
Review of Challenges Facing the Teaching and Learning of Science Education in Nigerian Tertiary Institutions

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Abstract: Tertiary education is the education given after secondary school education. It is an advance education that deals with training and human capital development through teaching, researching and community services. Tertiary education offer a lot of advance programme such as sciences education, social science education and art education. The teaching and learning of science education in Nigeria is facing a lot of challenges. This paper discussed the challenges. The paper among other things discussed the concept of tertiary institutions, concept of science programme and challenge facing teaching and learning of science education in the Nigerian tertiary institutions and recommendation were given.

Keywords: Challenges, Learning, Science Programme, Tertiary, Teaching.

Introduction

Tertiary institutions are institutions owned by the government. Public tertiary institutions are institutions established by the law of the parliament to provide a public higher education for the people within the country. Tertiary Education is the education given after Post Basic Education in institutions such as Universities and Inter-University Centres such as the Nigeria French Language Village, Nigeria Arabic Language Village, National Institute of Nigerian Languages, institutions such as Innovation Enterprise Institutions (IEIs), and Colleges of Education, Monotechnics, Polytechnics, and other specialized institutions such as Colleges of Agriculture, Schools of Health and Technology and the National Teachers' Institutes (NTI) (NPE, 2013).

The goals of Tertiary Education shall be to: Contribute to national development through high level manpower training; provide accessible and affordable quality learning opportunities in formal and informal education in response to the needs and interests of all Nigerians; provide high quality career counseling and lifelong learning programmes that prepare students with the knowledge and skills for self-reliance and the world of work; reduce skill shortages through the production of skilled manpower relevant to the needs of the labour market; promote and encourage scholarship, entrepreneurship and community service; forge and cement national unity; and promote national and international understanding and interaction (NPE, 2013).

Tertiary Educational institutions shall pursue these goals through: Quality student intake; quality teaching and learning; research and development; high standards in the quality of facilities, services and resources; staff welfare and development programmes; provision of a more practical based curriculum relevant to the needs of the labour market; generation and

dissemination of knowledge, skills and competencies that contribute to national and local economic goals which enable students to succeed in a knowledge-based economy; a variety of flexible learning modes including full-time, part time, block release, day-release, and sandwich programmes; access to training funds such as those provided by the Industrial Training Fund (ITF), Tertiary Education Trust Fund (TETFund); Students Industrial Work Experience Scheme (SIWES) that is well structured, coordinated and supervised; maintenance of minimum educational standards through appropriate regulatory agencies; an all-inclusive credible admissions policy for national unity; supporting affordable, equitable access to tertiary education through scholarships and students' loans; inter-institutional co-operation and linkages; and dedicated services to the community through extra-mural and extension services (NPE, 2013).

Tertiary Educational institutions in where is known to offer wide scope of programme. Olatunde-Aiyedun & Ogunode, Niyi Jacob (2021) submitted that science programme is one of the programme offer in the Nigerian higher institutions. Izunna Somadina Okwelogu, Ogunode Niyi Jacob and Ayinde Abayomi (2021) submitted that the universities education is designed to offered many academic programme. Some universities are specially designed for science programme, other for research purposes while other are conversional in nature offering all forms of programme. Majorities of public universities in Nigeria are offering science programme that is science education programme. Science education in the Nigerian public universities is facing a lot of challenges (Ogunode, & Aiyedun, 2020).

Olatunde-Aiyedun & Ogunode, Niyi Jacob (2021) remarked that science programme is defined as programmes that are mathematical oriented. Science programme is also viewed as programme that are involved in practicals. Science programme is the programme that is very important to the social economic and technological development of a nation. The place of science programmes in the development of the social. Economic and technological development cannot be underestimating. Akpan (2008) opined that science contributes to the quality of life in such areas as health, nutrition, agriculture, transportation, material and energy production, and industrial development. He further stated that it ensures that the air we breathe, and the water we drink are life sustaining, and not vectors of disease and decay. He finally concluded that if science and technology form the bedrock of sustainable development, that this revelation should constitute a beacon to our nation, so that science education must be given prominence in Nigerian schools. Orukotan (2007) stated that science education has introduced a lot of changes in our world today and it will continue to do so in the future. Nwachukwu, (2008) observed that achievement in science education will go a long way in reducing illiteracy and poverty, which are impediments to national development.

