Impact of ICT on Teaching Practices in India

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Contents

Abstract

Integration of Information and Communication in the classroom has been transforming the way learners are learning today. Teachers in India are also experimenting with innovative ways to teach with the help of ICT tools. They are leveraging various digital platforms for planning their lessons, delivering them in the classroom setup or virtually, and conducting the assessment as well. Educational technology is offering effective ways to reach different types of learners and assess their understanding in more than one way. Teachers' well-equipped preparation with ICT tools and facilities is one of the main factors in the success of technology-based teaching and learning. The Indian government has been persistent in implementing policies to encourage technology-driven innovations in the education sector and encouraging educators to adopt and integrate ICT. Although the perception of Indian teachers towards the use of ICT is positive, still need more support with the infrastructure and training especially in the rural regions. This paper will cover how technology has impacted the teaching practices, perceptions of teachers about the use of technology in the classroom, and their professional development.

Introduction

Technology integration nowadays has gone through innovations and transformed the societies that have totally changed the way people think, work and live (Grabe, 2007)[1]. It has profoundly changed the way of educational interactions around the world and has become an integral part of most of the educational process. The emerging trends have enabled the teachers to use technology innovatively to create learning objectives, develop curriculum and instructional strategies, deliver instruction, embed ongoing assessments, and provide appropriate interventions based on student needs and track outcomes and learning. The New Education Policy of India, 2020[2] has also emphasized the usage of technology in education. The policy calls for investment in digital infrastructure, development of online teaching platforms and tools, creation of virtual labs and digital repositories, training teachers to become high-quality online content creators, designing and implementation of online assessments, establishing standards for content, technology, and pedagogy for online teaching-learning.

The education sector has faced radical transformation with the help of technological advancements like digital books, multi-sensory classrooms, remote learning, virtual and augmented reality, and artificial intelligence across the globe. ICT is considered an important tool for building knowledge societies (UNESCO, 2003) and especially, as a tool in school education that could help in reconstructing the educational processes and system leading to effective education for all people. The Indian education sector has also witnessed an extensive push by the policymakers, educators, and learners in integrating technology with improving the learning process. It has also led to a considerable shift in the teacher's beliefs in using ICT as a pedagogical tool. Indian teachers have been optimizing various EdTech initiatives launched by both national and state governments potentially solving systemic issues such as access, equity, and quality. The efforts of teachers integrating ICT in the classroom have helped in improving the quality, accessibility, and cost-efficiency of delivery of instruction to students, and the teacher-student relationship as well. Thus, playing a significant role in contributing to achieving the targets of the Sustainable Development Goals, by providing platforms for increasing access to high-quality educational resources and reaching larger numbers of learners.

Integration of ICT with Classroom Teaching

Technology integration in the classroom involves the use of technological resources like computers, mobile devices like smartphones and tablets, digital cameras, social media platforms, software applications, internet, to build a deeper understanding of content among the learners.

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[1] https://files.eric.ed.gov/fulltext/EJ1105224.pdf
[2] https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf

With the increased access to mobiles, internet connections, and other digital infrastructures across the country, Indian teachers are becoming more comfortable using technology in their classrooms. Teachers are now experimenting beyond linear, text-based learning and engaging students in more meaningful ways. According to a study[3] conducted by the Central Square Foundation[4] about the adoption of EdTech by Indian teachers, irrespective of the school type, teachers' willingness to use technology is high. Computers and mobile phones were the most digital devices at 94% and 86% respectively. A similar trend was observed in the findings of the Digital School Survey by the Center for Sustainable Development (CSD), conducted across Maharashtra state in India. 81.5% of schools reported having teachers using ICT to prepare lessons and 83.3% where teachers are using ICT to deliver the lessons in the classroom[5]. The role of technology has evolved from classrooms having a computer set to integrating technology into the way concepts are taught and assessed. EdTech is helping educators with effective ways to reach different types of learners and assess students' understanding in more than one way. This also encourages students to explore tech-related platforms and collaborate among themselves making learning more student-driven.

