

A Short Review on Effects of the Internet of Things on Academics

D. Wasih Tasneem¹, C. Ishaq Shareef², Md. Asim

^{1,2,3}Asst. Professor, Ashoka Women's Engineering College, Kurnool

Article Info

Page Number: 149 - 154

Publication Issue:

Vol 71 No. 1 (2022)

Article History

Article Received: 02 February 2022

Revised: 10 March 2022

Accepted: 25 March 2022

Publication: 15 April 2022

Abstract

The internet of things is a system in which gadgets, mechanical and automated machinery, items, and people may exchange data with one another and with other systems without the need for human interaction. The Internet of Things (IoT) provides benefits beyond the transfer of physical goods, including in commercial settings and the delivery of social services. It permits the improvement of all kinds of material and modalities of delivery, which in turn permits the customization and development of the educational process. Instructors can now pay close attention to each student's form while they instruct. Also, it cuts down on the work and costs of training by automating key tasks that are done outside of the actual education process.

Index Terms: Internet of Things(IoT), Academics.

1. Introduction

In 1999, Kevin Ashton introduced the concept of the "Internet of Things" for the firm Procter & Gamble. Almost everything is linked to everything else: every area, gadget, sensor, and piece of software. Connecting these gadgets to a computer or a mobile phone is what's known as the "Internet of Things" (IoT). It is possible to control these gadgets from a distance. As was predicted, the IoT has been useful in classrooms. IoT-enabled networks are replacing more traditional classroom resources like chalkboards and chalk as pedagogical approaches and learning opportunities evolve. The rise of online education and the popularity of "flipped classrooms" are two instances of this movement. Other instances include the development of portable technologies that work together and the use of more efficient teaching methods. "It is not about the technology; rather, it is about exchanging knowledge and data, communicating efficiently, forming learning networks, and fostering a culture of professionalism in [1] schools," said one experienced training expert on the IoT. These are the fundamental roles of any innovative educator [1]. The Internet of Things (IoT) aims to further this accessibility by gradually connecting more and more devices to the web, fostering both human-machine and machine-machine interactions. Through its ability to link people all over the world, the World Wide Web has revolutionized the ways in which we conduct business and interact with one another (via the internet). By connecting devices to the web in a sequential fashion, the Internet of Things can also increase the convenience of this accessibility to a whole new level.

2. Key Elements of IoT

The Internet of Things (IoT) truly makes things smarter, which means that it improves many facets of daily life by making appropriate use of the data, systems, and calculations that are available.

- i. **Connectivity:** The concept of system administration does not necessarily need to be limited to massive computer networks; rather, it can also exist at a size that is both more manageable and less expensive without sacrificing any of its usefulness. The Internet of Things comes into play and makes these tiny networks between the many devices in the framework.
- ii. **Sensors:** Without sensors, the Internet of Things (IoT) as a concept would not be able to stand on its own as an argument. They are, in essence, the reason for and the driving force behind the distinguishing characteristics of this breakthrough. They play a crucial role in determining the boundaries of the IoT by transforming it from a potential into an operational system.
- iii. **Active Engagement:** Uninvolved dedication is what allows today's collaboration amongst the many connected technological advances to take place. The acquisition of dynamic content, products, or administration commitments has made the IoT a model in this regard.
- iv. **Devices:** After some time, devices have become more prevalent, less expensive, and smaller. The Internet of Things purposefully utilizes small gadgets to convey its adaptability, flexibility, and precision.

3. IoT's Importance In Education

Training organizations regularly suffer the negative impacts of constrained funding, employment worries, and a general lack of care for actual learning. Because of the assumption that examination does not make a difference to their industry and the financial difficulties they are experiencing, they are more likely than other associations to require or avoid inspection. The Internet of Things not only improves access to crucial data by making it feasible to collect it with inexpensive, low-power devices that are also superior, but it also supplies that data itself. This innovation aids in cost management, improving training quality, advancing professional careers, and [3] improving office executive performance through rich assessments of key areas such as facility observing and support, data from various offices, and student and instructor reactions, executions, and conducts.

Thanks to information, they are aware of ineffective strategies and behaviors, whether they relate to academic pursuits or professional abilities. The successful conclusion of these other routes is dependent on their evacuation. IoT devices give valuable data that helps teachers improve their lessons. They examine the results of their methods, their students' points of view, and different aspects of their presentation. The Internet of Things helps them to focus on their core mission without being distracted by management and board responsibilities. It streamlines routine administrative work and encourages close monitoring of pupils with tools like system banners and controls. The IoT facilitates the speedy and simple implementation of state-of-the-art pedagogical resources. Internet of Things tools allow teachers to maintain their one-on-one relationships with students and tailor lessons to their individual needs. As an example, teachers can use IoT to continue working with students individually by, for instance, analyzing data to determine which improvements will have the greatest impact on each individual student or by automatically creating content from exercise materials that will pique the interest of any given student.

