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Research Article

Prospectus And Problems of Using the Internet of Things in Education Comoro System

Clement John Maganga [1*], Dr. Ashwarya Srivastava [2], Djabir Abdallah Inzoudine [3], Dr. Neha Sharma [4]

[1] PhD scholar, School of Education, Galgotias University, Greater Noida, Gautam Buddha Nagar, Uttar Pradesh, India

[2] Associate Professor, School of Education, Galgotias University, Greater Noida, Gautam Buddha Nagar, Uttar Pradesh, India

[3] Master of Science Physics, School of Science, Noida International University, Greater Noida, Gautam Buddh Nagar, Uttar Pradesh, India

[4] Master of Science Physics, School of Science, Noida International University, Greater Noida, Gautam Buddh Nagar, Uttar Pradesh, India

Corresponding Author: * Clement John Maganga

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Abstract

The Comoros Islands are among the countries envisaged to make a revolution in the education system via the Internet of Things, but they encountered many challenges. This project aimed to study the prospects and Problems of using the Internet of Things in the Comoros Islands. The study focused on two objectives, including: to study the benefits of using Internet of Things in the Comoros education system and the second to study the Problems of using Internet of Things in the education system. The study used documentary analysis from various altimetry databases base namely: Google Scholar, linked, website, articles from various indexed journal and chapter reviews as methodology. The findings showed that the Internet of Things helped in: Enhancing teaching and learning approaches, improving the quality of education, Virtual learning, improving academic performance and helping in data analysis for the first objective. In second objective showed that: Power supply, Internet connectivity and network, Learning Infrastructure and Lack of professional development were major challenges. The study recommended that: open a website for teachers and students, an alternative source of energy and competition in telecommunication companies and lack of professional training. The study concluded by asking the government to change its economic policy so as to import many Internets of Things.

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1. INTRODUCTION

According to Marinova (2016), the Internet of Things means the connection of physical objects to a global network and other networks. The use of the internet touches every aspect of life and involves the use of electronic devices such as tablets, smartphones, iPads, laptops, desktops and iPods. The use of the Internet of Things has given it different names according to where it operates. For example, when it is used in hospitals is called e-health, in government is called e-government, in education is called e-learning, in agriculture is called e-agriculture, in commerce is called e-commerce, and in business is called e-business (John, 2023). In recent years, internet users have increased, and billions of devices has increased. From 2012 to 2020, more than 8 billion devices were manufactured worldwide. It is estimated that by 2025, more than 11.1 trillion US dollars will be spent on the Internet of Things (Marinova, 2016). Today, the Internet of Things is useful in vehicles, vehicle condition based on maintenance, transportation, logistics and navigation, human health and fitness, factory operations and equipment optimisation, office security and home security. The internet of things in education is useful in applying various teaching and learning methods, namely: Massive Open Online Courses (MOOCs), Bring your own devices, service learning, social mass media, digital classroom, video conferences, television, radio, YouTube video, Google Meet, Zoom and Google Meet. (John & Srivastava, 2024)

However, the world is moving fast in the use of the Internet of Things in the provision of the education system in the Comoros Islands; the situation is worse. The majority of teachers, students, parents and other stakeholders lag in the use of the Internet of Things in education. The teachers still use the traditional modality of teaching. For this reason, this project aimed to study the prospects and Problems of using the Internet of Things in the education system in Comoros.

Research questions

1. What are the benefits of using the Internet of Things in the Comoros education system?
2. What are the Problems of using the Internet of Things in the education system

Research objectives

1. To study the benefits of using the Internet of Things in the Comoros education system
2. To study the Problems of using the Internet of Things in the education system

Significance of the study

The study aimed to remind curricular developers, educational administrators, policy makers, teachers, students and other stakeholders of the benefits and Problems of using the Internet of Things in the education system in the Comoros Islands.

Statement of problem

Despite the world has moving fast in the application internet of things in education system such as laptops, iPad, iPod, desktop, tablets, television, radio, flipped classroom, digital classroom, clipart, and white board and the software application such as YouTube video, team meeting, zoom, video conferences, Facebook, instagram, watsap and e-mail still the situation in Comoros Island is worse. Few studies have been done in this area in Comoros. Based on this literature views the project aimed to study the benefits and challenges of the Internet of Things in the Comoros Island education system.

