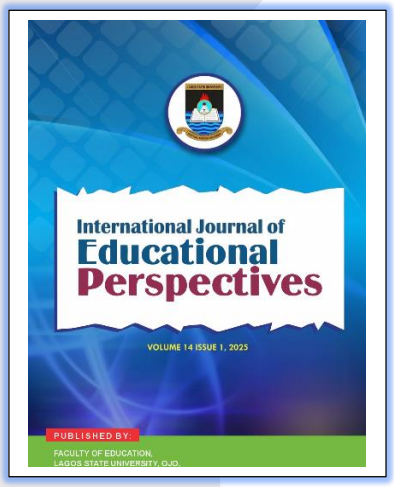

Creation of the Department of Biomedical Engineering Technology and a College Diploma Programme, Challenges and Successes – The Lagos State College of Health Technology (LASCOHET) Experience

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ABSTRACT

The journey towards creating a department of biomedical engineering technology in Lagos State College of Health Technology took off in the year 2020. Biomedical engineering technology department is a pioneer clinical engineering training school in Lagos State College of Health Technology. The department was created with a vision of training Biomedical Engineering Technologists who will become gainfully engaged and responsible for the repairs and maintenance of medical machines, engineering facilities and installations in the many state run medical establishments, and other organizations who require their services. Several hurdles, along the way, tested our resolve for the establishment of a vibrant career pathway for the teeming youth population of Lagos State. From challenges such as space constraints due to the limited land area of 3,849 square meter to construction/setting up of adjudged suitable laboratories and workshops to procurement of numerous expensive training machines, tools and gadgets. The doggedness and determination of the management of the college has seen the department through these challenges and here, we present a report of the successes gained since the commencement of the diploma programme in biomedical engineering technology.

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1.0 Introduction

1.1 Historical Background

Lagos State College of Health Technology, formerly known as School of Hygiene was established in 1920 by Dr. Oluwole I. Oladipo based on the prevailing health situations and low human health resources available in the community. His vision for providing a medical training institution in Lagos at the time is a masterstroke as it heralded the development of several departments, including the department of Biomedical Engineering Technology, to cater for this pressing need (Kassim M, 2021). The then School of hygiene offered six major health courses before incorporating the training of community midwives and nurses into its program between 1957 and 1966 (Lagos State College of Health Technology, 2021).

On the 21st of February, 1977, Lagos State College of Health Technology, under the directive of the Federal Military Government, with General Olusegun Obasanjo as the head of state, was transformed from a School of Hygiene to a School of Health Technology as a result of the Third National Development Plan (1975-1980) on National Basic Health Service Scheme (NBHSS) which mandated the training of middle level manpower for the health sector (9JaPolyTv, 2023).

On the 22nd of January, 2004, Lagos State College of Health Technology's establishment was assented to by the former Governor of Lagos State, Asiwaju Bola Ahmed Tinubu and the Lagos state college of health technology's governing council was constituted and inaugurated in July, 2012 by Governor Babatunde Raji Fashola's Administration (Lagos State College of Health Technology, 2021).

The establishment of the Department of Biomedical Engineering Technology at Lagos State College of Health Technology represents a vital response to one of Africa's most pressing healthcare challenges: the "medical equipment graveyard" phenomenon. Research shows that around 40% of medical equipment in low- and middle-income countries eventually becomes non-functional due to lack of proper maintenance, training, and infrastructure (PATH, 2024). In some cases, up to 97% of donated medical equipment stops working within five years (Medical Xpress, 2025).

This crisis is particularly severe in Nigeria, where studies reveal that between 50% and 80% of medical equipment in hospitals is broken or non-functional, making it extremely difficult for healthcare facilities to provide adequate patient care (Frontiers in Health Services, 2025). By training biomedical engineering technicians who understand local conditions which includes unstable electricity, dust, heat, and limited resources, LASCOHET's programme directly addresses this challenge by producing professionals who can maintain, repair, and adapt medical equipment to work effectively in African healthcare settings (United Nations Economic Commission for Africa, 2019).

