

# Implementation of Suitable Metalwork Technology Workplace in Tertiary Institutions in Nigeria: Challenges and Recommendations

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## Introduction

Metalwork technology is a crucial component of vocational and technical education, particularly in tertiary institutions. The discipline equips students with skills in welding, machining, and fabrication. In Nigeria, the importance of technical and vocational education in general, and metalwork technology in particular, has been highlighted in national development plans. This metalwork field plays a pivotal role in driving industrialization, manufacturing, and the development of skilled labor for the country's growing economy. However, the metalwork technology workspace in many Nigerian tertiary institutions often faces several challenges, from outdated equipment to poor funding, all of which hamper the effective training of students. This article examines the current state of metalwork technology workplaces in Nigerian institutions, highlights key challenges, and proposes recommendations for improvement.

This paper seeks to address the following questions: What are the major challenges confronting metalwork technology workplaces in tertiary institutions in Nigeria? What are the implications of these challenges for industrial growth? What strategies can be employed to overcome these challenges and improve the effectiveness of metalwork technology training in Nigerian institutions?

## The Role of Metalwork Technology in National Development

The contribution of technical education to economic development is well-documented (Akomolafe, 2020; Usman & Nwosu, 2021). Metalwork technology, in particular, is vital for Nigeria's industrial sector, providing skilled manpower for the construction and manufacturing industries (Ekanem & Ojo, 2019). As a practical-oriented discipline, metalwork technology ensures that graduates acquire the technical skills and knowledge required to engage in productive ventures, either as employees or entrepreneurs. Several studies underscore the

direct correlation between the availability of skilled metalworkers and national industrialization (Yusuf, Ibrahim & Olowu, 2022).

### **The Current State of Metalwork Technology Workplaces in Nigerian Tertiary Institutions**

Metalwork technology workshops in tertiary institutions across Nigeria, including polytechnics, technical colleges, and universities, generally lack the modern infrastructure necessary for delivering high-quality training. Most institutions are equipped with old, worn-out machines that are no longer compatible with modern manufacturing processes. This is largely a result of years of underfunding, limited industry partnerships, and lack of adequate government policies focused on the vocational and technical education sector.

Additionally, the metalwork technology curriculum in most institutions has not been updated to keep pace with the advancements in the metalworking industry. Concepts such as Computer-Aided Design (CAD), 3D printing, and advanced machining processes are often not covered in sufficient depth, leaving students ill-prepared for the dynamic job market. Moreover, safety protocols and modern industrial practices are often inadequately enforced in workshops, further compounding the challenges.

### **Major Challenges Facing Metalwork Technology Workplaces in Tertiary Institutions**

Several studies have documented the challenges confronting metalwork technology programs in Nigeria. These challenges range from inadequate facilities to poor funding and outdated curricula (Ogunleye & Shittu, 2021). For instance, most institutions lack modern metalwork machines, forcing students to rely on outdated or broken-down equipment (Oladele, Babalola & Adeyemi, 2020). In addition, the gap between the academic curriculum and the practical demands of industry further exacerbates the challenges faced by students and lecturers alike (Babatunde & Aderemi, 2022).

These challenges are:

- 1. Inadequate Funding and Outdated Equipment:** A major hindrance to the advancement of metalwork technology in Nigerian tertiary institutions is the lack of adequate funding. Metalworking machinery such as lathes, milling machines, CNC machines, and welding equipment are either obsolete or non-functional in many schools. Without regular maintenance or the acquisition of newer models, students are left to work with tools that do not reflect current industrial standards.
- 2. Lack of Skilled Instructors:** The shortage of qualified instructors is another critical challenge. Many metalwork technology educators in Nigeria have not been sufficiently trained in modern techniques or new technological advancements in metalworking. As a result, they are unable to

provide students with the required competencies needed for success in today's competitive job market.

**3. Poor Infrastructure:** Metalwork workshops in most institutions lack essential amenities such as proper ventilation, adequate lighting, and reliable power supply. These deficiencies not only hinder practical activities but also pose safety risks to both students and instructors. Most metalwork workshops are equipped with outdated machines, many of which are not operational (Adekunle, 2021). This situation hinders the ability of students to acquire practical skills, leaving them inadequately prepared for the demands of the workplace.

**4. Weak Industry Collaboration:** A gap exists between tertiary institutions and the manufacturing industries in Nigeria. This lack of collaboration means that students rarely gain exposure to real-world applications of metalworking skills through internships or work-study programs. Consequently, graduates often face difficulties transitioning from the classroom to the workforce among others.

### Recommendations

To address these challenges and improve the quality of metalwork technology education in Nigeria, the following recommendations are suggested:

**1. Increased Funding and Modernization of Equipment:** The government, through the Ministry of Education and industry stakeholders, must prioritize funding for vocational and technical education. Institutions need to be equipped with modern machinery and tools that reflect current industrial practices. Regular maintenance schedules should be implemented, and obsolete equipment should be replaced with advanced tools such as CNC machines, laser cutters, and 3D printers.

**2. Capacity Building for Instructors:** Continuous professional development programs should be introduced to enhance the knowledge and skills of instructors. Workshops, certification programs, and industrial attachments should be made mandatory to expose instructors to modern metalworking techniques. Furthermore, partnerships with international organizations that specialize in technical education could facilitate the exchange of expertise.

**3. Improved Infrastructure and Safety Standards:** Institutions should prioritize the development of state-of-the-art metalworking facilities that meet international standards. This includes ensuring proper workshop layouts with sufficient space, ventilation, lighting, and safety measures. Regular safety audits should be carried out to ensure compliance with industry best practices.

**4. Industry Collaboration:** Tertiary institutions must establish stronger partnerships with the manufacturing sector. This collaboration could take the form of internship opportunities, industry-sponsored workshops, and joint research initiatives. By engaging industry experts in curriculum design and review processes, institutions can ensure that students are learning skills that are relevant and in demand in the job market.

**5. Curriculum Review and Integration of Emerging Technologies:** The metalwork technology curriculum should be regularly reviewed to reflect advances in the field. Emerging trends such as automation, robotics, and additive manufacturing (3D printing) should be incorporated into the curriculum. Additionally, practical entrepreneurship training should be embedded in the program to enable students to set up small-scale manufacturing businesses upon graduation.

## Conclusion

The development of a suitable metalwork technology workplace in tertiary institutions is critical to Nigeria's industrial and economic growth. However, this goal can only be achieved through strategic reforms, including adequate funding, modernized equipment, skilled personnel, and strong collaborations with the industry. By implementing these recommendations, Nigeria's tertiary institutions can produce graduates who are not only technically competent but also capable of driving innovation in the metalworking industry.

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## About Author



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Dr. Dawodu has spent over a decade teaching at the former Adeniran Ogunsanya College of Education, Oto/Ijanikin, Lagos State, before its upgrade to Lagos State University of Education in 2022. He has been dedicated to teaching and guiding students through the practical and theoretical aspects of metalworking.

Dr. Dawodu is deeply passionate about improving the quality of technical education in Nigeria and has published several papers on vocational and technical education reform and curriculum development. He is currently working on a paper that explores innovative collaboration between Technical Vocational Education and Training (TVET) institutions and industries for work-based learning, entrepreneurship, and economic development.

Dr. Dawodu is also actively involved in professional organizations that promote vocational and technical education in Nigeria and internationally, regularly contributing to conferences and workshops aimed at addressing challenges in the technical education sector. In addition to his teaching and research roles, he collaborates with colleagues and policymakers at the Ministry of Tertiary Education to advocate for increased funding and the modernization of machines and equipment for Nigeria's technical education system.