Information and Communication Technology in Education

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Abstract **- The role of technology in education is a worldwide reality; it is not limited to one country. A new technology is making the change in the requirements of skills for the next generation of occupations drastically from those required in the past generation of jobs. When it comes to education and industry, it's important to focus on the current state of affairs. Thanks to information and communication technology, students can learn from any location and at any time. Implementing "new change" and engaging pupils in constructive learning is made easier with the help of this method of learning. The educational sector must take on the responsibility of gradually implementing all of the technologies that may be beneficial to student learning in some way and ensure that students learn to use these technologies in a world where they are already a part of professional life and their social environment, among other things. Digital education abilities have evolved into a critical component of any job market's core competencies. Three of the sixteen abilities recommended for supporting innovation and creativity are ICT literacy, communication, and teamwork (World Economic Forum, 2015). The paper discusses the advantages and skills acquired with the use of ICT in education.**

Index Terms **- Competencies, Education, ICT (Information Communication and Technology), Skills, Principles.**

I.INTRODUCTION

Prior to the covid-19 epidemic, education was delivered face to face in class, unplugged and with the use of technology not to a great extent; but, following the pandemic; education was delivered virtually, using videoconferencing, which is a main driver of the personalization of online courses. The field of education is undergoing revolutionary changes; Students' abilities must be improved in order to meet the challenges of the Fourth Industrial Revolution., for the same educators must adopt a hybrid paradigm for education. The integration of developing technology into our daily lives has enabled a substantial amplify the use of ICT in education in recent years. Increasingly significant in modern culture, ICTs have a varied variety of applications in industries ranging from cinema to management to robotics to education to all types of enterprises.

II. OBJECTIVES

a. To study about what is ICT and its related skills.
b. To study about principles governing ICT in Education.
c. To study effectiveness of ICT integration for student's learning.
d. To study advantages and drawbacks of ICT in education.

III.WHAT IS INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT)

ICT is an abbreviation for Information and Communication Technology, and it refers to everyday usage of digital technology such as computers, cell phones, and other similar devices. The considerable increase in the societal usage of ICTs, in an area of education that cannot be ignored. ICT is rapidly becoming a required technique of instruction for both new teachers and pupils in the classroom. The problem can be solved by integrating ICT into schooling, "How do we broaden the scope of our school to include a larger number of students?" Mobile learning, which is type of e-learning, is a developing phenomenon in which schooling has transcended the physical confines of classrooms and has gained the ability to move around. Students now have access to knowledge at any point and from any place, and the numbers of organisations that have such complex technical

terrains are increasing by the day, as is the number of organizations that have such sophisticated technical terrains.

IV.ICT SKILLS

The following are the skills discussed, which are inculcated through ICT and skills required for employment.

a. The first step in selecting what to study in ICT skills is to define them. ICT skills are a vital component of an organization's information technology capability. To overcome this constraint, it is preferable to develop ICT competence rather than acquire ICT skills.
b. Technical Skills: Professionals must be fluent in rapidly evolving technologies. As a result, technology is gradually displacing physical labor and integrating itself into the majority of occupations. Workforces must be flexible in order to adapt to changing job requirements as a result of new skill-intensive technologies.
c. Communication skills: It is critical in the growing service sector because they enable information to be communicated effectively while taking into account the audience and medium. Employers require communication skills due to the interconnection of our global economy. ICT has made it possible to communicate with a broad audience and swiftly and extensively.
d. Collaboration skill: Work is becoming more specialised and interdisciplinary in nature, employees must collaborate. As a result, more work is accomplished through the collaboration of individuals with complementary skills. ICT is progressively facilitating techniques for managing interdependencies throughout time. Workers must be able to communicate and collaborate with others who are not physically located in their immediate vicinity. With the proliferation of online collaborative platforms, it is more critical than ever to value and control information sharing.
e. Critical thinking is the process of forming sound judgments based on careful consideration and reasoning. It is the capacity to reflect on and assess the relevance of knowledge or communication in a specific situation. Filtering incoming facts to create one's own perspective is a necessary talent in the twenty-first century. Employees require domain-specific knowledge in order to develop a self-contained, well-founded perspective or opinion.
f. Knowledge can only be created via the use of creativity. It helps develop and realize ideas. Web 2.0 also enables students to create and allocate material in new ways.
g. Individuals require domain-specific problem-solving skills when they face more difficult and nonrecurring situations. To deal with challenging, non-routine circumstances effectively, problem-solving knowledge and abilities are often required. While domain-specific knowledge is vital, it does not constitute pre-knowledge. ICT helps to build the same.
h. Digital Skills for Twenty-First Century: Technical abilities are analogous to twenty-first-century abilities. These are the abilities necessary to use software or digital gadgets. Thus, digital literacy is critical in today's rapidly changing world. Budding digital information requires growing skills for searching, analyzing, and organizing it. Management of information includes the skill to identify need of information, locate information digitally, and select digital information. Once the data is found, workers must grasp how to value the source.