Nigeria faces an alarming shortage of biomedical engineering professionals, with fewer than 0.05 biomedical engineers per 10,000 people according to a 2017 World Health Organization report, translating to only about 280 biomedical engineers serving a population that now exceeds 200 million (Springer, 2025). This severe shortage means that most healthcare facilities lack the technical expertise needed to keep medical equipment functioning properly. When we consider that Nigeria already struggles with a healthcare workforce crisis, having only 1.83 skilled health workers per 1,000 people compared to WHO's recommended 4.45, the importance and need for biomedical engineering technicians becomes even more urgent (The Lancet, 2024).

The biomedical engineering technology (BMET) programme of LASCOHET helps fill this critical gap by training mid-level professionals who can

work directly in hospitals, clinics, and laboratories to ensure that medical devices remain operational and safe. This is especially important because many Nigerian healthcare facilities cannot afford to outsource equipment maintenance to external companies, making in-house biomedical technicians essential for sustainable healthcare delivery.

Beyond equipment maintenance, the BMET programme at LASCOHET helps contribute towards the broader vision of healthcare innovation and economic development in Nigeria and across Africa which aligns with key elements of the global sustainable development goals (SDGs). African countries increasingly recognize that simply importing medical technologies from developed nations is not sustainable; instead, the continent needs professionals who can design, adapt, and manufacture appropriate technologies that fit local contexts amid resource constraints (Fogarty International Center, 2019). Training biomedical engineering technicians creates a foundation for developing home-grown medical device industries and fostering innovation ecosystems that can produce affordable, accessible, and appropriate healthcare technologies.

The African Biomedical Engineering Consortium has been working to standardize training programmes and build capacity across the continent, recognizing that success depends on creating a "critical mass" and network of local professionals who understand both the technical aspects of medical equipment and the unique challenges of African healthcare systems (LinkedIn, 2023). LASCOHET's programme aligns with these continental efforts by preparing graduates who can contribute to Nigeria's growing medical technology sector and participate in regional collaborations that strengthen healthcare systems across Africa.

The relevance of LASCOHET's biomedical engineering technology programme extends beyond national borders to global health security. The COVID-19 pandemic highlighted how quickly healthcare systems can become overwhelmed when medical equipment fails or when countries lack the technical capacity to maintain critical devices like ventilators, oxygen concentrators, and diagnostic machines. Training biomedical engineering technicians helps to strengthen healthcare system resilience by ensuring that facilities can respond effectively to health emergencies without depending solely on external technical support.

Also, as healthcare becomes increasingly digital and technology-driven, with advances in telemedicine, mobile health applications, and artificial intelligence (AI)-assisted diagnostics, there is growing demand for professionals who can bridge the gap between technology and healthcare delivery (University of Johannesburg, 2025). LASCOHET graduates are positioned to play pivotal roles in implementing and maintaining these emerging technologies, helping Nigeria participate fully in the global digital health transformation while ensuring that innovations are adapted appropriately for local contexts. This contributes to the global objective of achieving universal health coverage by making healthcare technologies more accessible, affordable, and sustainable in resource-limited settings.

1.2 Governing Council of the College

The governing council of Lagos State College of Health Technology is constituted by a chairman, representative of the ministry of education and 2 members of the teaching staff of the college.

1.3 Academics

Lagos state college of health technology is divided into eight schools:

School of Environmental Health
School of Pharmacy Technician
School of Health Information Management
School of Community Health
School of Complementary Health Sciences
School of Biomedical Technology

School of Medical Laboratory
School of Morbid Sciences

1.4 Location

Lagos state college of health of technology is located 8, Harvey Road, Alagbomeji, Yaba, Lagos State in an environment that accommodates several other government institutions such as; Queen's College, the Nigerian Institute of Medical Research, the Yaba College of Technology, Igbobi College, the University of Lagos, the Federal Science and Technical College, and the Federal College of Education. Its official website is at https://lascohet.edu.ng.

1.5 College Vision

To be a premier destination for excellent learning, producing world class allied healthcare professionals.

1.6 College Mission

To train competent and motivated graduates imbued with a sense of social responsibility in a conducive environment with renowned faculty employing state-of-the art technology to meet the ever evolving health care needs.

