

Smart Education in Nigeria: Meaning, Merits, Problems and Prospects

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Abstract: The increasing demand by countries to cope with the challenges of the 21st century digital process has led to the establishment of smart education and smart schools in various advanced and advancing countries. This paper took a look at the concept of smart education and smart schools, their meanings, importance and implementation in Nigeria educational system. In doing this, this paper, conceptualized smart education as a new trend of education backed up by the use of technological equipment for teaching and learning. The paper situated smart school as a component of smart education based on use of ICT for effective teaching and learning. The importance of smart schools include providing interactive learning experiences, enhancing learning experiences, easy access to online research, environmental friendliness, promotion of individual learning etc. the challenges of implementation in Nigeria include poor manpower and infrastructure, lack of funds, low level of ICT education, lack of electricity and internet connectivity etc. the paper also made suggestions.

Keywords: Smart school, smart education, and educational system.

Introduction

Smart education is a new trend of world education. In order to build a smart nation, many countries have aimed to build smart education to train generations of smart citizens. As an advanced school model, smart schools, create opportunities and conditions for schools to enhance their adaptive capacity and balance development in the face of rapid changes in society in general. Under this advanced learning model, learners are able to discover and construct knowledge, develop self-reading and research habits, develop self-control and adaptive capacity, and think creatively through personalized pedagogical instruction suitable to individual characteristics and needs (increase the importance, credibility, usefulness, flexibility of the curriculum content).

The application of smart technology to school education has reshaped the educational landscape by transferring the content and mode of receiving and delivering learning as well as the way in which instruction and school administration are structured.

In Nigeria, the prospects of the adoption of these new learning school models are bright if our governments both at the federal, state and local government levels can show enough commitment to the process by putting in place the necessary infrastructure like regular electricity and provision of computer mediated teaching materials in our schools. Only this way can smart schools and smart education in Nigeria could be realized for the production of smart citizens.

Meaning of Smart Education

When considering the origin and meaning of smart education, international studies often mention the requirements to transform the school model as an essential element for school education to keep up with the latest challenges of information technology era, meeting the requirements of citizen training for the new era. The advent of the internet and increasingly widespread application of the internet, the rapid development of science and technology, the trend of globalization and integration in general have changed all aspects of social life. The effects of the industrial revolution with the fusion of technologies, the emergence and application of artificial intelligence, the internet of things, the system of combining reality and virtual has made it possible for people to connect and interact with each other by intelligent interactions.

Smart education according to www.researchgate.net 2022 is the influence of diverse technologies on education. It is the use of technology to enhance education. Smart education is the process of optimally managing human, economic and technological resources from educational institutions and research centres. It involves combination of use and optimization of learning machines, data visualization, internet of Education Things, Learning analytics etc.

Smart education has become a direct productive force, creating products with high value and gray matter content. It is smart education that creates an open and modern educational environment to train generations of smart citizens, thus taking care of learners changing needs, interests, learning styles and modes of activities of learners. Smart education lays the foundation, information and communication technology and transform teaching and learning through its potential as a source of knowledge, a medium of interaction and dialogue. Smart education through information technology changes the elements of the curriculum and type of programme that prepared learners for essential activation of individual competences, experiences and independence.

Origin and Spread of Smart Education in the World

According to www.pht.smartschools.com 2022 smart schools has been deployed in many developed countries as an innovation and modernization of schools and has spread to many other countries around the world. In United States of America since the 1990s, technology in the classroom has been a concern and school intelligence programme emphasize the role of technology integration in the classroom. In 1997 Malaysia launched its first smart education project, which included a plan to build smart school supported by government to prepare the workforce to meet the challenges of the 21st century. Singapore has implemented the smart Nation Master plan since 2006, identifying smart education as an important part of achieving the national goal. Korea has a smart education project whose mission is to reform the education system and improve the educational infrastructure. Choi and Lee (2012). In Australia, through a partnership with IBM, an intelligent education system was designed to enable multi-dimensional relationships for learners. In Vietnam, the idea of smart education is relatively new and the elements of the smart school model appeared not long ago. So also it is with Nigeria which started in the 21st century to embrace elements of school technology and digitalization in our primary, secondary and tertiary institutions, the idea of smart education is a new idea in Nigeria and other West African countries.

Definition of Smart School

According to www.phx.smartschool.com, 2022 (6p.3) when considering smart school as a component of a smart education system based on ICT achievements ‘Smart School is an educational institution through teaching processes and educational management practices to promote systemic changes, helping learners overcome the challenges posed by the information technology era’.

