The Roles of STEAM Teacher Education in the Emerging E-Society and Sustainable Development Goals

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Abstract: The ever increasing applications and widespread use of digital Information and Communication Technologies (ICT) in every aspect of human interactions has become a dominant culture in the current post-modern society. Consequently, it is almost impossible for individuals who are e-illiterate to survive in the emerging smart cities and e-societies, in general. Sustainable development in any nation now rests largely on the level of mastery and use of ICT, as well as, the degree to which citizens are e-literate. The task of developing human potentials needed to power sustainable socioeconomic development as well as producing e-literate citizens, is a core function of the education industry. Here it lies the significance of education, especially teacher education in the achievement of sustainable development goals. This paper therefore, addresses the role of STEAM teacher education in the emerging smart cities, e-societies, and sustainable development goals. The concepts of smart cities, e-societies, Sustainable Development Goals (SDGs) and STEAM teacher education were discussed in the paper. The role of STEAM teacher education in the attainment of SDGs, was critically examined, and the paper calls for the restructuring of the Nigerian education system in line with the basic tenets of STEAM education as parts of measures to attain the SDGs in Nigeria. 

Keywords: Smart city, e-society, STEAM teacher education, sustainable development goals, e-literate.

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Introduction

Traditionally education is often considered as a process of enculturation. However, the emergence of schooling few centuries ago propelled education beyond mere cultural transmission to become dominant agent of evolution of human cultures. The gradual evolution of the knowledge-based societies is closely interwoven with the evolutionary role of education, in the society. Ion, Rodica and Ioana, (2009) opined that knowledge creation and its propagation, through education, its dissemination through Information and Communication Technologies (ICT) as well as technological innovations are essential to the development of knowledge-based society. Indeed modern digital ICT permeates every aspects of knowledge-based society to the extent that as a necessity; citizens are increasingly becoming e-literate. This partly account for why the society is also termed e-society. In knowledge–based societies, the focus is on critical thinking leading to knowledge creation and applications rather than on things, virtual world instead of the real one, while keeping abreast with the quantity, complexity and pace of generation of new knowledge requires enormous mental effort (Csilla, 2005).

There is no doubt that the role of education in knowledge creation and propagation in the emerging knowledge-based societies rest on teachers and by extension on teacher education. In the view of Ion, Rodica and Ioana, (2009) education deepens the interrelationships between individual and society, and develops the individual’s potentials to survival as a member of the society and contributes meaningfully to the society. Indeed the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2015) highlighted strong connection between personal

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The degree of smartness of a city depends to a large extent on the technological readiness of such city and the extent of spread of the e-services. E-services exert a very great influence on virtually all fields of human endeavors, ranging from educational, health, banking, businesses, building and governing sectors. This implies that existence of e-services
or e-society reduces stress of face to face transactions encourages easy transition to smart city in educational and health industries among others.

**History and Concept of Sustainable Development Goals**

Sustainable Developments Goals (SDGs) was proposed by committee of nations to fill the gaps noticed in the Millennium Development Goals. Carruthers (2018) stated that SDGs which was adopted in 2015 and created by the United Nations with the intention of creating common set of developmental goals for all communities in every nation for 2030 agenda of sustainable development. Sustainable development unlike the Millennium Development Goals (MDGs) has 17 goals and included aspects that deal with the economic and environmental dimensions in addition to the social dimension which was the primary focus of the MDGs (Catholic Agency For Overseas Development [CAFOD], 2015). United Nation Development Program (2018) asserted that SDGs is expected to finish the job of MDGs and as such will tackle the root causes of poverty and the universal need for development that works for every person irrespective of gender, race or ethnicity.

The milestone for the promulgation of the SDGs began as far back as 1993 with the creation of the Committee for sustainable development by the United Nations. This was followed with the review and renewed commitment for the implementation of the Agenda 21 at the Earth Summit +5 in 1997, and in the year 2000 at the Millennium summit in New York comes the birth of the Millennium Development Goals otherwise known as the MDGs with eight goals. Sachs (2012) opined that the MDGs mark a historic and effective method of global mobilization to achieve a set of social priorities worldwide. The main objectives of which include but is not limited to promoting global awareness, political accountability and public pressures to fighting against poverty for the years 2000 to 2015. In the year 2002 there came an increase renewed interest and commitment by committee of nations to the pursuit of the sustainable development with the Johannesburg Plan of Implementation otherwise referred to as JPOI. JPOI and the Agenda 21 were built upon at the Rio +20 in 2012 emerges the concept of SDGs.

