

Innovations

Adapting Nigerian Education System to 21st Century Demands: Panacea for Unemployment and Poverty

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Abstract

Educational institutions in Nigeria usually claim that they are equipping learners with competencies they need to gain employment or become self-reliant but the reality does not match this claim. A cursory examination of the economic state of Nigeria, marked by rising unemployment, underemployment and poverty even among university graduates will convince anyone familiar with the situation that the education system needs to do more in terms of preparing students for the world of work. This paper argues that adapting the education system to the demands of 21st century will enable the system to produce graduates who can succeed in the world of work and pull themselves out of poverty. The paper, therefore, presents a roadmap that Nigerian education system can follow in order to offer 21st century education. The roadmap emphasises the need to provide basic education for all citizens; to make valuable inputs that can yield 21st century learning outcomes and also to adapt educational processes to the demands of 21st century education. It requires effective collaboration among stakeholders - government, school managements, ministries of education, related educational organisations, teachers, parents/guardians. In order to explain the development of the roadmap for adapting Nigerian education system to the 21st century, the systems theory was adopted as a theoretical framework. The case study, thematic and analytical approaches were also employed.

Keywords: 21st century education, Unemployment, Poverty, Nigeria

Introduction

Education is expected to continuously rejuvenate and transform various aspects of society through its product – an educated person. Educated people have well-developed moral, physical, emotional and intellectual capacity to contribute to social, economic and political reforms. Education awakens and nurtures human potentials and, to a great extent, determines what its beneficiaries can achieve for themselves and for society. Accordingly, researches conducted in Nigeria found strong positive relationship between human capital development and economic

growth (Johnson, 2011; Eigbiremolen & Anaduaka, 2014). World Economic Forum (2023) summed it up when states that:

Human capital—the capabilities and skills of individuals and populations—is a key driver of economic prosperity and productivity. It can be developed by ensuring individuals are able to sustain good health, and they are in possession of in-demand skills and capabilities. The value of human capital is realized in the labour market through productive employment, and it is developed through education during the first two decades of an individual's life as well as through mid-career training investments.

In light of the foregoing, good quality education is at the centre of a nation's progress and it is regarded as the master key to socio-economic development. This explains why most countries that have achieved constant economic growth are those that also make considerable investments in human capital development.

Countries such as Switzerland, Singapore and Finland are among the countries with the best education systems in the world. In a 2020 Report by World Economic Forum (WEF), these countries' tertiary education systems were best placed to deliver to the needs of employers. They were also among the world's top best in attracting, developing and retaining talents (WEF, 2023). It is not surprising, therefore, that these countries were among the most competitive in the world, according to the IMD world competitiveness ranking for 2023 – Switzerland (3rd), Singapore (4th) and Finland (11th). Finland had three times ranked number 1 in the WEF's Competitiveness Index (World Bank, 2006), and the Finnish people believe that education had a direct impact on Finland's high-performing economy (Pitkanen & Sahlberg, 2006).

In the same way, there is a relationship between the kind of education offered in Nigeria and the economic state of the nation. The Nigerian education system has left out millions of children across all levels of education. A 2022 Report by UNICEF reveals that in Nigeria, 1 in 3 children are out of school - 10.2 million at the primary level and 8.1 million at the junior secondary school (JSS) level. The Report further states that only 1 in 3 adolescents eligible for senior secondary school are attending while only 17% pursued higher studies after secondary education.

According to UNICEF (2022), poverty is a major reason millions of Nigerian children are out of school. In Nigeria, basic education is meant to be free and compulsory. However, substantial costs related to uniforms and learning materials keep many children which out of school (Nigerian Education Data Survey, 2010; Education Sector Analysis, 2009). By staying out of school, these children have been trapped in a vicious cycle of poverty – they have missed opportunities for skills development and have, therefore, reduced their chances of securing better paying jobs. This puts the children at risk of perpetual intergenerational poverty. In addition, they may suffer violence, malnutrition,

disease, abuse, neglect, exploitation, early marriage and recruitment to extremist groups.

Besides the fact that far too many Nigerian children are out of school, many of those who are in school are not getting the kind of education that can translate into good prospects for their futures. With obsolete curricular, infrastructure, teaching resources and techniques, schools continue to produce graduates who can only succeed in the world that no longer exist. These graduates who do not possess in-demand skills end up being unemployed or underemployed. The growing mismatch between demand and supply of skills is holding back Nigeria's economic growth and continues to breed poverty even among "educated people".

Consequently, millions of people in Nigeria are poor. According to the World Poverty Clock (2023), Nigeria has a total population of 220,445,984 and total number of people living in extreme poverty is 71,280,925 which is 32% of the population (Figure 1). Nigerians living in extreme poverty constitutes 11.9% of the global population. Within the first five months of 2023, about four million Nigerians were pushed into poverty by inflation and 7.1 million more people are expected to join the poor population in the absence of any intervention (World Bank, 2023). The World Bank defines the extreme poor as those living on less than \$1.90 a day.

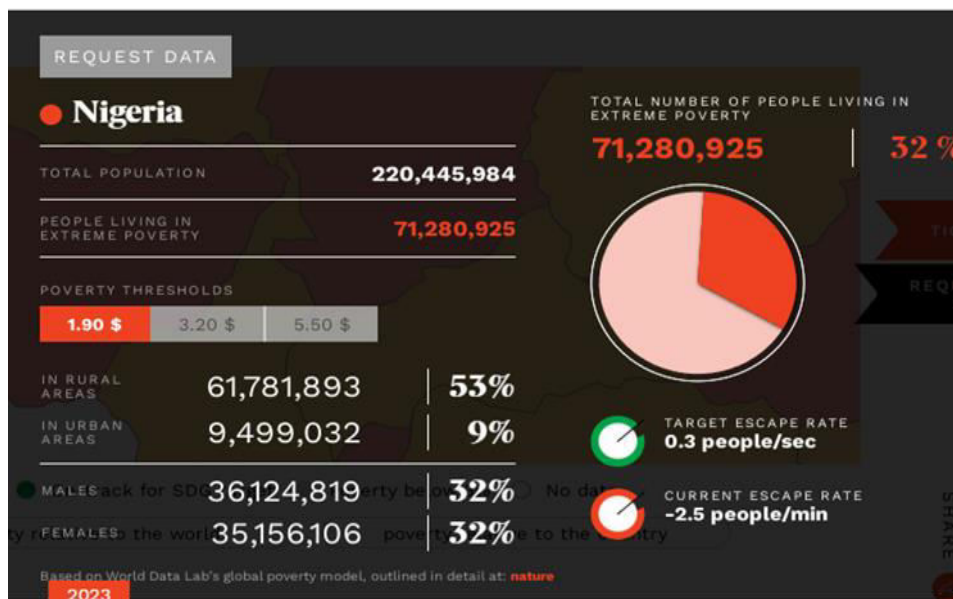


Figure 1: Nigeria poverty statistics on World Poverty Clock
 Source: World Poverty Clock