Smart school is emphasized as a model in which school processes and activities are optimized by using and encouraging and promoting the use of modern technological devices. The smart school in addition to focusing on stimulating thought, creativity and caring for students, is also interested in considering individual differences and individual learning.

Although approaches to define smart schools in research perspectives have certain differences. However, the outstanding content is agreed to show that: A smart school is a school that flexibly and effectively uses resources on the basis of advanced digital technology application to improve the quality of education meet requirements of society in training the young generation.

Features of Smart Schools

According to www.phx.smartschools.com 2022 (4), in the New York Smart Schools commission Report, the features outlined for smart schools are:

1. Delivering and extending online learning
2. Use of transformative technology to provide instruction tailored to the specific abilities and needs of each student.
3. Connecting every school to high speed, broadband using technological advancements and applications.
4. Expanding classroom connections with open sources outside the school.
5. Ensure members of the pedagogical team successfully integrated technology into teaching and learning for continuous professional development.
6. Focus on STEM skills in teaching and education.
7. Effective leadership and management based on technology foundation and technological capabilities.

In Finland, the characteristics of smart schools are mentioned as:

1. Increased opportunities for learning experiences and application of learning.
2. Easiest and most convenient in receiving pedagogical instructions and feedback.
3. Comprehensive and fast learning results information.
4. Enhance and continuously improve the quality and effectiveness of learning.
5. Both teachers and learners have opportunities for continuous development.

Although there are differences in the features or characteristics of smart schools in different countries, the general features are:

1. To prepare and motivate the workforce of the 21st century have the knowledge and skills to meet the needs and challenges of a modern technological society.
2. Learners are the centre, provided with modern and quality learning service; learning tailored to individual needs and pace, characteristics and circumstances.
3. The intelligent nature of the school towards flexibility, adaptability, modernity and continuous development-dynamic balance with development of modern technological world.
4. Smart schools provide a smart educational environment for learners.

Comparism of Smart School Characteristics and Normal Schools (Popular today) according to
www.phx.smartschools.com 2022

	Smart schools		Normal schools
1.	Curriculum Curriculum of smart schools are flexible, student centred with development education suitable to each individual student.	1.	Curriculum There is lack of flexibility and there are fewer opportunities for personal education.
2.	Content Content of the curriculum focuses of STEM skills that are expanded and unlimited.	2.	Content Contents of the curriculum are not focused on developing STEM skills
3.	Leadership and Management There is effective management based on application of modern technologies. Actively supporting teachers and students access to smart technological resources, develop leadership capacity and manage smart education environment	3.	Leadership and Management Highly administrative in nature with little or no application of modern technology in managing activities. Little or no use of smart technology. They focus more on the development of traditional school leadership and management capacity.
4.	Teaching There is great commitment to smart teaching strategies suitable to each individual learner. There is application of a variety of software smart technology devices in teaching. There is the development of professional and pedagogical capacity based on the application of modern technological devices.	4.	Teaching There is no commitment to intelligent teaching. There is little or no use of smart technology software and equipment to support teaching. They manage and educate students in the traditional way, develop professionally and manage pedagogical capacity in the traditional classroom environment.
5.	Learning There is a well-developed and self-directed learning in accordance with capacity and characteristics of individual students. There is access to learning materials, learning resources, self-study-using multi-media technologies required. Learning is expanded and learning opportunities.	5.	Learning There is not yet developed self -oriented learning. Learning here is according to instructions and lesson progress of teachers under the general education program. There is little or no support and no compulsory use of multi-media resources and technology. Learning is limited as well as learning opportunities.
6.	School Assessment and Supervision There is an objective and comprehensive assessment on the basis of smart technology, multi-dimensional resources. There is effective monitoring, supervision, information dissemination and school assessment criterion.	6.	School Assessment and Supervision Assessment is based on a few number of outstanding aspects corresponding to the educational objectives of the school. Supervision has not yet met comprehensive multi dimensional, public criteria.
7.	Education Facilities and Equipment There is availability of synchronized, smart technology devices based on platforms (smart boards, smart lecture halls, projectors, tablets), surveillance camera system, broad bond, internet connection data base open learning resources etc.	7.	Education Facilities and Equipment There is little or no smart technology devices. The infrastructures required for the operation of such facilities such as electricity, internet connections, data base etc are not available. There is high cost of technological materials for learning.

With the features described by comparison with normal school in the above table, smart schools have a convergence of factors such as intelligent pedagogy, intelligent learning, intelligent educational environment, intelligent and efficient management systems. In the interaction of operatives of students, teachers, school leaders and managers of students, teachers, school leaders and managers have changed, different from normal or traditional schools. In smart school arrangements, students are central and supported, facilitating the development of intelligent learning. The application of ICT, extensive and imbued smart technology devices in the schools activities increases interaction expands connectivity, improves the quality of teaching and learning and increases the efficiency of school management. Smart schools are truly on advanced school model and highly adapted to the technological environment and the general development of society.

