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Stem Programme Administration in Public Primary Schools in Federal Capital Territory, Abuja, Nigeria: Problems and Way Forward

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Abstract: *This paper examines the administration of STEM programme in federal capital Territory, Abuja: problems and way forward. Secondary data from print and online publication in the areas of STEM programme in Nigeria and across the World were consulted and used to provide empirical support for the various points raised in the course of discussion in the paper. The paper identified inadequate funding, inadequate professional teachers (STEM Teachers), inadequate infrastructural facilities, shortage of instructional materials, inadequate of lack of access to internet facilities, inadequate in-service training, poor remuneration, corruption, poor supervision and over-population as the problems militating against effective administration of STEM programme in FCT public primary schools. For the effective administration of STEM education in public primary schools in FCT, the paper hereby recommends that the Federal Capital Territory Administration should increase the funding of public primary schools in the Territory and more priorities should be given to the development of STEM programme in the Territory. More infrastructural facilities like classrooms, libraries, laboratories, ICT centers, stable electricity, internet facilities, water and offices should be provided in the public primary schools across the territory to aid teaching and learning of STEM programme etc.*

Keywords: *Public, Problems, Primary Schools, STEM*

1. INTRODUCTION

Federal Capital Territory (FCT) Abuja is the capital of Nigeria. Abuja is located inside Abuja Municipal Area Council. The Federal Capital Territory is under the administration of Federal Capital Territory Administration (FCTA). Federal Capital Development Authority (FCDA) is in charge of the construction and infrastructural development of Abuja city. The Federal Capital Territory is made up of six area councils. The six area councils include: Abaji, Abuja Municipal, Bwari, Gwagwalada, Kuje and Kwali area councils. The population of Abuja as at 2006 census was 776,298 making it one of the most populous cities in Nigeria occupying eighth position. The United Nations observed that Abuja was growing by 139.7% between year 2000 to 2010. This growing rate makes it the fastest growing city in the World.

Abuja is the political and administrative seat of Nigeria and also a key capital on the African continent due to Nigeria's geo-political influence in regional affairs. A Federal Minister is appointed by the Presidents to oversee the political administration of the Territory (Wikipedia, 2020).

Education in Federal Capital Territory is administered by Federal Capital Territory Education Secretariat. Federal Capital Territory Abuja is home to many educational institutions both public and private schools. The educational system in Federal Capital Territory is implemented according to the National Policy of education (2013). Education in FCT consists of three forms the Universal Basic education (ten years), secondary school (three years) and higher education which include universities, Colleges of Education, Poly-technics Education, vocational Education (four, six years depending on the study).

Basic Education is the education given to children aged 0-15 years. It encompasses the Early Child Care and Development Education (0-4) and 10 years of formal schooling. Early Child Care and Development Education however is segmented into ages 0-4 years, situated in daycare or creches, fully in the hands of the private sector and social development services, whilst ages 5-6 are within the formal education sector. Basic Education, to be provided by Government, shall be compulsory, free, universal and qualitative. It comprises: 1-year of Pre-Primary, 6 years of Primary and 3 years of Junior Secondary Education. The primary school education is one of the component of basic education. The National policy on education (2014) defines primary Education as the education given to children aged 6 — 12 years. The objectives of primary education according to National policy on education (2014), are to: Inculcate permanent literacy, numeracy and the ability to communicate effectively; lay a sound basis for scientific, critical and reflective thinking; promote patriotism, fairness, understanding and national unity; instill social, moral norms and values in the child; develop in the child the ability to adapt to the changing environment; and Provide opportunities for the child to develop life manipulative skills that will enable the child function effectively in the society within the limits of the child's capability. In pursuance of these objectives: Primary education shall be compulsory, free, universal and qualitative; and curriculum for primary education shall be as follows: primary 1-3 and 4 to 6. Science subjects are among the subjects offered in the Nigerian primary schools (NPE, 2014).