2.0 Main Body

The college currently has over a thousand students undertaking different programs and seventy-six (76) academic, non-academic and technical staff. Several other adjunct lecturers and staff members make up her workforce. The college has 8 schools (faculties) which offer varying courses that lead to the award of certificate, college diploma, ordinary national diploma and higher national diploma upon successful completion of prescribed examination. The college also has an active e-learning platform for her students as well as a Learning Management System (LMS) portal to cater for Distance learning and on-line teaching which became invaluable especially during the COVID-19 disease outbreak the world over that crippled all sectors of the world economy, not the least education.

The Biomedical Engineering Unit was set up at the Lagos State University Teaching Hospital (LASUTH) in 2009. The purpose of this unit was to maintain laboratory and medical equipment in the College of Medicine, Lagos State university and at Lagos State University Teaching Hospital (as they share structures together) as well as to train biomedical technologists for the nation.

The capacity to maintain medical equipment and ensure their functionality is central to the successful provision of healthcare, medical education and biomedical research. The achievement of this capacity was a key objective and deliverable of the Biomedical Engineering unit, and of its aims to train technicians to cater for the need for equipment repairs and maintenance in the West African sub-region.

2.1 The Department of Biomedical Engineering Technology

Department of Biomedical Engineering Technology is a pioneer clinical engineering training school in Lagos State College of Health Technology. The department was created and established in the year 2020 by the 15th Executive Governor of Lagos State, Mr. Babajide Olusola Sanwo-Olu.

The academic staff of the department that kick started the program were deployed from the Biomedical Engineering unit of LASUTH and headed by Engr. Kalu C. Joseph as the pioneer Dean of school of Biomedical Engineering Technology (Adekoya, 2024). Qualified biomedical engineering faculty were engaged to bring their wealth of experience to bear in the training of competent and skilled workforce who can manage medical machines in hospitals, healthcare departments of corporate organizations and biomedical companies.

The Lagos State Government is committed to upgrading the medical facilities of all its primary, secondary and tertiary healthcare institutions in the state. A recurring challenge it has faced in achieving these laudable objectives was the lack of

maintenance of procured and installed medical machines in her healthcare institutions as it aligns with national health technology policy and equipment management goals (Federal Ministry of Health, 2020; World Health Organization, 2020; Ayeni & Adeniran, 2021). This is due to the dearth in qualified and skilled middle level manpower that will be charged with conducting routine and continuous maintenance of these machines. This became the major reason the government invested in the establishment and equipping of the department of Biomedical Engineering Technology.

The process of starting a college diploma programme in the Department of Biomedical Engineering Technology (which would ultimately mutate into a National Diploma (ND) program when it gets official assent by the National Board for Technical Education (NBTE)) generated a debate over the appropriate name for the programme at the level of seeking approval for the diploma program. In an effort to objectively resolve the debate, some questions were considered:

a. What effects will the availability or otherwise of lecture halls, laboratories and workshops have on the students (especially where most of the facilities in the college were still under construction)?
b. What is the likely effect of the location and identity of the programme as it affects the career of the students? *Some students were confused as to their position either in the engineering or medical field careerwise.*
c. Which is/are the appropriate body/bodies responsible for licensing, accrediting and regulating the practice of BME in the country? *Engineering programmes are regulated by COREN in Nigeria.*
d. What nomenclature/name will the programme be called upon take-off. At first, the college assigned the program name as 'Diploma in Biomedical Equipment Repair Technician'. This brought with it the huge problem of identity for the students offering the course of study. The reason brought forward by the college is that it does not want to run contrary to standards set by COREN.

It was resolved by the college academic board that the program be designated as Diploma in Biomedical Engineering Technology and domiciled in the School of Biomedical Engineering technology.

2.2 The Biomedical Engineering Technology Diploma Program

2.2.1 Why a diploma Program in Biomedical Engineering Technology?

The diploma program in Biomedical Engineering Technology was birthed out of the sheer desire of the government of Lagos State to close the gap in the shortage of highly skilled middle level manpower who will be in charge of the continuing maintenance of the numerous purchased and often imported sophisticated medical machines within its health establishments **(**Lievens et al., 2020; Omondi & Mwesigwa, 2021; United Nations, 2021)**.** This decision was made because of the desperate need of these particular set of staff strength because they are able to save (as well as prolong) the lives of machines which ultimately saves countless lives of patients in our various medical establishments. It is a two-year college diploma(certificate) program which aims to equip learners with foundational knowledge and skills needed to install, set-up, calibrate, troubleshoot, service and maintain medical machines, which are very often imported and procured at quite expensive costs to government, in order to ensure their prolonged life-span and minimize their down-time.

