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Research Paper

Transformation in Indian Education System: A Shift from Printed books to Educational Apps

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ABSTRACT: *The education system all over the world has witnessed a revolutionary transformation due to the effect of globalization and digitalization. The changes occur not only in the classroom infrastructure and curriculum by introducing innovative technology and by incorporating them in classroom teaching-learning process, but also in the materials used as resources to enhance the learning process from which the knowledge is acquired and constructed by the learners. Instead of the printed materials, the students of the present generation are more comfortable with the e-content like the digitalized version of the textbooks or the educational apps, that provides them open access to more resources, without the burden of carrying the heavy weight printed textbooks and notebooks. But it has its own barriers and barriers too, especially in those areas where internet accessibility is poor. This paper aims to study those initiatives taken by the Govt. of India with special emphasis on the development of the educational apps to make the education more inclusive, affordable and accessible to all. It shows the policies and schemes of Indian Government, by overcoming the digital barrier not only are enhancing the skill and knowledge of future generation, rather is restructuring the entire Indian education system through the innovations and integration of technology.*

Keywords: *Educational apps, Digital divide, Technology, Ministry of Education, Govt. of India.*

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I. Introduction:

The era of Globalization and the rapidly increasing use of technology at modern times are literally reshaping the very concept of teaching-learning or remolding the entire education system, and this change becomes quite evident especially in a developing country like India which is renowned for the fastest growth in major economy globally. It's true that it has its own challenges and hardships but the government initiations and the policies of Ministry of Education in India are very pro to make it happen, and this shift is ardent evidence of the transformation that could bring a revolution in the entire education system in India. But it has its obstacles too. Prof. Mehta has revaluated the traditional chalk and board classroom with respect to the digital alternatives like interactive boards or AI tools used in modern day classrooms, although it raises the question of affordability and accessibility (Mehta, 2025); along with mentioning the major health concerns due to chalk dust and the change in preferences of Gen Z, who are more attached to skill-driven, interactive learning (Nayak, 2024). The changes occur not only in the classroom settings or infrastructure but also in the role of the teachers as well, from a mere content deliverer to facilitator or mentor by using tech enhanced teaching learning materials (Mukta,2023) that becomes a necessity at present day context, but not without the accountability. Indian Government in the new Education Policy, i.e., NEP 2020 has also prioritized the use of technology, by considering equity, and especially in inclusive education and distance education, technology can be a boon for the students if that would be made accessible particularly in rural India by providing the uninterrupted and affordable internet service. The advancement which has started from overhead projector and radio-television broadcasting, now has taken a drastic turn by introducing multimedia presentations and collaborative online projects that is redefining how knowledge is acquired and constructed in the Indian classroom (Mukta, 2023) as an effect of this digital implementation. There are various government schemes and initiatives that work as the steeping stones to achieve the technology aided quality education, and the advent of these educational apps are the landmarks of this digital innovation which transforms the medium of instruction as well, but the success of such integration always depends on the adequate training of the teachers, increase of students' engagement and proper infrastructure to implement those policies (Ferreira, S. et. al,2024). This paper aims to re-investigate by throwing light on those initiatives, schemes

and policies of Indian Government that have been taken to improve the quality of education and to make the entire education system generation ready.

II. Literature Review:

Leaving behind the era of traditional classrooms of chalk and blackboard and printed books, the new advancement with technology brings change not only in classroom setup, but also in the very concept of teaching and learning as well as the preferences of the pupil. There are various researches done inside and outside India to review the digital transformation that brings almost a revolution in education system more or less in each and every country worldwide, but due the limited scope only the papers and reports on Indian context have been taken into consideration.

