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A Study on the Adoption of Technology in the Current Education Scenario in India

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Abstract

Incorporating technology into educational practices has fundamentally changed how knowledge is taught and learned. Technology has created new opportunities for students and educators, from interactive learning experiences to global connectivity. A competitive edge can be maintained by an education system that meets the demands of the technological age. The main aim of this research was to investigate the utilization of technology in present-day educational institutions. It examines the effectiveness of technology on education, exploring how it has improved learning outcomes, increased access to resources, and altered classroom dynamics.

The current research utilized interpretative phenomenological analysis (IPA) which is a qualitative method. Data collection involved one-to-one interviews with the help of semi-structured questionnaires with 50 teachers from 10 different private educational institutes in Cuttack District, Odisha. Purposive sampling was utilized for participant selection. According to the survey, the primary elements motivating teachers to utilize technology, e-learning/online learning include convenience of access, cost, usability, quality education, and opportunity.

Although it is a relatively new development in Indian education, the use of technology in classrooms, institutions, and other academic settings has a lot of promise for the future. Every aspect of civilization has been impacted by technology, which offers benefits including cost-effectiveness, increased flexibility, and quicker and simpler access to information. Students' acceptance of technology will be positively impacted by the availability of high-quality online resources.

Keywords: Technology Adoption, Education, Effectiveness of technology, Teachers Perspective, Indian scenario

1. Introduction: -

Over the last few decades, technology has altered every area of our lives, including education. Incorporating technology into educational practices has fundamentally changed how knowledge is taught and learned. Technology has created new opportunities for students and educators, from interactive learning experiences to global connectivity. This study examines the effectiveness of technology on education, exploring how it has improved learning outcomes, increased access to resources, and altered classroom dynamics. As we delve into these developments, it becomes clear that technology is not only a tool but a driving force for innovation in education, offering a future where learning is more personalized, inclusive, and adaptable to the needs of learners in the digital era. The knowledge society and skilled workforce shape the development and advancement of citizens in every country. A competitive edge can be maintained by an education system that meets the demands of the technological age. The latest technological advancements have improved the quality of modern education.

2. Literature Review: -

According to a report by Prof. Indu Kumar, CIET, NCERT on Technology in Education: NDEAR, he claimed that technology is the need of the hour. Further, he said that keeping this in mind the NEP 2020 has greatly focussed on the adaptation of technological tools in the school and higher educational sector. Keeping in mind this objective, the NEP 2020 envisions on creation of an autonomous body named NEFT (National Education Forum Technology) as a vehicle aiming at the integration of technology in the different educational segments. The NETF will create institutional and intellectual capacities in educational technology, envision strategic emphasis areas, articulate new research and innovation paths, and provide unbiased, evidence-based advice on technology-based interventions to Central and State Government agencies.

R. Raja (2018) concluded that technology has both positive and negative impacts on the education sector. On one side it creates interest in study in students by making topics easy to understand, helps in time management, and upgrades technological skills for future use. At the same time, it reduces the imagination and thinking skills of the students and affects their eyes. It is further expensive and not affordable for everyone.

The results by Dr. Rajeshwari Jain (2018), revealed that the technological teaching-learning process is much more effective than traditional classroom teaching as it makes students more creative and focussed on their studies. Further, the teachers look at ICT as a source of their professional development as they get interesting content development ideas through the use of technology which creates an interest in them towards their profession.

Chetana M.H (2019) suggested that Technology can save students a lot of time and effort in accumulating various printed books and journals to acquire knowledge, allowing them to focus on more important knowledge-gathering activities. It can illustrate education in ways that help students understand current concepts and ideas. Education technology also enables teachers to include project-based learning. Students of all levels can use these tools to build knowledge and improve skills required in modern society, such as presentation and analytical skills, under the guidance of competent professors. The teacher must help kids learn by providing access to technology. Teachers can identify strategies to better engage children in learning while meeting their different needs.

According to a study by Shivi Grover (2022), The idea that the introduction of technology facilities automatically results in a greater level of the issue of social quality in teachers' daily working conditions needs to be addressed. Constitutional human variables, in particular, play key roles in digitalization processes as well as intersubjective variances in digital technology integration capacity. Although technology is not a panacea for all educational issues, it can help teachers engage with students on certain topics, both content-specific and ongoing learning. The implementation of sufficient, individually oriented support systems, as conditional variables addressing teachers' constitutional considerations, could have a significant impact on the growth of our technology-mediated education system.

According to R. Ravichandran (2024), following the COVID-19 epidemic, hybrid learning has developed as a promising educational strategy. By mixing in-person and online training, hybrid learning provides students with additional pliability, personification, and availability. Additionally, the development and enhancement of hybrid learning in education has been greatly aided by learning management systems, video conferencing, adaptive learning platforms, and virtual reality simulations. Hybrid learning has many advantages, but it also presents several obstacles, including those related to technology, pedagogy, and student interaction. Furthermore, he suggested that teachers expand the potential of hybrid learning and make it more advantageous and accessible for all students by implementing new technologies and pedagogies.

In his study, Pawan Kumar Sharma (2024) discovered that social influence, outcome expectancies, quality of the content, self-efficacy, and facilitating environments are the crucial employed external elements for technology acceptance in education. He also noted that India, with its different educational demands, is greatly gaining from the most recent breakthroughs in education technology. However, to ensure its effective implementation, it is vital to understand how Indian students and teachers perceive and use technology. Then only the finest outcomes can be obtained from the use of technology in education.

