WAVES OF INFORMATION AND COMMUNICATION TECHNOLOGY COVID -19 IN HIGHER EDUCATION

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ABSTRACT: *The environment of higher education in India is changing dramatically over the past few decades in COVID-19. Teaching, learning and evaluation process is undergoing lot of changes when viewed in the perspective of ICT (Information and communication technology). ICT was interleaved with higher education so much that if we look back into the past, we can easily identify the difference before ICT and after ICT in the evolution of higher education.*

KEY WORDS- 1-E-governance, 2 Virtual Objects, 3 Waste Management, 4Network, 5Middleware

INTRODUCTION

1. PRESENT SCENARIO OF USING ICT IN HIGHER EDUCATION

At present ICT is being used extensively in higher education. Teaching, Learning and evaluation process has changed drastically from the past few decades in COVID-19. Teaching was supplemented with power points, videos, LCD projectors, and virtual labs and so on. Similarly learning is also taking its turn towards self-pace learning and customized learning with the support from video lessons, virtual labs, online courses, discussion forums, etc. Evaluation process along with regular traditional written examination pattern is also including online exams and submission of online assignments.

Today learning became lifelong learning. Many Universities and high-end institutions are offering online courses in almost all disciplines. Along with regular subjects' online courses are also available in the areas like cooking, gardening, self-grooming, etc. Students are now fortunate to do online courses even from world's top universities. Also, some online courses are free of cost whereas few of them are charged for certification and few more with payment. Distance Education is another area where ICT is being effectively used in India and abroad. ICT today is a quality supplement to distance education. It offers students a great flexibility as to time and place as most courses are offered online. Students can take them at any time. Previously distance education students used to continue their education with some learning material posted to them. But now, excellent learning material along with videos having high multimedia and animation are available to students asynchronously. Also, at their own pace, science students can even do their experiments remotely through virtual labs. Students can even participate in discussion forums with their peers to share their thoughts and to get their doubts clarified. Even in administration of higher education, ICT is playing a major role. Websites and e-mails are being used for communication and other features of e-governance for maintenance of the institutions.

2. FUTURE TRENDS OF HIGHER EDUCATION WITH THE ADVENT OF IOT:

What is IOT? Connecting people over internet is called as Internet of people. But along with people we have many things around us both embedded with electronics and without electronics. In COVID -19 times we all are familiar with the information technology, Thus IOT could be understood as connecting physical objects to internet. The Internet of things is the networking of physical devices, vehicles, buildings and other items embedded with electronics, software, sensors and sometimes items not ordinarily considered to be computers having network connectivity that enable these objects to collect and exchange data [3]. The IOT allows objects to be sensed and/or controlled remotely across existing network infrastructure [2]. "IOT" is defined as the extension of network connectivity and computing capability to objects, devices, sensors, and items not ordinarily considered to be computers, require minimal human intervention to generate, exchange, and consume data, and are amenable to remote data collection, analysis, and management capabilities [5].

Purpose of IOT If we connect things or objects to internet, things start talking among themselves. One can access his washing machine from his office. Your refrigerator can communicate with the milk vendor by saying that its milk tray is empty. If you are at a conference in Delhi, you can remotely switch off your lights at your home in Vijayawada. Your wearables could communicate with your doctor in emergency. Cell phones are there even before IOT. But everyone used cell phone just to call their friends and family members before the cell phones are connected to internet. But now, after the advent of smart phones, where cell phones are connected to internet, many features like online banking, online shopping, viewing moving, listening to songs, learning etc are being done in cell phones. Thus, just imagine what could happen if many of the real-world objects are connected to internet. Components of IOT the following are essential components to form an IOT node [4]. In order to survive for longer periods of time on a single battery charge, an IOT node should exhibit low power consumption.

