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Technology Transfusion in Indian Education Systems - Impact and Challenges

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Abstract
Technology continues to be incorporated into India's educational system in a revolution that promises to upend established teaching-learning paradigms. The emergence of digital classrooms and the spread of online learning environments are two examples of how technology is changing educational environments across the nation. This essay attempts to provide a thorough analysis of the various ways that technology has affected Indian education, examining how it might be used to increase access, boost student achievement, and support creative teaching methods. There is no denying technology's revolutionary power. It provides previously unheard-of chances to tailor instruction, increasing student engagement and relevance to their specific requirements. Additionally, technology-enabled platforms can cross geographic barriers to give students in underserved and rural places access to high-quality education. Digital materials have enormous potential to enhance classroom experiences and complement textbooks. There are many obstacles in the way of fully utilizing technology in Indian education, though. The disparity in technology access and digital literacy, known as the "digital divide," continues to be a major obstacle. Limitations in infrastructure, especially in rural regions, make it difficult for technology to be adopted smoothly. Furthermore, thorough teacher training is necessary for the successful integration of technology; this is a process that calls for a significant financial commitment and continuous assistance. In order to better understand these complications, this article will look at how technology specifically affects different stakeholders, such as administrators, instructors, and students. This research aims to contribute to the development of strategies for optimizing the advantages of technology while minimizing its disadvantages, ultimately helping to create a more inclusive and efficient education system in India, by comprehending the interplay between opportunities and challenges.
Keywords: Indian Education Systems, Technology, Impact and Challenges

1. Introduction

Tremendous potential and difficulties have arisen as a result of the introduction of technology into the Indian educational system. The goal of this infusion of digital tools and platforms is to close the gap between urban and rural areas, improve learning results, and increase educational accessibility. The Indian government has emphasized the significance of using technology to promote a more inclusive and efficient educational environment through programs like Digital India and the National Education Policy (2020) [1]. There are several ways that technology is affecting schooling. Particularly during

the COVID-19 pandemic, online learning platforms, educational apps, and virtual classrooms have become essential tools for providing education. These technologies have democratized access to high-quality education, allowing students in remote regions to take use of previously unavailable resources [2]. Furthermore, data analytics and artificial intelligence are being used to tailor learning experiences, accommodate different learning styles, and highlight areas for growth. However, this technological revolution does not come without its obstacles. The digital divide remains a substantial obstacle, with discrepancies in device access and internet connectivity preventing equitable distribution of educational possibilities [3]. Furthermore, the quick pace of technological change needs educators' constant upskilling, as new technologies must be successfully integrated into their instructional techniques. There is also the difficulty of protecting students' data privacy and security in an increasingly digital learning environment. Furthermore, reliance on technology can worsen socioeconomic disparities, as students from low-income families may struggle to acquire necessary gadgets and internet access [4]. The transition to digital education necessitates significant investment in infrastructure and teacher training, as well as the creation of strong regulations to encourage and control the use of technology in education. To summarize, while the integration of technology into Indian education systems has immense promise for changing the landscape of learning, tackling the associated issues is critical. A collaborative effort from the government, educators, and stakeholders is required to guarantee that the benefits of technology are realised equally and sustainably [5].

2. Growth in the Number of Higher Educational Institutions in India

According to the All-India Survey on Higher Education (AISHE) report for 2020-21, the number of higher education institutions in India has increased significantly. According to the research, the number of higher education colleges registered for the survey has increased significantly, from 864 in the 2016-17 academic year to 1,113 in 2020-21. This reflects a nearly 28.8% increase, suggesting that the higher education industry expanded significantly during this time period. In addition to universities and higher education institutes, India's number of colleges has grown significantly. The overall number of colleges has increased from 40,026 in 2016-17 to 43,796 in 2020-21 [31].