According to Ali Bordoloi's (2024) research, ICT improves teaching-learning experiences, makes the teaching-learning process more interesting, encourages self-learning and collaborative exercises among teachers, promotes innovation, develops critical thinking skills, exposes students to vocational skills, promotes active learning, and so on among principals, teachers, and students. However, some obstacles were identified, such as a lack of suitable infrastructure and a sufficient number of properly educated teachers. He also recommended that increasing educational quality by incorporating ICT into the teaching-learning process, as well as raising awareness among stakeholders, is critical to digitalizing India through the adoption of ICT-integrated education in schools. To keep up with the rapid advancement of technology in education, it is necessary to provide teachers with hands-on training and regular orientation programs on ICT. Additionally, schools must be equipped with grid-connected solar power generation facilities to meet their power needs. Teachers must also be made aware of the benefits of ICT in education, and parents must receive guidance and counseling on how to use ICT tools, particularly smartphones, for their children.

3. Research Gap: -

Overcoming obstacles to technology learning and reaching potential achievements is extremely difficult in the quickly evolving world of today. Therefore, further study is required to determine how educational technology and the Internet are used in Indian classrooms and what effects they have.

4. Research Objectives: -

1. To understand the effectiveness of technology in school education.
2. To assess the hurdles faced by the teachers in adopting technology.
3. To evaluate the role of technology adoption in enhancing the performance level.
4. To provide recommendations for error-free technology adoption in education.

5. Research Methodology: -

To fully investigate the participants' first-hand experiences, the current study used interpretive phenomenological analysis (IPA) (Eatough and Smith, 2008; Pringle et al., 2011; Saini and Chaudhary, 2019). IPA is a type of qualitative approach that is used in research projects when the goal is to conduct in-depth interviews with a limited sample of participants, usually using semi-structured interviews. When researchers want to know how people interpret particular events they come across, IPA comes in handy (Smith and Osborn, 2008). Instead of creating a theory that can be applied to the entire population, it helps researchers get deep insights and a clear understanding of participants' perceptions within a specific group (Pietkiewicz and Smith, 2014). Cited by Dipboye and Foster (2002), IPA enables a more detailed description, facilitating the dr According to Dipboye and Foster (2002), IPA allows for a more thorough explanation, making it easier to reach specific and significant conclusions that are based on accepted theories and concepts.

5.1. Teachers' perspective on Technology adoption: -

To guarantee that useful data is collected for this kind of study, care must be used while selecting participants, and the sample size must be carefully considered. Small sample sizes, ranging from one to fifteen or more, are usual for IPA investigations (Smith and Osborn, 2008). Participant counts in phenomenological research might vary from 2 to 25 (Creswell, 2012; Chaudhary et al., 2019). IPA avoids generalizations in favor of careful case investigation (Smith, 2003). Respondents for this study were chosen from the Cuttack District of Odisha, India. To get primary data on technology adoption experiences, semi-structured interviews were done, enabling researchers to get close to each instance. To investigate the phenomena, fifty teachers from Cuttack, Odisha, were selected as respondents. Data collection involved in-depth interviews using semi-structured questionnaires with 50 teachers from 10 different private educational institutes in Cuttack District, Odisha. Purposive sampling was utilized for participant selection, aligning with previous studies that emphasize the identification and selection of information-rich cases in qualitative research (Patton, 2002; Etikan et al., 2016). Only teachers with at least three years of technology adoption in their teaching methods were eligible for participation, aiming to understand the drivers and barriers to Technology adoption. To ensure diverse perspectives on Technology adoption, teachers from various schools were included in the study. Approval was obtained from the Heads of Departments, and invitations were extended to potential participants. Interested individuals were asked to contact the researchers directly, resulting in fifty respondents (38 females and 12 males) volunteering to take part in the study.

6. Data Collection and Analysis: -

For this study, primary data was gathered through semi-structured interviews to delve deep into the perspectives of the participants. Following introductory details, three key questions were posed to the interviewees to gauge their utilization of technology in teaching practices. The questions were designed to elicit clear and straightforward responses, ensuring there was no room for ambiguity. On average, each interview lasted forty minutes, with the total duration varying between thirty-five to eighty minutes. The collected data was analyzed using Atlast version 8, following the prescribed steps for analyzing interview data by Moustakas (1994) and Smith and Osborn (2008). Verbatim transcripts were meticulously reviewed to identify central themes and insights on the adoption of technology in teaching practices. The emerging themes were noted and marked on the transcripts, then recorded separately for analysis of associations, similarities, and differences, ultimately forming clusters. This process, as recommended by Ryan and Bernard (2000), aimed to maintain objectivity and transparency. The results were discussed until a consensus was reached, further supported by verbatim excerpts to validate the outcomes. Following Smith's (2011) suggestion, excerpts from a select number of respondents per theme were used, ensuring a balanced representation across the group. To manage the word

count, individual perspectives were not extensively detailed, though all themes and participants' views were considered in the analysis.

7. Discussions: -

7.1. E-Learning in India: -

Within the diverse and expansive realm of Indian education, technology has emerged as a powerful force for change, offering solutions to narrow gaps, improve accessibility, and redefine traditional learning approaches. India, boasting one of the world's largest education systems, grapples with distinctive challenges related to scale, fairness, and excellence. Nevertheless, technology has presented remedies that go beyond the confines of the classroom, transforming teaching techniques, curriculum delivery, and student involvement. Here we explore the multifaceted influence of technology on the Indian education system, investigating its role in making education more accessible, encouraging innovation, and equipping students for a competitive global future. By examining these advancements, we uncover how technology enhances learning experiences and enables educators and students to navigate the complexities of an increasingly digital world.

