RESEARCH PROPOSAL

Research Topic : Investigating Usage of IoT Smart Education in educational institutes

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Abstract

This proposal highlights the key aspect of how IoT smart education can successfully be implemented in educational institutions . It also explains , about how institutes find it difficult and problematic to implement IoT smart education . Research questions and objectives are also mentioned that algin with the difficulties and issues , furthermore the solution to the issues is also illustrated . Additionally , the research methodology , as well as ethical considerations is explained while doing the research .

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INTRODUCTION AND BACKGROUND

Internet of things is where devices and objects are connected through an internet connection. IoT utilizes smart devices and internet to solve various challenges around the world in different industries , with its unique solutions (Kumar, Tiwari and Zymbler, 2019). The Covid-19 pandemic allowed applicability of IoT in education . Although , since IoT is still developing in the education system , there are numerous benefits that it has . Such as , creating smart interactive classrooms , customizing interactive models for students to actively interact in the learning process , real time reporting on the students' cognitive activities , etc (Mircea, Stoica and Ghilic-Micu, 2021) . Smart education is students learning in the digital era . It is an activity that can be done from anywhere and anytime , as takes learning outside the traditional classrooms. It allows students to learn by using up to date technology and enables students to study with various materials based on their intellectual levels (Demir, 2021) .

PROBLEM STATEMENT

Some institutes find it problematic and difficult to implement IoT related smart education , due to some issues . Connectivity can be one of them , as poor internet connection is a key problem. The smart devices need to be interconnected with each other through the internet , so that the students can learn conveniently without any disruptions of connection . For these devices to be connected smoothly , better internet connection is necessary , which may not be available in the area where some institutes are located at (Shrestha and Furqan, 2020) . Security and privacy are huge concerns for institutes , as devices start to measure and collect data from students, they put student's security and privacy at risk . Any security breach could disclose student's personal information related to an individual's medical record, family financial background or any other private information . Therefore , it can also lead to data being stolen , which can ruin the institute reputation and can paralyse the whole college system . Cost is also a limitation , as the entire setup of an IOT-based educational institution can be expensive. Therefore , schools and educational institutions should have enough money to acquire these services (Mohanty, 2019).

RESEARCH QUESTIONS AND OBJECTIVES

Main Research question : How can IoT smart education successfully be implemented in educational institutions ?

Sub question 1 : What are the methods needed to solve connectivity issues for educational institutes when attempting to implement IoT smart education ?

Sub question 2 : What are the safety measures to security and privacy for education institutes when trying to implement IoT smart education ?

Sub question 3 : How can IoT smart education be more affordable to education institutes ?

Objectives 1 : To investigate on methods to solve connectivity issues for educational institutions when attempting to implement IoT smart education .

Objectives 2 : To examine safety measures of security and privacy for education institutes when trying to implement IoT smart education .

Objectives 3 : To explore solutions of making IoT smart education more affordable to educational institutes .

LITERATURE REVIEW

An Overview of Internet of Things in smart education

Internet of things is an emerging technology that allows objects, devices, and other things to communicate within a system with internet connection , hence performing various tasks and services . In IoT-equipped systems , sensors monitor, measure, and collect data . Then , the data is passed on to the network or cloud-based control centres for processing , analysing , and storage . After that , based on the data , the decision making is performed (Terzieva, Ilchev and Todorova, 2022) . According to Chawla, Tomar and Gambhir (2021) IoT devices has created new opportunities for assisting choice making and enhancing excellence of life , especially in the field of teaching college students. Faritha Banu *et al* (2020) defines a practical example of IoT in college environments , is usage of customized ARM Microcontroller . This system can be operated for resource management, attendance monitoring, or faculty management , as by applying ID cards and wristbands , the location of the learner can be tracked . The IoT college environments can also manage with intelligent parking system, dynamic ticketing system, etc .