Benefits of smart education and smart schools

According to www.leadership.in/blog/sm 2022, the benefits of smart school are:

1. Interactive learning experiences
 2. Enhanced learning experiences
 3. Easy access to online resources
 4. Environmentally friendly
 5. Promotes individual learning
 6. Time saving technology and
 7. Increased productivity
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- i. Smart education and smart schools provides students with quality learning experience with the aid of technology. Since many countries have switched to smart schools and smart classes due to the COVID pandemic traditional schools and classes are fast losing their credibility, smart schools and smart classes are assisted by technical tools including laptops, computers, internet access, projectors, smart screens, speakers, microphones, amplifiers, visualizers etc.
 - ii. Smart education and smart school have become an enjoyable and exciting way to break free from the rote learning system. Through creative technology, smart classes in schools are transforming the learning environment for learners and teachers to be more explorative and to depend less on the traditional role system of learning which is purely memorization of knowledge as against explorative, research, practical, challenging and technologically oriented nature of smart education.
 - iii. There is greater access to online resources. According to UNESCO (2019), 'learning environments have changed significantly in the past few decades due to the inclusion of emerging information and communication technology (ICT), both hardware and software, as well as a variety of online media in classrooms, learners today use mobile gadgets and applications as their primary sources of information, knowledge and social discourse.
 - iv. **Enhanced learning experiences:** With smart class technology, information can be illustrated on interactive whiteboards using photos, maps, graphs, flow charts and animated videos. This makes learning engaging and easy to understand.
 - v. **Promotion of individual learning-** Smart schools enable learning to learn at their own pace and to engage in individual research and learning. Students or learners are offered a wide variety of learning options and their convenient times without having to come face to face with the teachers with the classroom, looking like a battle ground.

In a traditional school system, students rely more on books for their learning. But in the smart school system, students get to learn through three modes of teaching.

- a. Through videos and slides that teaches show from their teaching apps.
 - b. Through activities using materials from online learning.
 - c. Through books and work books they generate from on line studies.
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- vi. Time saving technology is made available by smart schools. Smart class technology helps students make presentations online and seek inputs from their teachers in less time than the traditional learning process. The use of online resources makes it easier and faster for students and teachers interaction and problems are solved within very relatively short periods of time and without physical presence. Students can reach teachers easily through text messages, whatsapp chats, and other online sources and get their problems solved immediately without having to wait till the next class period when the teacher can have physical contacts with the learners. Smart classrooms have made teaching and learning a time saving experience in teaching and learning.

- vii. Increase productivity has been achieved through the actual smart schools and smart education. The use of technology has led to increase in productivity both in teaching, learning, economic activities and other areas of life. The use of technology in production and provision of goods and services has tremendously increase the level of productivity and cost of production also. More work is done and faster too using technologically aided means.

A smart school is as its name suggest different from a traditional school. This is a kind of school where advanced equipment and technology are used to take the educational process forward. The main idea is to provide students with learning experience that is a lot better than what way otherwise have been possible. Teaching has become advanced in its true sense.

Other benefits of smart schools are:

- a. Easy access to information.
- b. Taking notes on digital medium
- c. Better understanding of topics through digital tools
- d. A great option for students who are absent in class.
- e. Learning in a dynamic manner.
- f. Teaching environment that is interactive.
- g. Paper is replaced by digital tools.
- h. Easy maintenance of the technological materials (www.fedena.com/blog/2019).

Problems of Implementing Smart Education and Smart Schools in Nigeria

According to www.classhall.com/smartlearning Nigeria's Universal Basic Education Commission (UBEC) in pursuit of smart education in Nigeria has set up smart schools in the country which will begin operations in 2023 (January). The Commission signed a Memorandum of Understanding (MOU) with Korean International Cooperation Agency in October 2021. The objectives of the MOU are to assist Nigeria in the development of the smart schools project, to increase the capacity of teachers in the development and use of ICT content and to improve the access of teachers and pupils to quality teaching and learning materials.

However, many problems have been identified as affecting the implementation of smart schools in Nigeria as follows (Anene, Iman & Oduma, 2014).

1. Lack of manpower and technical infrastructure:

In Nigeria there is the problem of absence or insufficient computers in our schools coupled with poor technical infrastructure as the phone lines and internet connections are unreliable or one sometimes slow due to narrow band width. There is also limited expertise or inadequate trained personnel to maintain the current available systems.

