Transforming African Education Systems through the Application of IOT

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Abstract. The project sought to provide a paradigm for improving African education systems through the use of the IOT. The created IOT model for Africa will enable African countries, notably Namibia, to exchange educational content and resources with other African countries. The objective behind the IOT paradigm in Africa’s education sectors is to provide open access to knowledge and information. The study revealed that there are no recognised platforms in African education systems that are utilised by African governments to interact, communicate, and share educational material directly with African institutions. As a result, the current research developed a model for transforming African education systems using the IOT in the Namibian context, which will serve as a centralised online platform for self-study, new skill acquisition, and self-improvement using materials provided by African institutions of higher learning. Everyone is welcome to use the platform, including students, instructors, and members of the general public.

INTRODUCTION

Smartness and object interactivity are two key components of IOT in traditional learning (Bayani, Leiton). IoTs is a word that refers to a large platform that may supply learners and instructors with a range of remote learning devices and objects (Bayani et al., 2018). High interaction between virtual and real things, according to Soava et al. (2014), can develop a large number of collaborative settings. Furthermore, according to Economy & Report (2016), IoT approaches envisage the world in which structural problems in a bridge are discovered before it falls. In addition, IoT enables for customised solutions in all industries, both in terms of manufacturing and services. Furthermore, IoT may empower individuals in ways that would not be feasible otherwise, such as providing freedom for persons with impairments and special needs in areas like transportation. Firms and government agencies may use the IOT to achieve their goals in new and inventive ways.

For the purposes of this research, a model for transforming African education systems through the application of the IOT in the Namibian context will be developed, which will serve as a centralised online platform for self-study, the acquisition of new skills, 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 IOT 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 IOT play a fundamental role in economic and social development in ways that would have been challenging across the globe(Nilsson, Andersson et al., n.d.). Moreover, IOT 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 IOT is important in all the sectors such as health education, agriculture, transportation, manufacturing, electric grids, and many more.
Aim and Objectives

The primary goal of this research was to provide a paradigm for reforming African education systems through the use of the IOT.

The Objectives Were

- To determine the usage of IOT in the African education systems.
- To establish the level of access and usage of IOT in the African education systems.
- To identify the challenges facing Africa in accessing and using of IOT.

LITERATURE REVIEW

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

The usage of IOT in the African education systems

IOT is a relatively new idea that has the ability to improve learning and teaching (Nesnelern et al., 2019). Although IOT is evolving and becoming more popular in today’s educational environments, there is still a need to educate instructors and students about the nature of it and how it may be used for teaching and learning. IOT has the potential to alter education by transforming how schools, colleges, and universities acquire data, interact with users, and automate operations, according to Abdel-basset et al. (2018). The Internet of Things (IoT) is described as the networking of physical things through the use of embedded sensors (Brief, n.d.). The usage of IOT in the education arena has played a significant role in connecting and educating students on how information may be sent from one device to another (Abdel-basset et al., 2018). Furthermore, the IOT has a significant impact on schooling.

The level of access and usage of IOT in the African education systems

In the African setting, IOT is a novel idea that has recently become more accessible to the rest of the globe as a result of the proliferation of mobile devices, entrenched and pervasive connectivity, cloud computing, and data analytics (Abdel-basset et al., 2018). In terms of information technology, IOT is one of the buzzwords. The Internet of Things has the power to convert any thing in the real world into sentient objects. Furthermore, the IOT gives us control over the items around us while also keeping us informed of their status. IOT uses network, sensors, big data, and artificial intelligence technologies to create ideal service systems, hence it is considered an automation and analytics system. Furthermore, the IoT improves the cleanliness, performance, and control of any system.

The challenges facing Africa in accessing and using of IOT

Many African countries continue to face difficulties in implementing IoT as a relatively new concept. These difficulties include compatibility issues with various IoT systems, authentication and identification issues in IoT, integration of IoT points with IoT software, IoT data storage challenges, connectivity and power management. Difficulties with IoT, unstructured data processing, and inaccurate data collection (Barakabitze et al., 2019).

METHODOLOGY

This section describes the data collection methods and procedures that will be used in the project, as well as the types of data that will be gathered and how the data will be evaluated. The purpose of the project, which is to build a model for improving African education systems via the application of IOT, affected the selection of approaches and techniques. To pick 53 African nations, a simple random selection procedure was applied. 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 IOT among institutions were developed in Namibia to enable sharing of resources.

BUSINESS BENEFITS

In the context of education, IoT is one of the technologies used to help teachers keep track of their pupils and utilise student performance data to continuously analyse effective teaching and take a more informed instructional approach. Students may utilise IoT to interact with their professors and receive learning instructions and feedback even while they are physically present in class. For example, a sick student does not have to miss essential courses or acquire assignments from their peers.

DISCUSSION OF RESULTS

In today’s world IOT 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 IOT 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.

IOT MODEL A NAMIBIAN CONTEXT

This is a centralised online platform for self-study, new skill development, and self-improvement that uses
resources offered by African educational and higher learning institutions. Everyone, including students, instructors, and members of the general public, can use the platform.

![Architecture Diagram]

**Figure 1.** Prototype African educational content sharing framework.

**CONCLUSIONS**

In today’s world, IoT plays a significant role in ensuring that it has gadgets that self-report in real-time, enhancing efficiency and bringing crucial information to the surface faster than a system that relies on human interaction. Furthermore, IoT allows for connectivity amongst smart objects, allowing for conversation at any time, from anywhere, and with anybody.

**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.