The department was created with a vision of training Biomedical Engineering Technologists

who will become gainfully engaged and responsible for the repairs and maintenance of medical machines, engineering facilities and installations in the many state run medical establishments, federal medical institutions, and tertiary institutions within and outside the shores of the country (World Health Organization, 2022; Eze & Umeh, 2020; Ayeni & Adeniran, 2021; Federal Ministry of Health, 2020**).** The department also trains her students on contemporary entrepreneurial skills to become self-reliant and employers of labor.

Our vision is to build a future generation of researchers and professionals that will bridge the gap between Biomedical Engineering and medical science for improved healthcare service delivery and quality of life of healthy individuals.

2.2.2 Collaborations

The Department of Biomedical Engineering Technology enjoys strong ties and collaborations with different hospitals and medical equipment companies both within and outside its surrounding environs. Reputable institutions such as LASUTH, Federal Medical Centre Ebute Metta, National Orthopaedic Hospital Igbobi, Nigerian Army Reference Hospital Yaba and many others have assisted the department over the years in admitting our students who undergo short trainings in their Biomedical Engineering units.

As a department, we have taken our students to industrial field visits to many of these medical institutions of repute and other established biomedical engineering giants like General Electric (GE) healthcare. Upon completion of the two-year college certificate program in the department, many of our graduates have secured employment opportunities in these organizations with profitable compensation and benefits. Many new collaborations are currently being pursued by the department.

2.2.3 Challenges of Setting Up and Running the Department

A. Challenge of space for laboratories and workshops

Lagos State College of Health Technology has a major challenge in the area of space constraint, with the college sitting on a mere 3,849 square meter **(**Nwankwo & Okeke, 2021**).** This has led to stunting of the growth of the college and expansion of the programs being offered therein. Upon assumption of office at the helms by the new management of the college chaired by Professor Raheem Olasupo Akewushola, provost of the college, concrete measures and plans were put in motion to setup and furnish the laboratories and workshops of the department **(**Thisday 2024; Nwankwo & Okeke, 2021**).** These facilities form the backbone upon which the successful accreditation of the National Diploma (ND) as well as the Higher National Diploma (HND) by NBTE depends on. Some of these milestone achievements are as attached below in the gallery below to meet NBTE requirements for accreditation (National Board for Technical Education, 2022; Ojo & Afolabi, 2022; International Federation for Medical and Biological Engineering, 2020).

B. High cost of training machines and tools

The cost that is incurred in the procurement of training machines and equipment for the programme is quite expensive running into millions of Naira. These machines and training kits form the foundation upon which a successful Biomedical Engineering Technology programme can be achieved. It is also a major ingredient to becoming a fully accredited programme and maintaining such a revered status. The management of the college in collaboration with respective stakeholders are working assiduously towards ensuring that this goal is achieved in the shortest possible time.

C. Manpower shortages

Adequate quality manpower remains a challenge in the smooth running of the department. Biomedical engineering technology as a programme is an

amalgamation of engineering and medical sciences courses such as clinical engineering, electrical/electronic engineering, mechanical engineering, human anatomy and physiology, public health etc. thus requires competent quality workforce for its continued sustainability and expansion of its research frontiers. Most staff in the department are deployed from mainstream public service to handle the roles of academics. These staff members are adequately qualified for assigned roles and responsibilities however more hands are needed still in order to ensure a balance in quality faculty/students relations and strengthen workforce of few available staff members in the department.

D. Shortage of suitably equipped organizations for SIWES and Industrial Training (I.T.)

Our students, some of whom, upon deployment to commence their Students' Industrial Work Experience Scheme (SIWES) and Industrial Training (I.T.) had reported that few medical establishments (hospitals) do not have a functioning biomedical engineering units. This limits their level of exposure and training, resulting in them being withdrawn and redeployed to other medical facilities, which could be distant from their place of residence and hence leads to incurring extra transportation costs by the students.