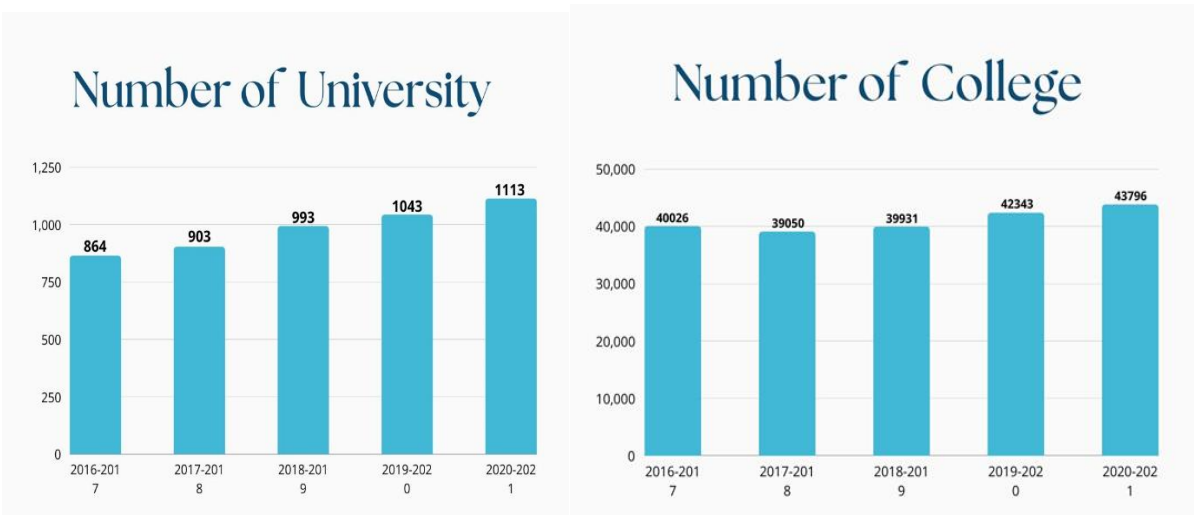

Fig 1: ezyschooling.com

This expansion underscores continuous efforts to enhance access to higher education across the country, meeting students' growing demand for quality educational opportunities. This development in higher education institutes and colleges demonstrates the Indian government's commitment to developing and upgrading the higher education system. The rise in institutions is intended to meet the diversified educational needs of a big and young population, promote socioeconomic development, and prepare a trained workforce for the future [6]. The linked graphs in the report provide a visual representation of this expansion, demonstrating an upward trend in the number of educational institutions throughout the provided period. These visualizations help to better comprehend and appreciate the scope and impact of India's higher education infrastructure expansion [7]. Inclusive, the large increase in the number of higher educational institutes and colleges demonstrates the dynamic nature of India's education sector, which is driven by policies and activities intended at improving access, equity, and quality of higher education. This expansion is a great step toward accomplishing the overarching goals of national development and international competitiveness.

3. Major Impacts of Technology in Indian Education System

Technology has transformed the Indian education system, increasing access to quality education, particularly in remote places. Interactive and multimedia tools have improved learning engagement and effectiveness, while customizable platforms adapt to particular student needs [8]. Teachers benefit from modern class planning and assessment technologies, which improve their efficiency. Overall, technology has facilitated a more inclusive and dynamic educational environment in India.

a. Enhanced Accessibility

Technology has transformed access to education in India. Online learning platforms, digital textbooks, and educational apps have broken down geographical barriers, making quality education available to students in remote and rural places. Students can now access a massive collection of knowledge and learning resources from anywhere, at any time [9]. With the widespread availability of the internet and mobile devices, students can now attend virtual courses and access online resources from their homes. Initiatives such as the Digital India program have helped connect schools and students to the internet. This connectivity has helped e-learning platforms like BYJU'S and Khan Academy reach a larger audience. Government programs such as SWAYAM offer free online courses from premier universities, hence expanding educational options for everybody [10]. This has resulted in a large rise in enrolments and decreased dropout rates, particularly among vulnerable communities. Technology has also played an important part in providing education to students with disabilities, including assistive technologies and inclusive learning platforms. Additionally, mobile learning apps have enabled students to continue their education even in places with insufficient infrastructure [11]. The improved accessibility has also created opportunities for adult education and lifelong learning, resulting in a better educated population.