2. Lack of Funds

In a developing country like Nigeria, the cost of ICT equipment is a limiting factor with regards to reaching a large audience, and making sure that everyone can afford the service, since government cannot provide all the funds, money is needed for setting up infrastructural facilities, provision of smart school learning equipment maintenance and maintenance of education projects. All these underscore the importance of funds as the government has to adequately make funds available for the equipment and manpower required for implementation of smart school.

3. Low/Poor Level of Computer Literacy

Another problem with the implementation of smart schools in Nigeria is the low level of computer literacy among Nigerian citizens (students and teachers, Aboderia (2015) asserted that some students cannot login and log off successfully, while others cannot access the school portal without any assistance. That is why Osuji (2012) asserted that, the level of computer literacy in Nigeria is very low. To overcome this, there is need for constant or regular training of students and teachers in computer literacy for implementation of smart school system in Nigeria.

4. Poor Power Supply and Internet Connectivity

Nigeria is still currently being faced with irregular supply of electricity in urban areas and complete absence of electricity in many rural areas. This is a major factor that will affect implementation of smart schools

because regular electricity supply would be needed for any successful implementation of smart school a Nigeria. The government should make electricity and internet connectivity a necessity in our schools.

5. Lack of Awareness among Parents

There is still lack of awareness among the populace in Nigeria about the advantaged of smart education in Nigeria. Tomoh (2018) noted that generally, there is lack of awareness among parents of the effectiveness of smart schools and smart education. This is because many parents still feel that the traditional learning method is still better.

6. Non Inclusion of ICT Programmes in the Training of Teachers

The non-inclusion of ICT programmes in the teachers training curriculum of the basic levels of education is one of the major problems facing the implementation of smart schools and smart education in Nigeria. There is need for teachers to be trained on ICT on regular basis for them to acquire the smart education equipments. They should also be equipped with a list of online resources that they can use to update their knowledge.

Despite many problems affecting the implementation of smart schools and smart education in Nigeria, there are still many prospects as follows:

Prospects of smart schools and smart education in Nigeria

1. Smart schools promote distance and individual learning. The demand for work and study has made it important for most institutions to utilize e-learning tools to support the interactivity in learning. On the other hand, the idea of increasing access to education promoting independent and life-long learning is a goal of education in Nigeria.
2. Smart education and smart schools extend the frontiers of knowledge in the future. With smart education and access to technological equipments for teaching and learning, learners are offered a variety of learning experiences and opportunities to learn at their own pace and time. Smart education enable different learners from any part of the country to acquire knowledge in their comfort zones, unlike traditional learning mode, where everyone has to attend lectures and participate effectively.
3. Smart education holds the promise of eradicating e-illiteracy in the county. It also allows learners to have access to education that is computer based and enables them to cope with the challenges of the 21st century. It improves learners performance and motivation. Aboderin (2014) stated that e-learning which is a component of smart education helps develop learners ICT competence, improved typing speed and the ability to surf the internet perfectly, thus eradicating e-illiteracy in the society.
4. Smart education makes education more effective and enjoyable. Smart education has diverse ways of delivering lectures to learners and exposes them to a variety of learning tools and machines, thus providing quick delivery of lessons and makes education more effective. Smart education enhances learners abilities to learn new knowledge anywhere, and to retain the knowledge or information for a longer time. This way it makes learning more effective and enjoyable.

Application of Smart Education in Nigeria Educational System

The application of the Smart School model in the educational system of Nigeria could take place in primary, secondary and tertiary education in the following ways:

(1) Pre-Primary and Primary Schools

Smart education could easily be adopted in the primary schools by using essential instructional materials such as television, projectors, laptops, tablets in illustrating certain concepts in many subjects such as school studies. In teaching social studies, the teacher can make use of overhead projectors or video tapes and CDs played on television to show the various dances in Nigeria which is an aspect of culture as a topic in primary school social studies. The use of projector, video tapes, Cd, laptops, tablets could be very effective to drive the lesson home as the students would match the dances and learn the various dance steps. This method is very effective for pre-primary and primary education. Other teaching should also follow this model.

(2) Secondary Schools

Application of smart education in secondary schools also involves the use of technological equipment in teaching and learning as well as access to internet connectivity by the students. At this level of study the students should be conversant with use of smart phones and should be encouraged to have one themselves. Apart from using overhead projectors, video tapes & CDs, laptops and tablets, students should also be encouraged to procure smart phones for whatsapp so that they can participate in whatsapp group discussions and assignments as may be given by the teacher. Government should encourage smart education by providing the necessary requirements of electricity, internet connectivity, smart phones, tablets, laptops, etc.

