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Transforming Education Through Technology: Empowering Students in The Digital Age, A Mini Review

Sharma Arvind[1], Sharma R.K.*[2]

1. Department of Zoology, B.K.S.N. Govt. College Shajapur (M.P.), India.
2. Department of Botany, B.K.S.N. Govt. College Shajapur (M.P.), India.

arvindsankhyan@gmail.com*[1]

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ABSTRACT

In the actively growing educational platform, the implementation of information and communication technology (ICT) has become pivotal for educators to facilitate students with the skills required to flourish in a dynamic learning environment. This review paper explores the diverse range of hardware and software technologies employed in education, highlighting their potential to enhance teaching and learning processes. By utilizing video-based communication platforms, educators can facilitate secure and efficient digital conferencing, while platforms like GitHub, Blackboard, and Courser a offer opportunities for online lectures. Additionally, digital content resources and audio-visual design tools contribute to engaging students and achieving learning goals. The use of ICTs also addresses the challenge of reaching marginalized populations, such as those in backward areas, women still struggling social conflicts, and pupils with disabilities. However, the successful integration of technology in education is not without its challenges, including limited connectivity, inadequate resources, and the need for teacher proficiency. Despite these obstacles, the advantages of incorporating ICT in education are observable, as it expands access to high-quality educational materials, fosters inclusivity, and improves administrative efficiency. This review paper concludes that embracing technology in education is essential for preparing students for the knowledge-driven economy of the 21st century.

Introduction

In the modern educational scenario, educators are inspired to utilize inventive methods that will assist students in acquiring the skills necessary to adapt in a dynamically evolving educational environment. One such cutting-edge approach employed by several countries worldwide is the implementation of information and communication technology (ICT) in teaching learning methods. It has been observed that incorporating ICT in the process of knowledge dissemination contributes to the creation of an engaging learning environment where students actively and effectively participate [1]. Consequently, it fosters the development of students' interaction abilities, problem-solving skills, collaboration, and lifelong retention of knowledge [2]. The creative utilization of ICT in education strengthens the learner-centered approach, a vital strategy for an effective teaching and learning process [3]. Therefore, the implementation of this technology is crucial for enhancing the overall educational experience of students [4]. The latest educational paradigm is student oriented, with the learning environment serving as a versatile resource that accommodates different learning styles, locations, and timeframes. It encompasses all learning resources, including teachers, knowledge, technologies, media, and organizational aspects, with a primary focus on the student [5].

It is argued that various ICTs have the capabilities to grow the educational standard by transforming tutoring into a dynamic process rooted in real-life contexts. When utilized effectively, these ICTs are believed to increase academic accessibility, make education more relevant to the technologically-driven workplace, and expand access to education. However, the previous observations of blending various ICTs into classrooms and tutoring systems worldwide over the past few decade's reveals that the full educational benefits of ICT are not always realized. Acquiring the technology itself is the easiest part of effectively integrating ICTs into the educational system, but there are numerous other factors to consider, including curriculum design, pedagogical approaches, institutional preparedness, teacher capabilities, and prolonged funding, among others. ICT is a rapidly evolving field, and technologies quickly become outdated, necessitating a continuous acquisition of new skills and knowledge. Reshaping can only occur when built upon a firm comprehension of the fundamental principles and

ideas that form the basis of information and communication technology (ICT)[6].

Education worldwide is undergoing significant shifts in teaching and learning techniques within an ICT-enabled learning environment. In the modern era, learning methods rely more on the latest findings in cognitive science, employing strategies such as adaptivity, gamification, and intermittent rewards to enhance learning and improve retention of key concepts, as opposed to rote memorization and routine-based learning that were more prevalent in the past. The shift from a mentor-centered to a mentee-centered approach is a clear indication of this transformation in education. By shifting the focus from teaching to learning, an extra participating and stimulating learning environment can be created for both mentor and mentee. The roles of teachers and students must adapt in this new context. Teachers' roles will evolve from being mere transmitters of knowledge to becoming facilitators, guides, and occasional co-learners. Instructors need to adopt a new mindset and acquire knowledge about the new learning process to effectively fulfill their new responsibilities. As learners actively seek, discover, synthesize, and share knowledge with others, they will assume greater responsibility for their own learning. ICT provides effective tools to support this prototype shift from a mentor-centered to a mentee-centered approach, as well as new roles for teachers, students, curriculum, and new media [7]. It is essential to maintain the necessary competencies for both students and teachers as their roles evolve due to technological advancements.