As the master key to socio-economic development, education can open the doors to job creation and poverty alleviation. The education system can achieve this if it can continuously graduate people who have the skills that are in-demand as well as skills and character required for self-reliance. This means that the education system should be continuously transforming its policies and practices in

accordance with the needs and circumstances of the time. As the requirements for success change, educational institutions need to also change what they teach and how they teach. Thus, formal and non-formal educational institutions must see educational goals as moving targets, which continues to change depending on what learners require to succeed.

The need for educational institutions to be flexible and adaptive is more important in this 21st century than ever as the century is characterised by fast change underpinned by rapid advancement in technology. This Paper will present a roadmap that educational institutions can follow to adapt to the 21st century and begin to produce graduates who will be successful and make meaningful contribution to economic development of Nigeria.

Theoretical Framework

In order to explain the development of the roadmap for adapting Nigerian education system to the 21st century (Figure 3), the paper will focus on systems theory as a theoretical framework. The general systems theory was originally advanced by Ludwig Von Bertalanffy in the 1940s. As a biologist, Bertalanffy was interested in open systems theory as he sought to understand how living systems interact with other systems or the environment outside of the systems. Systems theory posits that the component parts of a system can best be understood in the context of the relationships with each other and with other systems, rather than in isolation (Wilkinson, 2011). Systems theory emerged as a way of thinking that addresses wholes, interdependence, and complexity. The theory derives its notion from the belief that the parts of a system interact to achieve specified objectives (Wright, 2008; Wilkinson, 2011).

Batterlanfy envisioned general system theory as a way to address the increasing complexity of the world's problems (Mwangeka, 2020). Accordingly, various streams of systems theory have emerged such as Living systems theory Miller (1978), Mathematical systems theory (Mesarovic, 1964) Cybernetics (Rosenblueth et al. 1943), systems theory of organisations (Katz and Kahn as cited in Mwangeka, 2020), Social systems theory (Parsons, 1970; Buckley, 1967); Philosophical systems theory (Laszlo, 1972); Family systems theory (Dadds & Cobham, 1998) and Developmental systems theory (Paul, Griffiths, and Tabery, 2013). This means that the systems theory is applicable in a variety of disciplines when studying phenomena from a holistic approach.

The systems theory is important for understanding the education system, which is a huge network of parts (curriculum, teachers, policies, infrastructure, instructional materials, etc.) interacting among themselves and with other systems for the achievement of desired educational goals. Given the systemic nature of education, fragmentary reforms aimed at improving aspects or parts of the education system do not normally succeed (Barile & Polese, 2010). For instance, developing a curriculum that integrates the learning 21st century skills while teachers do not have the skills for teaching and assessing the 21st century skills will not yield desired results. Educational improvement efforts must be seen from a systemic perspective, ensuring that all the parts are of good quality. Daft 2010 emphasises that systems theory in organisations are made up of five major

components: inputs, a transformation process, outputs, feedback, and the environment (Daft 2010). Thus, the systems theory is analogous to education production function (Mwangeka) and human capital is the product of the education system (WEF, 2023).

The production function of education is a relationship between the amount of input and intervening factors to produce a certain good, with consideration to its quality (John 2010). The roadmap reflects the systemic nature of education and the system's function of producing human capital. It shows that to produce human capital with skills and capabilities for success in the 21st century, inputs that support 21st century learning must be made such as policies that support 21st century learning, leaders that are committed to 21st century education, curriculum that integrates 21st century skills and infrastructure that support 21st century education. In the same vein, the processes through which the inputs will be converted to outputs must also support 21st century learning.

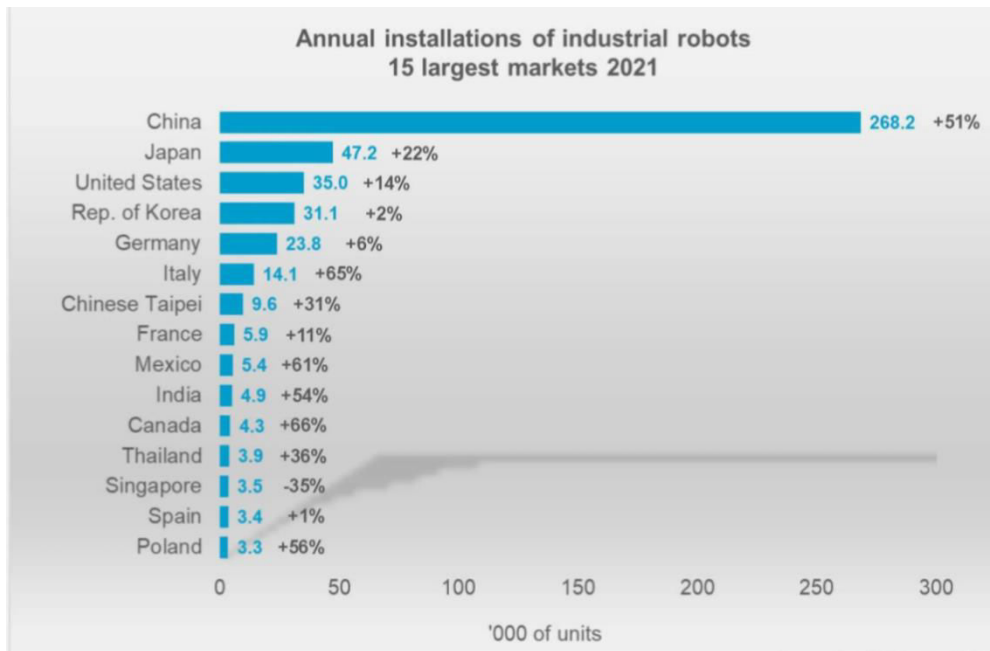
Changes in the 21st century that have changed skills demand and education

Since the dawn of the 21st century, the world has changed in many ways but this paper will focus on those changes that impact skills demand and education, especially automation, globalisation, changes in the world of work and demographic changes.

