

Implementation of Smart Education in Nigeria's System of Education

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Abstract: *Smart Education is a technology driven learning system that enhances the capability of the educators while enabling the learners to learn more efficiently, effectively, comfortably and flexibly. Smart Education is not just about technology. It is also about new teaching and learning approaches. This paper studied the implementation of Smart Education in Nigeria's System of Education. The paper further took a look at the meaning of Smart Education, challenges to the implantation in Nigeria's system of education. It also examined what makes up a Smart Education, differences between traditional school system and smart school, advantages and disadvantages over smart school and traditional system of education and recommendation.*

Key words: *Implementation, Education, Smart Education, Smart School, Importance of Smart Education and System of Education.*

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Introduction

Recent advances in information technologies are affecting our education and training approaches, methods, practices, and tools. Increasing internet speeds and storage areas together with the advances in cloud computing technologies, making the information available to everybody, from everywhere, at all times. Traditional training and education methodologies, in which the instructor explains the subject in the classroom and the students complete the exercises at home, are replaced by new learning approaches such as distant learning, mobile learning (m-learning), personalized learning, flipped and blended learning, social collaborative learning, game-based learning, etc. (Eynon, 2017). Information and communication technologies are creating the potential for more self-paced, interactive, and personalized learning. As new information technologies are introduced, we are moving from traditional education towards smart education.

The students in the twenty-first century are different than the students of the past. Oblinger and Oblinger (2005) identify the generation born after 1982 as net generation or “Millennials”. Unlike many prior generations, this generation grew up with technology (Garrison et al., 2018).

Meaning of Smart Education

Smart learning is a branch of electronic learning which uses advanced educational technology to deliver interactive lessons and assessments carefully designed to suit each learner’s cognitive abilities. It describes a learning approach that employs mobile, wireless communication, and sensing technologies to enable learners to interact with learning materials at their own pace without the barriers of space and time. Smart learning is relatively new in the Nigerian education space, but it is fast gaining acceptance by students, schools and parents because of its role in helping students to better grasp and retain lesson content with ease.

Smart education can be defined as the “effective and coherent use of information and communication technologies to reach a learning outcome using a suitable pedagogical approach”. An earlier definition provided by Bruer (2017) is that “the essence of smarter education is to create intelligent environments by using smart technologies, so that smart pedagogies can be facilitated as to provide personalized learning services and empower learners to develop talents of wisdom that have better value orientation, higher thinking quality, and stronger conduct ability”. Another definition of smart education is “the concept of learning in the digital age” (Buzzard et al., 2015). According to Butt (2018), smart education is “about providing personalized learning, anywhere and anytime. Moreover, they state that smart education is about taking learning outside the traditional classrooms; and is an activity that can be done anywhere and anytime”. Jang defines smart education as “an educational system that allows students to learn by using up-to-date technology and it enables students to study with various materials based on their aptitudes and intellectual levels” (Jang, 2014). Smart learning environments, sometimes used to refer to smart education, “represent a new wave of educational systems, involving an effective and efficient interplay of pedagogy, technology and their fusion towards the betterment of learning processes” (Shoikova et al., 2017). Notice that smart education is not just about technology. It is also about new teaching and learning approaches (Chan, et al., 2015).

Importance of Smart Education

The following features of smart classes highlight their importance in the new educational system.

i. Transforming the learning process, with access to more information

Smart classes enhance the learning experience with their resourceful, technology tools. There is an incredible online database available for both students and teachers to explore. Students can use them for useful study materials and teachers can browse through images, videos, and countless other online resources to help them simplify the teaching process.

Employing smart classroom technology also allows teachers to experiment with the teaching style. Instead of reading out big paragraphs of texts, they can resort to videos or flow charts to explain numerous concepts. This will help to keep the learning process interesting and the students will be able to retain the information for longer periods.

ii. Better interaction between students and teachers

Smart learning encourages more interaction between students and teachers. As they participate together in new learning ventures, both the party get a chance to connect better. In addition to simplifying the learning process, these interactive classes also give teachers an opportunity to learn about their students' academic skills.

iii. Easy to maintain technology tools

Unlike the tools used in the traditional educational system, the technology tools in smart classes last for a longer period and can be maintained easily. They may require some routine updates to ensure a smooth performance.