Usage of Technology for Classroom Instructions

Lesson Planning

Teachers are using various technological tools and platforms to prepare lessons catering to the different learning levels of students in the classrooms. Availability of various app and web-based platforms both public and private are providing resources for teachers to plan lessons using multimedia. These resources range from unstructured to structured lesson plans which teachers can directly use or edit according to their classroom needs. National Platform like DIKSHA - provides a list of multimedia content, teachers can access a pool of multimedia content (image, audio, videos, etc.) Some platforms are helping teachers with syllabus-aligned ready-to-use lesson plans. Teachers are also using platforms to provide ready-made lesson plans with resources like videos, worksheets, quizzes, etc, opportunities to collaborate with people to co-create lesson plans and receive real-time feedback on lesson plans makes the life of a teacher a little easy. Platforms like Teacherly[6] are helping teachers with accessing virtual educator communities to collaborate and provide feedback on lesson plans. Platforms like Storyweaver[7] and Seesaw[8] provide multimedia tools to make lesson plans interesting like videos, audio, slides,

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[3] https://www.centralsquarefoundation.org/94-percent-teachers-have-access-to-computers-but-only-68-percent-trained-in-using-technology-in-classrooms/

[4] https://www.centralsquarefoundation.org/

[5] https://csd.columbia.edu/sites/default/files/content/MaharashtraDigitalSchoolsSurveyFinalReport.pdf

[6] https://teacherly.io/

[7] https://storyweaver.org.in/

[8] https://web.seesaw.me/

stories, etc. Teachers are also exploring platforms providing them with differential lesson plans that are automatically created according to student's progress data and learning levels.

Lesson Delivery

For lesson delivery, the availability of platforms like SWAYAM Prabha[9] is enabling teachers to use a platform with a pre-set content and be an instructor in the classroom. WhatsApp has been a potential platform to deliver the lesson to students using the text service. Platforms like Google Classroom[10], Zoom[11] are widely used platforms to deliver the content by the teachers over live tutoring platforms and virtual classrooms. The free web service designed for schools helps in drafting, mass distributing, and grading assignments. Students can also post their queries and receive answers on the same platforms. These platforms have become extremely popular for remote learning. Such platforms have been helping teachers to personalize the content, become a coach and guide students. The process has helped teachers simplify lessons, organize their lessons, and conduct them in a multimedia-rich manner.

Assessments

Technology is playing a key role in identifying and creating assessments for a classroom on a need basis. The presence of platforms checking student's responses, providing performance summaries and feedback to the learners is reducing teachers to create engaging assessments. Teachers are using many platforms which enable assignment and correction of objective, text-based assessments. Platforms like Mindspark[12], a computer-based, adaptive learning program helps students to improve their skills in Maths and English. DIKSHA platform also provides resources for assessments in the form of worksheets and question banks. To make assessment more interesting and less overwhelming for the students, teachers are using gamified versions. One such platform Kahoot[13], a game-based learning platform helps with formative assessment and insights of the class progress. These platforms are helping teachers with the easy creation of subjective and objective assessments in interactive formats and provide real-time student performance data at a deeper level including when students are guessing, key misconceptions, etc.

Some of the Best Practices for Integrating ICT in the Indian Classrooms

Indian teachers ranging from a primary teacher to a college professor, have been utilizing the potential of technology and integrating it in their classroom to make education reach a large

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[9] https://www.swayamprabha.gov.in/
[10] https://classroom.google.com/u/0/h
[11] https://zoom.us/education
[12] https://mindspark.in/
[13] https://kahoot.com/

number of learners. Here are some of the best examples by the Indian teachers using technology to overcome the challenges they faced in the journey of providing education to their students. These possibilities show the potential ICT tools and platforms hold in transforming the way education is perceived in the country. The Source of these stories is the study about teaching with technology[14], by the Central Square Foundation[15] and British Council[16] and insights from focus group discussion as a part of Need Assessment study on DIKSHA platform, by CSD and TERI team with tech-savvy teachers of Maharashtra.