Research methodology

The study used documentary analysis from various altimetry databases base namely: Google Scholar, LinkedIn, websites, articles from various indexed journal and chapter reviews.

Research gap.

Many scholars have done in this area (Mfoihay et al., 2012; Marinova, 2016; Majain et al., 2017; Abdel-Basset et al., 2018; Bamiah et al., 2018; Asad et al., 2022; Gonzalez et al., 2022; Jing, 2022; Sultana & Tamanna, 2022). No study has been done on the prospects and Problems of using the Internet of Things in the Comoros Island education system.

LITERATURE REVIEW

Mfoihaya et al (2012) study done in Comoros findings showed the use of Internet of Things is only in administrative systems, and the use of Internet of Things depends on electricity availability.

Marinova's (2016) study done in Bulgaria showed the driving forces of the Internet of Things. These driving forces include: availability of investment, increase in local income, positive attitude towards income, availability of technical capacity, and understanding the risk of related security.

Majain et al (2017) in their findings showed that the Internet of Things provides efficient connections between all things physically and virtually. The report also reported that the Internet of Things provides the online library, online laboratory, didactic materials, for education assessment, passing information, administrative tasks and online self-learning.

Abdel-Basset et al (2018). In the report, they reported that the Internet of Things provides feedback about learning and is useful in decision-making.

Bamiah et al (2018) the study done in Saudi Arabia. They found that the Internet of Things improved the quality of education, enhanced learning experience, predictive teaching and assessment strategies, effective decision making, improved learning outcomes, and detected and predicted learners' behaviours. Moreover, the challenges include security, privacy, ethics, a lack of skilled professionals, data processing, shortage and interoperability.

Asad et al (2022) study done in Saudi Arabia showed that the Internet of Things helped in advanced teaching and learning approaches to cope with learning needs and raise education quality. Notwithstanding, the internet-based laboratory had significant advantages in uplifting students to have academic performance through interaction, motivation, creativity,

practical learning and allowed students to engage in authentic tasks and experience practical and active learning.

Jing's (2022) study done in China the Internet of Things enabled students in data collection and analysis, feedback and self-improvement, promoting students to understand various experimental designs and the easy provision of teaching content.

Sultana & Tamanna (2022) the study done in Bangladesh. Their findings showed an easy-to-conduct questionnaire, maintaining physical distance and practical implications of academic scholars'

Gonzalez et al (2022) in their report they found that the Internet of Things helped in the identification of metacognitive, motivational, and grammatical written accuracy

Findings and Discussions

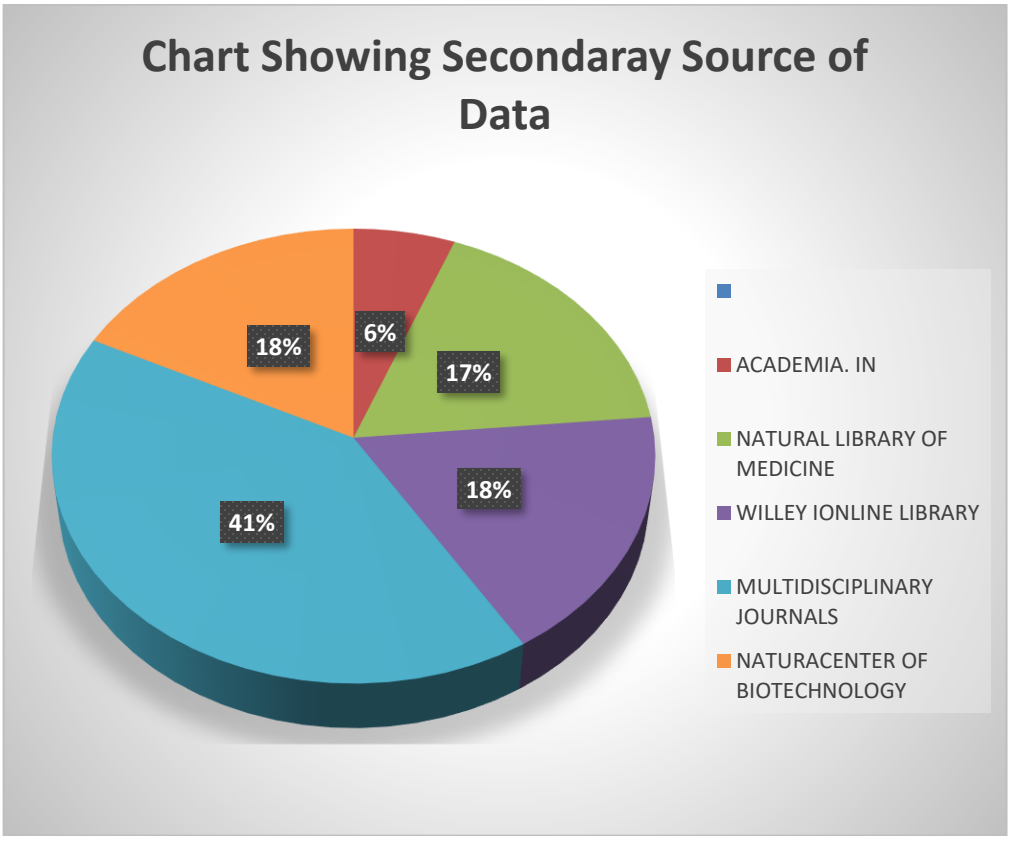
Table 1. Showing the source of secondary data

