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ESTABLISHING PARTNERSHIP WITH LOCAL AND INTERNATIONAL ORGANIZATIONS TO IMPROVE TECHNOLOGY EDUCATION IN KANO STATE, NIGERIA

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Abstract: *Technology education is widely recognized as a catalyst for innovation, workforce development, and sustainable economic growth. However, its effective delivery in Kano State, Nigeria, is constrained by inadequate infrastructure, shortage of qualified teachers, limited instructional resources, insufficient funding, outdated curricula, and weak industry-education partnership. This paper examines the potential of establishing strategic partnerships with local and international organizations as a sustainable mechanism for improving technology education in the state. Using a conceptual and analytical approach, the paper explores the roles of government agencies, non-governmental organizations, community-based organizations, private-sector institutions, multinational corporations, foreign development agencies, and international educational institutions in supporting technology education. The study reviews successful partnership initiatives from Nigeria and other countries, including South Africa, Ghana, India, and Rwanda, to identify best practices and lessons applicable to Kano State. Findings indicate that collaborative partnerships can enhance educational infrastructure, improve teacher capacity, provide access to modern technologies, strengthen curriculum relevance, and increase students' acquisition of industry-relevant skills. The paper further proposes a structured partnership framework based on stakeholder engagement, collaborative governance, public-private partnerships, capacity building, school-industry collaboration, and results-based management models. The framework outlines key stages for identifying partners, mobilizing resources, implementing interventions, and evaluating outcomes. The study concludes that sustainable partnerships are essential for transforming technology education in Kano State and recommends stronger policy support, adequate funding, continuous professional development for teachers, curriculum modernization, and effective monitoring mechanisms to ensure long-term educational and socio-economic benefits.*
Keywords: *Technology Education, Partnerships, Technical and Vocational Education, Educational Development, and Sustainable Development.*

Introduction

Technology education plays a fundamental role in national development as it provides learners with the knowledge and practical skills needed for innovation, industrial growth, and economic transformation. In Kano State, Nigeria, the need for effective technology education is particularly important due to its large youthful population and its status as one of the country's major commercial and industrial centres. A well-developed technology education system in the state has the potential to equip young people with relevant technical competencies for self-reliance, job creation, and industrial productivity, thereby contributing to socio-economic development and reducing unemployment (Ayo-Sobowale & Orunbon, 2025).

Technology education refers to the teaching and learning of technical knowledge, practical skills, and problem-solving abilities required in science, engineering, and applied technological fields. Globally, especially in developing regions such as Sub-Saharan Africa, technology education is increasingly recognised as a major driver of innovation and economic growth. However, its effectiveness depends largely on the availability of resources, qualified instructors, and strong institutional support systems (Donou-Adonsou, 2019). In Kano State, although technology education is expanding, it still faces limitations that reduce its ability to fully meet labour market demands.

In Kano State, several constraints continue to hinder effective delivery of technology education, including inadequate infrastructure, poorly equipped laboratories, shortage of skilled technical teachers, and outdated instructional materials. In addition, curriculum-content mismatch with modern industrial requirements further limits students' employability and practical competence (Nassarawa *et al.*, 2025). These challenges collectively contribute to low student interest, reduced enrolment in technical courses, and inadequate skill acquisition, which in turn affects productivity and economic development (Anaman *et al.*, 2022).

Partnership with local and international organizations serves as a strategic approach to improving technology education. Such partnerships involve collaboration between educational institutions, government agencies, industries, and international development organisations to provide funding, technical expertise, capacity building, and modern equipment. These collaborations are essential for bridging the gap between classroom learning and industry expectations. According to Bello and Muhammad (2021), partnerships in technical and vocational education can significantly enhance resource availability, improve instructional quality, and strengthen curriculum relevance.

Establishing effective partnerships is therefore not only an educational strategy but also an economic development necessity. Strengthening technology education through collaboration can help address unemployment, promote entrepreneurship, and support sustainable development goals. Edokpolor and Owenvbiugie (2017) emphasised that technical education remains a key driver of job creation and economic sustainability in Nigeria.

