Transforming African Education Systems through the Application of Internet of Things

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Abstract. The study aimed at developing a model for transforming African education systems through the application of internet of things. The internet of things model for Africa developed would allow African countries particularly Namibia to share education materials and resources with other countries across Africa. The idea behind the internet of things model in the education sectors in Africa is to encourage open access to knowledge and information. The study discovered that in African education systems there are no known platforms that are used by African countries to collaborate, communicate and share educational information directly with universities in Africa. Therefore, the present study developed a model for transforming African education systems through the application of internet of things in the Namibian context which will act as a centralized online platform for self-study, new skills-acquisition and self-improvement using materials provided by African institutions of education and higher learning. The platform is open to everyone such as students, educators and members of the public.

Keywords:

INTRODUCTION

IoT have two essential elements into the traditional elearning that are smartness and object interaction (Bayani, Leiton). IoTs is an important terminology that can provide a huge platform for learners and instructors with a wide variety of distance learning devices and object (Bayani et al., 2018). According to Soava et al. (2014) high interaction between virtual and physical objects can generate a great number of collaboration environments. Furthermore, Economy & Report (2016) states that IoT techniques view the world in which a bridge’s structural weaknesses are detected before it collapses. In addition, IoT allows for tailored solutions, both in terms of production and services, in all industry areas. Moreover, IoT can empower people in ways that would otherwise not be possible, for example by enabling independence for people with disabilities and specific needs, in an area such as transport. The IoT enable firms and public authorities to meet their objectives in new and innovative ways.

For the purpose of this study, a model for transforming African education systems through the application of internet of things in the Namibian context which will act as a centralized online platform for self-study, new skills-acquisition and self-improvement using materials provided by African institutions of education and higher learning.

PROBLEM STATEMENT

In today’s world ICTs have played a significant role as a building block of modern society. IoTs is challenging in today’s operation and implementation since most entities cannot afford to have the capacity and capability of implementing it because of its complex and technical issue (Soava et al., 2014). In developing countries the internet of things remains a concern because most of the remote areas do not have electricity in the everyday lives of people. In developed countries IoTs work perfect because they have access to electricity everyday therefore internet of things play a fundamental role in economic and social development in ways that would have been challenging across the globe (Nilsson et al., n.d.). Moreover, internet of things is defined by Nilsson et al. (n.d.) as an ecosystem in which applications as services are driven by data collected from devices that sense interface with the physical world. Many literatures indicated that internet of things is important in
all the sectors such as health education, agriculture, transportation, manufacturing, electric grids, and many more.

Aim and Objectives
The main purpose of this study was to develop a model for transforming African education systems through the application of internet of things.

The objectives were:
- To determine the usage of internet of things in the African education systems.
- To establish the level of access and usage of internet of things in the African education systems.
- To identify the challenges facing Africa in accessing and using of internet of things.

LITERATURE REVIEW
This section discusses the scientific and general overview of the usage of internet of things in the African education systems, the level of access and usage of internet of things in the African education systems and the challenges facing Africa in accessing and using of internet of things.

The usage of internet of things in the African education systems
Internet of things is a relatively new concept which is regarded to offer some potentials for learning and teaching (Nesnelerln et al., 2019). Although Internet of things is emerging and become more popular in today’s educational contexts, there is still a need for clearing up the minds of teachers and students with respect to the nature of it and how it can be utilized for the purpose of teaching and learning. According to Abdel-basset et al. (2018) internet of things has the capability to transform education by changing how schools, colleges and universities gather data, interface with users and automate processes. IoT is defined as networking of physical objects through the use of embedded sensors (Brief, n.d.). The use of Internet of things in education domain has played a major role to connect and educate the students as to how information can be transmitted between one device to another (Abdel-basset et al., 2018). In addition, the internet of things has a very important influence on education.

The level of access and usage of internet of things in the African education systems
In the African context, Internet of things is a new concept which lately becomes more practical to the world due to the increasing of mobile devices, entrenched and widespread communication, cloud computing, and data analytics (Abdel-basset et al., 2018). In terms of information technology internet of things is classified as one of the buzzwords. The internet of things has a capability of transforming any object in real world into intelligent objects. Additionally, the internet of things grants us a control of things which are around us, as well as keeping us informed of the state of the objects. Internet of things operates through the use of network, sensors, big data, and artificial intelligence technology for delivering perfect systems of services so it considers an automation and analytics system. Moreover, the IoT provides a greater limpidity, performance, and control of any system.

The challenges facing Africa in accessing and using of internet of things
Many countries in Africa continue facing challenges in implementing internet of things as a relatively new concept the challenges includes compatibility of various IoT systems, authentication and identification issues in IoT, Integration of IoT points with IoT software, IoT data storage challenge, connectivity and power management IoT challenges, unstructured data processing and incorrect data capture difficulties (Barakabitze et al., 2019).

METHODOLOGY
This section explains the methods and techniques that would be employed in the study, to collect data, the type of data that would be collected, and how the data would be analyzed. The selection of the methods and techniques were influenced by the goal of the study, which is to develop a model for transforming African education systems through the application of internet of things. A simple random sampling technique was used to select 53 countries in Africa. The data was collected through secondary data. A quantitative approach using the survey research design was used. For proof of concept a prototype to enable internet of things among institutions were developed in Namibia to enable sharing of resources.

BUSINESS BENEFITS
In the education context, IoT is one of the technologies used to make life easier for teachers to keep tabs on their students as well as use student performance data to continually evaluate the effective teaching and take a more informed instructional approach. With the use of internet of things it can allow students to connect with their teachers and receive learning instructions and reports even when they are physically in class. For instance, a student who is sick doesn’t have to miss out on important lessons or get homework from their friends.
DISCUSSION OF RESULTS

In today’s world internet of things is regarded as the key to information access and dissemination as it provides communication and collaboration among the physical and virtual objects in various sectors. The are many benefits offered by internet of things such ease of access to information timely or in real time as well as monitoring of data, adapting to new standards and also automation and control.

INTERNET OF THINGS MODEL A NAMIBIAN CONTEXT

This is a centralized online platform for self-study, new skills-acquisition and self-improvement using materials provided by African institutions of education and higher learning. The platform is open to everyone such as students, educators and members of the public.

CONCLUSIONS

In today’s world internet of things play a major role of ensuring that it should have devices that self-report in real-time improving efficiency and bringing important information to the surface more quickly than a system depending on human intervention. In addition, IoT enables communications between smart things, and thus enabling communications anytime, anywhere, and among anything.

REFERENCES


Brief, S. (n.d.). The Internet of Things in Education Improve learning and teaching experiences by leveraging IoT on a secure foundation IoT fundamentally changes the education equation.