The science subjects offered in the Primary schools in FCT include; Mathematics, Basic Science, Basic Technology, Information Technology and Physical and Health Education. According to Ogunode (2020), STEM education implies Science, Technology, Engineering, and Mathematics (STEM) and is part and parcel of the Nigerian educational system for long. STEM education is very important as it offer children ability to develop economically, socially, politically and technologically. Any nation that wants to advance tremendously, should not treat STEM education with levity. The STEM education has contributed a lot to the economic, social and industrial life of Nigeria and in the world in general. Every individual on the planet earth has felt the positive impact of STEM. Ahmed, Ajemba, & Ogunode, (2021) submits that the science subjects or programme are unique programme that are meant to develop the scientific skills and knowledge of the students. The teaching of sciences is vital to the social, economic and technological advancement of the country. Science programme are offer in the all the phases of educational institutions in Nigeria from the basic education to the higher institutions. The primary school education is the foundation education designed to prepare the learners holistic education that covers science education. It is unfortunate that the teaching of science education in Nigerian primary schools is faced with many problems.

STEM education is part of the universal basic education program in Nigeria. STEM subjects are offered from the basic schools and junior secondary schools. The objective of STEM Education is to emphasize the teaching and learning of technology, engineering, and mathematics. These teaching commonly include all education-related activities across all grade levels starting from pre-school up to post-doctoral levels. These could also be either informal, formal setting, or both. As a basis for the different emerging

technologies, the role of STEM is crucial to the development of any economy. The realization of the STEM objective depends on effective school administration. Primary school administration is the systematic application of school resources for the business of the school with the aims of actualizing the school objectives. Primary school administration is the arrangement of human and materials resources in way that will guarantee effective use and implementation of schools programme and the realization of school goals. Primary School administration is the provision of leadership to ensure school resources are used to implement school programme for the achievement of the school objectives. STEM programme is one of the programme in the primary school system in Nigeria. The STEM programme deals with the teaching of science subjects like Science, Technology, Engineering and Mathematics. It has been observed that teaching and learning of science programme including STEM programme is faced with problems in different states in Nigeria. It is imperative to examine the administration of STEM programme in FCT public primary schools.

2. Concept of STEM Education Programme

Science, Technology, Engineering and Mathematics (STEM) Education is an organized science education programme designed to produce manpower for the 21 century industrial and information technology communication driving world. The objective of STEM programme include to inculcate in the learners practical education that is meaningful to the society; to provide industrial education that will make the learners fit into the industrial revolution of 21st century; to provide innovative education that will make learners problem solver; to provide an experiential education to the learners; and to provide a transformative education through scientific methods. Sulai, & Sulai (Undated) and Olorundare (2010), noted that inclusion of engineering into STEM Education can be justified by the mere fact that young children tend to be engineers first; building, making and doing projects long before they can explore scientific principles that allow their buildings to stand or “canals” between puddles to carry water.

The important contribution of STEM as an enabler for sustainable national economic growth was affirmed at the World Summit on Sustainable Development (WSSD) in 2002. (Sulai, & Sulai Undated). Sulai, & Sulai (Undated) and David, Dallatu & Yusuf (2018), observes that it is in this regard that in the framework of the New Partnership for Africa’s Development (NEPAD), African leaders recognized that Science and Technology will play a major role in the economic transformation and sustainable development of any nation. STEM education is used in research, policy issues, teaching for innovation, problem-solving and prospects. STEM is needed towards globalization demands. The complexity of today’s world requires all people to be engaged with new set of core knowledge and skills, to solve difficult problems like novel coronavirus pandemic, gather and evaluate evidence and make sense of information they receive from varied print and increasingly digital media. It is therefore clear that the learning and doing of STEM help develop skills and prepare students for a workforce where success results not just from what one knows but what one is able to do with the knowledge.

STEM education programme is practical inclined and inclusive. STEM had been the critical instruments used to uplift not only the standard of living but the economy of any nation. Developed nations such as USA, China, Japan and UK are not unconnected to the type of science and technology available to them (Sulai, & Sulai, Undated; Wasagu, 2019). STEM education is important in meeting societal needs like food, shelter, clothing, water, energy, employment, basic education, healthcare, defense and security, governance, etc.