b. Personalized Learning

Technology enables instructors to develop personalized learning experiences that are suited to each student's needs, speed, and learning style. Adaptive learning platforms use AI and data analytics to detect students' strengths and shortcomings, then provide customized interventions and support. Personalized learning helps to accommodate the different rates at which students understand information, preventing frustration and boredom [12]. Students can concentrate on their weak points while moving rapidly through topics that they find simpler. This strategy also enables teachers to track each student's development and provide individualized assistance. Tools like customizable dashboards provide students with a clear picture of their achievements and places for improvement [13]. Online tutoring and mentoring services enhance personalized learning by providing one-on-one supervision. This tailored strategy improves student engagement, motivation, and learning outcomes. Furthermore, technology allows students to pursue their hobbies and passions through a wide range of online resources and interactive tools, instilling a love of learning. The use of technology in education has altered the learning process, making it more dynamic and engaging. Collaborative tools facilitate group projects and peer learning, promoting a cooperative educational atmosphere [14]. Overall, technological developments have made learning more fun and efficient.

c. Improved Learning Outcomes

Technology has changed the way kids learn, making it more interactive, engaging, and efficient. Educational apps and software include multimedia content such as films, animations, and simulations to help students visualize complicated subjects. Gamified learning experiences enable students to participate actively, which boosts motivation and interest [15]. Virtual and augmented reality tools provide immersive experiences that can replicate real-world events and research. Smart classrooms with digital boards and projectors enable dynamic teaching methods. Furthermore, technology provides rapid feedback through quizzes and interactive exercises, allowing students to grasp their mistakes in real time [16]. Collaborative tools facilitate group projects and peer learning, promoting a cooperative educational atmosphere. Multimedia information, simulations, and virtual reality experiences bring complicated ideas to life, making them easier to grasp and recall [17]. Educational games and simulations can also make learning more pleasurable, which boosts student motivation and retention.

d. Teacher Empowerment

Technology provides instructors with a multitude of materials and tools to help them improve their teaching skills. Digital lesson plans and materials save time in preparation while allowing for more innovative and interesting content. Online assessment technologies automate grading and provide thorough data on student performance, allowing teachers to discover

areas that require improvement [18]. Administrative duties like attendance monitoring and assignment submissions are streamlined by learning management systems such as Moodle and Google Classroom. Virtual classrooms allow teachers to teach remotely, ensuring educational continuity during disturbances such as the COVID-19 epidemic [19]. Furthermore, professional development platforms enable teachers to upskill and stay current with educational trends. Collaboration technologies allow the exchange of best practices among educators, establishing a culture of continual development. The incorporation of technology allows teachers to focus more on teaching and less on administrative tasks [20]. We can make education more effective and rewarding by empowering instructors with technology.

e. Administrative Efficiency

Technology has simplified administrative work at educational institutions, freeing up time and resources for more important educational activities. Student information systems, online admissions, and digital record-keeping have increased efficiency and accuracy [21]. Digital platforms have transformed collaboration and communication in the educational system, linking students, teachers, and parents like never before. Online discussion forums and chat groups allow students to discuss issues, ask questions, and cooperate on projects, which improves peer-to-peer learning. Video conferencing systems like as Zoom and Microsoft Teams enable real-time interaction, allowing for virtual classes and meetings. Parents may keep track of their child's progress with digital report cards and regular updates via school applications [22]. Teachers may connect more effectively with students and parents, offering immediate feedback and support. Multiple people can work on the same document at the same time using collaborative technologies such as Google Docs and Microsoft Office 365, which promotes teamwork. Social media platforms also help to disseminate knowledge and foster community [23]. This enhanced efficiency enables schools to focus on increasing teaching and learning results while also offering better student support services.

f. Development of 21st Century Skills

Technology in education is critical in acquiring fundamental 21st-century skills required for future employment. Students learn to navigate and use numerous technical tools and platforms, with a strong concentration on digital literacy. The usage of coding and programming languages from a young age improves problem-solving and critical thinking skills. Project-based learning, supported by technology, helps students to apply their knowledge to real-world circumstances, thereby developing practical skills [24]. Online courses and certifications in data science, artificial intelligence, and digital marketing equip students with advanced knowledge and credentials. Interactive platforms use group activities and discussions to teach soft skills like communication and collaboration. Exposure to technology prepares pupils for the digital workforce, increasing their job market competitiveness [25]. Overall, technology-integrated education provides students with a varied set of skills that extend beyond standard academic knowledge. By providing kids with these 21st-century abilities, technology prepares them for future occupations and difficulties.