ICT has developed into a critical instrument for exchanging information and resolving issues. Hence ICT skills are valued.

V.EFFECTIVE METHOD OF LEARNING ICT SKILLS

Unless you are specifically interested in learning how to master ICT skills/techniques, it is recommended that you do not study them in a single context because doing so will make it harder for you and your pupils to generalize. Incorporating ICT approaches into a variety of contexts and scenarios will provide the opportunity for in-depth thinking and conceptual development. Students must be able to connect the actions taken in conjunction with an ICT technology to the outcome it produces. It is beneficial to have a name for the ICT skill or method. The name should not be regarded as an additional skill to be learned, but rather as a tool of conveying and thinking about the action and its consequences. The concept underpinning ICT skills and procedures should be

stressed in order to aid in the development of conceptual knowledge and to foster the ability to 'know that you know'. This is referred to as Meta cognitive reasoning, and it is what allows you to recognize situations in which the ICT techniques that you are familiar with are the most effective in achieving the intended result.

VI.THE PRINCIPLES GOVERNING ICT

a. Behaviorism: It says that when students are given a highly structured piece of work to complete using the computers or technology, it is teacher's responsibility to become more constrained, as the pattern are repetitive, students learn exclusive of having to think about it. Computer-assisted learning first began to have an impact on student learning. Drill and practice programmes continue to be popular in elementary schools, particularly where kids are acquiring reading and numeracy skills or are using integrated learning systems.
b. Constructivism: Reflecting on students' ICT learning is critical for students to develop their ICT abilities. Reflection is a beneficial process that aids in the formation of mental structures. Students must develop the ability to reflect on their ICT use, capabilities, concepts, and procedures. Additionally, it facilitates the resolution of cognitive disputes via conceptual shift. Subjects in which it is requested to provide simulations of circumstances that are difficult to recreate in the real world but are possible via the use of ICT. When ICT devices do not function or behave as expected, children frequently assist one another in resolving issues. Students "learn how to learn" by analyzing the restrictions of their work and collaboratively developing solutions with their peers and teacher.
c. Situativity: It is vital for a secondary school student to gain real-world experience in the modern era. This appears to be what is referred to as "situativity" hypothesis. Thus, it refers to taking students beyond the traditional educational setting and demonstrating how the various applications learned in class may be applied outside of school. By providing students with real-world experience in this field, they might be inspired, engaged, and encouraged to learn. In addition, having ICT experiences might help students feel more real in their classroom activities.
d. Metacognitive: Students need higher order thinking skills that focus on "metacognitive" information. A student who is capable of ICT is not only aware of various gadgets and approaches available. A capable student is aware of their knowledge and can decide appropriate skill or technique. With the multitude of ICT devices and applications kids are exposed to, this is crucial to how pupils approach tasks and their success. Success gives them a sense of self-efficacy, allowing them to choose a task and take risks. Also, students must believe that their success comes from their own hard work, not from outside factors.

All of the above approaches show how students can learn via ICT. Consider the pupils' prior experiences and talents when enhancing ICT capacity in the classroom. Recognize that children, especially those in primary school, learn differently than adults. The number of times a youngster must see and practise an ICT technique to comprehend it varies depending on their age and experience (Gebremeskel et al., 2016).