Academia. In	National Library of Medicine	Willey Online Library	Multidisciplinary Journal	National Centre Pf Biotechnology Information	Total
1	3	3	7	3	17
5.88%	17.64%	17.64%	41.17%	17.64%	100%

Source: Obtained from the study field (2025)

According to the table, Academia. In showing only one article that has been used equally (5.88%), followed by National Library of Medicine 3 articles (17.64%), Wiley Online Library Journal 3 articles (17.64%) and National Centre for Biotechnology Information 3 Articles (17.64%) that have similar data. Moreover, Multidisciplinary journals have the highest value of articles. In Multidisciplinary Journals, 7 articles (41.17%).

Figure 1: Study the benefits of using the Internet of Things in the Comoros education system
Designed by Authors (2025)



Enhance teaching and learning approaches

The literature review shows that when teachers and students use the Internet of Things enhances the teaching and learning process in the sense that students have a wide range of learning. Materials. Teachers are not only a source of getting materials. On the other hand, teachers use various approaches in teaching, including social platforms, namely YouTube videos, video conferences,

Gmail, WhatsApp to share their thought with the students. These ideas are supported by Asad et al (2022) & Wang (2023)

Improve the quality of education

Many years ago, the quality of education was actually poor. In the sense that the education sector has a lot of challenges include including inadequate teachers, shortage of books, poor infrastructures, classroom overcrowding, teaching by physical mode, bullying and severe punishment to the students. The use of the Internet of Things in the Comoros Islands will become a remedy for improving the education system. Teachers will be able to use the internet of things to teach students in virtual mode and presence of online books where students can acquire materials at any time. Students can gain knowledge while engaging in various economic activities (Bamiah et al., 2018)

Virtual learning

The student and teachers never meet when using the Internet of Things. Teachers and students share their thoughts, ideas and knowledge via links. This modality gives an opportunity for learners to get learning material anytime and anywhere. Notwithstanding online library, online laboratory, didactic materials, educational assessment, passing information for administrative purposes and self-learning can be achieved. The virtual learning enables engagement and motivation in learners, hence making learning accessible to all students, even with disability and shame students to participate effectively. The concept is also described by Majani et al (2017)

Improve academic performance

The use of the Internet of Things helped learners ' engagement, motivation, and collaboration and improved the communication scales. When the students share their thoughts, they become engaged in discussion about studies via WhatsApp groups, email groups and Facebook groups. By sharing these materials, student expand their knowledge and make it easy to perform their national exams, ultimately, they perform well in their academic development. Moreover, interaction, motivation, creativity, and practical learning allow students to engage in authentic tasks and experience practical and active learning (Asad et al., 2022)

Help with data analysis

The students of higher learning tend to enjoy learning better when it comes to data analysis in their research activities. Methods like questionnaires, recording the data, and dissemination of the results, all of these can be done by the Internet of Things. The methods like Microsoft Office, a social package for statistical software (SPSS), Python, JavaScript, Matlab and AutoCAD. Furthermore, applications like ChatGPT, machine learning, deep learning and artificial intelligence are helpful in grammatical correction and checking plagiarism for the entire research report. The idea has been supported by González et al (2022)