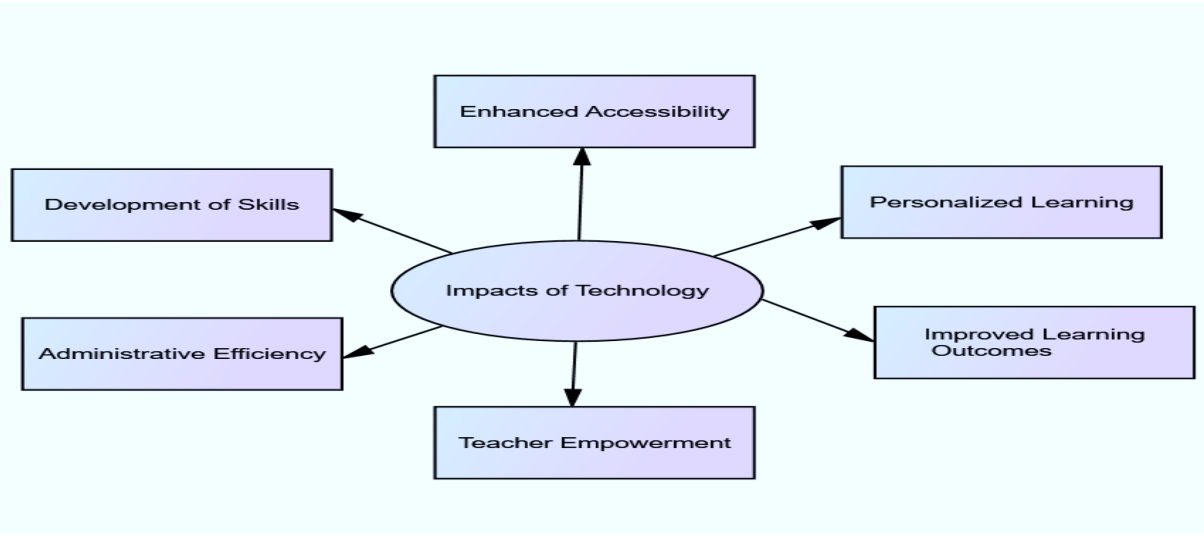

Figure 2: Authors Formulation

4. Major Challenges of Technology in Indian Education System

Disparities in technology availability between urban and rural areas, quality assurance of digital information, and the requirement for teacher training are all barriers to technology integration in the Indian education system. Cybersecurity dangers and privacy concerns over student data are also serious considerations. Furthermore, infrastructure limits and guaranteeing equitable educational practices are critical obstacles that must be addressed to fully realize the benefits of educational technology across the country.

a. Digital Divide

The digital divide remains a serious concern in India's education system. While urban areas have reliable internet connections and access to contemporary technologies, many rural and remote places lack basic infrastructure. This discrepancy results in an unequal learning environment in which pupils from underserved areas are at a disadvantage. Affordability is another concern, as many families cannot afford laptops or smartphones for their children's schooling [26]. Efforts to bridge this gap, such as government initiatives and public-private partnerships, are ongoing, but the issue has not yet been entirely resolved. The digital gap also impacts teachers, who often lack proper training and resources. Ensuring fair access to technology is critical to fulfilling India's universal educational ambitions. Without bridging this difference, the benefits of technology in education will not be fully realized for all kids.

