

Teacher Education in the Digital Age: Reforms and Policies



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Abstract

Education globally is one of the significant sectors to witness revolutionary changes in recent times. Digital Education is the panacea for this anathema of education all over the globe. It is in particular a blessing for developing countries which chronically suffer from ailments of access and affordability.

Primarily Digital Education has 3 components:

1. The content
2. The technology platforms
3. The delivery infrastructure

The Indian IT sector organically or otherwise holds enough capacity and character to provide excellent digital content and supporting technological platforms. With the advent of several corporate giants like TATA, BSNL & RELIANCE in digital education and the subsequent money flow this sector is gearing up for some quality movement. But innovation is one thing that has no end and therefore would always invite different stakeholders like Government, Content experts, Technology firms, Users, Teaching community etc. to come together to collaborate and invent cutting edge technologies and methods to facilitate this sector's meaningful growth. But the delivery infrastructure can't be talked about without teachers. There lies an onus on the teachers to adapt to the changing times and learn digital techniques for more innovative modes of teaching. In India, digital education comes as a win-win for all. Education institutions see the rapid rise in enrollments and added revenue. Students view this as a flexible option allowing them to study as per their time and pace. Teachers too find it convenient to prepare their learning plans well aided by technology. Teaching becomes a smoother experience with a perfect mesh of personalized packages having a blend of animations and elaborate audio-visual effects.

Keywords: Digital Education, Reform, Teacher Education, Technology.

Introduction

The Education System which was evolved first in ancient India is known as the Vedic system. The importance of education was well recognized in India, '**Swadeshe pujiyate raja, vidwan sarvatra pujiyate**' "A king is honoured only in his own country, but one who is learned is honoured throughout the world."

In the last twenty years, the educational scenario has seen major changes and new concepts such as rights-based approach to elementary education, student entitlement, shift in emphasis from literacy and basic education to secondary, higher, technical and professional education, the endeavour to extend universalization to secondary education, reshape the higher education scenario. Recent developments include a new impetus to skill development through vocational education in the context of the emergence of new technologies in a rapidly expanding economy in a globalised environment, need for innovative ways of student financing, addressing challenges of globalization and liberalization, recognition of multi-disciplinary and inter-disciplinary nature of learning and knowledge, efficient use of public resources and encouraging ways of enhancing private investment and funding.

The advent of technology and Digital Era

The process of imparting education has gone through a sea change if we look at the picture 10-20 years before now. Technology has taken over almost every field of our lives and the onset of online courses came as a path-breaker. No longer did one need to have access to schools, time or a lot of money! All one needed was a good internet connection and a computer. Now however, digital learning has seeped into the system considerably and has a far-reaching impact towards educating the vast population of India.

Though India is at a nascent stage when it comes to digital education compared to developed nations, none the less it's growing at a substantially rapid rate of 55 per cent. Edu tech is certainly ushering the new age of learning in India. It is estimated that the ed-tech market will double in size from the present USD 20 billion to USD 40 billion by the end of 2017.

Aim of the Study

The paper thus seeks to look into the future prospects with respect to digitalization of teaching mechanism and also the current policies and programs that support this vision. The study undertaken delves into the current realities as well as future prospects and also various changes that may be incorporated in different levels of Education by means of Information Communication and Technology.

Review of Literature

1. National Policy on Education-2016, Ministry of Human Resource Development, Government of India (TSR Subramaniam Report): This is a government report published by ministry of HRD on various dimensions of education policy and a special focus is given to the use of Information and Technology in teachers education.
2. National Policy on Education (www.mhrd.gov.in) : The policy is currently in progress as an initiative of the government of India to reach its goal of advancement in education at all levels by introducing technology at all – primary, secondary and tertiary levels of education
3. E-Education, Digital India program (www.digitalindia.gov.in): This is the official website of government of India used in the paper to collect recent statistics and highlight the initiatives taken under Digital India program.
4. <http://www.dailyo.in/politics/digital-india-narendra-modi-education-technology-students-teachers-schools/story/1/4829.html> : This is an online article which stresses upon the need of the hour to upgrade the teachers education and thereby bringing advancement in modes of learning through technology.
5. Educational Technology and ICT, Dr. Bhatnagar, Bookman publications, 2016: The book entitled 'Educational Technology and ICT' Comprises a bird's eye view of current knowledge in Educational Technology and its application to teaching-learning. In this, the information and matter have been brought up to date in accordance with the latest development in the field. The application and significance in education of each topic have been specially treated. The authors feel that there is ample scope for further study as the field of Educational Technology is growing day by day. Attempts have been made to avoid unnecessary details. Material and information given in points with brief explanation have been arranged in a logical manner. Also, the language used is quite lucid and easy. Though, the book is left for the readers to judge and decide about its usefulness, yet, the authors are sanguine and fully confident that the book in its present form will be quite helpful in

giving them a whole view of Educational Technology.