iv. Creates a simplified and solid ground for information sharing

Teachers can use smart tools, including smart boards, to creatively craft the learning text, along with visuals, and break down even the complicated subject to an easier, understandable format. This process is especially useful when teaching young students and is a useful method to grab their attention. They can even use voice-overs to add a little bit of fun to the teaching activities.

v. Nurturing the creative imagination of students

Powerful visuals, charts, and videos that come with smart classes are important factors to cultivate the creative skill of students. Exposure to images and visuals and not just texts gives the students a chance to enhance their imagination.

vi. Saves time

The traditional education system encouraged students to rigorously take notes while they attended classes. This can be a tedious job and sometimes distracts the students from the actual learning process. With smart classes, teachers can easily share online notes, allowing students to keep their full attention on the ongoing

class. In addition to this, the smart features also help the teachers in quick grading processes, easier homework distribution, and more (Eynon, 2017).

Smart Education and its implementation in Nigeria's system of education.

The Federal Government through the Ministry of Communications and Digital Economy has launched the National Adopted School for Smart Education (NASSE). The initiative which was launched at Junior Secondary School, Karshi, Abuja, is being implemented by the National Information Technology Development Agency (NITDA). Speaking at the launching, the Minister of Communications and Digital Economy, Dr. Isa Pantami, said the NASSE is in line with the present administration's digital economy agenda. He said the digitalization of every sector in Nigeria will accelerate the digital economy of the country's dream. "NASSE is a model of catching our young ones early enough into the world of technology in a more productive way particularly in the education sector. "Education is the backbone of a nation's prosperity as allows a country and individual to hold a competitive edge in the ever-advancing technological world and reach their full potential

"The goal of education is not only to increase the amount of knowledge but to create the possibilities for a child to invent and discover, to create men who are capable of doing new things. "The purpose of education is to teach our children to think intensively and critically. This can be more realistic if they are exposed to education at young ages," he explained. He said the digital education space, the Government would want to support such indigenous businesses to grow while promoting the development of digital education in Nigeria. "I am proud to say that the solution being deployed today here at JSS Karshi is an indigenous Cloud-based Digital Education Platform for smart teaching and learning based on the National Educational Research Development Council (NERDC) curriculum (Fischer and Daley, 2015).

Nigeria's Universal Basic Education Commission (UBEC), says some of the newly constructed smart schools in the country will begin operations by January 2023. The UBEC Executive Secretary, Hamid Bobboyi, made this known when a team of Korean experts led by Professor Dae Joon Hwang of UBION Consortium paid him a courtesy visit at the end of their 4-week stay in Nigeria. The Country Director of the Korea International Co-operation Agency (KOICA), Mr. Son Sungil, stated that the 3-man team had been in Nigeria since July 3rd 2022 as part of the implementation of a memorandum of understanding (MOU) signed between KOICA and UBEC 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. The Team Leader, Prof. Hwang, applauded the Executive Secretary for the warm reception and collaboration received from the Commission during their stay. He noted that the three pillars of the collaboration revolved around the supply of sophisticated recording and broadcasting studio equipment in some of the smart schools, content development with particular reference to Mathematics and Science, and capacity building for teachers and education managers across the country in the use of new Information and Communication Technologies (ICTs) and the Blended Learning methodology. Also speaking during the occasion, the Co-ordinator of the Smart Schools Programme, Prof. Bashir Galadanci stated that, during their one-month stay, the Korean team of experts had extensive discussions with officials of UBEC, NERDC and NTI on the Smart Schools Programme (Fischer et al. 2017).

Challenges to the implementation of Smart Education in Nigeria's system of education.

Many challenges militate against the effective use of ICT-enabled programs like Education Technologies in higher education in Nigeria. These challenges according to Albert (2016), are classified in to three groups namely: infrastructural, capacity building, and finance related challenges.

Infrastructural related challenges: A country's educational technology infrastructure depends on the national telecommunications and information infrastructure. To this end, before any ICT-enabled program is launched; policy-makers and planners must carefully consider buildings to house available ICT facilities, availability of electricity, and ambiguity to types of ICT. In areas where there are old school buildings, extensive retrofitting to ensure proper electrical wiring, heating/cooling and ventilation, safety and security would be needed.

The availability of electricity supply is also essential as most of technological facilities use electricity to function. Nigeria as a developing country still experience erratic power failure and most higher institutions rely on power plant that are not easily serviced due to paucity of funds.

Critical consideration of the ambiguities of different types of ICT in the country and in the educational system is important. For instance, a basic requirement for computer based or online learning is access to computers in school, communities, and households, as well as affordable internet service.