b. Quality of Digital Content

The quality of digital content available for teaching varies greatly, which presents a considerable difficulty. Some platforms give high-quality, interesting content, whilst others deliver outdated or badly designed information. This instability can result in a substandard learning experience and reduce student engagement. Furthermore, much of the available digital content is in English, which limits access for pupils who speak regional languages [27]. There is a demand for educational materials that are more culturally and locally relevant. The fast expansion of online education has resulted in the proliferation of unverified and low-quality content, making it difficult for students and teachers to identify reputable sources. Effective digital learning requires the assurance of content quality through standardization and regulation [28]. Collaboration among educational institutions, technology businesses, and regulatory agencies can enhance the quality and relevance of digital instructional content.

c. Teacher Training and Adaptation

Many teachers in India struggle to adapt to new technology due to a lack of training and assistance. The traditional education system has not adequately prepared educators for the use of digital resources into their instructional techniques. Continuous professional development and training programs are required to provide instructors with the skills they need to properly use technology [29]. Another difficulty is resistance to change, since some educators may be hesitant to adopt new ways because they are more comfortable with traditional approaches. Providing incentives and demonstrating the benefits of technology in boosting teaching can assist to alleviate this aversion. Furthermore, there is a demand for more user-friendly and simple technology solutions that require little training [30]. Addressing these issues is critical for the successful adoption of technology in education since teachers play an important role in the learning process.

d. Cybersecurity and Privacy Concerns

The increased use of technology in education raises serious cybersecurity and privacy problems. Educational institutions and platforms collect massive amounts of data, including personal information from students and professors. Protecting this data against breaches and illegal access is critical [31]. Many schools and institutions may lack the necessary resources and knowledge to deploy effective cybersecurity safeguards. The proliferation of online learning exposes pupils to cyber dangers such as hacking, phishing, and cyberbullying. Ensuring secure online settings is critical to retaining trust in digital education systems. There are also issues regarding data misuse, such as the marketing of student information [32]. Implementing strict data protection policies and teaching students and instructors about online safety can assist to reduce these hazards.

e. Infrastructure Limitations

Nevertheless developments, infrastructure restrictions continue to be a key impediment to widespread adoption of technology in education. Many schools, particularly in rural areas, lack basic utilities like electricity and dependable internet access. Even in cities, bandwidth limitations and network congestion can impede online learning [33]. Many institutions find it prohibitively expensive to upgrade their infrastructure to facilitate digital education. Furthermore, the

maintenance and technical support needed to keep the system functioning smoothly provide new obstacles. Government and private sector investments are required to construct and maintain the essential infrastructure. Public-private collaborations can help address these obstacles and ensure that all children benefit from digital education.

f. Equity and Inclusivity

Ensuring that technological developments in education benefit all students equally presents a big problem. Students with impairments may encounter additional challenges to obtaining digital education. Many educational platforms and technologies are not created with inclusiveness in mind, rendering them inaccessible to students with disabilities. Furthermore, socioeconomic gaps ensure that not all pupils have equal access to technology and internet connectivity [34]. Gender discrepancies are also present, with females in some areas having less access to educational technology than boys. Developing inclusive educational policies and accessible digital tools are critical steps toward eliminating these imbalances. Efforts to encourage digital literacy and provide tailored assistance to underrepresented groups can help close the gap and ensure that all students benefit from technological improvements in education.