The relevance of STEM education to the social, economic and technological advancement cannot be underestimated. The knowledge of science, technology, engineering and mathematics combine together lends to economic and national development. The knowledge is used to harness the forces of nature and to transform the raw resources with which nature endows man into goods and services for better quality of

life. The knowledge, skills and competences in STEM affects people's lifestyles. It affects the way people eat, drink, travel, work, lead, play and sleep. It also carries along environmental implications such as pollution (Sulai, & Sulai, Undated; Olaitan, 2007). Science, technology, Engineering and mathematical knowledge are related to life in the community. Everyone in the society sees, hears, touches or uses various objects in the course of a single day. Such objects include soap, tooth paste, broom, knife, safety razors, hot water, mobile phones, cars, buses, train and objects in the offices, factories, homes, schools, restaurants and theatres in addition to all these, one is likely to touch and use such devices designed to save physical labour, as tractors, those designed to help in communication, entertainment, transportation, high – speed computers and medicines. All these and many more are called products of technology (Sulai, & Sulai, Undated; Awachie, 2001). Sulai, & Sulai (Undated) observes that goods and services are products and processes of STEM. Advance in STEM is central to any nation's ability to manufacture better and qualitative products, improve health care services, develop cleaner and more efficient domestic energy sources, preserve the environment, safeguard national security and grow the economy. The STEM education programme is part and parcel of Nigerian educational system from the Basic education to the higher education. Ogunode (2020) opines that STEM education is the bedrock of innovative and highly productive future workforces, integral to the economic development of the continent. In line with this, the African Union Agenda 2063, identifies one of its goals as raising well educated citizens and skills revolution underpinned by Science, Technology, and Innovation. Nigeria's government has initiated many arrangements and has done many collaborative programs with the objectives of drawing from the technological experience of many developed countries to build its STEM education program for its teeming youths across the country especially those in the educational institutions.

3. Problems Militating Against Effective Administration of STEM Programme in FCT

Many challenges are facing the administration of STEM programme in FCT. In this paper the following would be discussed as the problems: inadequate funding, inadequate professional teachers (STEM Teachers), inadequate infrastructural facilities, shortage of instructional materials, corruption, poor supervision and over-population.

3.1. Inadequate funding

Funding is vital for the implementation of STEM programme in public primary schools in Federal Capital Territory, Abuja. STEM programme administration required a lot of human and materials resources. These resources are very expensive to incur. In FCT, the budgetary allocation for the administration of STEM programme is not adequate. Education funding in Nigeria and in FCT particularly have been described by Ogunode (2020) as inadequate for administration of public primary schools. For instance, Ezechi & Ogbu (2017), observed that funding science programmes and science related research has been a major problem facing technological growth and self-reliance in Nigeria. Government do not adequately fund science and science related programme and research. In addition to this, the little fund provided relapse and are embezzled by top officials in charge of its implementation. Ahmed & Ajemba, & Ogunode, (2021) submits that inadequate funding is a major problem responsible for poor development of science education. Science education is very expensive and cost effective. The annual budgetary allocation for the primary school education is inadequate. Science programme in the primary school drives their funds from the general budget of the primary school education. In FCT, (Ogunode, & Ahaotu, (2021), Ogunode (2020) and Emmanuel (2016) concludes that the budgetary allocation for education administration is not adequate.

3.2. Inadequate Professional Teachers (STEM Teachers)

Ajemba, Ahmed, Ogunode, & Olatunde-Aiyedun, (2021) observes that science teachers are trained teachers that are saddled with responsibilities of providing science instruction to students. Science