Table1-List of Tool/Tools used in teaching

S.No.	Tool/Tools used in teaching	Percentage
1	Google Classroom only	6%
2	Google Classroom and Whatsapp	37.5%
3	Google Classroom, Whatsapp and Youtube	1%
4	Whatsapp only	85.7%
5	Whatsapp and other tools	6%
6	Whatsapp and Youtube	18.75%
7	Zoom only	12%
8	Zoom and other tools	6%
9	Zoom, Google Classroom and Whatsapp	6%
10	Zoom, Google Classroom, Whatsapp and Youtube	2%
11	Zoom, Google Classroom, Whatsapp, Youtube and other tools	6%
12	other tools	56%

Chart1-List of Tool/Tools used in teaching. Adapted from [5]

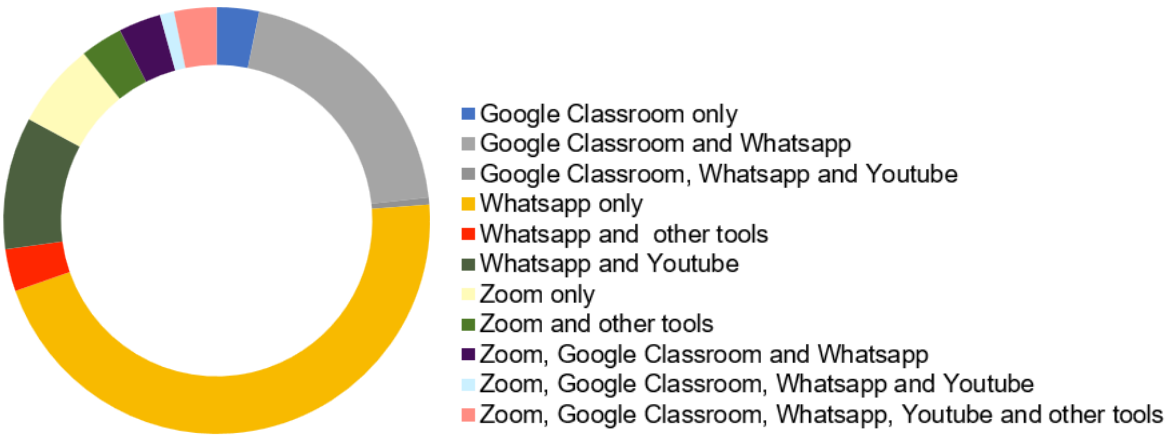

Table 2 :- List of various Tools used in teaching learning process

S.No.	Building Interactive Lessons Tools	Classroom Management Tools	Lesson Planning Tools	Tests and Exams Makers Tools	Plagiarism Checkers Tools	Content Sources for Teachers Tools	Audio-Visual Design Tools	Communication and Collaboration Tools
1	iSpring Free	Google Classroom	Plan board	Free Quiz Maker	Check Plagiarism	YouTube Edu	Pixlr	Flipgrid
2	Kahoon	Class123	Plan book Edu	Spell Quiz	Dupli Checker	YouTube Teachers	Animoto	Go board
3	Edpuzzle	Flubaroo	Evernote	Quizizz	Paper Owl	Ted-Ed	Pic Lits	Teacheroo
4	Starfall	Show my Homework	Read write Think		Plagiarism Detector	Ted Talk	Gickr	Loop
5	Common Lit	Class Dojo	Learn zillion		Que Text	Teacher Tube	Smilebox	Teach Learn Lead
6	Quill	Edmodo				School Tube	Pixton	Google Docs
7	Plickers					Google Books	Chartsbin	Bloomz
8	Powertalk					Read works	Tableau Public	
9	JeopardyLabs					Bibsonomy	Roxio Photoshow Maker	
10	Endgames					Project Gutenberg	Ezvid wikimaker	
11						Gap Minder	Free Cam	
12							Vocaroo	