1. **Expansion and Accessibility:** E-learning platforms have democratized education by making quality learning available outside of traditional classrooms. This is especially important in a country as large and diverse as India, where access to education varies by location.
2. **Government initiatives:** Initiatives such as Digital India and the National Education Policy (NEP) 2020 have emphasized the use of technology in education. This has accelerated the development of digital infrastructure and online instructional resources. It emphasizes the use of digital technology in teaching and learning and advocates for its integration across the educational system.
3. **Market Growth:** The e-learning market in India has expanded significantly, with an increase in platforms offering a wide range of courses, from academic disciplines to vocational skills.
4. **Technological acceptance:** The development of low-cost cell phones and cheaper internet data plans has increased e-learning acceptance among students and professionals, particularly in urban areas.
5. **Skill Development:** E-learning has been essential in upskilling and reskilling the workforce, bridging the gap between industry expectations and formal schooling.
   issues: Despite its rapid expansion, e-learning in India has several issues, including the digital divide (unequal access to technology and the internet), varied content quality, and the need for effective online teacher training.
6. **Post-Pandemic Acceleration:** The COVID-19 pandemic hastened the uptake of e-learning as schools and institutions transitioned to online instruction. This period demonstrated both the possibilities and limitations of digital education in India.

Overall, while e-learning in India has made great progress, there is still much space for improvement, particularly in terms of guaranteeing inclusive access and preserving educational quality across several platforms and areas.

7.2. Online Learning Platforms: -

One of the best applications of technology in the education sector is online learning platforms. Experts view the migration to online learning as a promising alternative for the future, to gradually overcome infrastructural constraints to preserve quality and accessibility to satisfy the learning needs of the country's rising population. There are multiple advantages and disadvantages of online education for students from various classes, castes, genders, and socioeconomic backgrounds. Despite all difficulties, the government and educational institution stakeholders have been working hard to improve individual, community, and societal knowledge in preparation for normal and potential crisis scenarios. In India, there are several online learning applications where students can easily dive into world-class hassle-free education any time anywhere. It includes an Online Educational Portal, instructional technology, information and communication technology (ICT) in education, multimedia learning, technology-enhanced learning (TEL), computer-based instruction (CBI), computer-managed instruction, computer-based training (CBT), computer-aided instruction (CAI), internet-based training (IBT), flexible learning, web-based training (WBT), online education, digital educational collaboration, distributed learning, computer-mediated communications, virtual learning platforms, etc. Higher education demand is expected to grow from under 100 million students in 2000 to over 250 million by 2025 (Lay Cheng Tan, UNESCO, 2011a). Various private and Government online learning platforms are of great help to students in this Sputnik age of technology. There are several online educational platforms based out of India. The details of some such platforms are given below.

Top Private Online Learning Platforms in India

Sl No.	Online Platform	Description
1	**Byju's**	Based in Bengaluru, it is a global Indian company that specializes in education technology. This tutoring program uses a freemium business model. It was introduced in August 2015 and offers educational materials to kids in grades 4 through 12.
2	**Unacademy**	This Bangalore-based, Indian multinational company specializes in educational technologies and runs an online learning environment. In addition to offering foundational (K–12) and skill-building curricula, it prepares students for a range of competitive exams, including JEE, NEET, UPSC, Chartered Accountancy, GATE, UPSC NDA, CUET, Boards, and others. It began in that year, 2015.
3	**Vedantu**	With its headquarters located in Bengaluru, India, it is an international online tutoring platform that was launched in India in 2014. Children in grades four through twelve are the main target audience. Live online tutoring is the company's primary line of business. For one-on-one student-teacher live sessions, it employs the White Board Audio Video Environment (WAVE) method.
4	**ExtraMarks**	It is an Indian education technology firm offering online and offline schooling and courses. It was created in 2007 and is based in Noida, India.
5	**Toppr**	Students in grades 5 through 12 can use it as a study aid, as can students preparing for entrance and scholarship exams. Toppr is an Indian-based global portal for education. The company's main office is in Mumbai, India.
6	**UpGrad**	It is a prominent online education company in India that emphasizes specialization and higher education. Digital marketing, data analytics, product management, data-driven management, and digital technology management are their areas of expertise.

Top Government Online Portals in India

Sl No.	Online Platform	Description
1	**Swayam**	The Government of India started this program to achieve the three main objectives of the Education Policy, which are equity, quality, and access. Providing everyone, especially the most disadvantaged, with the best teaching and learning resources is the aim of this project. For students who were previously excluded from the digital revolution and unable to engage in the knowledge economy, it seeks to close the digital gap.
2	**Diksha**	The National Council for Educational Research and Training (NCERT) established the Digital Infrastructure for Knowledge Sharing, a national school education platform run by the Indian government's Ministry of Education (MoE). introduced in 2017. It is currently supported in 36 Indian languages and is available to educators and students nationwide.
3	**NPTEL**	The Indian government's Ministry of Education (MoE) funds the National Programme on Technology Enhanced Learning (NPTEL), a joint project of the IITs and IISc that was established in 2003. It presently offers more than 600 certification courses per semester in 22

		different fields. It is the biggest online course archive in the world, offering courses in engineering, basic sciences, and a few humanities and business fields.
4	**E Pathshala**	To promote all educational materials, the Ministry of Education and the National Council of Educational Research and Training (NCERT) founded e-Pathshala a few years ago. It contains audiobooks, films, grade-level instructional materials, digital textbooks, and other tools for educators, instructors, and parents. The project was started in 2015 and is a part of the Digital India effort.
5	**Swayam Prabha**	This network of 40 DTH channels broadcasts top-notch educational content 24 hours a day, 7 days a week via the GSAT-15 satellite. The channels originate from Gandhinagar's BISAG-N. The information is supplied by IGNOU, UGC, CEC, and IITs. The web portal is managed by the INFLIBNET Centre.

Students can customize their learning experiences to meet their unique requirements and learn at their own pace using online learning platforms. They provide a wide range of courses, from fundamental to advanced topics, so students can select the one that best meets their requirements and interests. Simply said, these top e-learning platforms and digital learning platforms have transformed education by making it possible for anyone to acquire knowledge and skills without having to physically attend a traditional classroom.