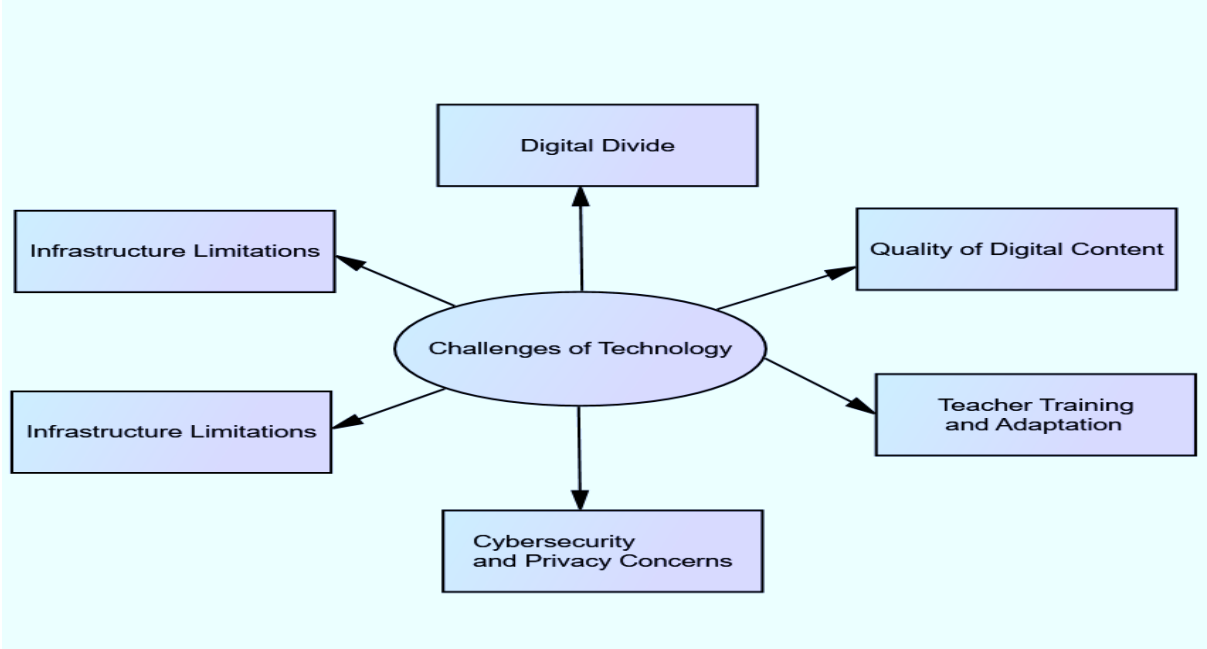

Figure 3: Authors Formulation

5. Conclusion

The incorporation of technology into the Indian education system has resulted in dramatic changes, improving access, learning experiences, and educational outcomes. The rise of online learning platforms, digital classrooms, and interactive learning technologies has increased access to high-quality education, particularly in rural and isolated places. Personalized learning, enabled by adaptive technology and AI-powered platforms, has personalized education to match individual needs, resulting in improved student engagement and progress. Teachers' efficiency has improved, as has teamwork and communication, enriching the educational scene even more. Nonetheless, this technological infusion poses substantial obstacles. The digital divide remains a key issue, with discrepancies in device access and internet connectivity limiting equitable learning possibilities. To promote successful learning, digital information must be standardized and quality assured. Teachers require proper training and support to adapt to new technologies, yet cybersecurity and privacy issues required strong safeguards. Infrastructure constraints, particularly in remote areas, and the demand for comprehensive and fair education exacerbate the situation. In conclusion, while technology has the potential to transform education in India, tackling the accompanying problems is critical to reaping the full advantages. A collaborative effort between the government, educational institutions, and the commercial sector is essential to close gaps, improve quality, and ensure that technological developments benefit all students. By overcoming these obstacles, India may use technology to build a more inclusive, effective, and forward-thinking educational system.

6. Implications and Limitations of the Study

The incorporation of technology into the Indian education system has considerably increased access to education, particularly for pupils in remote and rural areas, by breaking down geographical obstacles. It has improved learning experiences with interactive and multimedia tools, facilitated personalized education with adaptive technologies, and provided teachers with novel resources, resulting in increased teaching efficiency and student engagement. Furthermore, technology has promoted greater collaboration and communication among students, instructors, and parents, assisting in the development of critical 21st-century skills.However, this revolution has limitations, such as the digital divide, which exposes discrepancies in access to technology and internet connectivity between urban and rural communities. Ensuring fair access to these technology breakthroughs remains a significant barrier in reaching their full potential across the educational environment.