Ranjitsinh Disale, a primary teacher from Solapur District in Maharashtra has been using a number of different ways to make his classroom teaching interactive. He used the technology to get students interested in education and attend school regularly. He introduced the use of Quick Response (QR) codes in the textbooks to provide additional resources to the syllabus and as a means to extend the curriculum. He also used virtual field trips to introduce the surroundings of the science labs and historical monuments. With the help of services like Google SMSs and WhatsApp groups, he interacted with parents and managed absenteeism. The Maharashtra Government recognized the innovation of using QR codes in the textbooks and adopted the innovation for the state and was adapted by the national level on the DIKSHA platform[17]. He recently won the Global Teacher Prize 2020 for his efforts to promote education.

Shruti Sharma, a high secondary grade teacher from Ghaziabad in Uttar Pradesh. She has been teaching subjects English and Life skills in grades 10 and 11. She used video conferencing and text-based discussions, on a platform offered by Generation Globe[18], to connect to classes in other parts of India and also abroad. Her students engage in exchange programs on different topics. The availability of a fully equipped computer lab in her school provided students the necessary technology and resources to engage in video conferencing. This helped her students build confidence levels and proactively initiate new endeavors.

Mrunal Shinde, a primary teacher from Maharashtra. She started using innovative ways in her primary classroom to increase the attention span of the students. She used a digital platform, Skype to help her students interact with students from different countries. She also used the platform Kahoot to create a quiz based on the knowledge about these different countries. This helped her integrate subjects like history and

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[14] https://www.britishcouncil.in/sites/default/files/teaching_and_technology_case_studies_from_india_final_low_res_new.pdf

[15] https://www.centralsquarefoundation.org/

[16] https://www.britishcouncil.in/

[17] https://diksha.gov.in/help/getting-started/diksha-mobile-app/understanding-qr-code.html

[18] https://generation.global/

mathematics in an interesting manner. She also uses the Microsoft platform[19] to interact and learn from other fellow teachers using different innovative teaching practices in their classrooms.

Premananad Edward Malyakkal, a college lecturer from Calicut, Kerala teaches English to degree-level students. He uses technology in a variety of ways to provide and create overviews of different kinds of literary material. One of his projects involves creating infographics with his students, summarising the key texts with the help of mobile-friendly software packages. He identified the problem of students having a tough time understanding the difficult text. His motive became to give maximum information to a maximum number of people using very basic and simple technology. He teaches his students basic computing skills and core applications like word processing, database management, and spreadsheets with design skills and infographic making. He uses Piktochart software and allows students to explore different tools which can be used on their mobile phones.

Suchi Dakoria, a primary teacher from Surat, Gujarat. She addressed the challenge of maintaining a portfolio of her student's work and communicating regularly with the parents. As a possible solution, she started using the app Seesaw[20], an online portfolio tool (e-portfolio) to address both these needs simultaneously. The portfolio contains a wide range of media: audio, pictures, and videos. Parents were involved with their child's progress through the platform. It helped in decreasing the workload of the teachers as the portfolio is maintained on a regular basis without the rush of only doing assessments at the end of the year. This also enabled maintaining a regular smooth way of communication between the school and the parents.