(a)

(b)

Figure 1(a) and (b). Anterior and posterior view of the biomedical engineering workshop

(b)

Figure 2(a) and (b). Interior and exterior view of the mechanical engineering workshop

Figure 3. State-of-the-art biomedical engineering laboratory

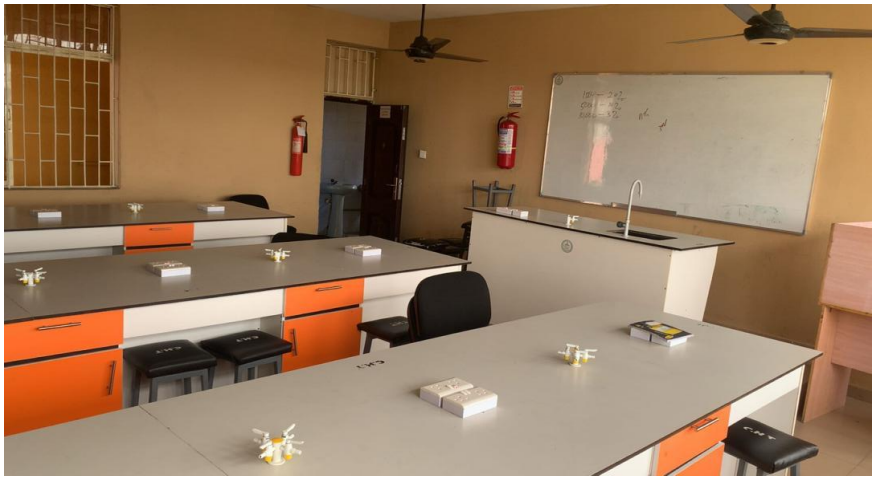

Figure 4. Electrical/Electronic Workshop

2.2.4 Successes Recorded in Running the Department

A. Successful graduation of five sets of students with college diplomas

One major success recorded in the establishment of the department is a hitch-free and smooth academic calendar through the support and commitment of the Lagos State Government at ensuring the welfare of staff and students of the college is adequately taken care of. This in turn has been repaid through the dedication of members of staff towards quality teaching and service delivery. The department has hence graduated Five (5) sets of technically sound biomedical engineering technologists who have gone on to become positive influence and productive members of their immediate community and the society in general.

B. Successful receipt of donated medical machines for students' training

The department of BMET has successfully taken delivery of donated medical machines for the training of her pupil engineering technologists through collaborative efforts. Donated machines include: Anesthesia machines, mechanical ventilator machines, neonatal incubator machines, suction machines etc.

C. Successful collaboration with reputable medical organizations and biomedical engineering companies

Collaboration with well-established biomedical engineering companies and other medical institutions remains a central pillar supporting the progress of the department of BMET. Collaborations with companies such as GE Healthcare, Mogbonju Nigeria Ltd, Medcourt and distinguished medical hospitals such as LASUTH Ikeja, FMC Ebute Metta, NARH Yaba, LUTH Idi Araba etc. has exposed our students to productive industrial training placements where they gain valuable knowledge of standards and practice of biomedical engineering in the corporate world. These trainings are offered to our students totally free of charge with some organizations opting to give out stipends to the trainees.

D. Successful and productive employment of graduates of the department

We have recorded several success stories and testimonies from our graduates who have become gainfully employed in organizations where they carried out their industrial training and other reputable companies. This serves as motivation for continued dedication towards the success of the programme in the college.

2.2.5 Admission Requirements

Admission requirements into the department of biomedical engineering technology are as follows:

O'level: At least Five (5) credit passes at NOT more than TWO sittings in subjects including Mathematics, English Language, Physics, Chemistry and Biology.

UTME: Physics, Chemistry and Mathematics **(**National Board for Technical Education, 2022; International Federation for Medical and Biological Engineering, 2020).