Reference

1. Vijayan, V., & Joshith, V. P. (2018). Technological pedagogical content knowledge: A framework for 21st century teacher cognition, International Journal of Research and Analytical Reviews, 325-329.
2. O'Doherty, D., Dromey, M., Lougheed, J., Hannigan, A., Last, J., & McGrath, D. (2018). Barriers and solutions to online learning in medical education - an integrative review. BMC Medical Education, 18(1), 130. https://doi.org/10.1186/s12909-018-1240-0.
3. R. Bhattacharya, Kafila, S. H. Krishna, B. Haralayya, P. Nagpal and Chitsimran. (2023). "Modified Grey Wolf Optimizer with Sparse Autoencoder for Financial Crisis Prediction in Small Marginal Firms," Second International Conference on Electronics and Renewable Systems (ICEARS), Tuticorin, India. 907-913, doi: 10.1109/ICEARS56392.2023.10085618.
4. Anurag Shrivastavaa , S. J. Suji Prasadb , Ajay Reddy Yeruvac ,et.al (2023). IoT Based RFID Attendance Monitoring System of Students using Arduino ESP8266 & Adafruit.io on Defined Area. Cybernetics and Systems: An International Journal. https://doi.org/10.1080/01969722.2023.2166243.
5. P. Nagpal, A. Pawar and S. H. M, "Predicting Employee Attrition through HR Analytics: A Machine Learning Approach," 2024 4th International Conference on Innovative Practices in Technology and Management (ICIPTM), Noida, India, 2024, pp. 1-4, doi: 10.1109/ICIPTM59628.2024.10563285.
6. BK Kumari, VM Sundari, C Praseeda, et.al (2023), Analytics-Based Performance Influential Factors Prediction for Sustainable Growth of Organization, Employee Psychological Engagement, Work Satisfaction, Training and Development. Journal for ReAttach Therapy and Developmental Diversities 6 (8s), 76-82.
7. Namita Rajput, Gourab Das, Kumar Shivam,et, al (2023). An inclusive systematic investigation of human resource management practice in harnessing human capital, Materials Today: Proceedings, 80 (3),2023, 3686- 3690, ISSN 2214-7853, https://doi.org/10.1016/j.matpr.2021.07.362
8. Kebritchi, M., Lipschuetz, A., & Santiague, L. (2017). Issues and challenges for teaching successful online courses in higher education: a literature review. Journal of Educational Technology Systems, 46(1), 4–29. https://doi.org/10.1177/0047239516661713
9. P Nagpal, Arulmoli, et.al. (2024). Determinants Of Women Entrepreneur Motivational Factors Towards Marketing Organic Products, 6 (10), 687-699. doi: 10.33472/AFJBS.6.10.2024.687-699
10. Dua, S., Wadhawan, S., & Gupta, S. (2016). Issues, Trends & Challenges of Digital Education: An Empowering Innovative Classroom Model for Learning. International Journal of Science Technology and Management, 5(5), 142–149
11. Lakshmi, J.Divya, Pooja Nagpal, et al., (2021). Stress and Behavioral Analysis of Employees using Statistical & Correlation Methods. International Journal of Aquatic Science 12(01), 275-281. ISSN: 2008- 8019 2021
12. Monu Bhagat, Dilip kumar., & Sushma M.Balaji. , (2020). Application of internet of things in digital pedagogy, Computational intelligence in digital pedagogy, 219-234.
13. P Nagpal, C. Vinotha, et.al. (2024). Machine Learning and Ai in Marketing–Connecting Computing Power to Human Insights. International Journal of Intelligent Systems and Applications in Engineering, 12(21s), 548–561. https://ijisae.org/index.php/IJISAE/ article/view/5451
14. Innovations and Education in the digital age: Reconciling the roles of pedagogy, technology and the business of learning, IEEE transaction on engineering management,50(4),403-412.