Automation

Rapid advancement in technology especially Artificial Intelligence (AI), machine learning and big data is fuelling job automation. Across industries – retail, automotive, marketing, logistics, ICT and many more - computers now perform most of the routine jobs. Computers are able to accomplish a wide range of work-related thinking tasks even more accurately and faster than human beings. Artificial intelligence systems can, for a given set of human-defined objectives, make predictions, recommendations or decisions influencing real or virtual environments (OECD, 2019). Thus, robots and machines have erased many manufacturing jobs that once paid good salaries. According to a 2022 World Robotics Report, 517,385 new industrial robots were installed in factories around the world in 2021, an increase of 31% compared with 2020. The Report further states that the new installations brought the stock of operational robots around the globe to a new total of about 3.5 million units in 2021.

Figure 2: Annual Installations of Industrial Robots: 15 largest markets 2021



Source: *International Federation of Robotics (2022). World Robotics Report*

Besides blue collar (manufacturing jobs) jobs, many white-collar jobs are now also at risk of being automated into obsolescence. For instance, TurboTax for preparing American tax returns have taken some jobs away from Accountants and in Nigeria, applications like *Chatbots* for customer support is gradually erasing some customer service roles. In fact, any job where information can be digitized and key tasks can be broken down into a set of predictable rules is vulnerable to automation. According to World Economic Forum’s Future of Jobs Report (2020), AI is expected to replace 85 million jobs worldwide by 2025. In their 2023 Future of Jobs Report, WEF forecasts that 26 million jobs will be lost by 2027 in Record Keeping and Administrative roles such as Cashiers and Ticket Clerks, Data Entry, Accounting, Book Keeping and Payroll Clerks; as well as Administrative and Executive Secretaries.

Skills that are immune from automation (for now) are those skills in the use and design of technologies (digital skills) as well as those that require higher order thinking skills. WEF (2023) found that analytical thinking and creative thinking remain the most important skills for workers in 2023. Earlier, research by Levy and Murnane (2007) had shown that two kinds of non-routine skills are increasingly important. According to the authors, the skills are “expert thinking,” and “complex communication”. The authors explained that while expert thinking is the ability to solve unexpected problems for which there are no predictable and programmable rule-based solutions, complex communication involves interacting with other people to acquire and explain information or to persuade others of its importance. Jobs requiring these skills cannot be routinised or broken down into predictable rules and so the jobs cannot be automated.

Globalisation

Due to increasing globalisation, outsourcing and off shoring are becoming more regular practices in the world of work. Therefore, some high skill jobs that require human thinking are being packaged and sent offshore as long as the jobs do not require physical presence of the employee. Globalisation has broken geographic distances as well as economic, social, and intellectual borders between nations. According to Craig Jerald of the US Centre for Public Education, advances in information and communication technology as well as investments in internet development have created an “information super highway” along which all kinds of digitized work products could travel. Many jobs in computer programming, computer systems, marketing and accounting are deliverable remotely and are now being bundled and sent offshore from various countries to anybody (not somebody) who is most competent and cheapest, irrespective of where they are located on the globe. This means that there is now a global workforce – an international labour pool - in which highly skilled and ambitious people are competing directly with each other, no matter their location.

Changes in the world of work

There are also remarkable changes in the way work is organised because of automation, globalisation, speed in technology change, increasing foreign competition, complexity of business environments, and pressure on companies to produce more with less. In the present time, many organisations are flattening their hierarchies, encouraging more collaboration, reducing spending on employee training, and regularly changing their strategies to stay competitive. Accordingly, employees who will remain relevant in their work places are those who regularly update their skills and obtain new skills as required; are able to manage their own work, collaborate with colleagues in any part of the world, think creatively and critically to find solutions, and work effectively on physical/virtual teams.

Demographic changes

The population of Nigeria has been rising steadily and, as at December 14, 2023, Worldometer shows that the population of our country is 226,234,813. According to the United Nations Population Fund (2023), 43 percent of the population are between 0-14 years. This means that almost half of the Nigerian population are school-age children. These children, mostly born by millennials, have never known a world without digital devices. Their exposure to digital devices from the youngest age makes them truly global citizens because through those devices, they are almost commonly affected by the same films, music and fashion, irrespective of their location around the globe.

The above narrative has some implications for the kind of education the children should be offered. First, they need to be prepared to thrive as global citizens. Secondly, given that their screen times can be very long, conscious effort need to be made towards equipping them with practical skills and strong character such as specific skills in subjects like science, engineering and technology as well as entrepreneurial skills, strength and coordination, creativity and innovation, resilience and resourcefulness. Thirdly, owing to fast changes in skills demand,

many of the jobs this population will do after graduation does not exist yet. Therefore, their education needs to be future-based – that is the kind of education that is responsive to the changing needs of learners, society and the labour market. Fourthly, their learning styles are more visual, multi-model and hands-on. For instance, they will learn more effectively from watching a video that summarises an academic content than from reading pages of books discussing the same content. For this reason, a big portion of their education must be technology-based.

Defining 21st century education

The major changes discussed above ultimately call for 21st century education. By 21st century education, It is meant the kind of education that equips people with the skills they need to live in, work in and shape the society of the future. The skills include complex communication, critical thinking, collaboration, creativity, digital skills, and problem solving skills among others. These skills are commonly referred to as 21st century skills. They are called 21st century skills not because they emerged in the 21st century but because, although they have been around for a long time, they have now become indispensable and a condition for success.

Schools are, therefore, expected to teach these skills in the context of core academic subjects such as mathematics, economics and history. The core academic subjects, along with basic literacy and numeracy such as reading, writing and arithmetic remain very important in 21st century education as they are the foundation for the learning of 21st century skills. Jerald (2006) rightly puts it thus:

Applied skills and competencies can best be taught in the context of the academic curriculum, not as a replacement for it or “add on” to it; in fact, cognitive research suggests that some competencies like critical thinking and problem solving are highly dependent on deep content knowledge and cannot be taught in isolation.

In essence, the skills that students require to be successful in the 21st century are a blend of: (1) core academic subjects; (2) thinking, learning and innovation skills; (3) information, media and digital skills; (4) life and career skills and (5) Social Skills. These skills have been presented more succinctly in figure 3.