Capacity building related challenges: For successful integration of ICT-enabled programs in the educational system in Nigeria, MacDougal and Squires (1997) noted that various competencies are required: These competencies relates to: teachers technical skills, skills for educational administrators, technical support specialist, and for content developers.

The competencies required of teachers are to develop skills with particular applications; integration into existing curricula; curriculum changes related to the use of IT (including changes in instructional design); changes in teacher role; and underpinning educational theories. Hawkins (2002) noted that the acquisition of these skills is expected to be addressed in pre-service teacher training and built on and enhanced in-service. The possession of ICT skills according to Hawkins is a prerequisite for teaching qualification in western countries like Malaysia, and the United Kingdom. Even the most fluent ICT teachers need to continuously upgrade their skills and keep abreast of the latest developments and best practices. This is done to make teachers more effective in their roles in the classroom as the learning process becomes more learner-centered.

The possession of ICT skills by educational administrators is essential as leadership plays a key role in ICT integration in education. Many teacher or student initiated ICT projects have been undermined by lack of support from education administrators. Esoswo (2011) noted that for ICT-enabled integration program to be effective and sustained, education administrators must be competent in the use of technology, and they must have a broad understanding of the technical, curricular, administrative, financial, and social dimension of ICT use in education.

The provision of necessary technical support specialists for successful integration ICT-enabled programs possesses a challenge to schools. Technical support specialists whether provided from among school staff or from external service providers is essential to the sustainability of ICT-enabled programs in Nigerian higher institutions. While technical support requirements of an institution depend ultimately on what and how technology is deployed and used, general competencies that are required according to Drent & Meeliseen (2008), would be in installation, operation, and maintenance of technical equipment (including software), network administration, and network security. Without on-site technical support, much time and money may be lost due to technical breakdowns. This is the case with Nigeria as ICT technicians are hardly reached within the country, and pose a threat in times of systems breakdown.

Finally, another capacity building related challenge in integrating ICT-enabled program in education is that of content developers. Content development is a critical area that is too often overlooked. Developing ICT-based educational materials in English language relevant to the needs of the learner is important. Also, there is need to develop original educational material content (e.g., radio programs, interactive multimedia learning materials on CDROM or DVD, and web-based courses etc.), adapt existing content, and convert print based content to digital media. These are tasks for which content development specialist such as instructional designers, scriptwriters, audio and video production specialists, programmers, multimedia course authors, and web-developers are needed.

Universities in Nigeria planning for the integration of ICT-enabled programs for instructional delivery are expected to dedicate special units to technical support and content development for sustainability.

Finance related challenges: One notable challenge to the integration of ICT-enabled programs in educational institutions for instructional delivery is balancing educational goals with economic realities. The integration of ICT-based education programs in higher institutions require large capital investments and developing countries like Nigeria need to be prudent in making decisions about what type of model to be introduced and to be conscious of maintaining economics of scale. Tinio further noted that the issue to be considered in integrating Information Technology in education especially for instructional delivery is whether the ICT-based learning is the most effective strategy for achieving the desired educational goals, and if so, what is the modality and scale of implementation that can be supported given existing financial constraints in Nigerian higher institutions due to inadequate budgetary provisions less than the 26% UNESCO recommendation for the education sector.

What are required for it to be successfully implemented?

It is imperative to employ ICT in education to improve learning outcomes and incorporate communication technologies pervasive in all aspects of students' lives. Review of existing research illustrated the extensive impact of ICT in education around the world. Based on the driving need to incorporate ICT in education, our main concern was to assess the feasibility of applying ICT the study examined five main issues:

- i. The most applicable areas for ICT
- ii. The current conditions, ICT equipment and resources
- iii. The current teaching and learning methodology
- iv. The barriers to using ICT
- v. The factors that facilitate the use ICT in secondary schools

The results identified the important areas ICT can be applied to in the schools. The results stressed that the current (before implementation) conditions, equipment and resources for the application of ICT in schools were not sufficient or appropriate for the successful application of ICT schools, and the teachers also listed and ranked conditions, equipment and resources that they considered essential to the future of ICT in schools. The barriers to ICT are corroborated by the teachers, suggesting that these issues, if unresolved, may hinder future deployment of education at the schools along with teacher and student development.

What makes up a smart school?