7.3. Online Teaching Applications: -

In India, e-learning has become one of the most widely used methods of delivering education. Because of the greater population and strong demand for education in the nation, it has become increasingly important. It gives those who would not have had the means or opportunity to attend traditional classroom-based education the chance to receive a high-quality education. Since its initial introduction in India in the late 1990s, e-learning has experienced significant growth. When e-learning first started, software applications and computer-based instruction were mostly delivered via CDs and DVDs. Later, as technology developed and the internet became more accessible, e-learning grew to include virtual classrooms, online platforms, and Massive Open Online Courses (MOOCs). An increasing number of schools, institutions, and organizations are implementing e-learning as a means of instruction, making it an essential component of India's educational landscape.

The accessibility of e-learning is one of its main advantages in India. As long as the learner has access to a computer, tablet, or smartphone and an internet connection, this type of instruction can reach a large and diverse audience at any time and from any location. E-learning can contribute to closing the education gap and offering educational opportunities in a nation like India, where a large population lives in remote or rural areas with little access to schooling. Moreover, self-paced and customized e-learning enables students to study whenever it is most convenient for them. The affordability of e-learning is another benefit for Indian students. Traditional classroom education can be expensive, especially for people who live in rural or metropolitan areas. Since e-learning does not require infrastructure, textbooks, or commuting, it is a more economical option. Additionally, e-learning courses are more widely available because they are occasionally offered for free or at a reduced cost compared to traditional courses. E-learning is a viable option for those who wish to further their education without taking on significant financial obligations due to its cost-effectiveness.

Since everyone in India has access to high-quality education, e-learning also helps to democratize information. Physical barriers and other constraints are removed by e-learning, making it easier to access educational materials. Educational institutions may easily provide educational materials to everyone, anywhere, at any time, regardless of geography or history. Marginalized groups in society can now access education and training without facing obstacles related to their social, economic, or cultural backgrounds because of the democratization of knowledge. Additionally, e-learning provides teachers and students with ease and flexibility. Students can learn from the comfort of their homes by scheduling online courses to fit in with other obligations, such as work and family. There is no longer a need for teachers to commute to schools because they may work and teach from home. With less time and money spent on travel and classroom supplies, this flexibility can increase productivity. Indian educational institutions use a range of online teaching software. Below is a description of a few of the most popular internet apps.

Top Online Teaching Applications in India

Sl No.	Application Name	Description
1	**Zoom**	This platform facilitates communication via chat, phone, audio, and video. It is utilized by a wide range of people and organizations, including banks, schools, universities, healthcare providers, and government institutions.
2	**Google Meet**	It is a video communication service designed by Google. Because of its strong security, ability to integrate with Google resources, accessibility, easy-to-use interface, large number of participants, live captioning, and recording features, it is widely used.
3	**Google Classroom**	To make it simpler for educational institutions to create, assign, and grade tasks, Google developed a free blended learning platform. Google Classroom's main objective is to make file sharing between instructors and students easier.
4	**Moodle**	This PHP-based learning management system is free and open-source, available under the GNU General Public Licence. In schools, colleges, corporations, and other industries, it is utilized for blended learning, remote learning flipped classrooms, and other online learning initiatives.
5	**Teachmint**	It is a major provider of education infrastructure solutions, enabling the education ecosystem to provide inspiring learning outcomes. It offers live classrooms, recorded lectures, YouTube live streaming, automated attendance, live polls, online quizzes and assignments, a question bank, and access to study materials. It is a user-friendly platform for teachers and students.
6	**Class Dojo**	It is an educational technology company that provides messages and a feed of pictures and videos from the school day to teachers, students, and families in elementary schools. In addition, it lets teachers give students feedback on their abilities and creates a portfolio for the kids so that parents may learn about school events outside of teacher-student conferences.
7	**Nearpod**	It is a type of technology-enabled learning environment in which teachers can design presentations, interactive activities, and assessments that are organized into lessons. Several forms are supported, including text, PowerPoint presentations, PDFs, images, and videos, as well as certain virtual reality (VR) classes. Lessons exported to students can be run as mobile apps or web browsers.

7.4. Contribution of Technology in Present Education Scenario: -

The most significant technological advancement in modern life is the Internet. It is frequently used in business and school nowadays. It is always changing and getting new features. The Internet is incredibly helpful for education. It facilitates children's and students' access to and understanding of information on several platforms. In a brief period. Students are encouraged to join and create their own by learning something. It has the potential to improve education in many different ways. These days, distance learning is becoming more and more important.

1. **Enhanced Learning Experiences:** Technology provides dynamic and engaging tools like simulations, virtual reality (VR), and gamified learning platforms to make learning more immersive and effective.
2. **Accessibility:** It allows students from varied backgrounds and places to have access to learning materials and resources, hence overcoming educational hurdles. Online courses and digital libraries, for example, provide learning opportunities that extend beyond traditional classrooms.
3. **Personalized Learning:** Educational technology enables adaptive learning programs that are tailored to the speed and style of individual learners. Students can learn at their own pace with this individualized method, which concentrates on the areas in which they need more help.
4. **Collaboration and Communication:** Students are encouraged to interact and work together with their lecturers through platforms such as collaborative papers, online discussion forums, and video conferencing technologies. An environment for learning that is more supportive and interactive results from this.