2.2.6 Curriculum and Subject Classification

The curriculum employed for training our students in the department of Biomedical Engineering Technology is based strictly on approved curriculum by NBTE (National Board for Technical Education, 2022). The curriculum was predominantly developed to meet local needs while applying international best practices. It was tailored to equip our graduates with competence and skill (Ng et al., 2020; Butcher et al., 2020; International Federation for Medical and Biological Engineering, 2020).

Figure 1 shows the distribution of courses in the 2-year program and cuts across the following sub-groups of natural (basic) science, engineering/mathematics, general studies/languages, medical sciences, entrepreneurship, computer/ICT, biomedical engineering and industrial work experience (the students' industrial work experience scheme – SIWES) (Pappas et al., 2022; African Biomedical Engineering Consortium, 2021).

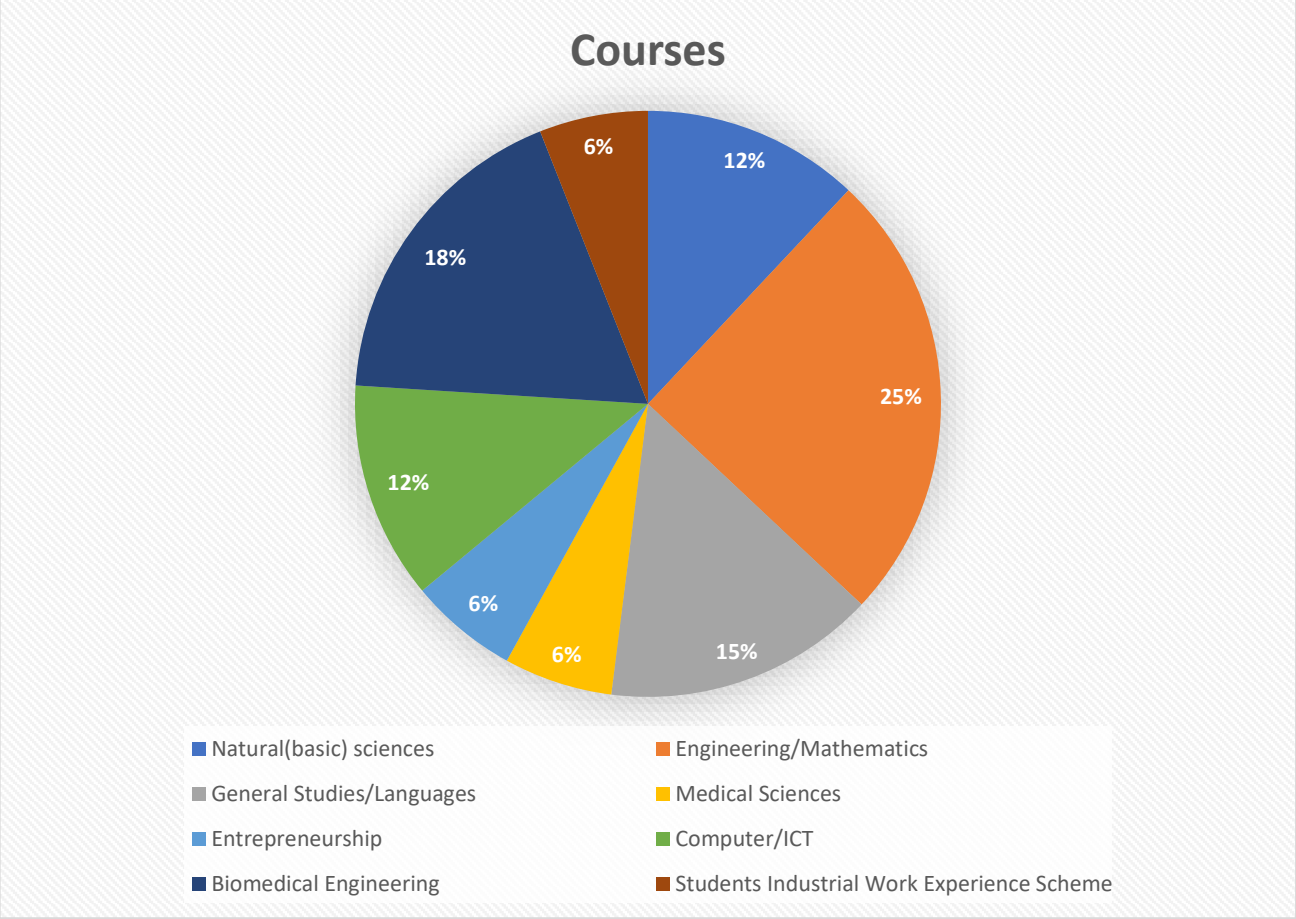

Figure 5. Curriculum distribution for the college diploma programme

3.0 Conclusion

We have discussed our challenges, experiences, and motivations in starting up a college diploma