Nowadays, when students are more in touch with digital trends than ever, schools have to keep up. With technology becoming part of their everyday life, smart schooling makes more sense than ever. Unlike conventional schools, a smart school makes use of advanced technology and equipment in classrooms to give students better and more effective learning experiences.

- **Enhance Student Engagement**

A smart school makes the teaching environment much more interactive. The teaching system and the tools used in the school encourages students to be more interactive and participate more in the learning experience, with fun quizzes, online tests, group activities and more, there are no dull moments in the classroom and students are engaged with the content. This helps to increase knowledge retention on a great scale and gives even the shy kids the chance to be more interactive and active in the learning experience comfortably, introducing many new ways to engage with the teacher (Akyol and Garrison, 2015).

- **Guaranty an Effective Learning Experience.**

A smart school enables teachers to share knowledge in a more interesting and easy to understand manner for the students with digital technology. In such a school, the teachers have access to share the lessons using many mediums such as videos, presentations, audios and many other forms of visuals. It provides the opportunity for the teachers to update their lessons as the years pass by with the new information emerging in creative ways to help students receive up to date knowledge.

- **Provide Easy Access to Online Resources**

“Teachers and students in smart schools have all the information available on the web at their fingertips; no need to wait for a trip to the library to look something up. This can be helpful in class by giving students a way to work on their own projects and learn in real-time.”

- **Ensure Parent Involvement**

Despite their busy schedules, parents should be able to communicate with teachers from anywhere efficiently. They can use classroom management apps to improve parent involvement and keep them up to date. In smart school for example, parents are fully engaged with their kids’ school activities. From their phones, tablets or PCs, parents get instant updates on class schedules, assessment results and pending fees for their child(ren).

- **Never have to miss a lesson again**

In a smart school, you can record all the lessons taught in the day. So even if you miss a class, you will still have the opportunity to learn the lesson for the day without missing anything out, including the jokes.

Therefore, even when a student falls sick and misses out a couple of lessons, they don't have to feel bad. They have access to recordings they can fall back on and keep up with their studies. So the students no longer have to copy down all the notes and learn by themselves or with the help of a friend.

Differences between traditional school system and smart school

Smart classes (education) are designed for the purpose of providing assistance to teachers for overcoming several challenges in classrooms, in addition to enhancing the academic performance of students. These goals are achieved by adopting technology in a very practical, simple and meaningful manner, all of which will surely help in changing the atmosphere of the classroom from boring to interesting.

Traditional education, on the other hand, lacks proper infrastructure, innovation, etc. because of which the performance of students gets lowered to a very large extent. Students nowadays have a tendency to score lesser marks when technology is not used in classrooms. This makes it very important for schools to move towards the smart education system, in order to bring the best out of the students.

A comparison between smart education system with the traditional one will give a better understanding of which one will be better in the long run for all stakeholders of schools –

1. Learning material

In traditional education, books are the only learning materials that are provided to students. In case of smart education, students are given a variety of learning materials which include e-books, PDF documents, online links to website content relevant to the subject, etc.

2. School management

Traditionally, records of school activities like fees, attendance, examination, payroll and registers are maintained in a paper-based format, which increases the chance of data loss. When school ERP software, that is a part of smart education, is brought into the picture, the day-to-day functioning of schools becomes automated. Paperless records are maintained, thereby facilitating security of data.

3. Smart classes

In the traditional school environment, teachers utilize only blackboards or whiteboards along with books for explaining various subjects to students, in an infrastructure that is most of the time not very well maintained. Whereas in smart classes, education is imparted via presentations having visual effects, animations, projectors and virtual reality.

4. Costs involved

Schools generally don't incur much costs when they are run without using technology. But low costs do not usually translate into good quality education, that is extremely important for boosting the academic performance of students. Smart education, though a bit expensive, proves to be beneficial to schools, primarily due to increased attention spans and interest levels of the students towards the subjects being taught by teachers.

5. Communication

Face-to-face interaction is the only way of parent-student-teacher interaction in traditional education. In smart education, the interaction level with these same stakeholders of schools is increased since technology ensures timely and regular communication. Some examples of the technology being used for facilitating seamless communication includes instant messaging, calling, email, portal-to-portal messages and SMS.

Looking at the benefits of smart education that override traditional education, schools should think of switching over to the former for the purpose of ensuring long-term benefits to the teachers, students, parents and the management.

What do you need in a smart school?