5. **Teacher Help and Professional Development:** Technology offers teachers tools for lesson planning, assessment, and data analysis, allowing them to modify their teaching approaches and provide focused help to students. It also provides options for professional development via online courses and communities.
6. **Global Learning Opportunities:** Using educational technology, students can connect with peers and professionals from all over the world, obtaining varied viewpoints and cultural knowledge. Virtual exchanges and international collaborations expand their educational opportunities.
7. **Efficiency and Administration:** Technology simplifies administrative responsibilities like attendance monitoring, grading, and resource management, allowing educators to concentrate on teaching and student interaction.
8. **Preparation for Future Careers:** Integrating technology into education prepares students for the digital age workforce by providing them with digital literacy skills, critical thinking, and problem-solving abilities required for success in the 21st-century labor market.
9. **Continuous Learning and Lifetime Education:** With online courses, webinars, and digital tools, individuals can pursue lifetime learning opportunities and maintain their skills and knowledge up to date throughout their careers.

Overall, educational technology improves traditional educational techniques while also creating new opportunities for learning, cooperation, and skill development in today's educational scene.

7.5. Paradigm Shift in Current Education Scenario from classroom teaching to digital learning: -

We may say that different perspectives have been the driving force behind this transition. There is a new paradigm in the education sector, and there are many reasons why we must adopt it. From lectures to role-playing, online learning, knowledge-based education, and education centered on technological innovation, teaching, and learning have changed dramatically. A significant transition to educational technology-centered learning, technology, and internet learning, which is offered in a variety of styles throughout the educational system, including online e-learning, blended learning, and network learning, has occurred as a result of education moving from teacher-centered learning to face-to-face classrooms, then student-centered learning to student-only classrooms.

(1) Education's primary focus has changed. Education was formerly only available to a select few, but with the development of virtual learning, knowledge is now available to everyone. The goal of education has changed.

(2) Education is no longer limited to a single area or time, but may now be accessed from anywhere in the world.

(3) Web-based courses have replaced traditional ones in education.

(4) Diversify education sources, such as the Internet, to enhance learning opportunities.

(5) New educational technology has led to a shift from face-to-face to remote or digital learning.

6.5. SWOC Analysis of Educational Technology: -

SWOC stands for Strength, Weakness, Opportunities, and Challenges. Among these Strengths and Weaknesses are the internal factors that are under our control up to a certain extent whereas Opportunities and Challenges are the external factors where we have no control.

STRENGTH	WEAKNESS
• It increases access to quality education.	• It is not reachable in all parts of India.
• It saves time, money, and energy.	• There is a lack of training on its use.
• It improves learning outcomes.	• There is a lack of proper setup/infrastructure.
• It can be used as personalized learning instruction.	• There is a lack of focus on writing skills.
• It is flexible.	• It is less effective in comparison to classroom teaching.
OPPORTUNITIES	**CHALLENGES**
• It gives access to multiple courses at the same time.	• There is a lack of access to quality education.

• It gives the experience of global teaching and learning.	• Non-availability of experts in rural areas.
• It is helpful during uncertainties like covid pandemic.	• Absence of dedicated portals for students and correct content for teachers.
• It gives access to certified courses.	• Not every technology tool will work for all subjects and students.
• It is easy to learn due to the use of animated videos and graphics.	• Poor learners may not cope with the content.

8. Findings: -

The results of the IPA analysis of fifty interviews are presented in this study. The results have been examined in five categories known as "themes," which comprise

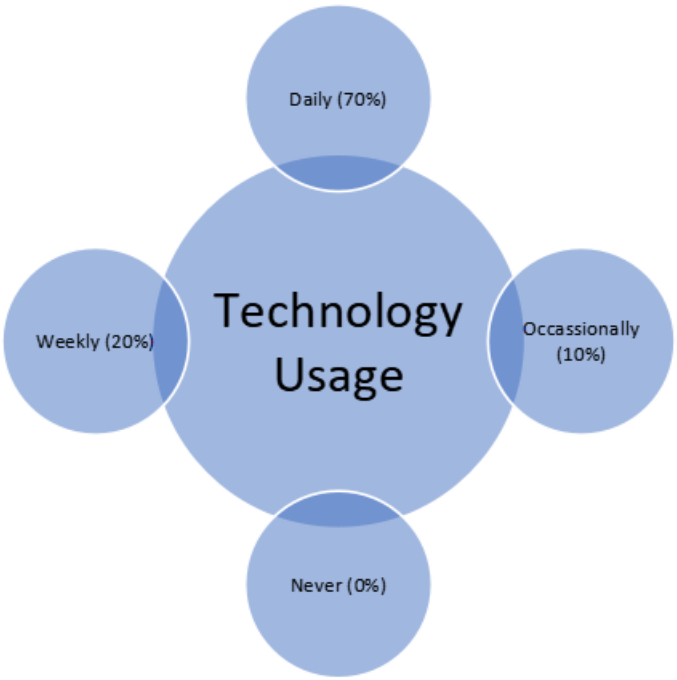
“Technology Usage”, " Enhanced Learning Experience", "Accessibility and Inclusivity", "Student Motivation and Engagement", "Personalized Learning", "Impact on Teaching Practices", "Professional Development", "Challenges and Solutions", and "Overall Impact and Future Outlook".

Drivers for Technology adoption:

The study found that cost, convenience of use, opportunity, high-quality instruction, and affordability are the main drivers of instructors' use of e-learning and online learning.

(1) Technology Usage:

In discussing with the respondents their usage of technology in the teaching process it was found that out of 50 respondents, 70% were found using a technology-based teaching process daily while teaching the students, whereas 20% of teachers were found using it every week. Only 10% of teachers were using the technology occasionally and there were no teachers who did not use technology at all in the class.



Regarding the type of technology tools being used for delivering classes, it was seen that many schools have implemented smart boards in their classrooms and some schools have started using educational apps to make the teaching-learning process easier and interesting for both the teacher and the students.