- Mehta, A. (2025) has done a detailed study on "The Future of Classroom Board and Chalk in Indian Higher Education: Infrastructure, Policy and Pedagogical Shifts" to revisit the technological advancement from blackboard to interactive white board, shifting of students' preferences towards the more interesting tech-aided experiential learning and also health concerns due to the chalk dust by studying the research reports. And he has concluded that a hybrid method that can balance between tradition and innovation can be more effective for Indian Higher Education Institutions situated both in rural and urban areas.
- Bala, A. et al. (2024) has revisited the transformation and development of Indian education along with the increasing demand of technological innovations in "Transformation of The Education System in India: Chalk and Duster to Digitalized Learning" with primary focus on NEP 2020. It has concluded that to hide the lapses in traditional classroom teaching, the digital integration can be an effective alternative, a revolutionary step towards quality education.
- Gorvadiya, A. and Raval, M. (2024) has also studied the future of education system with the advancement of technology in "The Digital Blackboard: How Technology Is Reshaping Education in India" to examine the potential role of technological innovation in improving the quality of teacher training as well as learning outcomes of the students, by overcoming the hurdles of digital divide and through the successful implementation of advance technology in the classrooms. It concludes that digital blackboard has all the potentialities to make the education more meaningful, effective, inclusive and future ready.
- Parveen, S. and Ramzan, S (2024) has revisited the significant transformation in the field of education in "The Role of Digital Technologies in Education: Benefits and Challenges" to illuminate the fact how technology now-a-days serves as a knowledge provider, information creator and mentors by providing access to digital devices like iPads and e-books as resources of knowledge, as an alternative to the heavy weight notebooks.
- Yadav, N. (2024) has examined the historical development of digital learning along with the current trends and its future prospects in "The Impact of Digital Learning in Education" to give an overview of the implementation of technology in education system. It also has showed its drawbacks, notwithstanding proposed that this digital learning has all potentials to drastically change the teaching-learning environment.
- The profound transformation in the landscape of education is major concern of Dr. Mukta (2023) in "From Chalkboards to Chatbots: The Evolution of Tech-Enhanced Teaching" that reflects the shift from traditional teacher centric approach to more dynamic and interactive learner centric approach of learning by using the technology tools. The technological evolution from overhead projector to interactive whiteboards and chatbots or AI generated tools are key focus of this research article. It has pointed out that technology should serve only as a tool to empower both the teachers and the students, but not to replace the human touch in the relationship and values that defines the effectiveness of meaningful education.
- Chaudhary, N. (2023) has examined in "From Chalkboards to Virtual Classrooms" how the digitalization in the field of education has playing a key role in fostering the modern 21st century skills, cultivating a global perspective and nurturing the social and mental wellness, along with promoting equity and inclusion by overcoming the hardships and challenges caused by digital divide. He emphasizes that any advancement comes with its own challenges and risks but that can be overcome by taking the proper measures, but blending of technology in teaching methods is effective for the holistic development of the students.
- Nayak, A. and Parveen, F. (2023) have studied the current trends in the field of education in "Digitalization of Education And Its Impact on Academic Ecosystem: A Review" to figure out the effect of integration of ICT in teaching and learning. It shows how technology have enhanced and become beneficial for teachers, students and the larger ecosystem. Along with supporting the technology integration in the classrooms to prepare the students for this era of globalization, it also shows a major

concern regarding its accessibility and affordability and suggests proper planning and support to ensure the successful implementation.

- Islam, A. and Nachiappan, B. (2021) have studied the revolution in the classroom teaching- learning due to the technological advancement in "Digital Technology and Distraction of Digital Classroom" to investigate how it has evolved in Indian context from the beginning with the overhead projector to the modern technical tools and its effect on teaching learning processes.
- Alokluk, J.A. (2018) tries to re-explore the effectiveness of the use of blackboard in the classroom teaching and learning in "The Effectiveness of Blackboard System, Uses and Limitations in Information Management" to review the utility value of blackboard in the era of digitalization and its importance as teaching learning materials by comparing it with the other learning materials. It shows both its effectiveness and limitations to achieve the quality education and for better academic information management. It emphasizes on the flexibility and accessibility in the use of blackboard.
- Bedi, N. (2017) has investigated the effectiveness of digital classroom in "Impact of Digital Learning in Education" to show how web-based teaching plays a vital role in the enhancement of the learning skills of the students.

III. Aims and Objectives:

This paper aims to review those schemes and policies of Indian government taken to improve the quality of education through the integration of technology and by introducing various educational apps for the enhancement of the learning experience of the students at different levels. The objectives of this research paper are as follows;

- To analyse the effectiveness of the educational apps developed by Ministry of Education, Government of India for the school students and the students of Higher Studies.
- To evaluate the potentialities of the educational apps for professional development in various fields in India.
- To examine the importance of educational apps developed by Indian Government for the students preparing for various competitive examinations.

IV. Research Questions:

The education system in India has witnessed a major shift from the pen and paper and the heavy weight notebooks and printed textbooks to the light weight mobile, iPad, and educational apps that bring a drastic change in the teaching-learning experience as well, being more interactive, learner-centred and inclusive in its approach. The research questions of this research paper are;

R_1: What is the effectiveness of the educational apps developed by Ministry of Education, Government of India for the school students and the students of Higher Studies?