In an era of rapid global technological advancement, Kano State must prioritise strengthening technology education through strategic partnerships with both local and international organisations. Such collaboration will not only improve teaching and learning outcomes but also contribute to building a skilled workforce capable of driving innovation, industrialisation, and sustainable socio-economic development in the region.

Challenges of Technology Education in Nigeria

Kano State's education system is not isolated from the overall issues and concerns affecting technology education in Nigeria. The state faces numerous challenges that hinder the effective delivery of technology education. These challenges are multifaceted, spanning inadequate infrastructure, limited access to quality resources, a shortage of trained educators, socio-economic barriers, funding constraints, and curriculum issues.

One of the most pressing issues is the lack of proper facilities in many schools. Laboratories, libraries, and internet access, which are essential for effective technology education, are often absent (Poirier & Remsen, 2017). According to a report by Bawa and Rabiu (2020), technical schools often lack modern equipment. This infrastructure deficiency severely limits practical training opportunities for students, which are crucial for understanding and applying scientific concepts.

There is a significant shortage of textbooks, teaching materials, and modern equipment necessary for practical learning (Sanusi, 2022). Igudia and Akangbe (2021), in a separate study, reported that the availability of the required textbooks in most schools was inadequate, with many of the available textbooks being outdated. The absence of these resources hampers the ability of students to engage in hands-on experiments and projects, which are vital components of technology education. Furthermore, Kano State faces a critical shortage of qualified teachers in technical subjects. This shortage affects the quality of education delivered, as many existing teachers lack the necessary training and professional

development opportunities to stay current with advancements in their fields (Tumba & Haruna, 2025). Moreover, a study by Janguza (2025) found that a large proportion of technology education teachers in Kano State are unqualified or lack adequate training, leading to suboptimal student performance. The inadequate training of teachers results in poor delivery of scientific knowledge and technical skills to students.

Economic challenges and cultural norms often limit access to education, particularly for girls and children from low-income families in Kano state (Darma, 2017). Enrollment in technical courses remains low due to various socio-economic factors. The National Board for Technical Education (NBTE) (2020) reported that only 35% of students in secondary schools in Kano State are enrolled in technology-related subjects, and performance in national examinations remains below the national average. These socio-economic barriers prevent a significant portion of the population from pursuing and benefiting from technical education. Financial limitations at both state and institutional levels result in insufficient resources for schools and technical colleges. This lack of funding affects everything from teacher salaries to the maintenance of facilities (Idris & Mbudai, 2017).

The curricula in many schools are outdated and do not align with the current demands of the job market. This misalignment results in graduates who are not adequately prepared for employment or enrolment to further their studies in higher education (Anaman *et. al*, 2022). An outdated curriculum makes it difficult for students to acquire relevant and up-to-date knowledge, further diminishing the quality of technology education. Additionally**,** gender disparity is a critical issue in Kano State's educational landscape. Female students are underrepresented in technical education due to cultural and socio-economic barriers. According to a NBTE (2021) report, the enrollment ratio of male to female students in these fields is approximately 4:1.

The challenges facing technology education in Kano State are complex and interrelated. Addressing these issues requires a multifaceted approach in educational partnerships, including investing in infrastructure, improving access to quality resources, training educators, overcoming socio-economic barriers, ensuring adequate funding, and updating curricula to meet contemporary demands. Without these changes, the state will continue to struggle in providing effective technology education to its students.