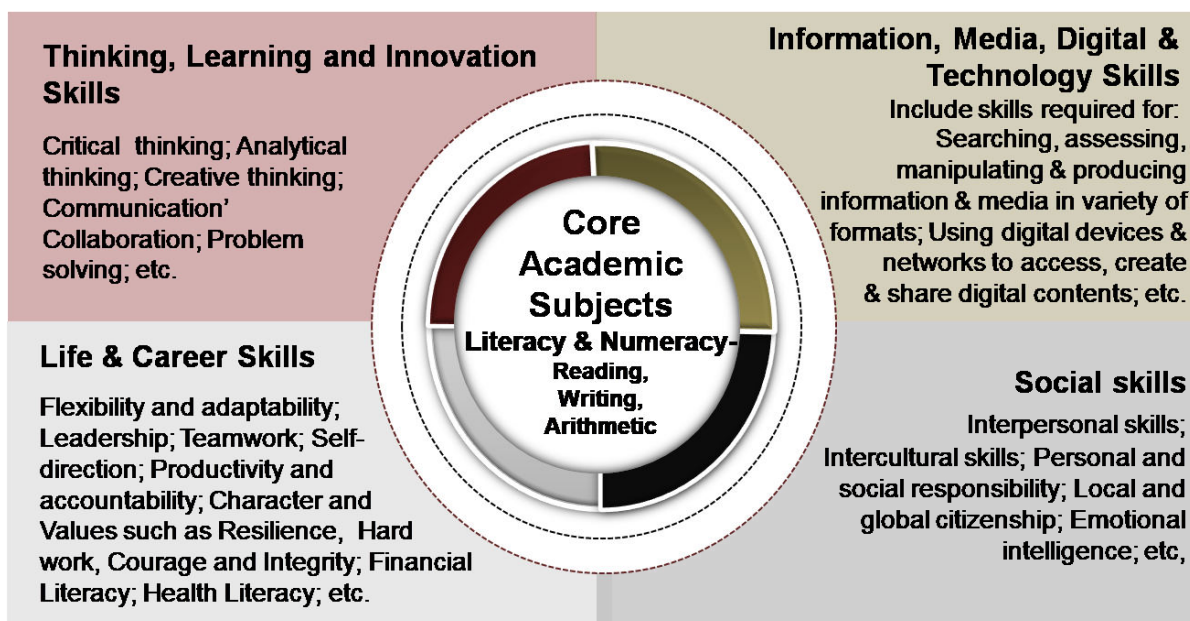


Figure 3: 21st Century skills blend

Therefore, products of 21st century education are flexible, self-directed, emotionally intelligent, hard working and resilient people who, in addition to attaining a good level of expertise in their core subject area, are also able to perform complex communication tasks; collaborate effectively across various platforms, think critically and creatively solve non-routine problems. They can use computers creatively to solve the complex problems of the 21st century's communities and work places. At the tertiary level, products of 21st century education do not only thrive in the world of work, they are also able to influence and lead change in their various industries.

It is significant to note that 21st century education does not (and cannot) prepare people to compete with computers and robots. Instead, it prepares them to take advantage of the opportunities created by advancements in technology. For example, World Economic Forum's Future of Jobs Report (2020), which predicted that AI will replace 85 million jobs worldwide by 2025 also predicted that AI will create 97 million new jobs within the same time frame. In the 2023 Report, WEF stated that employers anticipate structural growth of 69 million jobs in the next five years.

Thus, even though automation is taking jobs away from humans, it is also creating jobs. In fact, there is a deficit of required skills across the globe as employers cited difficulties in finding people with required skills. This are the key barriers preventing industry transformation (WEF, 2020; WEF 2023). Figure 4 presents the trends in finding skilled employees. The trend shows that there are vacancies to be filled but employers cannot find people with the right skill sets. 21st century education equips learners with in-demand skills so they are able to take opportunities available in local and global workplaces.

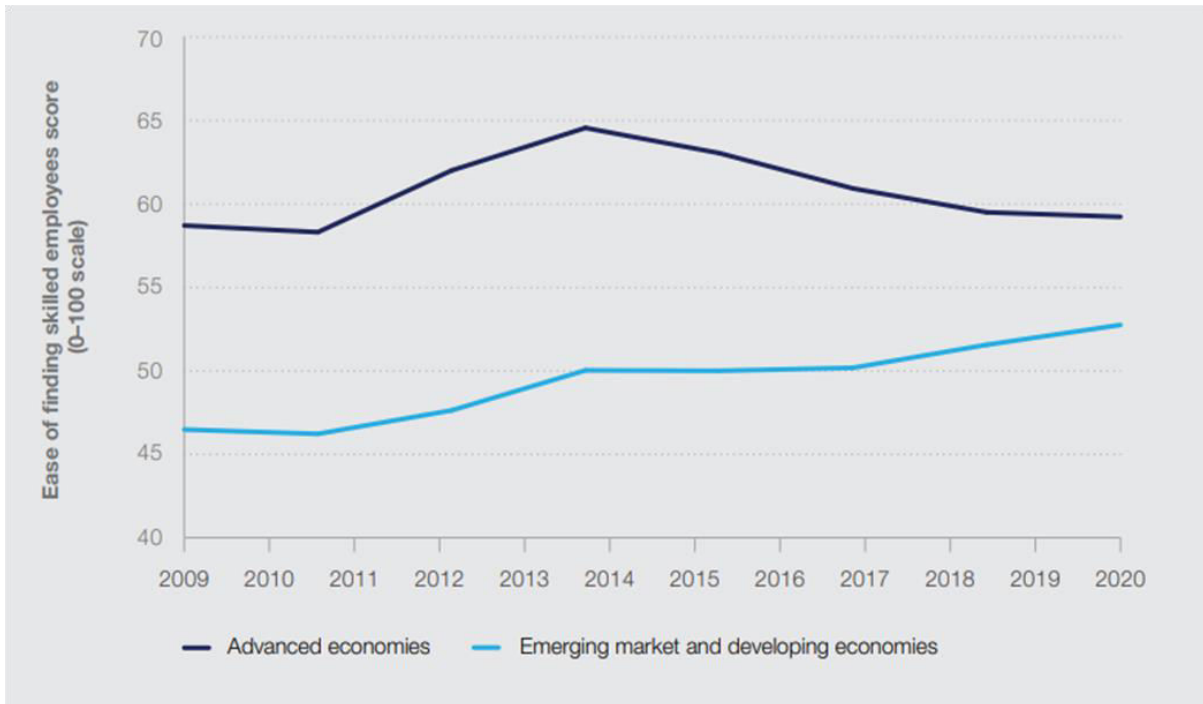


Figure 4: Trends in ease of finding skilled employees in advanced economies and in emerging markets and developing economies, 2009–2020

Source: World Economic Forum (2020)

Based on the foregoing discussion on 21st century education, it is already clear that education in the 21st century should be learner-centred, technology-driven, future based, collaborative, holistic and responsive to change (Figure 5).