Perceptions of the Teachers on ICT Integration with Teaching

The new-age teachers are adapting to the new ways of classroom teaching with the help of innovative methods. Teachers are not leaving any stone unturned to take learning to the next level where learning is not limited to the four walls of the classroom. Technology has been supporting them in bringing in the knowledge and information from all the possible resources available. Successful integration of technology in the classroom depends on the teacher's perception about using technology with the teaching. Attitudes play a significant role in analyzing why teachers accept or reject technology (Rogers, 2010)[21]. A research study by

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[19] https://www.microsoft.com/en-in/about/empowering-educators.aspx

[20] https://web.seesaw.me/

[21] https://www.researchgate.net/publication/336589762_INVESTIGATING_TEACHERS'_PERSPECTIVES_TOWARD_ICT_INTEGRATION_IN_CLASSROOMS_IN_DELHI_INDIA

Rastogi and Malhotra (2012)[22] highlighted that examining teachers' attitudes and beliefs about ICT integration with pedagogy is particularly important in developing countries like India, where technology integration is usually not a part of school culture. The data from various studies about technology in teaching supports the idea that teachers in India have high interests and are positive about bringing ICT into the classrooms. Their level of expertise with the technological tools will determine their level of acceptance with the integration. Tondeur et al (2008) found that teachers who were less skilled in the use of computers had a negative attitude towards the use of computers and hence their acceptance level was also found below. Some teachers were reluctant to use ICT due to anxiety and lack of motivation (Duhaney, 2001)[23]. Thus, effective integration of ICT in pre-service and on-service of the teachers plays a crucial role in building positive attitudes technology in education.

ICT for Teacher's Professional Development

Educational communities around the country have been making continuous efforts to emphasize the importance of integrating ICT in the classrooms and the need for quality teachers' professional development to do so. Technological advancements have made it possible to deliver the large scale of quality training modules for teacher professional development providing flexibility and agency to teachers for their learning. Various digital platforms are helping teachers to improve their area of content with conceptual mastery, effective instructional practices, and improving digital literacy as well. National and state governments are utilizing different platforms like DIKSHA, NISHTHA and collaborating with private players like Dell, Microsoft to equip teachers with the required skills to successfully integrate technology in their classrooms. This helps resources to reach a large number of teachers with the resources available through a menu of options categorized by subject, skill, topic, and software. They also consist of dedicated platforms for teacher social communities with forums, multimedia exchange, topics, etc allowing teachers to engage with each other and form a strong community. Such initiatives not just help to build ICT skills and competencies but also building positive attitudes and beliefs among the teachers.

ICT for Teachers' Training

Teacher training and professional development are seen as driving forces for the successful usage of ICTs in education. Pre-service teacher training is now focussing on the initial preparation on pedagogy, subject mastery, management, and using various ICT teaching tools. While in-service training includes more structured learning opportunities building upon pre-

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[22] http://euacademic.org/UploadArticle/22.pdf
[23] https://www.researchgate.net/publication/334273403_Barriers_Perceived_by_Teachers_for_Use_of_Information_and_Communication_Technology_ICT_in_the_Classrooms_in_Maharashtra_India

service training, directly relevant to the teacher's needs and keeping up with the introduction in new Ed Tech innovations. National Platforms like DIKSHA, NISHTHA provide online training courses for capacity building of the teachers with the help of CBSE and NCERT training modules. These platforms allow registration of the teachers, dissemination of resources, training gap and impact analysis, monitoring and measuring of the program progress. Till now 30 lakh teachers have been trained digitally and aim to train 56 lakh school teachers in the coming academic session. The availability of resources in different regional languages makes it reach wider across the country.

Other digital platforms like Firki[24], ChalkLit, and The Teacher App are also supporting teachers professionally by providing them effective ongoing training and professional development. Firki, with the help of a blended (online and offline) learning model, provides continuous support to teachers by identifying their strengths and building skills to build an effective practice, leading to improved student outcomes. The platform also provides market-driven accreditations to teachers on completing the course. ChalkLit, a mobile application provides regular professional development for in-service teachers through online training with SCERTs/DoEs, teaching tools, and daily updates from an active teachers community. The platform allows teachers to undergo self-evaluation to understand their progress and make suitable amends to their technique.WhatsApp is another popular platform used to bring groups of teachers together at the school level or national level or global level as well. This way teachers learn from local and global teacher communities by sharing best practices, resolving doubts, and collaborating with peers through virtual platforms.