Importance of Partnership in Coping the Challenges of Technology Education

Partnerships between governments, educational institutions and local and international organizations have proven to be effective in addressing educational challenges globally. For Kano State, forming such partnerships can provide several key benefits: (1) Local and international organizations can provide financial resources, educational materials, and infrastructure support that are often beyond the reach of the state's budget (Usman *et al.*, 2021). (2) These partnerships can facilitate professional development programs for teachers, helping to improve the quality of education (Postholm, 2018). (3) Exposure to global best practices in education can lead to the adoption of innovative teaching methodologies that enhance student engagement and learning outcomes (Frelin & Grannas, 2021). (4) Partnerships often involve community-based projects that encourage local participation and ensure that educational interventions are culturally relevant and sustainable (Johnson *et al.*, 2021). By utilizing available collaboration opportunities, Kano State can make significant strides in improving technology education, ultimately contributing to the region's socio-economic development and the empowerment of its youth.

Potential Local and International Partners for Collaboration

Government Agencies

In Kano State, several government agencies play critical roles in the promotion and development of technology education. Notable among these is the Kano State Ministry of Education, which is responsible for policy formulation, implementation, and supervision of educational programs. The Ministry oversees secondary and tertiary education, ensuring that curricula include adequate technical education components (Kano State Ministry of Education, 2023). Another significant agency is the Science and Technical Schools Board Kano State (STSB). The STSB specifically focuses on enhancing technical and vocational education and training (TVET) within the state. It manages technical colleges and vocational training centers, providing essential resources and support for both students and teachers (STSB, 2023). Additionally, the Kano State Ministry of Science, Technology, and Innovation (MSTI) promote scientific research and technological advancements. The MSTI collaborates with educational institutions to integrate cutting-edge technologies and innovative teaching methods into the curriculum, thereby enhancing the quality of technology education (Kano State MSTI, 2023).

Local Non-Governmental Organizations (NGOs)

Local NGOs in Kano State are pivotal in complementing government efforts to improve technology education. One such organization is the Kano State Education Development Initiative (KSEDI), which focuses on enhancing educational quality through various programs and interventions. KSEDI works closely with schools to provide teacher training, curriculum development, and student support services (Odogwu, 2022). Another influential NGO is the Kano Literacy and Development Initiative (KLDI). KLDI targets underprivileged communities, offering educational programs that emphasize technical skills. Their initiatives include after-school programs, science clubs, and vocational training workshops aimed at increasing student engagement and interest in STEM fields (Literacy, Skills Dev, 2026).

Community-Based Organizations (CBOs)

Community-Based Organizations (CBOs) are grassroots entities that play a crucial role in local education development. In Kano State, the Kano Community Education Network (KCEN) is a prominent CBO that works directly with local communities to improve educational outcomes. KCEN organizes community-driven educational projects, including technical workshops, and mentorship programs, fostering a culture of learning and innovation at the grassroots level (Sagagi, 2016). Another key player is the Optimum Women and Youth Empowerment Foundation (OWYEF). WYEF focuses on empowering women and youth through education, particularly in technology. They offer targeted programs that provide girls and young women with the skills and knowledge needed to pursue careers in STEM, thereby addressing gender disparities in these fields (OWYEF, 2022).

Private Sector Involvement

The private sector in Kano State is increasingly recognizing the importance of supporting technology education. Companies such as Dangote Group and BUA Group have established corporate social responsibility (CSR) initiatives that focus on educational development. These initiatives include funding for technology laboratories, scholarships for students pursuing technical courses, and partnerships with educational institutions for curriculum enhancement (Dangote Donate N15 billion, 2025; Rabiu, 2021). Moreover, tech companies like Andela and Co-Creation Hub (CcHub) are investing in the local education sector by providing training programs, internships, and technology boot camps. These companies collaborate with schools and universities to bridge the gap between education and industry requirements, ensuring that students acquire relevant skills for the job market (Andela, 2023; CcHub, 2023).

International Non-Governmental Organizations (INGOs)

Education Cannot Wait (ECW) is a global fund dedicated to education in emergencies and protracted crises. They focus on providing immediate and sustainable educational interventions, making them a potential partner for addressing educational gaps in Kano State due to socio-economic challenges and conflicts (Education Cannot Wait, 2026). Additionally, Plan International is committed to advancing children's rights and equality for girls. They have various educational programs aimed at improving access to quality education for children in underprivileged areas, making them an ideal partner for initiatives in Kano State (Plan International, 2026). Another notable INGOs are the Save the Children which focuses on child education, health, and protection. They have extensive experience in implementing educational programs in crisis-affected regions and can contribute significantly to enhancing technology education in Kano State (Save the Children, 2026).