R_2: What are the potentialities of the educational apps developed by Govt. of India for the professional development in various fields in India?

R_3: What is the importance of the educational apps developed by Indian Government for the students preparing for various competitive examinations?

V. Methodology:

This research paper adopts the qualitative approach by analysing both primary and secondary data from the available resources. Primary data are the information provided by the particular education apps about its scope and usage. Secondary data refers to the research papers, articles available to the researcher regarding the use of technology in the educational sphere, particularly in Indian context.

VI. Internal and External Criticism:

The source of primary data is genuine as it is collected by the researcher from the information provided by the government about the app on that particular site and the secondary data collected by the researcher to support the study are also accurate and meaningful and its sources are also reliable.

VII.Educational Apps under Ministry of Education, Govt. of India for School Students, Students of Higher Studies and Competitive Exams:

The initiatives taken by Ministry of Education, the Government of India to make the students adept in using technology for the betterment of their career and enhancement of skill-based experiential learning as well as for professional development. The government has introduced new education policy to make the education system more accessible, affordable, equitable, accountable and inclusive. Various educational apps have been launched by Indian Government in collaboration with various renowned institution for the welfare of the students. A detailed study on those applications has been done here.

1. SWAYAM (Study Webs of Active learning for Young Aspiring Minds): It is a programme initiated by MoE, Govt. of India to achieve the three cardinal principles of education policy, i.e., access, equity and quality. It tries to bridge the gap due to the digital divide, especially in disadvantageous areas. It facilitates learning by introducing courses from class 9 to post graduation. All the courses are prepared by best teachers across the country and are free of cost. Certificates are also provided after the completion of the courses. To provide the best quality content, it has appointed ten National Coordinators, that are

- AICTE (for self-paced and international courses)
- NPTEL (for engineering courses)
- UGC (for non-technical post-graduation courses)
- CEC (for under- graduate courses)
- NCERT (for school education programmes)
- NIOS (for open school education)
- IGNOU (for out-of-school/ open education students)
- IIMB (for students of management studies)
- NITTTR (for technical teacher training programmes)
- INI (for non-technical courses)

It provides the facility of credit transfer in which the credit points obtained by the students will be transferred on the academic record for courses done on SWAYAM.

2. DIKSHA (Digital Infrastructure for Knowledge Sharing): It has been formally launched by Govt. of India on 5th September, 2017 under PM-e-Vidya mission, to provide the digital access to the resources by scanning the QR code in the books of NCERT, not only to the teachers but also to the students and parents as well. It provides e-content of the text books, audio books, virtual labs as well as sign language videos for the improvement of school education. It allows for location-based and class-based preferences. It also provides the facility to store the information and to share it offline without internet connectivity. This application is beneficial for the teachers since it provides more interactive teaching materials to make the classroom teaching-learning experience more engaging. It allows them to track the record of their teaching history and to receive official announcement from state government. This app allows students to facilitate their learning through self- assessment by providing practice sets or exercises. The parents can also have the access to this application to have a knowledge about the classroom activities and to clear their doubts regarding the education of their child.
3. ePathsala: A National initiative by NCERT in collaboration with Ministry of Education, Govt. of India to provide digital access of the textbooks via app, making the learning experience more engaging and interesting with audios, videos, epubs, flipbooks etc. These e-contents are available in multiple languages and can be accessed very easily by anyone through the mobiles, tablets, laptops or desktop computers to achieve the SDG Goal 4 by bridging the digital divide and by ensuring equitable, inclusive and quality education for all that also promote the lifelong learning. It is used as a vast repository of the e-resources for students, teachers, educators and parents. It also provides scope for the research activities in the field of education. The access to the digital textbooks and e-resources in a way helps to reshape the teaching- learning experience in the Indian classrooms as well.
4. PM e-Vidya: An educational app that serves as an umbrella space by unifying all the digital apps and platforms launched under Ministry of Education, Govt. of India for the school students. It includes the programmes like DIKSHA, SWAYAM, SWAYAM Prabha tv channels, Community radio and podcasts, Special e-contents for children with special needs and Online coaching for competitive exams to make the learners future- ready and more adept in using technology or e-resources for their improvement.
5. NDLI (National Digital Library of India): This application is the most important project launched with tag line 'your library in your pocket', under NMICT (National Mission in Education through Information and Communication Technology) by the Ministry of Education, Govt. of India in collaboration with IIT, Kharagpur. It is sponsored by MoE, Govt. of India but developed by IIT, Kharagpur to enhance the learning experiences by providing a vast resource repository accessed by all. It helps the learners to find out proper e-materials in the minimum time just by one click. Here users can also download the e-content for further reading. It has newspaper archives, research materials, materials for skill-development, judicial resources, e-books for school education and higher education and cultural archives that can be accessed from anywhere and anytime. It also provides materials for career development by allowing access to the e-contents like question papers related to Entrance and Recruitment examinations.
6. SATHEE (Self-Assessment, Test and Help for Entrance Exams): It is an educational app launched under Ministry of Education, Govt. of India in collaboration with IIT, Kanpur aiming to provide quality coaching to the disadvantageous students preparing for Entrance examinations like JEE, NEET, SSC, Banking Exams, CUET and ICAR Exams. The faculties from various IIT/AIIMs are associated in this project. It tries to make the exam preparation more inclusive, affordable and accessible across India. It is