Tech-savvy educators have an advantage in the job market because they can more effectively track what works and [3] learn how to design new practices. In contrast, some educators continue to use strategies that have proven unproductive over time. The Internet of Things enriches the data pool used to create instructional policies and methods (IoT). Studies used for training purposes have had issues with precision, and there is a general dearth of data. Massive, high-quality datasets from the actual world are now the bedrock of instructional design thanks to the Internet of Things. This is

because the Internet of Things is the only way to collect huge amounts of newly made data from anywhere in the world.

4. Challenges in Implementing the Internet of Things

The Internet of Things will cause hitherto unseen data flows, putting strain on the network's capacity, efficiency, and manageability while also increasing the risk of security breaches across the board. Educational institution network administrators must adapt existing network designs to meet the demand for more network intelligence, automation, and security. They can then deal with the issues mentioned earlier. Higher education facilities need a network that is not only easy to manage and administer but also cheap, secure, and able to handle enormous amounts of data traffic. It is crucial for the underlying infrastructure to:

- i. **Automate IoT device onboarding:** The manual provisioning and management of hundreds of devices or sensors in a large Internet of Things system is laborious and prone to human error. Using automated onboarding, the network infrastructure can automatically find the right encrypted network for each device.
- ii. **Supply the right network resources for the IoT to perform smoothly:** Many of the devices that make up the IoT system supply information that is crucial to the operation of the system and necessitate a certain level of quality of service. Some educational use cases, for instance, call for appropriate bandwidth reservations to be made on a high-performance network infrastructure in order to guarantee both the delivery and stability of services.
- iii. **Secure cyberattacks and data loss:** Security is absolutely necessary in order to reduce the likelihood of becoming a victim of cybercrime. This is due to the fact that the Internet of Things contains a large number of networked devices and sensors, which results in an excess of potential attack vectors. There is a need for security on numerous levels, one of which is the containment of the Internet of Things networks themselves.

5. Educational Applications of IoT

Let's dive into the uses of the Internet of Things in the education right now.

- i. **Interactive Learning:** Learning in today's world is not confined to the simple pairing of visuals and words, but rather encompasses a far wider range of activities. The process of learning is made easier by the fact that many textbooks come with websites that have extra learning resources like films, materials, animations, tests, and other types of content. The children benefit from this in a number of ways, including having more opportunities to learn about new topics, improving their ability to communicate with their peers and teachers, and broadening their worldview. The challenges that are encountered in the actual world are brought up in the classroom by educational professionals, and the students are challenged to develop solutions to these problems.
- ii. **Close Monitoring:** Whether a student is using the portal from inside the school's walls or from outside the institution, they will always have the option of monitoring the time and effort they are putting into their coursework. Through the use of IoT-connected sensors, educators can gather information about their students' interests and tailor their lessons accordingly. It's easy to see who participated in which assessment, and you can easily track their scores and development as a whole. By limiting students' access to the internet on school-issued mobile devices to a single, narrowly-focused app, schools can cut down on students' time spent on non-essential web surfing and encourage them to focus on their

studies. When coupled with parental restrictions and teacher monitoring tools, devices can be tailored to restrict access to specific software and operating systems.