programme in biomedical engineering technology at LASCOHET, and how these challenges have been successfully resolved. The experience has helped to form strong bonds and interdisciplinary relationships between stakeholders. We believe that the Biomedical Engineering technology programme at LASCOHET will be a beacon of excellence in Africa (Okafor & Adebayo, 2020, African Biomedical Engineering Consortium, 2021; Pappas et al., 2022; International Federation for Medical and Biological Engineering, 2020).

4.0 Recommendation

More effort is yet needed for the successful accreditation of the programme by NBTE**.** Our study shows that the college has performed exceedingly well with respect to availability of training facilities such as classrooms, laboratories and workshops. However, more biomedical engineering training machines/tools, circuits, and other consumables are needed for the program to scale through the last round of accreditation inspection visit by the NBTE team.

References

9JaPolyTv. (2023). *Lagos State College of Health Technology Yaba (LASCOHET) courses and school fees*. https://9japolytv.com/lagos-state-college-of-health-technology-yaba-lascohet-courses-and-school-fees/

Adekoya Abimbola Julius. (2024). *Lagos State College of Health Technology (LASCOHET) rewards members of staff for outstanding performance*. Diagnostic News Reporters. https://www.diagnosticnewsreporters.com.ng/lagos-state-college-of-health-technology-lascohet-rewards-members-of-staff-for-outstanding-performance/

African Biomedical Engineering Consortium. (2021). *Building biomedical engineering capacity in Africa: Lessons from regional academic networks*. ABEC.

Ayeni, A. O., & Adeniran, A. O. (2021). Health technology management in Nigerian public hospitals: Current status and improvement opportunities. *Health Technology*, *11*(6), 1313–1323. https://doi.org/10.1007/s12553-020-00501

Butcher, C., Ho, A. M., & Nwosu, N. (2020). Integrating biomedical engineering education in low-resource settings: Strategies, challenges, and opportunities. *Global Health Education & Learning*, *5*(2), 55–67. https://doi.org/10.1234/ghel.2020.0055

East Central and Southern Africa Health Community. (2024). *Empowering local expertise: The future of biomedical engineering in sub-Saharan Africa*. ECSA-HC. https://ecsahc.org/empowering-local-expertise-the-future-of-biomedical-engineering-in-sub-saharan-africa/

Eze, C. U., & Umeh, C. A. (2020). Availability and functionality of biomedical equipment in tertiary hospitals in Nigeria. *Nigerian Journal of Clinical Practice*, *23*(8), 1101–1107.

Federal Ministry of Health. (2020). *National policy on health technology and biomedical equipment management*. Federal Republic of Nigeria.

Fogarty International Center. (2019). *Focus on biomedical engineering in Africa: Fogarty grantees publish book to boost biomedical engineering*. National Institutes of Health. https://www.fic.nih.gov/News/GlobalHealthMatters/september-october-2019/Pages/biomedical-engineering-lmics.aspx

Frontiers in Health Services. (2025). *The availability and functionality of medical equipment and the barriers to their use at comprehensive specialized hospitals in the Amhara region, Ethiopia*. https://www.frontiersin.org/journals/health-services/articles/10.3389/frhs.2024.1470234/full

International Federation for Medical and Biological Engineering. (2020). *Global perspectives on biomedical engineering education and accreditation*. IFMBE Press.

Kassim, M. (2021, November). Our graduates are highly sought professionals at home and abroad—Dr Moyo Kassim, Provost, LASCOHET. *Vanguard*. https://www.vanguardngr.com/2021/11/our-graduates-are-highly-sought-professionals-at-home-and-abroad-dr-moyo-kassim-provost-lascohet/

Lagos State College of Health Technology. (2021). *Students' handbook 2020/2021 academic session*. LASCOHET.