teachers instructs students in subject-specific classrooms. Science teachers create lesson plans; evaluate student performances; and teach using lectures, technology and hands-on learning experiences. They also model expected behavior to establish and maintain an orderly, disciplined classroom. Ajemba, et al, (2021) cited Alaebo (2019) who sees science teachers as key factor to be considered when talking about the development of science education in any nation. Science teachers should use different strategies as there is no single universal approach for specific class. The role of teachers in curriculum implementation is very essential because they translate educational policies and programmes into action. The teachers plan the lesson note, prepares the lesson plan and also present the lessons (Ogunode, & Ahaotu, 2021). In Nigeria, the 2018 National audit report on Universal basic education programme in Nigeria revealed that there was a deficit of 135,319 teachers at the Early Childhood Care Development Education, 139,772 deficits in primary schools and 2,446 shortages in Junior Secondary Schools across the nation. 27756 teachers at the early child education programme, 3564 teachers at the basic schools (Independent, 2019). The problems of science teachers in federal capital territory is not aiding the development of science programme. The inability of public primary schools in FCT to have adequate STEM teachers is affecting the administration of STEM education in the various educational institutions located in the territory. Ogunode, & Ahaotu, (2021) observes that effective and efficient administration of public primary schools in Federal Capital Territory and its' environs will be a function of adequate teaching quality and quantity. Many public primary schools in the six area councils of FCT are facing the problem of shortage of professional teachers. Many public primary schools in FCT do not have adequate professional teachers especially in the sciences.

3.3. Inadequate Infrastructural Facilities

Another major challenge facing STEM Education in Federal Capital Territory, Abuja is the problems of inadequate infrastructural facilities. Many public primary schools in rural areas lacks adequate classrooms, laboratories, libraries, ICT centers and offices for admin staff and teachers. No any meaning teaching and learning of STEM programme can take place under atmosphere where no modern laboratories facilities are. Ahmed & Ajemba, & Ogunode, (2021) observes that laboratories is an important segment of school facility that is another problem hindering effective teaching of science education in the Nigerian primary schools. Laboratories are specialized room or hall designed for carrying or conducting practical with the aims of inculcate science skills and knowledge to the students. Laboratories are social capital that aids the teaching of science education. It is unfortunate that as important as the laboratories to the development of science education in the educational institutions that many public primary schools do not have adequate laboratories. Ezechi & Ogbu (2017), who submitted that majority of Nigerian schools lack laboratory spaces, those who have spaces lack equipments and necessary infrastructure for proper teaching and learning of science. Science therefore is not miracle where something happen out of nothing. Philip, Peter & Iro (2015) and Ogunode & Gregory (2020) agrees that inadequate infrastructural facilities is a major problem affecting the administration of Basic schools in FCT.

Tijani (2014) observed that one of the outstanding problems of primary education in Nigeria is inadequate provision of infrastructural facilities such as school building, classroom, library, sporting facilities and equipment. Ajemba, et al, (2021) cited Omorogbe, & Ewansiha, (2013) who submits that the situation in many science classrooms in Nigeria is nothing to write home about. In many schools there are no laboratories. Some schools merely have empty rooms labeled laboratories. Students rarely have hands-on, minds-on experiences.

3.4. Shortage of Instructional Materials

Instructional materials are vital for the implementation of STEM programme in educational institutions. Instructional materials makes teaching and learning simple and clear. Mkpa (1989), opines that children at

the junior secondary school level are often young learners who require to be stimulated to learn through a variety of instructional materials. Opara & Etukudo (2014), observed that the objectives of basic science may not be attained without the availability and use of adequate instructional materials. Ahmed & Ajemba, & Ogunode, (2021) noted Shortage of instructional materials is a very big problem preventing effective teaching of science education in the primary schools across the country. Instructional materials is vital to the development of science education. Instructional materials provide the science teachers to teach well and students to understand more. Emmanuel (2016) did a study on problems and prospects of primary schools administration (A case study of Kuje Area Council of FCT Abuja). The findings showed that administration of LEA schools in Kuje Area Council had problems of non-availability of teaching aids, inadequate funding, over populated classrooms, lack of recommended textbooks for teachers and pupils, poor functional P.T.A; lack of security. Iheagwan (2000), submitted that resource constraints have been there since time immemorial as one of the major problems besetting our primary education in Nigeria. Ajemba, et al, (2021) observes that shortage of instructional materials is a major problem facing science teachers in Nigerian public secondary schools. Many science teachers do not have adequate instructional materials to deploy for teaching and this is affecting the learning processes of the students. Students learn fast when instructional aid are applied in the implementation of the teaching.