Smart school classes can be technology-driven and learner centric with the teacher as a facilitator. Teachers have better teaching tools to effectively engage learners. Virtual classrooms allow students more freedom to create, experiment, explore and steer the class. Smart school needs good environment, teachers, ict equipment and technologies among many others.

Can smart schools be located anywhere?

The location differences and the differences in the quality of instruction from one school to another can create differences in the level of knowledge acquisition of

the students. This shows that the learning facilities children are exposed to and the socio-economic effect on them can affect their academic performance.

Advantages of Smart Education over traditional method

Traditional education system our primitive education system which are still opted by many people till now. In traditional education, students are gathered under a roof at a specific time and specific place. The teaching style of traditional education is teacher-driven. The learners discuss with the peers to clear their doubts or interact with the instructor after the class to do the same. The knowledge attained by the learner depends on the knowledge of the instructor.

Punctuality: The students will have a specific time for every period and time for taking a break. This timing is all planned at the beginning, the students follow this routine and make them punctual and disciplined.

Social interactions: The students interact with their peers which help them in character building. They learn to share and respect others.

Extracurricular activities: This gives the students an opportunity to showcase their hidden talent to others. This helps them recognized for their talents and are able to excel in their life.

Face to face interactions: The students are able to have direct interactions with their teachers. They are able to ask questions and more explanations on the areas they have doubts.

Disadvantages of traditional method over smart education

Generalized learning: Generalized education for all the students make it difficult for them to learn things they are interested in. Different students have different talents and interests which this general education fails to provide. Students will be spending more time and effort to study in which they are not good at, and this will not help them in their future career.

Passive listeners: In traditional education, students should listen to their teachers. Sometimes the students do not make an effort to listen to the teachers. They lack interest in the lectures and become passive listeners

No flexible time: The traditional education follows a rigid schedule which is challenging to study. The students have difficulties to cop up with it.

Expensive: It is very expensive as the school provides certain facilities and for the tuition fee for their instructors etc. Everyone cannot afford it and end up taking loans.

Teacher-centered learning: Teacher and books are the main source of information. The students are unable to learn new things, and their knowledge is restricted to the knowledge provided by the books and lecturers.

Conclusion

A smart school makes the teaching environment much more interactive. The teaching system and the tools used in the school encourages students to be more interactive and participate more in the learning experience, with fun quizzes, online tests, group activities and more, there are no dull moments in the classroom and students are engaged with the content. This helps to increase knowledge retention on a great scale and gives even the shy kids the chance to be more interactive and active in the learning experience comfortably, introducing many new ways to engage with the teacher (Anderson et al., 2018).

A smart school enables teachers to share knowledge in a more interesting and easy to understand manner for the students with digital technology. In such a school, the teachers have access to share the lessons using many mediums such as videos, presentations, audios and many other forms of visuals. It provides the opportunity for the teachers to update their lessons as the years pass by with the new information emerging in creative ways to help students receive up to date knowledge.

Teachers and students in smart schools have all the information available on the web at their fingertips; no need to wait for a trip to the library to look something up. This can be helpful in class by giving students a way to work on their own projects and learn in real-time (Arbaugh, 2017)

Despite their busy schedules, parents should be able to communicate with teachers from anywhere efficiently. They can use classroom management apps to improve parent involvement and keep them up to date. From their phones, tablets or PCs, parents get instant updates on class schedules, assessment results and pending fees for their child(ren)

In a smart school, you can record all the lessons taught in the day. So even if you miss a class, you will still have the opportunity to learn the lesson for the day without missing anything out, including the jokes.

Therefore, even when a student falls sick and misses out a couple of lessons, they don't have to feel bad. They have access to recordings they can fall back on and keep up with their studies. So the students no longer have to copy down all the

notes and learn by themselves or with the help of a friend. The implementation of smart schools should be encouraged in Nigeria.

Recommendation

Based on the study, the following recommendations were offered;

- Availability of stable power supply especially for schools in rural areas.
- The government should ensure there is enough smart gadgets in our schools (private and public). Any school who defaults, drastic measures should be taken against such school.
- Teachers should be trained on the use of smart gadgets and software to make competent for the job before been employed.
- Teacher remuneration should be visited knowing that it is more tedious to teach in a smart classroom compared to teaching in a traditional classroom.
- Government at all tiers should ensure continuous capacity building of teachers and education across disciplines most especially in appreciation of current trends and issues in smart education.

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