The Indian government has also been collaborating with tech players like Microsoft and Dell Technologies. India's All India Council For Technical Education (AICTE) has partnered with Microsoft on Microsoft Learn for Educator platform[25]. The platform empowers learners and educators with future-ready skills. This provides Indian educators access to best-in-class online learning paths and instructor-led training material through Microsoft's ready-to-teach curriculum and teaching material aligned with industry-recognized Microsoft certifications. Dell technologies with its initiative "Dell Aarambh[26]" equip teachers in India with the requisite knowledge to implement technology in the classroom. The objective is to improve the digital literacy of the teachers to bridge the digital divide in the country.

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[24] https://www.firki.co/
[25] https://docs.microsoft.com/en-us/learn/roles/educator/
[26] https://www.dellaarambh.com/

Role of ICT in a positive learning environment

The appropriate use of ICT tools helps in catalyzing the paradigmatic shift in making the classroom a creative space for exploration and experiment for both the teachers and students. It promotes the acquisition of skills and knowledge for students to become lifelong learners. Thus making students autonomous learners and bringing the world into their classrooms. The new ways of teaching and learning create a shift from a teacher-centered pedagogy to student-centered pedagogy. Various innovative platforms provide an active learning classroom environment and opportunities to work on real-life problems in depth making it less abstract. By keeping the classroom environment engaging, technology enables students to become better focused on their learning. This also helps teachers to juggle various responsibilities like attendance maintenance, delivering academic content, monitoring student's progress, and much more.

Challenges of Using Technology in the Classroom

Technology integration can also present significant challenges to educators. There are several barriers, some extrinsic related to the availability of resources, time, support system, training facilities, and some intrinsic factors such as attitudes, beliefs, practices, and the resistance of the teachers. The constant need to keep updating with the new innovations makes it an overwhelming experience for the teachers. Teachers are constantly adapting the new ways of learning and teaching at the same time. In a diverse country like India, the digital divide also plays a major role in access to ICT tools. Availability of limited or no access to hardware facilities can pose the biggest challenges in adopting technologies for the teachers. Many schools in rural India lack basic facilities of electricity and internet making teachers rely on textbook-based teaching. School-level factors such as organizational culture and teacher-level factors as beliefs about teaching and technology also impact the motivation levels of the teacher. Lack of digital literacy and adequate continuous training about the use of technology in the teaching process makes it difficult to navigate with the technology in the classroom. Another constraint is of insufficient time and content to use their ICT skills. The non-teaching responsibilities and pressure to complete the textbook syllabus also discourage teachers to use ICT tools. All these factors contribute to making it difficult for teachers in India to explore digital resources and use technology with their teaching.

Conclusion

Indian teachers have been adopting various EdTech integration with their classroom teaching and exploring the potential it holds for improving the learning outcomes of the students. In today's time technology is viewed as an important tool that helps teachers in effective classroom delivery. These technological advancements are helping teachers to reinforce existing

pedagogical practices in innovative ways. It has allowed teachers to create and disseminate high-quality lesson plans. Technology is helping in transforming the role of a teacher from an instructor to a guide that supports students learning journey. However infrastructural challenges, lack of digital content, insufficient time, non-teaching responsibilities, and contextualized resources are restricting teachers from fully leveraging the potential of technology. The Indian government needs to address these challenges of poor connectivity and infrastructure. Blended forms of training with both online and offline resources should be encouraged to have a sustainable model for continuous teacher development. Availability of more mobile-based applications for resources for teachers will help in easy access of these resources. Teacher training through sustained technical as well as pedagogical support will prove to be the foundation of any investment in education technology. There should be a collaboration of teachers, policymakers, administrators, and other stakeholders in the decision-making process as well design and implementation of professional development programs. This will create a positive perception of technology in a teacher's mind and will encourage them to optimize it more in their classrooms.

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