Millar, (2011) acknowledged that science Education should provide learners with the kind of understanding of science that citizens in a modern democracy should have. Every education system must strive in developing and promoting learners' scientific literacy for —active citizenship and engagement of science as a cornerstone of contemporary culture. Olatunde-Aiyedun & Ogunode, Niyi Jacob (2021) observes that Science Education is the main component of school curricula in almost every country. Hence, it is essential to maintain and develop the technical infrastructures, national securities and economic prosperities for the future. If well developed and executed, Science Education can provide a stable flow of graduates into high-level jobs that require advanced scientific knowledge and expertise (Millar, 2011).

Problems facing Science Education in Nigerian Tertiary Institutions

Inadequate funding, shortage of science academic staff, lack of laboratories, inadequate infrastructural facilities, brain-drain, insecurity and corruption.

Inadequate funding

Inadequate funding is a challenge to the teaching and learning of science education in the Nigerian tertiary institutions. Niyi Jacob Ogunode and Aiyedun, Tope Gloria (2020) observed that inadequate funding is one of the major problem facing the administration of science programme in the Nigerian higher institutions. Annual budgetary allocation for the administration and management of science programme is not adequate. The administration of science programme is very cost intensive. So, more funds are needed to effectively implement science programme in higher institutions across the country. Izunna Somadina Okwelogu, Ogunode Niyi Jacob and Ayinde Abayomi (2021) also stated that inadequate funding is a major problem facing the science education in Nigerian public universities. Science education drives it budgetary allocation from the general budget of the universities which have been described as inadequate by (Ogunode, 2020). Josiah, H., F & Ogunode N., J. (2022) and Ogunode Niyi Jacob and Abubakar Musa (2020) observed that the budgetary allocation for the administration of public universities in Nigeria is not adequate to implement the programme of universities in Nigeria. The university system requires a lot of funds for effective administration to be able realized it goals. The annual budgetary allocation for the administration of universities in Nigeria is grossly inadequate. The inability of the federal government to stick to the UNESCO 26% of national budget for education is affecting the management of Nigerian universities. Ogunode Niyi Jacob (2020) identified factors responsible for inadequate funding of public universities in Nigeria include lack of political will, corruption, increase in population, inflation, fall in national revenue and poor financial planning. The implications of underfunding of the public universities according to Ogunode Niyi Jacob (2020) include; inadequate infrastructural facilities, shortage of academics staff, poor quality of education, brain-drain and strike action.

Shortage of Science Academic Staff

Many tertiary institutions in the country do not have adequate science lecturers and this is affecting the teaching and learning of science education. Niyi Jacob Ogunode and Aiyedun, Tope Gloria (2020) stated that another problem facing the administration of science programme in the Nigerian higher institutions is the challenge of inadequate science lecturers. NEEDS (2014) submitted that data from the NUC revealed that universities experience an acute shortage of teaching staff in computer science and technology-based disciplines, but teaching staff shortage is very acute in disciplines such as law, engineering, medicine and surgery. NEEDS (2014) submitted that stakeholders attributed skill and personnel shortage to a number of factors, among which are poor salaries and low social prestige accorded teachers especially at the basic level of the education sector. Respondents expressed the view that teaching is generally viewed as the last resort of job-seekers because of the harsh economic realities and poor prestige accorded teachers in the society. Most newly recruited teachers would not mind leaving the profession if and when more attractive jobs become available in the public and private sectors. These shortages are attributed to several reasons, such as poor incentives for serving teachers, inadequate turnout of teachers in these subjects by teacher-training institutions in the country, and the exodus of lecturers to Western countries in search of greener pastures. Ogunode Niyi Jacob (2020) submitted that the problem of inadequate lecturers in public universities is caused by underfunding of the universities, corruptions, brain-drain, poor motivation, unconducive working environment and lack of manpower planning and the implications as stated by Ogunode Niyi Jacob (2020) include high student –teacher ratio, poor learning, poor delivery of teaching, low productivities and poor quality of education.