EFFECTIVENESS OF ICT INTEGRATION FOR STUDENT'S LEARNING METHOD RESEARCH DESIGN

The data collected and analyzed in this study is quantitatively.

VII.POPULATION AND SAMPLING

Thirty teachers from a public school participated in this research as a whole. The Instrument is used to study and analyze "The effectiveness of ICT integration for students' learning." Participants responded using a 4-Likert scale ranging from 4=Strongly Disagree, 3=Disagree, 2=Agree, and 1=Strongly Agree. "Ghavifekr, S., and Rosdy, W.A.W. (2015)" adapted the questionnaire from the original questionnaire produced by Gulbahar and Guven (2008). The alpha score exceeds 0.7, indicating that the items are dependable and can be used as study instruments by the researcher.

No	Item	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean

1.	"ICT allows students' to be more creative and imaginative."	1	1	15	13	1.66
2.	"The use of ICT helps students to find related knowledge and information for learning."	0	2	14	14	1.63
3.	"The use of ICT encourages students to communicate more with their classmates."	2	0	19	9	1.83
4.	"The use of ICT increases students' confidence to participate actively in the class."	2	1	14	13	1.73
5.	"I think students learn more effectively with the use of ICT."	2	1	15	12	1.76
6.	"I think the use of ICT helps to broaden students' knowledge paradigm."	1	3	14	12	1.76
7.	"I think the use of ICT helps to improve students' ability in reading, writing and speaking English."	1	1	19	9	1.8
8.	"The students' are more behaved and under control with the use of ICT."	1	5	15	9	1.93
9.	"The use of ICT enables students' to express their ideas and thoughts better."	1	2	15	12	1.73
10.	"The use of ICT promotes active and engaging lesson for students' best learning experience."	0	1	14	15	1.53

Findings:

The result demonstrates that ICT is effective for students' learning because it encourages students to communicate more with their classmates and builds students' confidence to participate actively in class, as evidenced by a mean of 1.83 and 1.73 respectively. It is effective in that it keeps students occupied with necessary knowledge which instils greater confidence in them when it comes to sharing and exchanging ideas with their classmates. Finally, it seen that fewer teacher accept that students are more behaved and under the control with the use of ICT as the mean score is the highest of all at 1.93. This may provide insight for Teachers believe that students are somewhat out of control when ICT is used in the classroom because teachers are not the main focus. The ICT has many benefits in teaching learning and builds skills.

What is it about ICT that makes it the most powerful tool in the modern classroom?

ICT in education facilitate pupils thrive in a competitive world by fostering professional development. Additionally, it can facilitate social mobility by increasing educational options and skills. Massive Open Online Courses (MOOCs) are an excellent strategy to increase student enrolment. Additionally, it assists with faculty development, decreases the cost and time associated with information transfer, and automates day-to-day operations. Additionally, it broadens the scope of organisational governance in order to increase the consistency and efficacy of service delivery. Additionally, it teaches students digital skills.

They are inexpensive and already in use in the classroom or school. They are widely available to students and teachers despite their simplicity. It is devoid of stuff. It is a versatile educational tool that may be used for a variety of reasons.

ICT tools aid in the development of literacy. To enable the "new literacy" in the digital age, new ICT skills are required. Students must be comfortable with contemporary technologies in order to be successful in the twenty-first century. Using new technologies, traditional chores can be accomplished in a more innovative and motivating manner. Word processing, blogging, emailing, website development, web searching, drawing and graphics tools, spreadsheets, and databases are all included in the programmes.

Computers facilitate interaction. Additionally, programming and application development are extremely beneficial. Children can write without having to learn to write by hand by using the Internet and word processors. Other tools such as audio recording programmes, walkie-talkies, and phones can be used to teach individuals how to communicate and listen. Improve writing abilities on a large scale with interactive whiteboards and smart boards. However, these technologies are frequently combined with others.