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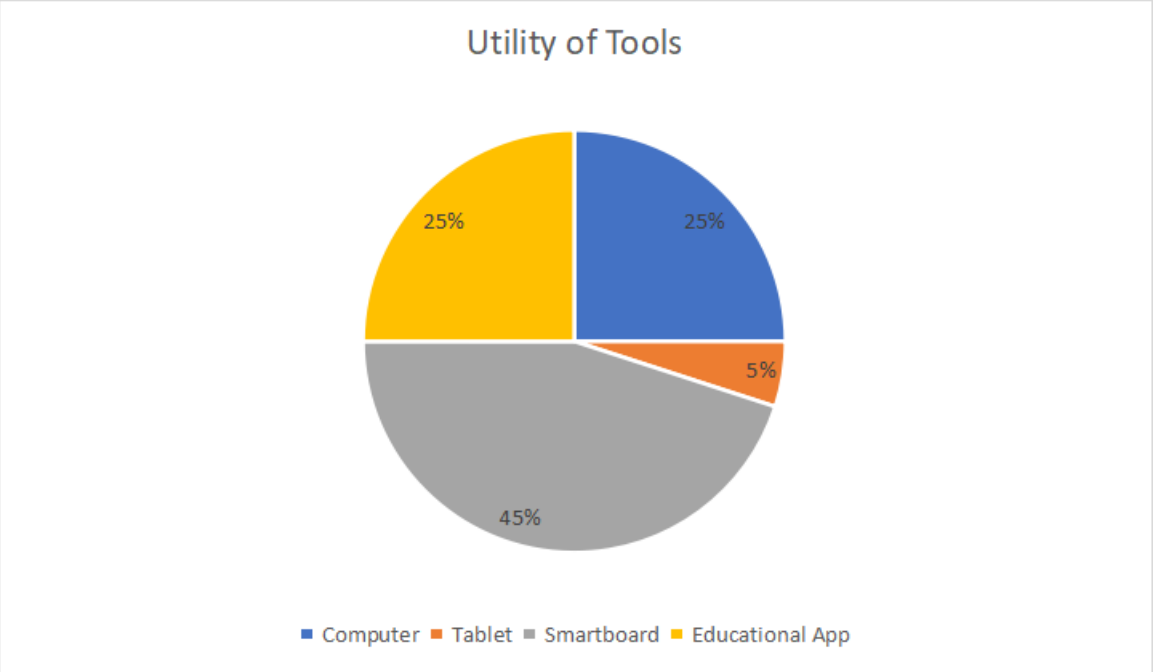

(2) Enhanced Learning Experience:

Our study found that it has transformed the learning experience by making it more interactive and engaging. Tools such as interactive simulations, educational apps, and digital resources have enabled students to grasp complex concepts more easily. Personalized learning platforms adjust to individual student needs, while collaborative tools facilitate group work and peer interaction, fostering a more comprehensive understanding of the material.

i. Interactivity: Technology makes learning more engaging through interactive simulations and educational apps.

ii. Personalization: Platforms for adaptive learning adjust information to meet the needs of each unique student.

iii. Accessibility: Digital resources provide easy access to a wealth of information and materials.

iv. Collaboration: Tools like online forums and collaborative platforms enhance group work and peer-to-peer learning.

v. Visual Aids: Multimedia elements, such as videos and animations, help in understanding complex concepts.

(3) Accessibility and Inclusivity:

Technology has greatly improved the access to educational resources for the school students. On having a verbal discussion with the respondents about the extent to which their students have benefited due to improved access to educational resources it was found that affordable smartphones and internet connectivity have democratised access to a wide range of educational resources. Students now access online textbooks, educational videos, tutorials, and interactive learning platforms from almost anywhere. Students are now able to access a wide range of books available online free of cost and understand the subject topic more easily with the help of animated videos. The use of digital classes in the school has developed a keen interest among the students positively affecting their learning outcomes. With the advent of virtual classrooms and online learning management systems (LMS), students can participate in live classes, access recorded lectures, submit assignments, and interact with peers and teachers remotely outside the classroom.

Although technology has leveled the playing field by increasing access to educational resources and opportunities for all students, regardless of geography or financial status still in our discussions we found that there is an effect of the socio-economic background of the students on their usage of technology. All students were not able to get this facility at their home due to the poor financial status. Out of 50 respondents, 42 teachers confirmed the existence of the effect of the financial status of the students on the usage of technology at home.

(4) Student Motivation and Engagement:

i Relevance of Content: Connecting lessons to real-world applications can make learning more interesting and meaningful for students.

ii. Interactive Teaching Methods: Using group work, discussions, and multimedia can keep students actively involved in the learning process.
iii. Positive Classroom Environment: A safe and inclusive atmosphere encourages students to participate and express their ideas.
iv. Strong Teacher-Student Relationships: Supportive relationships with teachers can boost students' motivation and engagement.
v. Use of Technology: Incorporating tools like educational apps and online platforms can make learning more engaging and interactive.
vi. Active Learning Techniques: Strategies such as problem-based learning and peer teaching help students take an active role in their education.

(5) Personalized Learning:

Technology adoption in education has not only been beneficial for the students also it has uplifted the skills of the teachers as well. In this regard, from our interview with the respondents, we got to know how digital teaching tools have enhanced the personal learning of teachers in several ways. Online platforms and digital tools have provided teachers with a wide range of professional development options where they can engage in webinars, online courses, and virtual seminars that are tailored to their unique requirements and interests. Further, they get access to a multitude of teaching materials, lesson plans, instructional films, and interactive tools through digital libraries, educational websites, and online repositories. These tools can be adjusted to fit students' different learning needs, allowing teachers to modify their teaching approaches to individual learning styles and skills. Also, Educational technology platforms frequently collect and analyze information about student performance and learning outcomes which can be utilised by the teachers to identify areas where children may require extra help or enrichment activities. Educational applications and digital tools provide teachers with new opportunities to engage pupils in learning. Whether through interactive simulations, virtual reality experiences, or gamified learning activities, technology expands the range and effectiveness of instructional approaches available to educators.