Foreign Governmental Agencies

The United States Agency for International Development (USAID) is a foreign agency that has numerous educational programs globally, including in Nigeria (USAID, 2024). Their focus on improving the quality of education and promoting partnerships with local entities aligns well with the needs of Kano State's educational sector. Similarly, the United Kingdom Department for International Development (DFID), now part of the Foreign, Commonwealth & Development Office has a strong presence in Nigeria and has supported various educational initiatives (Usman *et al.*, 2021). Their expertise in educational reforms and teacher training can be valuable for Kano State. The German Agency for International Cooperation (GIZ) is another agency known for its work in vocational training and technical education (GIZ, 2026). Their programs are designed to align education with labor market needs, making them a key partner for technical education projects in Kano State.

Multinational Corporations

Google has educational initiatives such as Google for Education, which provides tools and resources to enhance learning and teaching. They also offer coding and digital skills training (Google, 2026), which can be particularly beneficial for technical education in Kano State. In the same vein, Microsoft's educational programs, including Microsoft Education and the Microsoft Imagine Academy, focus on providing technology resources and training for students and educators (Microsoft, 2026). Their expertise in technology integration in education can help modernize technology education in Kano State. At the same time, Siemens is actively involved in technical education through its Siemens Stiftung foundation. They provide resources and training for STEM education and vocational training (Siemens Stiftung, 2026), which can greatly enhance technical education infrastructure in Kano State.

Educational Institutions Abroad

One of such institutions is the Massachusetts Institute of Technology (MIT). It has various international collaborations aimed at improving global education standards (MIT, 2026). Their expertise in STEM education and innovative teaching methods can be harnessed for technology education projects in Kano State. Another source of collaboration is the Cambridge University. It runs several educational outreach programs and partnerships with developing countries (Cambridge University, 2026). Their experience in curriculum development and teacher training can provide substantial support for educational initiatives in Kano State. The Technical University of Munich (TUM) is yet known for its strong focus on technical education and engineering. They have international partnerships that promote technical education and research, making (TUM, 2026) them a suitable partner for advancing technical education in Kano State.

Case Studies on Partnerships in Technology Education

1. The Educate-A-Child project in Nigeria integrates technology education into primary and secondary school curriculums through a partnership that includes the Universal Basic Education Commission (UBEC), state governments, and private sector stakeholders. This initiative focuses on improving infrastructure, training teachers, and providing learning materials, leading to significant increases in enrollment and retention rates in technical education courses (Educate A Child, 2026).
2. The Cape Peninsula University of Technology (CPUT) has forged workable partnerships with local industries to align its curriculum with industry needs. This collaboration includes cooperative education programs where students gain practical experience in their fields of study. Local companies benefit by accessing a pool of well-trained potential employees, particularly in the engineering and information technology sectors (Cape Peninsula University of Technology, 2024).
3. The partnership between Ghana and MIT, through the MIT-Africa Initiative, focuses on enhancing technical education. This program supports curriculum development, faculty exchange, and joint research projects. One notable achievement is the establishment of Fab Labs, which are equipped with digital fabrication tools to promote innovation and entrepreneurship among students. This collaboration has significantly improved the quality of technical education in Ghana and inspired similar initiatives across Africa (MIT News, 2025).
4. The India-German Programme for Vocational Education and Training (IGVET) is collaboration between the Indian Ministry of Skill Development and Entrepreneurship and the German Federal Ministry for Economic Cooperation and Development. The program aims to enhance vocational training through a dual education system that combines theoretical and practical learning. This partnership has established several model training centers and improved the employability of graduates in the manufacturing and technical sectors (Indo-German initiative, 2020).
5. CMU-Africa, collaboration between the Rwandan government and Carnegie Mellon University, aims to develop a cadre of highly trained engineers and technical professionals. The program offers master's degrees in information technology and electrical and computer engineering, tailored to African students and industries. The high graduate employment rate and the positive impact of alumni across various sectors underscore the success of CMU-Africa (Opportunities for Africans, 2026).