VIII. THERE ARE A VARIETY OF TECHNOLOGIES UTILIZED IN EDUCATIONAL SETTING

a. The use of blogs and social media sites to talk about a wide range of topics, post material that is relevant to the topics, and so on.

b. Using different tools, like calendars and task managers, to plan exams, deliveries, and other tasks, as well as to set up workflows, etc.
c. Cloud computing for data storage.
d. As a means of making the teaching and learning process more interactive, digital whiteboards and interactive table tops are used.
e. Access to course materials through distant devices. Lectures, course texts, and a reference archive can all be available in digital libraries that are accessible online. The flipped classroom method, online academic administration systems (also called cloud-based academic management systems), cloud-based academic management systems, and other examples are just a few.
f. Blogging, Web 2.0 publishing, and creating a video are all possibilities.
g. Using a word processor Spreadsheets Competencies in information literacy: presentation software that includes animation (clay or drawing).
h. Simulations are used for real time experience. Virtual Reality in education makes difficult concepts easy to understand explain. Existing equipment for both capturing and generating virtual images, such as pictures, 3D sound, olfaction, and haplics, allow a student to experience new sensory impacts, turning learning into an interesting experience (Kovács et al., 2015).
i. Gamification will continue to provide more efficient and effective accelerating alternatives than traditional sage on stage instruction (Arnold, 2014)

IX.ADVANTAGES OF INCORPORATING ICT INTO EDUCATION

It has been demonstrated that incorporating information and communication technology (ICT) into the classroom increases student motivation, allowing students to become more engaged in and involved in the things they are studying. ICT encourages the use of new teaching tools and the rethinking of how students learn. This allows students to work together more actively while learning technical skills at the same time.

a. The enthusiasm for learning has risen as a result of the employment of a number of technologies to make traditional topics more engaging. These resources include movies, websites, animations, and games. Multimedia materials are a great way to teach students about a lot of different things in a complete and interesting way.
b. Student participation and critical criticism are encouraged through interactivity, which puts them in the driver's seat of their own learning.
c. Student collaboration on digital venues, such as blogs and social media. Working in groups on assignments, collaborating, and learning from one another is far more convenient.
d. Encourage creativity and support the development of imagination, as well as the initiative of students in the class.
e. Increased engagement between student and teacher through a variety of channels, in a more spontaneous and less formal manner than previously.
f. Personalization and up-to-date content are also important.
g. Cheap apps or software can be downloaded, making it a resourceful tool for learning and enhancing memory retention. The most effective applications help students build higher-order thinking skills while also providing them with a variety of innovative and individualized ways to convey their understandings.
h. Student-centered activities which incorporate interactive smart boards are used for whole-class education and small-group instruction. ICT can be used in all the steps of teaching learning in the classroom, this makes student engagement often higher, the flipped classroom paradigm can allow for a more comprehensive course of study.
i. Incorporating teaching learning at home through computer-guided instruction, as well as interactive learning activities in class.
j. When teachers integrate ICT into the curriculum, this has an impact on student learning.
k. Schools communicate, generate, disseminate, save, and manage information using a varied collection of ICT tools. People in some places use ICT to help them teach and learn, like when chalkboards are replaced with interactive digital whiteboards, students use their own smartphones or other devices to learn in class, and the "flipped classroom" model, where students watch lectures online and use class time for more hands-on work.

l. If teachers are tech savvy and trained to effectively use ICT, these initiatives can assist students in developing higher-order thinking skills, offer additional students with creative and unique ways to express their understandings, and prepare students to deal with ongoing technological change in society and the workplace. Planners must consider a variety of ICT issues, including the complete cost-benefit analysis, the installation and maintenance of necessary infrastructure, and ensuring that investments are linked to teacher help and other policies that promote successful ICT use.

m. Additionally, the growing popularity of Massive Open Online Courses (MOOCs) such as Coursera, Khan Academy, and edX demonstrates a significant demand for non-traditional learning possibilities. Our organizations' futures will be determined by their ability to meet those demands.

n. Differentiated modes of learning: ICT can assist learners in absorbing and processing information, comprehending concepts, and communicating their learning. Children learn visually and tactilely, and ICT can assist them in 'experiencing' knowledge rather than simply reading it. As well as easy-to-use interfaces and instructions and consistent menu and control placement, visuals with text, aural feedback, and the ability to change pace and complexity are just some of the ways that mobile devices can help students with disabilities.