Overall, technology has transformed personalized learning for educators by providing resources, professional development opportunities, data-driven insights, and collaborative networks. Embracing educational technology enables instructors to create dynamic and personalized learning environments that address students' requirements and promote academic success.

(6) Teaching Efficiency & Professional Development:

In our discussions with the respondents, it was found that technology has considerably benefited teaching processes, enhancing efficiency in several critical areas. Digital resources like teaching materials, multimedia content, videos, etc streamline lesson planning and preparation thus saving their time and effort in creating effective PPTs and engaging notes for the students. The usage of LMS has helped the teachers by reducing paperwork thus providing them with more time for lesson preparation. Online platforms provide teachers with professional development possibilities such as webinars, workshops, and online courses. This enables educators to regularly refresh their abilities, stay current on educational trends, and enhance their teaching approaches. Further, teachers can collaborate with educators all around the world thanks to technology, which includes online networks, social media groups, and professional learning communities. This global collaboration encourages knowledge sharing, the exchange of best practices, and creative teaching strategies.

Thus, technology has improved the efficiency of teachers to a greater extent and has given them a wide scope for their professional development.

(7) Challenges and Solutions:

Challenges:

i. Digital Divide: The digital divide refers to the gap between those who have access to modern technology and the internet and those who do not. In many regions, especially rural and underserved urban areas, students and schools may lack the necessary infrastructure, such as high-speed internet and up-to-date devices, which can hinder the equitable implementation of technology in education.

ii. Teacher Training and Professional Development: Many teachers lack the training required to effectively integrate technology into their teaching practices. The rapid pace of technological advancement means that continuous professional development is necessary to keep teachers updated on the latest tools and methods.

iii. Cost and Funding: The initial cost of purchasing technology, along with ongoing maintenance and updates, can be prohibitive for many educational institutions. Securing adequate funding is a significant challenge, particularly for schools in low-income areas.

iv. Resistance to Change: Both educators and students may resist the adoption of new technologies due to a preference for traditional teaching methods or a fear of the unknown. This resistance can slow down the implementation process and reduce the effectiveness of technological integration.

v. Cybersecurity and Privacy Concerns: The increasing use of technology in education brings heightened risks related to cybersecurity and privacy. Protecting sensitive student and staff data from breaches and ensuring safe online practices is a major concern for schools.

Solutions:

i. Bridging the Digital Divide: To address the digital divide, governments and private organizations can invest in infrastructure improvements, such as expanding broadband access in rural areas and providing subsidies or grants for schools to purchase necessary technology. Partnerships with tech companies can also help supply devices to students in need.

ii. Comprehensive Teacher Training: Implementing ongoing professional development programs focused on digital literacy and pedagogical strategies for using technology can empower teachers. Schools should provide regular workshops, online courses, and peer mentoring to help educators stay current with technological advancements.

iii. Securing Funding and Resources: Schools can explore multiple avenues for funding, including government grants, private donations, and partnerships with technology companies. Advocating for increased budget allocations for educational technology at the local and national levels is also crucial.

iv. Change Management Strategies: To overcome resistance to change, schools should involve teachers and students in the decision-making process, provide clear communication about the benefits of technology, and offer ample support during the transition period. Highlighting success stories and demonstrating the positive impact on learning outcomes can also help reduce resistance.

v. Enhancing Cybersecurity Measures: Schools must implement robust cybersecurity protocols, including regular software updates, strong password policies, and comprehensive data encryption. Educating students and staff about safe online practices and the importance of data privacy is also essential. Collaborating with cybersecurity experts can further strengthen these measures.

(8) Overall Impact and Future Outlook:

Some common perceptions of teachers on the overall effect of technology in education can be categorized into:

Positive Effects

1. Teachers believe that technology provides new and innovative ways of engaging students and developing their learning skills. Not only this rather it helps in developing interest among the students towards the topics.
2. Technology-enhanced teaching tools simply represent complex topics thus making it easier for the students to understand. The animated videos and lessons develop the imagination skills of the students.
3. Teachers recognize that technology enables more personalized learning experiences. Adaptive learning platforms, educational apps, and digital content can be adapted to specific student needs, allowing each student to learn at their own pace and focus on areas for growth.
4. Technology in education frequently emphasizes critical thinking, cooperation, communication, and digital literacy. Teachers regard these abilities as critical for educating kids for future vocations and life in a digital age.

Negative Effects

1. Some teachers were overwhelmed by the quick pace of technological change, or they lacked the essential training and support to successfully integrate technology into their teaching practices. They viewed technology as a distraction or impediment to traditional educational techniques.
2. Not all kids have equal access to technology outside of school, which can lead to inequities in educational possibilities. Teachers are frequently worried about how to ensure that all pupils benefit from technology, regardless of socioeconomic status.

3. Technology has transformed the teacher's position from a typical lecturer to a facilitator of learning. Some teachers welcome this move since it allows them to focus more on individual student needs and creativity, while others are troubled by the requirement to modify their teaching techniques.
4. Lack of proper in-service training on the use of technology makes some teachers feel pressured and dissatisfied with their profession. They don't get much time for their work apart from their professional task.

Overall, many teachers perceive technology as a valuable tool for advancing education, but their perceptions are influenced by how well it is integrated into the curriculum, the level of support they receive, and the impact it has on student learning. Balancing the potential benefits and challenges is critical to developing a positive impression of technology in school instruction.

Future Outlook of Technology

The future of technology in education is full of promise and possibilities, thanks to continual developments in digital tools, learning platforms, and instructional approaches. Here are a few significant factors impacting the future of technology in education:

1. Increased Personalisation: Technology will continue to provide more personalized learning experiences that are suited to each student's requirements and choices. Adaptive learning technologies, AI-powered tutoring systems, and personalized learning pathways will grow more complex, allowing students to learn at their own pace and in ways that are appropriate for their learning styles.