Ref.- https://www.ispringsolutions.com/blog/free-teaching-tools[21]

This section categorizes gadgets into hardware and software depend on their category. The educational system extensively employs more than 12 different set of software gadgets and over 44 different kind of hardware gadgets. By utilizing video-based presenting platforms e.g. Zoom application , WebEx app, Facebook Messenger app, and Google Hangouts application, educators can serve as "teaching and working assistants" to facilitate secure and efficient digital conferencing or establish connections to maintain social interaction in daily life during this unique period. For educational purposes, platforms like GitHub, Blackboard, Courser a, and others can be utilized to conduct online lectures. An illustrative example is the use of a tool called Voice Thread to create concise videos that outline course material while delivering remote lectures. Remote work technologies leverage digital information exchange for virtual services, including email, online surveys, Google Sheets, and various other tools. Furthermore, systems and applications like Google Trends, Geographic Information Systems, and social media platforms such as Twitter, Instagram, Facebook, and YouTube contribute to the monitoring, localization, and analysis of diverse academic activities and tasks assigned to educational institutions in the present academic year.

Tools/Software Used in Education

Online education has emerged as a contemporary form of engagement in the educational process today. Information and communication technology (ICT) and well-known e-learning applications are employed to facilitate information sharing and communication. We define new technology as a combination of techniques, procedures, software, and hardware that collaborate to gather, process, store, distribute, and display data or information for participants to utilize through communication. In the computer based educational settings, ICT and e-network based gadgets are commonly employed for educational interaction programs, prompt response, tracking learning performance and academic growth, visualizing materials, sharing statistics, presenting details, conducting simulations, planning experiments, and collaborating on team projects. Consequently, ICT and e-learning tools offer educators and students a range of flexible management and assessment options in the educational settings [10]. According to a survey, 56.9% of teachers utilized platforms such as WhatsApp tool and Zoom app for online tutoring, while 85.7% of teachers used the WhatsApp application for online education. Only 6% of mentors exclusively used Google Classroom application as a network based teaching tool, with a similar percentage using YouTube application and WhatsApp tool in conjunction with other resources not mentioned here. Additionally, 37.5% of mentors utilized Google Classroom application and WhatsApp tool together (refer to graph.1)[11].

ICT resources come in various forms and can be applied to diverse tutoring processes. These electronic assets can be utilized for diverse educational purposes [1]. The following table (Table 2) presents a list of popular e-learning tools and software employed in the teaching and learning methods.

List of Popular electronic -Learning Tools

(A) Tools for Creating Interactive Lessons - This collection of dynamic and captivating teaching resources has the potential to enhance student engagement. Through art, film, infographics, assessments, quizzes, and animations, they bring the educator's instruction and distance learning sessions to life.

(B) Teaching Tools for Classroom Management - Planning lessons, taking attendance, assigning homework, and grading are all responsibilities of a teacher. This is where classroom management tools for teachers can be beneficial. Here, educators will find online resources and supplements that can expedite these processes, enhance student interaction, and improve learning.

(C) Lesson Planning Tools - Lesson planning is one of the crucial aspects of a teacher's job, and it can be challenging. However, there are several resources and tools available that can make lesson planning more practical and efficient. Explore the top tools for teachers that enable efficient lesson planning without any cost.

(D) Test and Exam Makers - Assessing students' knowledge during distance learning may pose more challenges compared to in-person sessions in traditional education. However, with the right online tools, it can be simpler and more engaging for both students and teachers.

(E) Plagiarism Checkers - The aforementioned free online tools in Table 2 can be utilized by teachers to check their students' essays and theses for plagiarism.

(F) Content Sources for Teachers - With the abundance of educational digital content available online, teachers can enhance the value and engagement of their classes. However, it is crucial to select reliable websites that offer useful content. The following are some digital content and remote teaching resources that teachers may find valuable in their efforts to engage students.