(3) Tertiary Education

Classrooms in our universities and other institutions of higher learning should be more of virtual classrooms where each student would have unrestricted access to internet connectivity, electricity, use of smart phones and other electronic gadgets for teaching and learning. The lecturer should make the whatsapp platforms veritable classrooms where academic issues could be tackled and solved without the traditional face to face interaction. The lecturers can deliver their lessons through zoom or conference calls or group whatsapp discussions and every one would participate to make contributions. However, the government should ensure that these facilities are provided in schools for use.

Smart Education in Abia State, Nigeria During the COVID 19 Experience

During the pandemic of COVID 19 in the year 2020/2021, when all activities nearly grinded to a halt, the education sector in Abia State, Nigeria looked inwards and with the ingenuity of some teachers, smart schools were set up in radio and television houses to teach students and pupils on radio and television. They were called radio and television classrooms and had specific time for airing. All subjects were taught by seasoned teachers who are professionals in those areas and the students benefitted immensely from the smart schools set up in radio and television. The smart schools on Tv and radio reduced to a large extent the impact of the COVID 19 in students in Abia State as they were fully engaged with the radio and television classrooms which gave daily lessons in different subjects and at the end of the lessons also carried out assessment of the student and pupils. Many students benefitted from the lectures and didn't spend much time after schools resumed to take their examination. This is an example of smart education and its implementation in Nigeria educational system, with the hope of making them universal and sustainable.

Implementation Process: (Establishment of two Pilot or Sample Model Smart Schools in each Local Government Area in Nigeria)

The Federal, State and Local Governments can ensure the implementation of smart education through a gradual process of establishing sample model smart schools at least two in every local government area. The sample model smart school should be fully equipped with all the necessary facilities for smart education. The two sample model smart school would serve the people in the Local government as admission shall be purely on merit through a competitive examination. The teachers must be computer literate and knowledgeable in the use of ICT and computer mediated teaching.

Government can also come up with policies to gradually take the entire education system to smart education by making the smart school model a precondition for establishment of private schools in future and by ensuring that every teacher to be employed henceforth must be computer literate and those already teaching should engage in computer training programme.

Conclusion

The paper reviewed the concept of smart education and smart schools with emphasis on their meanings and origin. Smart schools and smart education are new innovations in education aimed at producing technologically and electronically driven learners that can cope with the 21st century demands in the labour market which is fast becoming digitalized. Smart education is a learner centred approach to learning that takes place anywhere and anytime, even in the remotest parts of the country.

The focus of the paper was to find out the problem and prospects of implementing smart education and smart schools in Nigerian educational system. There are a number of problems that militate against the smooth implementation of smart education in Nigeria which include lack of manpower and technical infrastructures, lack of funds for procuring technological equipments for learning, low level of computer education or literacy, poor power supply and poor internet connectivity, lack of awareness among parents, school managements attitude and non-inclusion of ICT programs in teachers in teachers training curricula in Nigeria. Despite these problems, smart education and smart schools have come to stay and will fully become functional as new smart schools built by UBEC would take off effectively this year 2023 as promised by the Executive Secretary of UBEC, Hamid Bobboyi. Smart education and smart schools holds the promises of eradicating e-illiteracy in the country, making teaching and learning more effective and rewarding, exposing learners to a variety of learning tools and machines as well as encouraging learners to learn at their own pace and time.

Smart education and smart schools if fully implemented in Nigeria would advance the country technologically and help produce a more informed and internet complaint work force, thus leading to greater productivity and more robust economy.

Suggestions

1. Teachers and students should make themselves available for training in information communication technology to be able to cope with the demands of setting up smart schools in Nigeria.
2. Governments at federal, state and local government levels in Nigeria should become more responsive to the provision of infrastructures like electricity and internet connectivity and ensure their regular supply or availability.
3. Both government and non-governmental agencies should make funds available and invest in smart education because of the great future it holds for our country. Funds should be sought for the procurement of the technological materials and machines for teaching and learning.
4. Greater awareness should be created by government among parents on the advantages of smart education over the traditional mode of education for them to fully embrace it.
5. Efforts should be made at training and retraining of teachers to equip them with the basic skills, competencies and knowledge for effective implementation of smart education in our educational system.
6. Information communication technology should form part of the curricula for teacher education in our colleges of education and universities to lay very sound foundation for e-literacy in the society.
7. Computer literacy should henceforth be a precondition for employing teachers at all levels of education apart from possession of educational degrees.
8. The State Ministers of Education should henceforth make the smart school model a precondition for approval to be given for establishment of private schools.
9. Federal and State Governments should engage in the process of gradually turning our public schools into smart schools by equipping them with facilities for smart education.

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