2. Blended Learning: The COVID-19 epidemic has pushed the adoption of remote and blended learning modalities. These methods are likely to persist in the future, providing students with more freedom in how and where they learn. Virtual classrooms, online collaboration tools, and digital content delivery platforms will grow to accommodate a variety of educational environments.

3. Augmented Reality (AR) and Virtual Reality (VR) Integration: By creating immersive learning environments, AR and VR technologies have the potential to enhance education. To increase their understanding and retention of complex subjects, students can take part in interactive simulations, virtual science experiments, and historical exploration.

4. Artificial Intelligence (AI) in Education: AI-powered solutions will help to automate administrative work, personalize learning experiences, and provide intelligent tutoring and feedback. AI systems can analyze student performance data to detect learning gaps and suggest personalized treatments.

5. Collaborative Learning Platforms: Technology will continue to improve collaboration among students, teachers, and specialists throughout the world. Online platforms and social learning networks will allow for collaborative projects, peer-to-peer learning, and access to a worldwide community of instructors and learners.

6. Focus on Digital Literacy and Critical Thinking: As technology advances, there will be a greater emphasis on teaching digital literacy skills such as information literacy, internet safety, and responsible technology usage. Teachers will also concentrate on helping students develop their creative, critical thinking, and problem-solving skills in a digital environment.

7. Equity and Access: Bridging the digital divide remains a significant concern. Efforts to guarantee fair access to technology and reliable internet connectivity for all students will be critical to realizing the full potential of technological advances in education.

8. Professional Development for Educators: Continuous professional development will be critical in equipping educators with the skills and knowledge required to effectively integrate new technology into their teaching methods. Teachers will benefit from training programs, workshops, and continuous support as they use technology to improve learning outcomes.

All things considered, the use of technology in education has a bright future ahead of it that might greatly enhance student outcomes and learning environments while also equipping them for success in a rapidly evolving digital environment. Embracing innovation while tackling equality, implementation, and sustainability issues will be critical to realizing this promise.

9. Conclusions: -

The main aim of this research was to investigate the utilization of technology in present-day educational institutions. A significant motivator is the innovative approach to integrating technology to enhance the academic environment and improve student performance. Through conducting surveys and gathering input from teachers in Cuttack using structured questionnaires, their feedback on technology adoption experiences across various aspects was collected. This study explores how educational institutions may create a more equitable, inclusive, and effective educational system that prepares students for the digital age by embracing technology. It also tackles issues like equality, privacy, digital literacy, and infrastructure to guarantee that all students can succeed in the rapidly changing digital environment and have access to excellent educational opportunities. The results of this investigation provide insightful information for academics and industry experts alike.

Whether in colleges, schools, or other academic contexts, the use of technology in education is still relatively new in India, but it has a lot of potential for the future. Technology has become ingrained in every facet of society, providing advantages including cost-effectiveness, improved flexibility, and quicker and easier access to information. This research emphasizes the importance of integrating technology to enrich students' knowledge. Survey participants affirmed that online courses complement their current studies, providing students with opportunities to acquire additional skills, enhance their knowledge, or specialize in a particular field. Additionally, additional qualifications act as motivators for students. More and more students are lured to the constant availability of excellent, current content online. Students' acceptance of technology will be positively impacted by the availability of high-quality online resources. The availability of real-time information, the low cost of online courses, and interesting multimedia resources like films and presentations that enhance the learning experience are further factors propelling the use of e-learning.

References: -

1 Ali Bordoloi (2024), “Role of ICT in improving quality of education: Perception of head teachers of secondary schools of Kamrup district. Assam”. Indian Journal of Educational Technology, Volume 6, Issue 1, ISSN 2581-8325.

2 Chetana M. H. (2019), “Role of Technology in Indian Education”. Journal of Emerging Technologies and Innovative Research, Volume 6, Issue 3, ISSN-2349-5162.

3 Dr. Rajeshwari Jain (2018), “A study on the importance of using technology in imparting education and its impact on learning retention by the students of CBSE schools in Ahmedabad”. Indian Journal of Applied Research, Volume-8, Issue- 12, ISSN No. 2249-555X.

4 M. Dinesh Kumar (2023), “A study on Education System to utilize new techniques for digital education in India”. ICTAT Journal on Management Studies, Volume 09, Issue: 03, ISSN: 2395-1680.

5 Nivetha R & B. Radha (2024), “Digital divide: A comparison of UG female students use of social media platforms in Urban & Rural areas”. Indian Journal of Educational Technology, Volume 6, Issue 1, ISSN 2581-8325.

6 Pawan Kumar Sharma (2024), “Modelling dominant factors of technology acceptance in education”. Indian Journal of Educational Technology, Volume 6, Issue 1, ISSN 2581-8325.

7 Prof. Indu Kumar, CIET, NCERT, “Technology in Education: NDEAR”.

8 R. Raja, P. C. Nagasubramani (2018), “Impact of modern technology in education “. Journal of Applied and Advanced Research, 2018: 3(Suppl. 1) S33□S35 https://dx.doi.org/10.21839/jaar.2018.v3S1.165 ISSN 2519-9412 / © 2018 Phoenix Research Publishers.

9 R. Ravichandran (2024), “Hybrid Learning: How educational technology is Enabling a new era of classroom flexibility”. Indian Journal of Educational Technology, Volume 6, Issue 1, ISSN 2581-8325.

10 Shivi Grover (2022), “Exploring the digital revolution in education in India during covid 19 pandemic”. International Journal of Social Quality, Volume 12, Issue 2, Winter 2022: 51–71 ISSN: 1757-0344 (Print), ISSN: 1757-0352 (Online) © The Author(s) doi:10.3167/IJSQ.2022.120204.