Lessons Learned from the Case Studies

Successful partnerships often tailor their programs to address specific local needs and contexts. For instance, the YSK program in Kenya focuses on secondary school students, leveraging local resources and expertise to foster innovation from a young age. Understanding and integrating into the local educational landscape ensures relevance and sustainability. Furthermore, partnerships thrive with strong support from local and international institutions. The commitment of local governments, educational institutions, and industry players is crucial. For example, the CMU-Africa program's success is partly due to the strong backing from the Rwandan government, ensuring necessary resources and policy support. In the same vein, effective partnerships prioritize capacity building and knowledge transfer. Programs like IGVET emphasize training local trainers and educators, ensuring that the benefits of the partnership extend beyond its initial phase. This approach helps in building a sustainable education ecosystem that can continue to grow and evolve independently and technologically.

The use of technology and innovation are key components of successful partnerships. The Fab Labs initiative in Ghana, supported by MIT, provides students with access to cutting-edge technology, enabling them to create innovative solutions to local problems. This focus on technology equips students

with relevant skills for the modern workforce. More so, combining theoretical education with practical experience significantly enhances the employability of graduates. Partnerships like those between CPUT and local industries in South Africa provide students with hands-on experience, making them job-ready upon graduation. This dual approach ensures that education is directly linked to industry needs. The long-term success depends on the sustainability and scalability of partnership programs. Initiatives like the Educate-A-Child project in Nigeria have scalable models that can be replicated in other regions, ensuring a wider impact. Building sustainable frameworks that can grow and adapt over time is crucial for lasting success.

Challenges of Partnerships in Developing Countries

Partnerships with local and international organizations in developing countries, such as Nigeria, often face several challenges that can lead to their failure. These challenges include:

1. Developing countries often struggle with inadequate infrastructure, such as unreliable electricity, poor internet connectivity, and insufficient laboratory facilities. These deficiencies can severely hamper the implementation of educational programs and the use of modern teaching tools (Gupta & Hayath, 2022).
2. Many partnerships are project-based with a fixed term, and when funding ends, the programs often collapse. Sustainability requires ongoing support, capacity building, and the integration of initiatives into local systems to ensure continuity (Dragomir & Foris, 2022).
3. Effective partnerships require strong coordination and communication among all stakeholders. Language barriers, time zone differences, and varying levels of technological proficiency can hinder effective collaboration (Rajhans, 2018).
4. Developing countries often experience political and economic instability, which can disrupt educational initiatives. Changes in government, policy shifts, and economic crises can lead to a lack of continuity and support for educational projects (Menashy, 2019).
5. International partners may not fully understand the local culture, leading to initiatives that are culturally insensitive or inappropriate. This can result in resistance from local communities and a lack of participation (Hora & Millar, 2023).
6. Bureaucratic inefficiencies and corruption can impede the progress of educational projects. Delays in the disbursement of funds, mismanagement, and corruption can drain resources meant for educational improvement (Transparency International, 2026).

Partnerships in Technology Education in Kano State Using Suitable Models

Establishing effective partnerships in technology education in Kano State requires a structured and collaborative framework involving government agencies, educational institutions, industries, non-governmental organizations, communities, and international development partners. The integration of suitable partnership models across different implementation phases is essential for improving the quality, relevance, and sustainability of technology education.