Lack of Laboratories

Laboratories which are very important in the teaching and learning of science education are not available in majorities of tertiary institutions across the country. Niyi Jacob Ogunode and

Aiyedun, Tope Gloria (2020) observed that practical-oriented courses demand the use of laboratory. Disciplines like Chemistry, Physics, Microbiology, and so on, require the use of well-equipped laboratories. Apparatuses and chemicals meant for practical have to be made available because a laboratory without the expected apparatus amounts to no laboratory. John, (2016) also remarked that infrastructure facilities and laboratory equipment in our universities are not in good condition and majorities have even outdated. All the required resources for the education production process are in short supply that poses a hindrance to learning and research work. The dearth of infrastructure in the universities is sickening and runs short of an ideal academic environment. Today, students are learning in dilapidated buildings. Ogunode, Niyi Jacob, Yilokun, I. B and Akeredolu, B. J (2020) opined that many Nigerian universities lack modern laboratories to carry out research work. Every year thousands of young scholars from Nigeria travel out to carry out research work on their thesis or research work. Physics, Chemistry, Biology, and computer labs in most Nigerian universities lack the necessary equipment to carry out simple research work. Enoghola (2013) stated that students were using kerosene stoves instead of gas burners to conduct experiments, specimens were kept in bottles instead of the appropriate places where such specimen should have been kept.

Inadequate Infrastructural Facilities

The problem of inadequate infrastructural facilities is posing a big challenge to the teaching and learning of science education in the higher institutions. Izunna Somadina Okwelogu, Ogunode Niyi Jacob and Ayinde Abayomi (2021) and Ogunode N, J, Jegede D, Adah, Audu E, I, Ajape T, S (2020) concluded that shortage of infrastructural facilities is another big problem facing the teaching of science education in the Nigerian public universities. Infrastructural facilities as viewed by Ogunode Niyi Jacob (2020) refer to facilities aiding delivery of academic and non-academic services in educational institutions. Infrastructural facilities include; libraries, laboratories, halls, offices, administrative blocks, hostels, roads facilities, water, electricity, internet etc. He went further by submitting that availability of the infrastructural facilities in adequate quantities will support effective administration of educational institutions and the inadequacies will prevent effective administration of educational institutions. Many public universities in Nigeria do not have adequate lecture halls, laboratories and offices for both students and academic staff. Ebehikhalu Nicholas Osagie and Dawam Patrick (2017) lamented that most of public universities in Nigeria lack modern infrastructural facilities. They went further to observed that in one of the public university it was observed that the science based programmes have one lecture room and one laboratory allocated to all levels of study. For example, the physics, chemistry, Biology, Mathematics etc programmes have one lecture room each for students from level one to final year. There is no programme that has a lecture theater assigned to it. The numbers of lecture rooms, laboratories and lectures offices are still grossly inadequate to meet the needs of the school. The library is still not adequate to meet the needs of the growing population of the university community. There is a significant deficit of basic learning resources which including multimedia systems, magnetic boards, computers, printers, plotter etc. The factors responsible for inadequate infrastructural facilities in Nigerian public universities according to Ogunode Niyi Jacob (2020) include; underfunding, increased in students population, corruption, poor infrastructural facilities planning, poor supervision and inflation. The implication of inadequate infrastructural facilities in the Nigerian public universities according to Ogunode Niyi Jacob (2020) include; poor quality of education, poor teaching and learning, low productivities, brain-drain and overcrowdings of lecture halls.

Brain-drain

The problem of brain-drain in the Nigerian tertiary institutions is another problem affecting the teaching and learning of science education in many public tertiary institutions. Ogunode,

N., J., Ezema, O., & Olugbenga, A., V (2022) and Niyi Jacob Ogunode and Aiyedun, Tope Gloria (2020) submitted that Brain-drain is one of the major factor responsible for ineffective administration of science programme in many Nigerian higher institutions. Many academic staff that are supposed to be lecturing and mentoring the students here in Nigeria are leaving every day to abroad for a better job. Ogunode Niyi Jacob & Abubakar Musa (2021) views Brain-drain as the mass movement of professionals from the developing countries to developed countries for better working conditions. Nigerian universities are facing the problem of brain drain because of poor motivation and poor working environment. Many lecturers have gone out of the Nigerian universities to other countries like South Africa and European countries. Few among many factors responsible for the best brain of Nigerian lecturers going abroad are poor condition of service, strike actions, poor research, poor motivation and insecurity challenge. The implication of brain-drain in the effective management of Nigerian universities is huge; the capable hands that would help in administering the universities are let go, this creates room for inexperience and under qualified people to run the universities in the country.