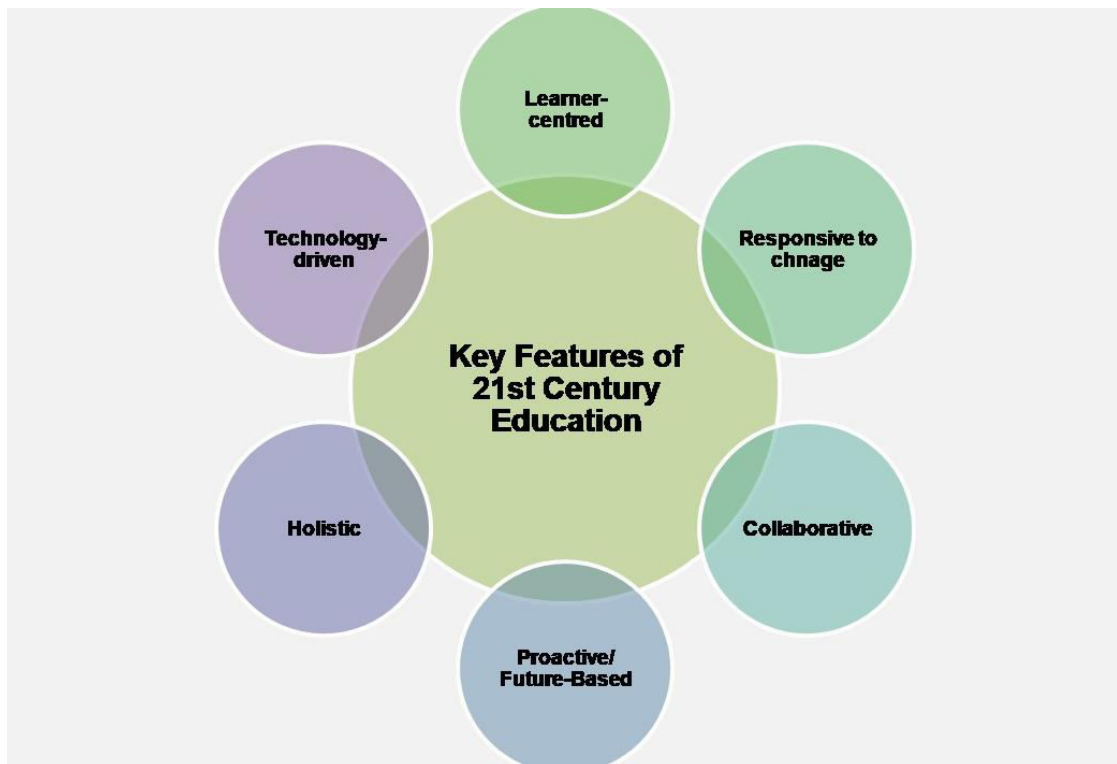


Figure 5: Key features of 21st century education

Country Case Studies

The case studies provided here are those of Singapore, Finland and China. The education systems of Singapore and Finland are among the best three in the world, especially in terms of meeting the needs of the labour market in the 21st century (WEF, 2020). They are also among the best three in terms of attracting, retaining and developing talents (WEF, 2023). WEF's 2020 Report also stated that China's secondary and tertiary education systems made significant improvements in the period under study when it comes to meeting the needs of employers. It was also reported that China's education system was the best in terms of adequacy of skills of all graduates. These case studies identified some of the recent initiatives the countries implemented, especially in the 21st century. It also identified some practices/principles that were perceived to be helpful.

Singapore

Box 2 shows some recent initiatives implemented in Singapore education system as well as some helpful practices/lessons learned. Information in Box 2 were obtained by synthesising the following literature: World Bank (2015); Patrinos (2020); and Kwek, Ho and Wong (2023).

BOX 2: SINGAPORE'S EDUCATION INITIATIVES AND LESSONS LEARNED

Some recent Initiatives

1997-2011

- Streaming (ability tracking strategy) was initiated at primary (grades 1-6) and secondary (grades 7-10) levels. It enables students with different abilities and aptitudes to learn at their own pace.
- More school deregulation and differentiation to cater to less academically inclined students providing multiple pathways to academic success;
- Development of a framework to equip students with 21st century skills and core values

2011-2019

- More focus on holistic development of the child.
- Expanding educational parameters beyond cognitive abilities and academic performance to other growth areas, such as physical, socio-emotional, and artistic achievements.

2020 to present

- Shift away from an overemphasis on academic achievement to emphasis on preparing students to connect, collaborate, create, and to be resilient.
- Teachers are encouraged to deepen their pedagogical skills, with emphasis on the teaching of values and socio-emotional competencies (self awareness, self management, etc).
- Schools and teachers are encouraged to be change agents to innovate and prepare students for life.

Some helpful practices/lessons learned

- Political stability allowed for long-term education policy planning.
- Making human capital development through education policy priority over the decades
- Attracting the best students into teaching
- Monetary and non-monetary incentives are provided to motivate teachers to perform
- Emphasis on holistic education
- Ensuring the wellbeing of students
- Close tripartite relationship among the Ministry of Education (MOE), NIE, and Singapore schools allowed systemic changes to spread throughout the school system

Finland

Box 3 shows some recent initiatives implemented in Finland education system as well as some helpful practices/lessons learned. Information in Box 4 were obtained by synthesising the following literature: Saavedra, Alasuutaru and Bernal (2018); Patrinos (2020) and Kupiainen and Hautamäki, (2021).