- iii. **Security:** It is not an easy chore to monitor the whereabouts and activities of each and every student in a classroom setting at any educational institution because there will be a large number of pupils present in the class. When compared to the general population at other types of workplaces, the student body of an educational institution is significantly more vulnerable to dangers and calls for a higher level of vigilant protection. The Internet of Things has the potential to significantly improve the safety of educational institutions such as schools, colleges, and other similar establishments. Students can be observed at all times of the day and night with the use of technologies such as 3D location, and their presence can be reported at any given moment in time. These technologies can also give users the choice of panic buttons, which allow them to trigger an alarm in the event that it becomes necessary to do so. The use of intelligent camera vision can be implemented across the campus in order to keep an eye on how students are behaving. The technologies that are used for computer vision have recently undergone significant advancements and are now able to track any distinctive motions. This undertaking has the potential to automatically prevent any unanticipated occurrences from taking place.
- iv. **AR Equipped Systems:** In this sense, augmented reality can be thought of as a simplified representation of the real world that is shown with the help of various computer-based tools. Augmented reality (AR) has the potential to increase the efficiency of IoT-based devices and systems. It is possible to provide students with detailed feedback on their research by simply scanning a barcode over the material. With AR, instructors may show students more nuanced, three-dimensional representations of the material at hand. A student is more likely to retain information about, say, the ear's structure if it is presented in an animated format rather than listening to a teacher read out a list of terms and definitions. This is possible thanks to the use of audio and visual content in augmented reality. The school's management will slowly update these kinds of curricular resources in the school's information systems and website, making it easy for students to find and look at animated versions of the topics wherever they think it's best.
- v. **Educational Apps:** The educational apps that make use of the Internet of Things can be regarded as powerful creative tools and are currently undergoing a transformative effect on the manner in which learning and instruction are carried out. They also make it possible for teachers and students to make 3D graphics textbooks with videos and space to take notes. As a result of the extensive selection of instructional video games that they offer, applications of this type can be regarded as game-changing tools. These games offer a wide variety of components, each of which enables the exploration of unique educational and pedagogical avenues. Because of this, getting an education is more enticing than it has ever been.
- vi. **Automated Attendance Recording:** Teachers are worried about student attendance, and keeping accurate attendance records is a daily chore that can't be avoided. Keeping track of attendance and computing it for different purposes is a time-consuming process that may be eased with the help of the Internet of Things. The Internet of Things has the potential to reduce workload across the board. Biometric attendance, barcode-based systems that use the student's identity card number, or both can be used to automatically record attendance when students enter the classroom. This means there is essentially no wiggle room and extremely limited storage space. The effectiveness of these systems can be improved by including a feature that notifies the parents of absent students directly of their children's absence from school. But this won't free up any additional time for instructors to focus on their main job—educating their kids. Instead, it will stop them from engaging in that behavior. A

similar mechanism may be used to keep track of the teacher's presence and the number of classes they have taught. Additionally, the school's assisting staff can record their entry and exit times by using their ID cards and biometric data, which will ensure that a complete record of everything is kept.

- vii. **Increasing Efficiency:** There is a significant amount of time wasted on activities that do not contribute in any way to the primary goal that many institutions and universities have for their very existence. For example, it is necessary to take a roll call of the pupils multiple times throughout the course of the day. In addition, the data must be transmitted to the central office in order to fulfil a variety of requirements. The Internet of Things has the potential to put a stop to this ineffective approach. This information can be gathered and automatically transmitted to the server at the central office with the assistance of IoT end-devices, which eliminates the requirement for any kind of manual intervention from a human being. The revolutionary move toward the internet of things has made it possible to simplify the laborious work that is required of both pupils and teachers. Because of this, they are able to focus more on instruction and education, which should be the primary focus of any center for learning.
- viii. **Evolving Methodologies:** The widespread usage of digital and internet-connected smart gadgets in classrooms and lecture halls is what we mean when we discuss the Internet of Things (IoT) in education. Modern education systems are changing to meet the needs of students by using tools like downloadable e-books that can be zoomed and saved and smart boards that can be used as a whiteboard with a marker and also show students images and graphics that are related to the topic. The devices are linked to a server that can manage and keep tabs on how students' assignments are organized in relation to course material and specific topics. Additionally, smart security cameras, GPS tracker equipped school buses, catastrophe alerts and tablets, and cell phones with educational applications are altering the way conventional schools and educational systems have always functioned. These features will ensure the safety of the students, faculty, and parents, and will also make the facility more accessible and easier to use. It's common knowledge that there isn't enough time to completely overhaul how classes are taught, but the technology required to make this shift is slowly but surely being developed and installed on these devices. This is being done on a gradual basis. In this case, in addition to having access to traditional textbooks, students also have access to the IoT in the form of smart boards in the classroom. The animated and 3D depictions of the concepts being taught on these boards aid pupils in their retention of the material.

6. Conclusion

Numerous initiatives have been taken in recent years to expand access to education. Increased innovation in the classroom can be attributed to both students' desire to learn and their ability to assimilate new information and perspectives. The learning process is propelled by the pursuit of novelty. The student will make heavy use of the outline, and details about the actual implementation will be the primary factor in shaping their approach. This, along with improvements made at every tier of administration and by individual educators, provides highly efficient education at a low cost. The current model of education will be phased out in favor of one based on the Internet of Things (IoT).

References:

- [1]. <https://builtin.com/internet-things/iot-education-examples>

- [2]. <https://data-flair.training/blogs/iot-devices/>
- [3]. https://www.tutorialspoint.com/internet_of_things/internet_of_things_education_applications.htm
- [4]. <https://www.biz4intellia.com/blog/iot-applications-in-education-industry/>
- [5]. <https://www.tomsonelectronics.com/blogs/news/iot-in-education>