Insecurity Problem

Ogunode N., J. & Ndayebom, A., J (2022); Ohiare Udebu M.F, Ogunode Niyi Jacob and Rauf Olaiya Sarafadeen (2021) and Ogunode, N.J. (2021) stressed that insecurity problem in Nigeria and in particular in the tertiary institutions is hampering the development of science education. Insecurity problems are another major challenge facing the implementation of curriculum studies programme in the Nigerian higher institutions. Insecurity is a known issues affecting the entire country especially the Northern part of Nigeria. Insecurity in the country have penetrated into the educational institutions since the school is a part and parcel of the society. Many higher institutions have experienced attacks from different sect groups in the country leading to death of students and lecturers. Many infrastructural facilities destroyed. The most worrisome of the insecurity is the school closure which has affected the academic calendar of different higher institutions in the Country. Many faculties and departments cannot graduate their students due to universities closure and many academic programme like the curriculum studies are affected due to the insecurity challenges facing the country. Some researcher like Ogunode & Abubakar (2020), Ogunode, & Abubakar, (2020m), Ahaotu & Ogunode(2021) and Ogunode ,Ahaotu & Ayisa (2021) opined that insecurity is one of the major problem facing the higher education administration and development in Nigeria.

Corruption

Corruption in the Nigerian tertiary institutions is hindering the development of sciences education. Ogunode Niyi Jacob & Abubakar Musa (2021) observed that institutional corruption is one of the major problems facing the administration of the universities in Nigeria. The entire higher educational system is engulfed in corrupt practices. The budgetary allocation for the administration of university education in Nigeria is some time diverted by officials within the system.

Strike actions

Niyi Jacob Ogunode and Aiyedun, Tope Gloria (2020) argued that strike action by different union groups in the Nigerian higher institutions is another problem preventing smooth administration of science programme across the Nigerian higher institutions. Ogunode Niyi Jacob & Abubakar Musa (2021) observed that strikes action by different unions in the Nigerian universities is another problem preventing effective administration of the universities. Strike simply means protest by employees (mostly under labour unions) through concerted cessation of work due to an impasse with the employers. It is the last resort for employees to have their grievances addressed. However, the incessant strike action is

adversely affecting the effective running of universities in Nigeria. For instance, a survey by premium times an online newspaper revealed that in the last two decades Nigerian universities were shut down fifteen times due to strikes and the period spent spanned about fifty months (still counting). This effect is massive; the most affected area is the academic calendar. Once the school is closed for strike, there must be changed in its existing plans of activities and the implication is that a programme that is designed to four years would have additional month(s) or year(s). This becomes a bottleneck in the smooth running of universities programme like science education programme in Nigeria.

WAY Forward

To solve these challenges, this article recommends the following:

1. For effective administration of science programme in the Nigerian higher institutions to possible, the government should increase the funding of science programme.
2. The government should direct school administrators to employ more science lecturers in all the higher institutions in the country.
3. The government should provide adequate infrastructural facilities like modern laboratories for physic, chemistry, Biology and computers etc should be provided.
4. To prevent brain-drain among the Nigerian academic staff, the government should increase the salaries of lecturers, provide conducive teaching environment and improve on their welfares packages.
5. The government should direct all the anti-corruption agencies in the country to establish offices in the various higher institutions. This will help them fight the corruption in the system.
6. The government should ensure tertiary institutions are provided with adequate security and factors causing insecurity in the country should be addressed.
7. The government and school administrators should always ensure agreement reached with different unions groups within the educational institutions are well implemented as agreed to avoid strike actions in the educational institutions.

Conclusion

Science programme is one of the programme offered in the Nigerian tertiary institutions. The programme is meant to produce science oriented career in Nigeria. The science education is faced with many challenges. Some of these challenges include inadequate funding, shortage of science academic staff, lack of laboratories, inadequate infrastructural facilities, brain-drain, insecurity, corruption and strike actions. To address these problems, the government should increase the funding of tertiary institutions, direct for employment of more science lecturers, provide adequate infrastructural facilities, motivate the lecturers by increase their salaries, provide adequate security in all tertiary institutions, implement all agreement reached with unions to avoid strike actions and direct for the establishment of anti-corruption offices in all tertiary institution to fight corruption in the system.

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