All the above are the few advantages of ICT in education(Fu, 2013).

X.DRAWBACKS

Along with the advantages, there are a few disadvantages, which include the following:

a. The digital divide is a disparity in technology between those who possess digital literacy or the ability to use digital media and the internet and against those who don't. The digital gap contributes to both the creation and exacerbation of poverty. Not just the most disadvantaged students, but all students must have access to the media, the internet, and digital literacy.

b. Students, whose native language is not English, in comparison to the majority of children, and have no access to computers and internet at home would face problem in understanding it and using it. Additionally, they have less access to internet resources in their native language than their classmates, who rely on ICT to gather knowledge, prepare lectures and papers, and communicate more effectively. These tools can also help minority language students improve their skills, especially when it comes to learning the official language of school.

c. Connectivity, technical assistance, and software all represent substantial expenditures associated with ICT ownership. Policies should gradually integrate ICT into classrooms, establishing infrastructure and introducing technology. Schools in some nations have begun to allow pupils to bring their own gadgets to class rather than providing them for everyone. Some families are still unable to purchase or subscribe to children's devices or services. Schools must ensure that all pupils have equal access to ICT equipment.

d. The use of ICT for formative assessment, personalized teaching, online resources, and student engagement and cooperation demands specific professional development for teachers. It will not only help teachers develop positive attitudes toward ICT in the classroom, but also provide direction for ICT teaching and learning within each discipline. Without this help, it is difficult to teach pupils to think academically. To help teachers change how they teach, education managers, supervisors, teacher educators, and other people who make decisions need to learn how to use ICT. This makes difficult to learn and upkeep with new upcoming technologies.

e. Assuring students' benefit from ICT investments requires the completion of additional prerequisites. School laws should demand reliable internet connectivity and security measures such as filters and site blockers. Basic ICT literacy, educational ICT exercise, and discipline-specific ICT usage should be emphasized in teacher policy. Amalgamation of the curriculum is necessary for booming ICT execution. Indigenous languages and cultures must be used to develop content. To keep ICT access and efficiency high, all of these issues need to be addressed on a

regular basis with technical, human, and organizational help.

XI.CONCLUSION

According to UNESCO, "Measuring ICT in education is important for policymakers to know when to set national priorities and implement ICT in education policies." Utilizing resourceful technology in the classroom is one method to raise the educational bar. Without minimum time limits, online interactions would boost learning, and evaluations and report generation would be far easier, as relevant data would not have to be manually entered. This results in a more open and interactive learning environment, which promotes higher grades. Enabling ICT in schools and utilizing technology in education creates a controllable learning environment in which knowledge is processed much more quickly and learning is made much easier. Additionally, ICT is clearly the way to go for institutions, particularly in developing nations like ours, because our progress is intimately related to technology, which includes education.

In education, the use of ICT assists, improves, and optimizes the transfer of information. ICT has been shown to improve student learning and teaching techniques in numerous research conducted worldwide. Student achievement is a significant and beneficial effect of increased practice of ICT in education and amalgamation of technology into the curriculum. In comparison to their counterparts, pupils who are regularly exposed to technology through schooling have enhanced their "knowledge," "presentation skills," and creative abilities, and are more eager to put in extra effort when learning. Acquired skills through ICT in education involve youngsters in collaborative problem-solving activities, which should eventually result in their development as active members of a twenty-first-century learning and working environment. The use of eLearning, particularly in face-to-face, adds flexibility to the setting and enables flipped classes, which results in increased engagement and learning. The evidence indicates that integrating technology into teaching and learning environments increases motivation to study, fosters cooperation, boosts student accomplishment, makes administration more transparent, and enhances both the efficiency and quality of education.

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