Lievens, T., Serneels, P., & Quartey, P. (2020). Healthcare worker shortages and the sustainability of health systems in Africa. *Health Policy and Planning*, *35*(1), 104–111. https://doi.org/10.1093/heapol/czz123

Mafarachisi. (2023, August 9). *Biomedical engineering in Africa: Impact, innovations, and challenges*. LinkedIn. https://www.linkedin.com/pulse/biomedical-engineering-africa-impact-innovations-mafarachisi

Medical Xpress. (2025, July 1). *Equipment graveyards: Why new tech alone doesn't result in equitable health care*. https://medicalxpress.com/news/2025-07-equipment-graveyards-tech-doesnt-result.html

National Board for Technical Education. (2022). *Directory of accredited programmes and institutions*. NBTE.

Ng, K. H., McLean, I. D., & Dowd, S. B. (2020). Medical physics and biomedical engineering education: Adapting to change. *Biomedical Engineering Education*, *1*(1), 3–12. https://doi.org/10.1007/s43683-020-00003-4

Nwankwo, O. N., & Okeke, C. I. (2021). Space constraints and infrastructural challenges in Nigerian health training institutions. *Journal of Educational Planning and Administration in Africa*, *3*(2), 67–79.

Ojo, T. S., & Afolabi, B. B. (2022). Accreditation standards and quality assurance in Nigerian technical and vocational education. *African Journal of Technical Education*, *12*(1), 45–61.

Okafor, U. N., & Adebayo, A. A. (2020). Developing biomedical engineering education in Nigeria: Opportunities and constraints. *Nigerian Journal of Biomedical Engineering*, *19*(2), 15–26.

Omondi, F. K., & Mwesigwa, R. (2021). Human resources for health technology management in sub-Saharan Africa: A systematic review. *BMJ Global Health*, *6*(7), e005432. https://doi.org/10.1136/bmjgh-2021-005432

Oresanya, O. A., & Omotoso, T. A. (2023). Challenges and prospects of health technology education in Nigeria. *Journal of Health Professions Education in Africa*, *4*(1), 27–39.

Pappas, I., Rauterberg, M., & Akinwale, O. (2022). Capacity building for biomedical engineering in Africa: Lessons from collaborative training programmes. *Biomedical Engineering Online*, *21*(1), 105. https://doi.org/10.1186/s12938-022-01038-9

PATH. (2024). *Strong health systems require resilient biomedical engineering: Four ways to expand its reach*. https://www.path.org/our-impact/articles/strong-health-systems-require-resilient-biomedical-engineering-four-ways-to-expand-its-reach/

Springer. (2025, May 8). *Landscape of biomedical engineering and technology in Nigeria: A perspective*. Biomedical Engineering Education. https://link.springer.com/article/10.1007/s43683-025-00187-5

The Lancet. (2024, October 5). Nigeria's new policy: Solution for the health-care workforce crisis? *404*(10463), 1579–1580. https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(24)01766-5/fulltext

THISDAY. (2024, October 23). *LASCOHET Provost urges new students to prioritize studies, warns against misconduct*. https://www.thisdaylive.com/index.php/2024/10/23/lascohet-provost-urges-new-students-to-prioritize-studies-warns-against-misconduct/

UNESCO. (2021). *Engineering for sustainable development: Delivering on the Sustainable Development Goals*. UNESCO.

United Nations. (2021). *World population prospects 2022: Summary of results*. United Nations, Department of Economic and Social Affairs.

United Nations Economic Commission for Africa. (2019). *Building biomedical engineering innovation capacity for improved health outcomes in Africa*. https://archive.uneca.org/publications/building-biomedical-engineering-innovation-capacity-improved-health-outcomes-africa

University of Johannesburg. (2025, September 17). *Biomedical engineering and healthcare technology*. https://www.uj.ac.za/faculties/health-sciences/biomedical-engineering-and-healthcare-technology/

World Health Organization. (2020). *Global report on effective access to assistive technology*. WHO.

World Health Organization. (2022). *Medical devices and equipment in low-resource settings: A landscape analysis*. WHO.