15. Pooja Nagpal (2023). The Transformative Influence of Artificial Intelligence (AI) on Financial Organizations World Wide. 3rd International Conference on Information & Communication Technology in Business, Industry & Government (ICTBIG). Symbiosis University of Applied Science, Indore.
16. R. Nandhakumar., & Govindarajan .(2020). Effectiveness of database technology in enhancing learning of physics at higher education level, Research and Reflections on Education, 18(3B), 42-46.
17. G. Gokulkumari, M. Ravichand, P. Nagpal and R. Vij. (2023). "Analyze the political preference of a common man by using data mining and machine learning," 2023 International Conference on Computer Communication and Informatics (ICCCI), Coimbatore, India. doi: 10.1109/ICCCI56745.2023.10128472.
18. Shirley Ayonmike, C. (2020). Comparative Analysis of the Effects of Classroom as against Online Mode of Instruction on Students' Psychomotor Performance in Woodwork Technology. Journal of Educational and Social Research, 10(6), 9–17. https://doi.org/10.36941/jesr2020-0106
19. Pooja Nagpal (2022) Online Business Issues and Strategies to overcome it- Indian Perspective. SJCC Management Research Review. Vol 12 (1) pp 1-10. June 2022, Print ISSN 2249-4359. DOI: 10.35737/sjccmrr/v12/il/2022/151
20. Thakker, S. V., Parab, J., & Kaisare, S. (2021). Systematic research of e-learning platforms for solving challenges faced by Indian engineering students. 16(1), 1-19. https://doi.org/10.1108/AAOUJ-09-2020-0078
21. F. A. Syed, N. Bargavi, A. Sharma, A.et.al . (2022). "Recent Management Trends Involved with the Internet of Things in Indian Automotive Components Manufacturing Industries," 2022 5th International Conference on Contemporary Computing and Informatics (IC3I), Uttar Pradesh, India. pp. 1035-1041, doi: 10.1109/IC3I56241.2022.10072565.
22. Kim, K. J., Liu, S., & Bonk, C. J. (2005). Online MBA students' perceptions of online learning: Benefits, challenges, and suggestions. The Internet and Higher Education, 8(4), 335–344
23. Pooja Nagpal & Senthil Kumar. (2017). A study on drivers and outcomes of employee engagement – A review of literature approach. Asia Pacific Journal of Research.4 (1) 56- 62. ISSN -2320-5504. Online E ISSN – 2347-4793.
24. P. William, A. Shrivastava, H. Chauhan, P. Nagpal.(2022). "Framework for Intelligent Smart City Deployment via Artificial Intelligence Software Networking," 2022 3rd International Conference on Intelligent Engineering and Management (ICIEM), pp. 455-460, doi: 10.1109/ICIEM54221.2022.9853119.
25. Fayeeza Khanum & P Nagpal (2019). A Study on Corporate Entrepreneurship Drivers and its Outcome. Journal of Emerging Technologies and Innovative Research, 7, (15), 152- 158.ISSN: 2349-5162.
26. Singh, V., & Thurman, A. (2019). How many ways can we define online learning? A systematic literature review of definitions of online learning (1988-2018). American Journal of Distance Education, 33(4), 289–306.
27. Mulenga, E. M., & Marbán, J. M. (2020). Is COVID-19 the gateway for digital learning in mathematics education? Contemporary Educational Technology, 12(2), ep 269.
28. Madhusudhan R. Urs & Pooja Nagpal (2019). A study on Determinants and Outcomes of Job Crafting in an Organization; Journal of Emerging Technologies and Innovative Research, 7, (15). 145-151. ISSN: 2349-5162
29. S. H. Abbas, S. Sanyal, P. Nagpal, J. Panduro-Ramirez, R. Singh and S. Pundir. (2023). "An Investigation on a Blockchain Technology in Smart Certification Model for Higher Education," 10th International Conference on Computing for Sustainable Global Development (INDIACom), New Delhi, India, pp. 1277-1281.
30. Pooja Nagpal., Senthil Kumar., & Ravindra. H V. (2019). The Road Ahead of HR-AI to boost Employee Engagement; Journal of Emerging Technologies and Innovative Research, 7,(15), 180-183. ISSN: 2349-5162
31. Barak, M. (2014). Closing the Gap Between Attitudes and Perceptions About ICT-Enhanced Learning Among Pre-service STEM Teachers. Journal of Science Education and Technology, 23(1), 1–14. https://doi.org/10.1007/s10956-013-9446-8
32. https://ezyschooling.com/parenting/expert/higher-education-statistics-in-india
33. Goktas, Y., Yildirim, Z., & Yildirim, S. (2008). A review of ICT related courses in pre-service teacher education programs. Asia Pacific Education Review, 9(2), 168–179. https://doi.org/10.1007/BF03026497