3.5. Corruption

Corruption is a very big problem facing the administration of STEM education in Nigeria and in FCT in particular. Fund allocated for smooth implementation of science programme like procurement of science resources, installation of science instructional materials and recruitment of more science teachers are mostly mismanaged and looted. The high rate of corruption in school administration in Nigeria is alarming. Ogunode, & Abashi, (2020) did a study that investigated the challenges facing the administration of Universal Basic schools in Abaji area council of FCT, Nigeria. The result established that there are challenges facing the administration of Universal Basic schools in Abaji area council of FCT. The study identified the challenges to include; corruption (looting of school fund), inadequate fund, inadequate infrastructural facilities, inadequate professional teachers, large class size, inadequate instructional aids, unstable policies, ineffective supervision, challenges of achieving quality and poor motivation of teachers.

3.6. Poor Supervision

Programme supervision is key to the realization of the objective of the programme. Supervision is critical to the realization of quality science education. Supervision of science education is very important in many ways. One it helps the teachers to improve in their professional skills and knowledge of teaching science. Secondly, it guarantee quality and ensure development of science programme. It is unfortunate that supervision of education and that of science programme in FCT is not effective and this is affecting the development of STEM programme at the primary schools sector. Ajemba, et al, (2021) pointed out that ineffective supervision of science teachers is another big problem facing the science teachers teaching in public secondary schools. Supervisors are professionals employed to help the teachers to grow professionally. Ogunode, Ajemba, et al, (2021) and Olatunde-Aiyedun and Akin-Ibidiran (2021) observed that the basic function of the inspectorate is to maintain effective instruction in schools. But due to the acute shortage of properly trained personnel in this field, effective supervision has been unavailable, thereby promoting nonchalance attitude among science teachers.

3.7. Over-population

Another problem facing the administration of STEM programme in Federal Capital Territory, Abuja is the problem of over-population experiencing the educational institutions especially the primary schools. Due to the insecurity problems in some part of the country such as North east states and North central, the

population of people migrating to Abuja for safety and settlement is causing unusual pressure on the educational institutions. Many public educational institutions are overpopulated now with pupils demanding for educational services. The inflows of these people is making majorities of educational facilities overcrowded and increasing the teacher-students ratio which is responsible for ineffective teaching and poor quality of education in the territory.

4. Recommendation

STEM education is key to the development of social, political and technological development of the country. The Federal Capital Territory Administration needs to do everything possible to ensure the STEM education at the primary schools are well developed. To achieve this, the paper recommend the following:

1. The Federal Capital Territory Administration should increase the funding of public primary schools in the Territory and more priorities should be given to the development of STEM programme in the Territory.
2. More infrastructural facilities like classrooms, libraries, laboratories, ICT centers, stable electricity, internet facilities, water and offices should be provided in the public primary schools across the territory to aid teaching and learning of STEM programme.
3. The Federal Capital Territory Administration should also ensure teachers and pupils are provided with adequate instructional materials. This will help to make the teaching of STEM programme simple and understandable for the pupils.
4. The government should employ more professional science teachers and deploy them to primary schools across the territory. This will help to improve the quality of STEM education by reducing the large teacher-pupil ratio in the classes.
5. The government should ensure funds released for the administration of STEM programme are used for the programme effectively and accountability of such funds should be demanded by the relevant authority. Anti-corruption agencies should be used to fight corruption in the school administration in the country.
6. Supervision of STEM education programme should be strengthened in all the educational institutions in the Territory. More resources should be provided to ensure that all policies regarding STEM education are implemented as formulated at the school level.

Conclusion

This paper discussed the administration of STEM programme in Federal Capital Territory, Abuja: problems and way forward. The paper identified inadequate funding, inadequate professional teachers (STEM Teachers), inadequate infrastructural facilities, shortage of instructional materials, corruption, poor supervision and over-population as the problems militating against effective administration of STEM programme in FCT public primary schools. To solve the problems identified, the following recommendation were made: the Federal Capital Territory Administration should increase the funding of public primary schools in the Territory and more priorities should be given to the development of STEM programme in the Territory. More infrastructural facilities like classrooms, libraries, laboratories, ICT centers, stable electricity, internet facilities, water and offices should be provided in the public primary schools across the territory to aid teaching and learning of STEM programme etc.

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