basically an AI generated platform that provides materials to help the self-preparation of the students for those competitive examinations with videos, lectures, mock tests and mentorship from the renowned faculties of IITs and AIIMs.

7. Bhasha Sangam: It is an educational application developed by Ministry of Education, Govt. of India, aiming to foster the spirit of 'Ek Bharat Shrestha Bharat' while celebrating the rich cultural and language diversity among different states and UTs. It wants to remove the language barrier by facilitating learning of 22 official languages of India. The entire programme is designed in a gamified lesson manner where each lesson is personalized based on user's accuracy in answering the questions. The users can learn 100+ daily used sentences in the 22 different languages and their translations through audios. After every sentence user is asked to answer few questions to facilitate the learning and an e-certificate also awarded from the Govt. of India to recognize the user competency in learning that particular language.
8. Rastriya e-Pustakalaya: It is an initiative taken by Ministry of Education, Govt. of India to foster the reading habits among learners in collaboration with Department of School Education and Literacy. It serves as a digital library by providing unlimited access to the vast repository of knowledge, literatures and stories to a diverse range from fiction or non-fiction to comics and rhymes for children in various languages aiming to make the reading joyful and enjoyable for the learners. It wants to make the youths aware about India's rich culture, heritage and achievements.

VIII. Other Educational apps developed by Govt. of India for Professional Development:

There are some other educational apps of Indian Government that are not under the Ministry of Education, Govt. of India but play a key role in skill development, professional development or development of language competency that also helps the learners to shine in their career.

1. Skill India Digital Hub: It is an initiative under Ministry of Skill Development and Entrepreneurship, Govt. of India to make the learners AI ready. It also has recently launched a programme SOAR (Skilling for AI Readiness) to empower the minds of the learners to the AI driven future. It provides interactive, hands-on learning experiences, courses are prepared aligned with NEP 2020 and also certifies the learners after completion of the courses.
2. NISHTHA (National Initiative for School Heads' and Teachers' Holistic Advancement): It is an initiative under Samagra Siksha Abhijan to improve the quality of the teachers through integrated training courses at different levels. It aims to increase the competencies of the school teachers to strengthen the school education system. It addresses diverse requirements of the learners, especially the learners from disadvantageous areas. It allows the teachers and principals to gain expertise in various domains so that they can fulfil the gap by addressing diverse needs of the children with the help of multiple pedagogies.
3. iGOT Karmayogi (Integrated Government Online Training Karmayogi): It is an educational app for the civil servants of India under Mission Karmayogi programme that hosts professional courses for the moral, ethical and skill development of civil servants to increase their competencies in governance. It provides self-paced courses in multiple languages, webinars, peer- learning opportunities to enhance their potentiality in governance, technical skills and management.

IX. Limitations of the study:

- This research paper only focuses on the technological advancement in the arena of education in Indian contexts.
- This research paper only studies the educational applications and the transformation due to its usage, whereas there are other various digital tools available for the learners to make their learning experience more engaging.
- This research paper takes only the educational apps developed by Govt. of India into the consideration. It overlooks the other non-governmental educational apps which also facilitates effective learning and capacity building of the learners, due to its limited scope to explore.

X. Conclusion:

A drastic revolutionary change occurs in the education system in India due to the integration of technology and implementation of new government policies and schemes that not only promotes digital learning but also lifelong learning and professional capacity building. The transformation of traditional classroom into a digital classroom, from blackboard to interactive digital board quite evidently leads towards another shift in learning materials from printed books to educational apps and from notebooks to iPads, that not only changes the learning experience of the learners, but also provides scopes for the researchers to study and explore their research activities in this domain.

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