	Addressing gaps in skills required by industry partners	2.97	1.26	Agree
24	Maintaining industry partnerships that align with educational goals	2.71	1.45	Agree
25	Handle conflicts between industry partner expectations and academic rigor	3.00	.91	Agree

26	Integrating industry-specific training into the curriculum	3.03	.80	Agree
27	Ensuring that industry partnerships prioritize student learning and development	3.89	.86	Agree

Table 3 shows that respondents agreed that several challenges affect the effectiveness of industry partnerships in metalwork crafting for skill development in technical colleges, as all the items recorded mean scores above the benchmark of 2.50. The findings reveal that balancing industry partnership requirements with academic responsibilities, managing conflicts between industry expectations and academic goals or rigor, adapting to industry-specific tools and equipment, and addressing skill gaps required by industry partners are major challenges confronting technical colleges. Respondents also identified difficulties in maintaining partnerships that align with educational objectives and integrating industry-specific training into the curriculum.

8. Discussion

The findings from Table 1 revealed that industry partnerships provide significant benefits to metalwork crafting for effective skill development in technical colleges, particularly in enhancing practical work experience, improving programme credibility, facilitating access to modern equipment, and creating opportunities for internships and employment. This finding corroborates the study of Mustafa, Hussain, and Zulkifli (2021), who reported that sustained collaboration between industries and vocational institutions enhances students' practical competence, curriculum relevance, and exposure to current industrial practices, thereby improving overall training quality. Similarly, Bekker and Mosalagae (2022) emphasized that industry engagement strengthens vocational programmes by bridging the gap between classroom instruction and workplace realities. However, this finding contrasts with the position of Emeasoba (2021), who argued that industry partnerships do not automatically translate into improved skill outcomes when such collaborations are informal, poorly structured, or lack adequate monitoring, suggesting that the benefits of industry partnerships depend largely on the depth and quality of implementation.

The results in Table 2 showed that industry partnerships positively influence students' career readiness in metalwork crafting by aligning skills with industry needs, developing soft skills, enhancing understanding of industry standards, and improving student motivation. This finding aligns with Kurdve, Bird, and Laage-Hellman (2020), who observed that structured industry–education collaboration enhances employability skills, professional networking, and career preparedness by providing students with real-world problem-solving experiences. In addition, Lima et al. (2023) noted that exposure to industry environments improves learners' adaptability to emerging technologies and professional expectations. In contrast, Nkondola and Deuren (2021) contended that industry partnerships may have limited influence on career readiness when industries are reluctant to actively engage in mentoring, curriculum input, or long-term training commitments, thereby reducing the transformative impact of such collaborations on students' career outcomes.

Findings from Table 3 indicated that several challenges hinder the effectiveness of industry partnerships in metalwork crafting, including balancing academic and industry demands, managing conflicts between institutional and industrial expectations, adapting to industry-specific tools, and integrating industry-based training into the curriculum. This supports the findings of Laguador and Ramos (2022), who reported that misalignment of institutional goals and industry priorities, coupled with limited resources, often constrains effective collaboration in technical education. Similarly, Zukarnain et al. (2020) identified coordination difficulties and curriculum rigidity as major barriers to successful industry –institution partnerships. Conversely, Hayadi et al. (2022) argued that many of these challenges can be minimized through well-defined partnership frameworks, regular communication, and shared responsibility, suggesting that the obstacles identified in this study are not insurmountable but require strategic planning and policy support to overcome.

9. Conclusion

This study examined the role of industry partnerships in metalwork crafting for effective skill development among technical college students in Ondo State, Nigeria. The findings revealed that industry partnerships significantly enhance students' practical work experience, improve curriculum relevance, provide access to modern tools and equipment, and strengthen students' career readiness through the development of both technical and soft skills. The study also showed that industry collaboration positively influences students' understanding of workplace standards, employability skills, and motivation to learn. Despite these benefits, several challenges were identified, including difficulties in balancing academic and industry demands, limited industry involvement in curriculum development, and challenges in integrating industry-specific training into the school system.Therefore, industry partnerships positively influence students' career readiness in metalwork crafting by aligning skills with industry needs, developing soft skills, enhancing understanding of industry standards, and improving student motivation.

10. Recommendations

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

i. Technical colleges should establish formal and sustained partnerships with relevant industries through memoranda of understanding (MoUs) to ensure continuous collaboration in training, supervision, and skill development of metalwork students.
ii. Industry professionals should be actively involved in curriculum design, review, and implementation to ensure that metalwork training reflects current industrial practices, tools, and technological skill.
iii. Government and school administrators should introduce SIWES, internships, and industrial attachments to the school programme so that students can gain meaningful hands-on experience that aligned with industry standard.

Industries, in collaboration with government and educational institutions, should support technical colleges by providing modern tools, machines, and equipment to enhance practical training and skill acquisition.

iv. Regular industrial training, workshops, and professional development programmes should be organized for metalwork teachers to update their technical competencies and teaching methods in line with industry requirements.

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