Solutions to Connectivity issues

Fernández-Caramés and Fraga-Lamas (2019) say that Zigbee connectivity network can be used to provide short to medium range communication . Therefore , ZigBee nodes can act as relays in a ZigBee mesh, so that the exchanged information can reach long distances . Hence , Zigbee can only work in small to medium sized educational institutes . Furthermore , Ding *et al* (2020) mention 5G as part of IoT technology . 5G address the drawback of low latency , as well as providing high-speed transmissions . Low powered wide area network technologies also know as LPWAN , has set of features including wide-area communications and large-scale connectivity for low power, low cost, and low data rate devices with certain delay tolerance. A good and stable Wi-Fi service provider needs to be established for the institute , so that all the users can access and learn information digitally. LPWAN can be used for large scale educational institutes .

Therefore , whether the institute is big or small , they will need to integrate all different types of connections such as WIFI , 5G , Zigbee, LPWAN , so that they can properly establish a stable and good enough connection for all learners to access academic information . Although , you can identify that not all small-scale institutes can afford to bring in and integrate all different types of connectivity options.

Solutions to Affordability issues

Osako *et al* (2019) states that proper maintenance can be an important aspect of reducing costs in organizations . Maintenance can be in different ways such as time-based maintenance , which are actions carried out after a specified amount of time . If educational institutions can avoid unnecessary time maintenance on certain parts in the organization , it can reduce costs in the organization and make IoT smart education more affordable . Additionally, Dagan (2021) mentions better decision making in businesses . As , efficient decision making can lead to more productivity in the business , therefore it can lead to proper strategic purchasing and budget planning. Hence, that can lead to educational institutes able to implement IoT smart education .

Safety measures for Security and Privacy

Tawalbeh *et al* (2020) mention usage of strong embedded passwords . It is important that students use complex passwords for IoT devices , such as uppercase letters, special characters, numbers, and at least eight characters . Therefore , this can reduce the possibilities of protecting users' data from being stolen and manipulated . Additionally, IoT can use two-factor authentication . As it doesn't have to rely solely on passwords for user access , hence users can implement additional layer of security like a verification code in a text message or pattern recognition , etc . Furthermore , IoT devices should have regular updates from firmware and software , regarding enhancements for safety . If IoT devices aren't getting updates anymore , then hackers or attackers have a higher chance of accessing your data , as devices are not getting the latest and the stronger updates for security .

Toma *et al* (2019) address about a strong and trusted network connection . As , Institutes should ensure that there are secure encryption protocols within the network . Whether it is Secured socket layer protocols (SSL) or Transport layer security (TLS) protocols both sides of user communication should be proofed by the secure transport protocol implementation.

RESEARCH METHDOLOGY

The research methodology chosen for this proposal is a mono method and within the mono methodology it is a qualitative study . Objectives 1 , 2 and 3 will require qualitative type data.

Data Source and Gathering Process

All three objectives will use secondary data such as journal articles to gather information. This data can be collected from journal articles such as (Faritha Banu *et al.*, 2020).

The data gathering process for all three objectives can be done through via online academic libraries such as EBSCO , Google Scholar , etc. All data gathered from these libraries should not be more than 5 years old .

Data Analysis

Thematic data analysis will be conducted to all three objectives. Thematic analysis involves identifying key themes and patterns within a large body of text that link with the objectives .

ETHICAL CONISDERATIONS

- Plagiarism : You should acknowledge the authors when utilising their sources when doing a research . Therefore , careful citation should be done when executing a research to avoid plagiarism .

- Non-biased stance : While doing is research , it is important to gather data that is non-bias . As biased data can impact the conclusions drawn from the data and will not give both sides of the story about a certain topic .

CONCLUSIONS

IoT smart education can have its problems being implemented in education institutions . As mentioned above with the drawbacks such as connectivity issues , security problems and lack of affordability for IoT devices . However, those problems do have solutions , as for connectivity issues is concerned it can be solved with various types of connectivity options such as WIFI , 5G , Zigbee, LPWAN . Security problems can be dealt with by strong authentication passwords of IoT devices , additional layer of security besides the passwords , regular software security updates to further strengthen the safety of the devices . Affordability issues can be solved by institutions , by internally improving their maintenance and decision-making process . Therefore, when implementing IoT smart education , institutes should also consider the skills and attributes of the teachers . If lecturers do not know how to utilize the IoT devices , then they wont able to teach students through IoT smart education . Hence , it then cannot be implemented in some institutes .

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