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IOT COMPONENTS	DESCIPTION
PHYSICAL OBJECTS	THINGS
SRNSORS	SENSE THE PHYSOCAL ENVIRONMENT
VIRTUAL OBJECTS	AFFECT THE PHYSICAL ENVIORNMENT
PEOPLE	ELECTRONIC TICKETS, AGENDAS, BOOKS WALLETS
SERVICES	Ex.: CLOUD SERVICES-CAN BE USED TO; 1-PROCESS BIG DATA AND TURN IT INTO VALUABL E INFORMATION 2-BUILD AND RUN INNOVATIVE APPLICATION 3-OPTIMAIZE BUISNESS PROCESSES BY INTERATING DATA.
PLATFORMS	TYPE OF MIDDLEWARE USED TO CONNECT IOT COMPONENTS (OBJECTS, PEOPLE, SERVICES, ETC.) TO IOT. PROVIDE NUMEROUS FUNCTIONS: • ACCESS TO DEVICES • ENSURING PROPER INSTALLATION/BEHAVIOR OF DEVICE • DATA ANALYTICS • INTEROPERABLE CONNECTION TO LOCAL NETWORK, CLOUD OR OTHER DEVICES.
NETWORKS	IOT COMPONENTS ARE TIED TOGETHER BY NETWORKS, USING VARIOUS WIRELESS AND WIRELINE TECHNOLOGIES, STANDARDS AND PROTOCOLS TO PROVIDE PERVASIVE CONNECTIVITY.

3. Applications of IOT

IOT finds its applications in almost all disciplines. To list few of them.

1. Human Safety, Security& Health.
2. Smart homes.
3. Energy management
4. Transportation.
5. Environmental monitoring.
6. Irrigation, Livestock farming.
7. Agriculture, Medical and health care systems
8. Building and home automation
9. Ground Water management.
10. Waste Management, Infrastructure management
11. Manufacturing
12. Everywhere in future

4. IOT in higher education

IOT has the potential to bring significant value to higher education institutions. Colleges and universities can benefit from IOT systems in several ways. To predict, few of them could be as follows

1. Smart cards with IOT could be issued to students. Using these smart cards students can gain the access into the college premises, labs, class rooms, libraries, etc.
2. As soon as a student enters the campus, he may get notifications regarding the availability of the library books he need his day wise schedules, etc.
3. In CBCS system, student can get customized schedule and venue of his class room as soon as he entered the campus. In future, option could be given to student to select his majors. For eg: student can select Maths, Economics, Computer science as majors for his graduation.
4. A student can have great freedom in picking up his subjects or papers if IOT systems are available.

5. IOT systems could be used to monitor student attendance. We can say that this has already started with biometric attendance system. Later this could be connected to scholarships, parent's cell phones, etc.
6. Health of hostel students could be monitored by adopting fitness devices.
7. Automatic control of temperatures in labs and lab equipment could be achieved through IOT systems.
8. Interactive projectors, Touch boards, automatic lecture capturing could be done. Touch boards could be connected to internet, where you can download the required things directly on to the board. Connecting worldwide educational resources for staff and students.
9. Database of student's submitted work could be maintained and could be analyzed to give customized advice for students.
10. When students' behaviour after analysis indicates that they are struggling academically or personally, customized alerts can be sent so that administrators can reach out and act more quickly to resolve issues.
11. Students' profiles can be built over the length of their engagement with a campus to assist them with employment activities.
12. Smart devices can alert staff and providers about when to service equipment before a problem even presents itself.
13. Smart doors, locks, cameras can be used to monitor and control movement in different facilities.
14. Customized learning at own pace and intellectual ability could be achieved easily.
15. Canteen prepaid facility could be given with the help of smart cards.

5. Challenges in using IOT in Higher Education:

1. As many devices, vehicles, buildings and other objects will be connected to internet in future, big data explosion could be a greater challenge.
2. Many connectivity standards for wired as well as wireless devices are yet to be established to allow various devices to get connected.
3. Security and privacy of data could be a greater threat because all data will be stored in clouds and one can easily gain access to confidential and important data.
4. High speed broad band is to be made available at any place.
Power is also critical as many IOT devices need to run for years.

6. CONCLUSION:

If misunderstood and misconfigured, IOT poses risk to our data, privacy and safety. But in COVID- 19 we understood its safe and secured, IOT will enhance the quality of life, communications, and delivery of services. Thus, all the public of the country must be aware of the new technology along with security threats and the precautions to be taken to make their transactions secure. In the era of developing smart cities, smart campuses are going to crop up. Andhra Pradesh state government is a bit ahead in taking the digital initiatives, as it is saying that fibre grid is about to be completed and within few months the whole state can utilize high speed internet. With this initiative, we can say that within no time Andhra Pradesh state would be ready with its infrastructure for the coming IOT era and will definitely bags up the major share of business of IOT and thus in the aspects of higher education.

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