The term sustainable development is based on the premise that nations can meet the needs of the present without actually compromising the ability of the future generations to meet their own needs. Sachs (2012) submitted that because of the growing urgency of sustainable development for the entire world emerged the idea for the concept of Sustainable Development Goals (SDGs). SDGs also known as global goals are universal action call to end poverty, protect the planet and ensure that there is affordable and clean energy, sustainable cities and communities respectively are very germane to the actualization of the goals STEAM teacher education with respect to education and SDGs. Teachers are also expected to provide career counseling and services to learners and are supposed to be a lifelong learner. Professional growth of teachers should be intensifying because teachers are supposed to be life learners. This is because it is through learning that quality and worth of teachers could be sustained. Emphasizing quality education at all level with respect to educational plans and development also constituted the goal of teacher education. Coincidentally this corresponds to goal four of SDGs, which is quality education. Quality in the area of contents, pedagogy and personalities of the teacher contribute tremendously to the success of the teacher education and SDGs. Teachers are also expected to provide career counseling services to learners and are supposed to be a lifelong learner. Professional growth of teachers should be intensifying because teachers are supposed to be life learners. This is because it is through learning that quality and worth of teachers could be sustained.

Industry, innovation and infrastructure reflects goal 9 of SDGs. This goal corroborated one of the purposes of teacher education that it is desirable to take cognizance of the changes in the methodology and in the curriculum and that teachers should be exposed to these innovations. One of such innovation is the integration of Information Technology
IT) in to training of teachers. The effectiveness of IT into teacher education depend greatly on infrastructural facilities like electricity and this consequently resulted to industrialization in such location. This implies that the 2013 edition of national policy had cater for the needs of present generation and next generation with respect to actualization of the SDGs. Teachers as the implementer of the policy are implored to be committed and motivated in discharge of their duties.

Federal Republic of Nigeria (2013) stressed the need to ensure equality quality education for all at every level. The idea in this goal reflects the need to understand the strength of students and make provision for the development of their needs. This is why one of the goal of teacher education had it that teacher education should be extended at NCE and degree level to cater for technical, vocational, business and special education. This is one of the ways by which inequality could be reduced the actualization of goal 10 which could be interpreted as every child count.

Having a sustainable cities and community is goal number 11 which could be correlated with several roles of teacher education. Such goals are assisting teachers to fit into social life of community the society at large and enhance their commitment to national goals; and providing teachers with intellectual and professional background that will assist them to cope with the changing words. This correlates to having peaceful coexistence between living and ecosystem and might be very helpful in conflict resolution. Depending on the perspective of the arguments, the goals of SDGs and teacher education are connected to one another, and should be considered as such for the success of 2030 agenda of SDGs.

Conclusion

This paper simplified the concept of e-society and smart cities as well as that of STEAM teacher education. Attempts were also made to the history and concepts of SDGs, alongside with the aspects of SDGs that is expected to be achieved through teacher education. The article was concluded by suggesting useful recommendations on how smart cities could be realized in developing country like Nigeria.

Recommendations

- Curriculum developers should set up monitory team that will ensure strict compliance of the implementation of the goals.
- Teacher training institution should emphasize the need to integrate and utilized ICT to all levels of education.
- Programs seminars and workshop should be organized to keep teachers abreast of the innovation in their profession as well as update the knowledge of the in-service teachers.
- Awareness sensitization should be intensifying by professional bodies like SAN, STAN, MAN, BOSON among others.
- Textbooks authors should design their textual materials to meet the emerging trends in the society.
- Government should make available basic amenities that will facilitate transition of normal cities to smart ones.
- Students should be encouraged to develop positive attitude towards embracing smart cities.

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