The first phase involves identifying potential partners through the Stakeholder Partnership Model and the Triple Helix Model, which emphasize collaboration among government, educational institutions, industries, and communities (Shapiro *et al.*, 2023). At this stage, relevant stakeholders including technical colleges, universities, industries, donor agencies, and community leaders are identified based on their potential contributions to technology education development. A needs assessment is conducted to determine specific institutional challenges such as inadequate laboratories, lack of digital learning facilities, and teacher competency gaps. Stakeholder engagement meetings are also organized to promote shared understanding, trust, and collective ownership of partnership initiatives. The second phase should focus on developing a collaboration framework using the Collaborative Governance Model and the

Public-Private Partnership (PPP) Model. During this phase, Memoranda of Understanding (MOUs) are drafted to define the roles, responsibilities, timelines, and expected outcomes of each partner (Shapiro *et al.*, 2023). Joint planning sessions are organized to design programs related to curriculum improvement, teacher training, infrastructure development, and student industrial training (Mustafa *et al.*, 2022). These collaborative planning activities ensure that educational programs are aligned with industry demands and technological advancements.

The third phase involves agreement finalization and preparation through the Capacity Building Partnership Model and Resource Dependency Theory. Partners mobilize resources such as funding, technical expertise, laboratory equipment, and digital learning tools required for implementation. Logistics for workshops, training programs, and project activities are carefully planned to ensure smooth execution. This phase is important because proper preparation improves coordination, minimizes delays, and enhances institutional readiness for program implementation. The fourth phase centers on implementing collaborative programs using the Experiential Learning Partnership Model and the School-Industry Collaboration Model. Teachers receive professional training from local and international experts to improve their instructional competencies in technology education (Dragomir & Foris, 2022). Educational institutions are also provided with instructional materials, laboratory facilities, and digital technologies needed for practical learning (Gupta & Hayath, 2022). Pilot programs involving practical teaching methods, internships, mentorships, and industrial visits are introduced to strengthen students' technical and employability skills (Hager *et al.*, 2018). These activities help bridge the gap between theoretical instruction and workplace expectations.

The final phase focuses on monitoring and evaluation using the Results-Based Management (RBM) Model and the Continuous Improvement Model. Key performance indicators such as student achievement, teacher effectiveness, program reach, and infrastructure improvement are used to assess partnership outcomes (Jabir & Nihuka, 2024). Data are collected through surveys, interviews, and academic assessments to evaluate progress and identify areas requiring improvement (Aithal & Aithal, 2023). Periodic reports and feedback mechanisms are also established to ensure accountability, transparency, and continuous improvement (Brown & Cohen-Vogel, 2019). Overall, the integration of these partnership models provides a sustainable framework for advancing technology education in Kano State and improving workforce development in the region.

Conclusion

Improving technology education in Kano State holds the key to advancing economic development and bolstering the region's global competitiveness. Through strategic partnerships with both local and international organizations, Kano State can surmount its current educational challenges and pave the way for transformative change. These collaborations offer invaluable resources, expertise, and innovative methodologies essential for revitalizing technology education.

Suggestions

To achieve effective partnerships, it is imperative for Kano state government to prioritize the following recommendations:

1. Kano state government should formalize and expand partnerships between Kano State educational institutions and local/international organizations. This includes establishing clear roles, responsibilities, and shared objectives to maximize collaborative impact on existing and new local/international partnerships.

2. Kano state government should ensure adequate funding and resource allocation to support collaborative initiatives. This involves leveraging external funding sources and optimizing the use of available resources to enhance educational infrastructure and access to technology.
3. Kano state government should integrate industry-relevant curriculum updates and innovative teaching practices facilitated by partner organizations. This approach ensures that education remains current, practical, and aligned with emerging global trends in technology.
4. Kano state government should prioritize continuous professional development for educators to enhance their pedagogical skills and technological proficiency. Partner organizations can contribute expertise in training programs tailored to meet evolving educational needs.
5. Kano state government should implement efficient monitoring and evaluation frameworks to assess the effectiveness of collaborative efforts. This includes regular assessment of educational outcomes, stakeholder feedback mechanisms, and accountability measures to ensure transparency and impact assessment.

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