BOX 3: FINLAND'S EDUCATION INITIATIVES AND LESSONS LEARNED

Recent Initiatives/reforms

2000

- Master's degree remain a prerequisite for teaching
- Continued decentralization of decisions and regulations regarding basic schools increased freedom, autonomy and responsibilities of municipalities and teachers;
- Respect for the teaching profession

2014/2015:

- K-12 curriculum revision focused on lifelong and authentic student development
- 21st century skills were embedded in the k-12 curricular objectives of each subject. The subjects embedded were thinking and learning to learn, cultural competence, interaction and self-expression, Multiliteracy, and ICT Competence

Some helpful practices/lessons

- Reliance on high-quality, extremely well-trained and committed teachers improved the quality of teaching–learning outcomes
- Sustainable Leadership: Education sector development in Finland has been based on the continuous adjustment of schooling to the changing needs of children, families, and society
- Leaders respect education as the key public service for all citizen – brought about commitment that was necessary for success
- Education at all levels in Finland is free. Free education increased access to education
- Culture of trust government and parents trusted teachers to do the best thing for their children. Placed more responsibilities on teachers
- Stable political environment
- Finnish people and their government believe that only a highly and widely educated nation will be successful in world markets
- holistic development of personality that includes knowledge, skills, values, creativity, etc
- Involvement of all relevant stakeholders in the reform process improved stakeholder buy-in and commitment

China

Box 4 shows some recent initiatives implemented in China education system as well as some helpful practices/lessons learned. Information in the box were obtained by synthesising the following literature: Li, Zhi-Hua, Jia-Qin, and Min (nd); Wang (2014); Li and Li (2019) and Feng (2006); Luo, (2023); Statista (2023).

BOX 4: CHINA'S EDUCATION INITIATIVES AND LESSONS LEARNED

Some recent initiatives

1999/2000

- Prior to the 21st century, China had set goals to be achieved in the first ten years of the 21st century. The goals were to: Realize the goal of “Education for All” and continuously promote universalization of education; build a system for lifelong education; actively promote enrolment in advanced vocational education; and increase educational funding among others.
- By 1999 China wiped out illiteracy among the young and middle-aged population by universalizing nine-year compulsory education. Net enrolment of school-aged children at the primary stage was 99.1% in 1999. Compulsory primary education was implemented in 92% of the country. As at 2020, the enrolment rate in primary education in China was 99.96%

2001:

- An Action Plan for Invigorating Education for 21st Century resulted in ground-breaking Basic Education Curriculum Reform that changed educational experience for Grade 1-12.
- The new curriculum had a balanced, integrative, and selective curriculum structure that emphasises lifelong learning, learning how to learn, and development of positive attitudes. The curriculum included the teaching and learning 21st century skills in process information, obtaining new knowledge, analyzing and solving problems, and communicating as well as cooperating with others.

2001:

- Adopted of a three-level curriculum structure that encompasses national, local, and school-based curricula, of which the national curriculum accounts for 80%, and local and school-based curriculum 20%
- 2001 curriculum reform was targeted at fostering the development of every student. emphasis was on quality education - knowledge, skills, values but puts more emphasis on abilities beyond mere knowledge

2022

- Curriculum reform focused on: alleviating problem of heavy academic burden on students undergoing compulsory education by providing a guideline to ease excessive homework and off-campus tutoring so as to promote students' all-rounded and healthy development; Promoting Quality Education, which emphasized the cultivation of students' innovative spirit and practical abilities; and improving educational evaluation among others.

Some helpful practices/Lessons Learned

- Evidence-based, participatory policy-making increased stakeholder commitment to goals
- Provision of professional support for teaching improved teaching-learning outcomes
- Learning from the world looking to other countries' experiences for inspiration in the process of making changes for improvement.
- Experimentation: new thoughts and ideas have been experimented in the education system. Successful experiments often being translated into policies ensured that China launches only reforms that will work
- focusing on teacher practice and enhancing teachers' motivation and competence to participate in reform represent a critical pathway to ensure successful curriculum implementation

Common features in the education systems of the three countries – Singapore, Finland and China - were committed, visionary and sustainable leadership; collaboration; highly trained teachers; teacher professional support; Good quality basic education that is compulsory and accessible; responsiveness to change.

Adapting Nigerian Education System to the 21st Century – The Road Map

This section presents the road map to 21st century education. In developing the road map, first, the authors adopted Obanya’s analogy of “what you sow is what you reap”. According to the author, “you do not wait till the end of a process to look for quality. It is sowed in form of quality inputs, nurtured in form of quality processes and reaped in form of quality outcomes” (Obanya, 2014). This simply means that, quality in the context of education is systemic. This view was earlier reflected in UNICEF (2000). Secondly, the authors incorporated lessons learned from some of the best education systems in the world – Singapore, Finland and China. Although these countries have some characteristics that Nigeria cannot easily replicate, some of their initiatives in the 21st century and lessons learned are highly relevant. The road map is presented in Figure 6.

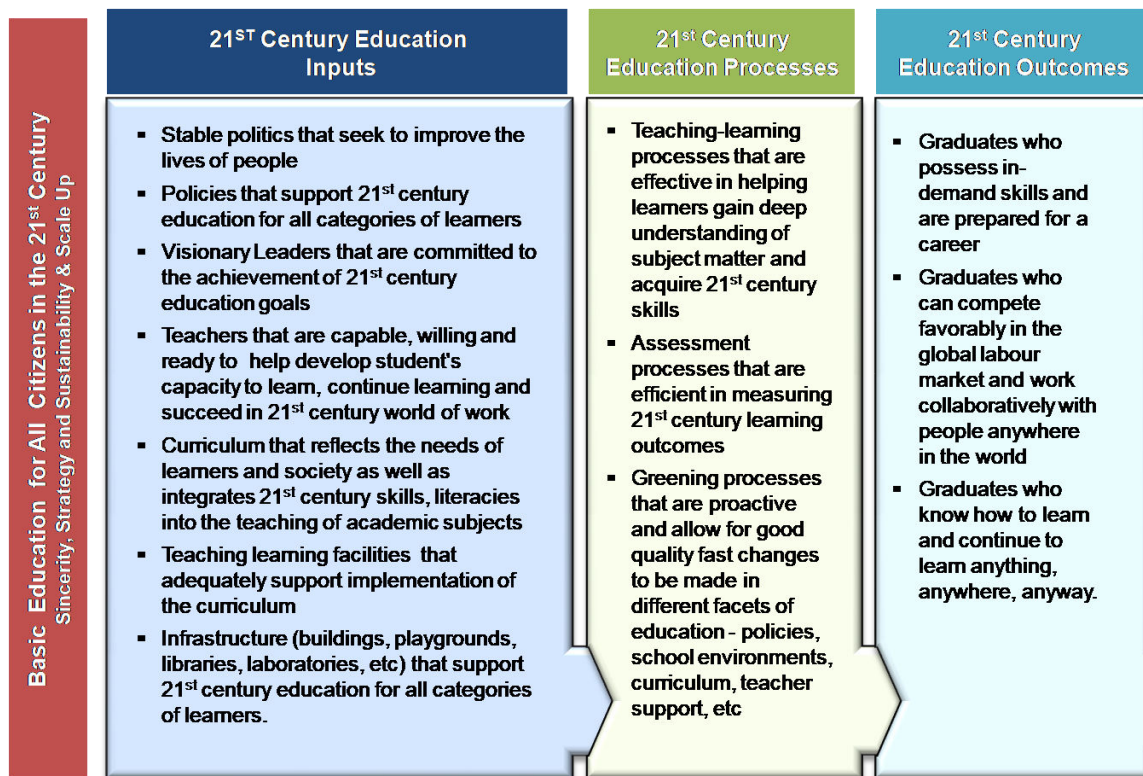


Figure 6: Roadmap to 21st century education

The Roadmap (Figure 6) begins with an emphasis on the need to provide basic education for all citizens. It further describes major inputs and processes that are capable of yielding 21st century educational outcomes and shows that when we make the inputs and adopt the processes, we can expect to have graduates who can thrive in the 21st century and beyond.