(G) Audio-Visual Design Tools - Audio-visual content is a valuable tool for achieving teaching and learning goals. If you wish to save time or lack proficiency in using more complex image and video editing platforms like CorelDraw and Photoshop, you can utilize the user-friendly online teaching tools listed. The intriguing aspect is that teachers have unrestricted access to all of these tools.

(H) Communication and Collaboration Tools - Both teaching and learning necessitate effective communication and collaboration. We have compiled a collection of online teaching resources that will simplify and enhance this process for educators. Within this compilation, teachers will discover instructional forums, platforms for sharing educational materials and guidance, video conferencing software, as well as popular applications for online discussions and collaborative

projects that are well-liked by students. The Internet can be utilized to improve our planning, classroom management, and educational offerings. As we aspire to progress, enrich, and introduce a fresh perspective to our teaching methods, or modify and elevate the quality of activities provided to students, we seek to educate utilizing the Internet. A certain level of motivation is essential for students to engage in learning. Granting students access to the Internet as part of their studies provides a stimulus for individuals who may be deterred by traditional methods of information delivery, thereby expediting the transfer of knowledge from short-term memory to long-term retention [12].

Utility of Technology in teaching learning processes

It illustrates the extent to which the persons perceive the ease of using a particular system. Previous studies conducted on proficient users of information and communication technology (ICT) have identified several attributes associated with the perceived usability of ICT. Based on these investigations, educators expressed the need for a diverse range of skills and proficiencies to perceive ICT as user-friendly. Some of these attributes encompassed being uncomplicated to grasp, comprehend, operate, manage, and recall[13].The following list includes applications for technology's utility given below

Expanding the availability of high-quality educational materials - The accessibility of top-notch educational resources can be broadened through network technologies. The interactive nature and global reach of these technologies enable the rapid and cost-effective sharing of customized information, materials, and databases across vast distances.

Increasing inclusivity through distance learning - Information and communication technologies (ICTs) offer innovative and imaginative methods to reach a wider range of individuals, including those in the backward areas, women still struggling social conflicts, and pupils with deformities, who would otherwise be excluded from educational opportunities.

Facilitating a knowledge network for students - In today's knowledge-driven economy, the effective acquisition and utilization of knowledge significantly impact economic success.

Enhancing the productivity and efficacy of educational management and governance- contemporary technologies can enhance the efficacy and effectiveness of administrative tasks and procedures, such as educational management, student enrolment, and progress tracking[3,14].

Challenges

Numerous studies have investigated the challenges associated with integrating technology in education. When teachers are introduced to the latest technology, various factors in their environment influence their decisions on how and when to utilize it. The integration of contemporary technology into the teaching and learning process highlights the difficulties that teachers face, which are often beyond their control. These challenges include:

- Limited network connectivity and usability.
- Insufficient ICT resources in higher education institutions.
- Limited approach to internet-based assets and tools.
- Inadequate guidance and support.
- Time constraints.
- Teachers lacking proficiency.
- Inadequate availability of essential technology for students at home [2, 13, 15, 16, 17 – 19]

Conclusion

The twenty-first century is characterized by technological advancements. It can be Summarised that introducing ICT into classroom enhances students' understanding of fundamental concepts and improves the effectiveness of the tutoring methods. ICT has a noteworthy effect on a nation's education and economy, as it helps overcome barriers to network based learning and helps in fruitful implementation of technology in the classroom to increase network based education[16]. Compared to traditional approaches, technology proves more effective in fostering students' attitudes and cognitive skills in their respective subjects[20]. The findings indicate that educators strongly advocate for the use of technology in education, but they face numerous obstacles. These obstacles include inadequate infrastructure, unskilled teachers, limited access to resources, and ineffective training. Nevertheless, the availability of entire necessary elements enhances the potential for successful implementation of technology in teaching and learning opportunities.

CONFLICT of INTEREST

The authors affirm that they have no potential conflict of interest.

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