To study the Problems of using the Internet of Things in the education system

Power supply

All internet of things demands a power supply, such as laptops, tablets, iPads, televisions and radios. The power supply can be generated from hydroelectricity, solar power, thermal power, biogas, generators and wind power. In Comoros only source of energy. The majority of the Comoros people still lag in the alternative sources of energy. They depend on only one source, which is hydroelectricity. According to the www.iea.org report, almost 70% of the population in Comoros has access to electricity, but it is unreliable due to its availability. This point of view helps teach students and other stakeholders to use the Internet of Things (Mfoihay et al., 2012)

Internet connectivity and network

Regardless of the expenses of purchasing the bundle, the network is constant in the Comoros Islands. Comoros has two major companies dealing with communication in Comoros, one owned by the government, known as Comoros Telecom and Telma, owned by the private sector. The presence of only two companies narrows the stiff competition; hence found that the internet connectivity is unpredictable. The majority of schools haven't connected to the internet, even a Local Area Network (LAN). However, the government owns the Telecommunication Company, but failed to connect to their school. This sanction led Comoros to lag in the usage of the Internet of Things in its education system. Furthermore, there is a claim that even the network is slow in some circumstances. The bundle purchased at a high cost, network availability, and low speed are key agenda items on the execution of the Internet of Things in education. (Jing, 2022)

Learning Infrastructure

Another great Problem with the use of the Internet of Things is the availability of learning infrastructure, such as digital classrooms, whiteboards and projectors. The majority of schools in the Comoros Islands use traditional classrooms. The classes are not smart for the Internet of Things. Teachers use the blackboard teaching modality as a result of the application of leaner learner-centred approach. Both teachers' content and subject content are used in teaching and learning. On top of that, the hardware and software are expensive to purchase. Smartphones, laptops, whiteboards, iPads, and desktops are expensive few people can purchase them. The use of the Internet of Things is questionable in the Comoros Islands, particularly in the education sector (Majani et al., 2017)

Lack of professional development

According to Bamiah et al (2018), among the challenges of the Internet of Things was a lack of skilled professional development. Professional development is the keystone to enhancing the application of the Internet of Things. The majority of teachers lack these skills. On the other hand, teachers are reluctant to acquire new skills. Poor motivation, low salary, negative attitude, negative perception, and few facilities are among the challenges faced by the use of the Internet of Things in the Comoros Islands. Also, the use of multimedia internet of things is said to be a waste of time, simply because the preparation of lessons needs much time.

Constraints of the study

The great challenge the study faced was the unavailability of enough literature reviews in the Comoros Islands. Few studies have been done in this area. It was difficult for the researcher to get enough data to analyse this country.

Recommendation

The study recommends that the government have to launch a website where all teachers should display what they want to teach in such a way that students can be able to access them at any time and from anywhere. All students must be registered on the website for easy access.

Alternative source of energy. It is observed that in the Comoros Islands, only hydropower is used as the source of power. The study recommends using other sources of power like volcanic thermal, solar energy, wind energy, wave energy and biogas and connecting them to all schools and higher learning institutions.

The study recommends that all telecommunication companies in the Comoros Islands expand the speed of the internet and network, and allow other companies to operate so as to reduce the expenses by permitting the operation competition among companies.

The study recommends that the government should provide workshops to in-service teachers, lecturers and tutors training so that they can have the skills to use the internet of things in their academic field.

CONCLUSION

The world has changed, while the Comoros Islands are still stagnant in adopting new technology in all aspects of life. Therefore, the government should formulate a new policy that reflects the reality of the application of the Internet of Things in its education system. Example: change her economic policy to import the Internet of Things at a cheap price.

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About the corresponding author

Clement John Maganga is a PhD scholar at the School of Education, Galgotias University, Greater Noida, Gautam Buddha Nagar, Uttar Pradesh, India. His research focuses on innovative pedagogical approaches, educational technology integration, and learner-centred methodologies aimed at enhancing teaching effectiveness and academic performance in higher education.