Basic education for all citizens

Nigeria has been pursuing the goal of education for all citizens for decades. The country accelerated her efforts when “Education for All”, an international axiom, was initiated by the United Nations as an integral part of the Millennium Development Goals. The goal of EFA was to provide for every citizen in every country, quality educational opportunities for participation in the emerging knowledge societies by 2015. However, Nigeria did not achieve the EFA goal (United Nations, 2015).

Nevertheless, in discussing strategies for bringing the Nigerian education system into the 21st century, we need to appreciate that a significant portion of the children who should be in the education system are not in the system. Basic education is a right and it lays the foundation for success. That is why for countries like Finland, Singapore and China, basic education for all their citizens is a priority. In fact China saw the eradication of illiteracy among her youths as a key strategy for success in the 21st century and embarked on the universalisation of basic education prior to entering the 21st century. By 1999, China achieved 99.1% net enrolment of school-aged children at the primary stage (LI, Zhi-Hua, Jia-Qin, and Min, nd).

Successive governments in Nigeria had made efforts to provide basic education such efforts include the establishment of Universal Basic Education and the construction of Almajiri schools. As at 2013, Government had completed construction of 80 Almajiri schools, 45 were near completion and Government had plan to complete construction of 400 Almajiri schools by 2015 (Okonjo-Iweala and Ahmed, 2013). In spite of these efforts, number of out of school children in Nigeria is rising.

Millions of out of school children, growing into adulthood without skills is not only a huge loss to Nigeria but also a huge threat to nation’s social and economic development. Therefore, even though United Nations have long moved on to other goals – the Sustainable Developments Goals - Nigeria needs to continue to pursue the goal of basic education for all citizens because the achievement of the goal is foundational to the success of individuals and Nigeria as a nation.

21st Century education inputs

Politics: Politics that seek the progress of the people and society is an important input to the education system. Politics determine the policies and practices in educational institutions. Good politics is therefore crucial and has been cited as a key success factor in the education systems of Finland and Singapore.

Policies: effective policies that will address the needs of education in the 21st century are necessary inputs. Some of the important policy areas to consider for 21st century education are as follows:

- Improving access to education, including making education and training widely available at any point in an individual’s life time and to people with different abilities

- Improving learning environments and infrastructure to meet the needs of 21st century education.
- Teaching and assessment of 21st century skills
- Adopting curriculum reform processes that are proactive and consider the future needs of the learners, employers and society
- Building competitive learning systems and encouraging Nigerian students to participate in international tests and competition
- Adopting new media and technologies to aid teaching and learning
- Increasing focus on Science, Engineering and Mathematics as well as Technical and Vocational Education and Training (TVET) in order to create highly skilled technical workforce.
- Recruiting, rewarding, training, and honouring talented teachers.
- Ensuring that teacher preparation institutions are strengthened to prepare teachers that can teach, assess and model 21st century skills
- Providing more advanced research infrastructure; building research networks among higher education institutions; and collaborating with international institutions
- Building closer cooperation among stakeholders

Leadership: Transformational and sustainable leadership is a necessary input for achieving 21st century education goals. Leaders that respect education and are proactive, visionary and committed are necessary at all levels including government, institutional leadership, programme leadership and classroom leadership.

Teachers: Teachers play important roles in implementing educational reforms and they must have the capacity to do what is expected of them. The issue of teacher capability is important since nobody can give what he or she does not have. Therefore teachers who are qualified, trained, and committed are necessary inputs. Especially, teachers should be able to teach and assess 21st century skills. They should be able to use technology and new media in delivering their lessons. They should also be exemplary in the acquisition and use of 21st century skills. Thus, in their daily activities and interactions with colleagues and students, they should demonstrate good levels of collaboration, critical thinking, creativity and communication skills.

Curriculum: There is need for 21st century skills-based curriculum that focuses on competencies the learners need in current and future jobs. The curriculum should reflect the values and needs of learners and society and align with national and global learning standards and best practices. The curriculum should reflect the integration of core subjects; important soft skills such as creativity, critical thinking, communication, collaboration, problem solving and life career and social skills including local and global citizenship, cultural awareness, etc. (see figure three for 21st century skills blend).

Infrastructure and teaching-learning resources: Infrastructure such as classroom, laboratories and playgrounds should support the acquisition of skills such as collaboration, communication and creativity. The facilities should be, as much as possible, technology-driven, flexible, relevant, adequate and safe. Learning facilities or teaching aids should be technology driven. For instance,

with artificial intelligence such as virtual reality, students can travel the world, visiting factories, airports laboratories, experiencing learning directly from the classroom.

21st century education processes

Teaching-learning process: Teaching-learning methods for 21st century education should be learner-centred; technology/media-driven; and problem-based. The processes should allow students to participate, create knowledge, communicate and collaborate with others; frame problems; analyse, synthesise and evaluate information; develop recommendations; and use technology effectively and responsibly to solve complex problems. Thus the processes should prepare students not only to be able to follow rules and directions but also to be able to think out of the box for solutions to complex non-routine, real life problems.

Assessment processes: Assessment for the 21st century should focus more on students' higher –order thinking skills including Analysis, syntheses and evaluation. The lower order thinking skills such as ability to recall or comprehend pieces of information are no longer the most important learning outcomes (Darling-Hammond and Adamson, 2010). What is more important is the ability to use the knowledge we have to solve problems. In addition, assessment processes should rely more on tests that present students with rich real-world tasks and require them to craft their own responses, perform an activity or produce a product rather than merely selecting multiple choice answers. The problems facing the world today such as increased global competition, unemployment, poverty and climate change certainly do not present people with four or five distinct choices (solutions) to choose from. Instead, solving these problems requires critical analysis and evaluation of the many complex issues around the problems. These should be reflected in 21st century assessments.

Greening processes: Updating of curriculum, policies, teaching and assessment processes, etc should be done more regularly to ensure that students are learning skills that they can use on graduation. The change process should be flexible, without so much bureaucracy to enable fast changes to be made.

Challenges of Bringing the Nigerian Education System into the 21st Century

There are many challenges to designing and implementing 21st century education but this paper will focus on four major challenges as follows:

1. The existing policy framework does not adequately support 21st century education due to the following among others:
 - a. Some of the policies and philosophies guiding educational practices are outdated. Curriculum documents are also not reflecting 21st century learning goals.
 - b. The reasons for some educational policies are not sufficiently clear and transparent to those expected to implement the policies.
 - c. There is inadequate fidelity in policy implementation as some stakeholders in the education system sometimes, do not support

some policies and as such may not play their parts effectively in the implementation.

2. Chronic underfunding of education is a major barrier to achieving 21st century education goals. Education in Nigeria is not adequately funded. Meanwhile, implementing 21st century education is financially demanding. There is need trained teachers, modern educational infrastructure as well as technologies that are safe, suitable and adequate. In addition educational organisations sometimes do not make efficient use of funds allocated to or generated by them for the agreed purposes (UNICEF, 2022).
3. Many teachers in Nigeria do not possess adequate levels of 21st century skills and do have the skills to teach and assess the skills. In addition, news sources indicate that many teachers feel that their conditions of service are not good enough and motivating. It is therefore difficult to get them to undertake the heavier task of preparing students for an entirely new world. Teacher preparation programmes in Nigeria are not yet preparing their graduates to possess, teach and assess 21st century knowledge and skills. As a result, they cannot become change agents for embedding 21st century knowledge and skills in core subjects. In addition, there is continuous brain drain of good quality teachers to institutions outside the country.
4. Many educational institutions are not capable of providing what it takes (, policies, funds, commitment and moral support) for 21st century education to take place in classrooms.

Way Forward

While there are many things that can be done to overcome the challenges of designing and implementing 21st century education in Nigeria, the authors will offer two major solutions as follows:

Demonstrating commitment

Stakeholders in education need to do more for the sector. There is no sector that can thrive if major stakeholders are not determined to make the things they desire happen. Every stakeholder in education has a role to play and the goals of 21st century learning can only be achieved when every stakeholder performs the role that it should perform with sincere commitment and without corrupt or fraudulent intentions. Specifically:

- Government should provide adequate funding and favourable policies that are clear and transparent to drive 21st century education. Government should remain faithful to the policies and support the implementation through adequate funding. Government should specially focus on teacher development and compensation as well as provision of effective and adequate educational facilities and learning resources. Government

should also protect their investments in education through effective monitoring, evaluation, feedback, reward and sanction systems.

- a. Management of educational parastatals and institutions should ensure effective implementation of educational policies. They should also ensure that their institutional policies support 21st century education. For example, appointment and evaluation of teachers for promotion could include ability to integrate 21st century skills into their classroom practices. Secondly, parastatals could have a system for retaining and rewarding staff that embed 21st century skills into their work processes. In addition, management of educational parastatals and institutions should utilise funds collected from government or generated internally responsibly as planned and for the good of their organisations. Leadership of the institutions should also encourage research and development around 21st century skills. Such research should focus on developing educational resources that help teach, learn and measure 21st century skills. They should create open repositories for these resources for sharing.
- b. Teachers need the support of government for continuous professional development as I mentioned earlier but at the same time, teachers can find inexpensive ways to upskill and improve their knowledge and expertise in new skills that students need to succeed. For example, teachers can take advantage of free training programmes online. They can also use reverse mentoring to learn digital skills from students and younger colleagues. In addition, teachers should model 21st century skills. For example, they should collaborate with students and colleagues to creatively solve problems. They should be good models of effective communication and responsible use of social media,
- c. Students should be committed to learning, develop self study strategies to improve their skills by themselves; join international forums and connect with other students and scholars around the globe, students should use social media responsibly. They should use the media not only for social connections but for the achievement of their educational goals.
- d. Parents should provide basic character and values training for their children from their early years to inculcate values like hard work, resilience and integrity; they should support their children financially, emotionally and otherwise; parents should allow their children to choose courses where they have natural strengths and talents rather than forcing them to study courses of their own choice.

Government support

The support of Government in helping schools to develop capacity to equip learners with 21st century skills is crucial. All levels of Government should, through their parastatals and agencies, provide clear policies, adequate funding and quality assurance for the education system with a view to helping the schools deliver 21st century education. Government should pay special attention to teacher education and professional development.

Stakeholder Commitment

Stakeholders in the education sector should champion the change they desire. First, championing a change requires much more than being capable and determined. Beyond “being” capable and determined, stakeholders must “show” capability and determination. Secondly, stakeholders cannot effectively champion a shift to 21st century education using 19th and 20th century skills and tools. The champions must learn and apply 21st century skills – They must communicate effectively using new technologies across all relevant media, gather information and think critically and creatively - out of the box - about how to break barriers to the achievement of major goals. In addition, the Nigerian education system is huge including government parastatals and ministries; formal educational institutions and non-formal institutions; academic and professional associations; and student bodies, among others. These entities must collaborate with each other. They must also collaborate with organisations outside the sector including businesses, related government organisations, multinational and supranational organisations as well as educational institutions in other countries in addressing important issues such as curriculum reform, funding and policy making.

Conclusion

This paper puts forward the viewpoint that the Nigerian education system is not adequately equipping its beneficiaries with the skills they need to succeed in current and future world of work because the system is outdated. Thus, the system - policies, people, processes, practices, curriculum, infrastructure and teaching-learning resources - need to be revived and transformed to make it more responsive to the needs of learners and employers. The need to transform the Nigerian education system is urgent. It is urgent because the system has been producing millions of graduates who do not have what employers need and also do not have what it takes to be self-reliant. It is urgent because the education system is expanding and, with more schools established and licensed every year, the system will increase production of graduates who do not have the skills that matter. Also, it is urgent because a generation is emerging that will find it really hard to tolerate archaic educational system.

The goal of this paper is to offer a solution to the transformation of Nigerian education system so that it can begin to equip students with competencies for success in the 21st century and beyond. This paper has achieved its goal by presenting a comprehensive road map that stakeholders can follow to achieve 21st century educational goals.

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