6. Quality Issues in ICT based higher education, Stephen Fallows and Rakesh Bhanot, SEDA Series, 2013: Education Through Information and Communications Technology, " covered how to best implement ICT program, this invaluable book provides advice on how to ensure educational quality is maintained when ICT approaches are successfully adopted. Issues of quality touch on every part of higher education, but those using ICT to deliver the curriculum are presented with many unique considerations. This book includes contributions from leading authors around the world, who scrutinize the implications of using institution-wide ICT in teaching strategy and examine how quality assurance can be embedded in the development of ICT-based materials. Contents include: the impact of initiatives from external quality assurance agencies; quality in distance learning ICT program; assessment using ICT-based approaches
7. ICT: Changing Education, Chris Abbott,, Psychology Press, 2000 : Information communication Technology (ICT) is changing the face of education. In this timely and accessible book, Chris Abbott examines the process by which ICT, and in particular its role in relation to literacy, has become central to national educational policies.
8. The author traces the history of computer use in schools and examines the concept of virtual learning communities using case studies involving learners, parents and educationalists. The role of the Internet is considered along with the differing national policies on its adoption and on developing online context. ICT: Changing Education reveals the development of open and flexible learning as the next stage of ICT's involvement with education.
9. Digital Generations: Children, Young People and New Media, David Buckingham, Routledge, 2013: The book is organized around four key themes: Play and Gaming, The Internet, Identities and Communities Online, and Learning and Education. The book brings together researchers from a range of academic disciplines – including media and cultural studies, anthropology, sociology, psychology and education – and will be of interest to a wide readership of researchers, students, practitioners in digital media, and educators.

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literacy and basic education to secondary, higher, technical and professional education, the endeavour to extend universalization to secondary education, reshape the higher education scenario. Recent developments include a new impetus to skill development through vocational education in the context of the emergence of new technologies in a rapidly expanding economy in a globalised environment, need for innovative ways of student financing, addressing challenges of globalization and liberalization, recognition of multi-disciplinary and inter-disciplinary nature of learning and knowledge, efficient use of public resources and encouraging ways of enhancing private investment and funding.

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Main Reasons for the Growth of Digital Learning

1. With nearly a billion people on mobile phones and over 200 million mobiles connected to the internet, there has been a considerable rise in digital learning,
2. The use of best-in-class content, real-time learning and feedback methods, and personalised instructions has encouraged online learning,
3. People are stepping towards digital learning as the ed-tech firms are providing them the comfort of 'live and interactive' anywhere learning in digital format, through its online programmes.

Such offerings are changing the way India learns by giving students an edge in learning, along with an opportunity to progress in their career. The impact of new technologies in educational contexts has been mostly positive as new technologies have given educators the opportunity to enhance their knowledge, skills, and therefore, enhance the standard of education through constructivist learning environment with digital storytelling. The students gain knowledge from masters of the subjects from world class institutes which is something they have always desired.

Creating Pathways for Digital Learning in Indian Schools: Some Policy Imperatives

Creating conducive policy framework to incorporate technology into educational practices in the nation is the need of the hour. The rapidly evolving landscape of digital learning has the potential to change how education is transacted and how both

teachers and learners engage and participate in the pedagogical processes. Over the past few years, the design and development of new technological affordances in the form of repositories of open educational resources, games, simulations and online learning platforms has been growing.

However, one of the key challenges has been to integrate it organically within the school curriculum while simultaneously empowering the teachers to use these affordances as effective pedagogical tools. In the Indian context, large scale adoption and diffusion of such innovative educational practices can be facilitated only through a conducive policy framework that can inform the manner in which digital learning can be leveraged in schools with the teacher as a central driver of the innovation.

The MHRD during 2015 had structured inputs on two new themes viz. Promotion of Information and Communication Technology (ICT) systems in school for adult education, new knowledge, pedagogies and varied approaches for teaching of math, science and technology in schools to improve learning outcomes. The manner in which the MHRD delivers on these two themes will be of particular interest to the small yet emerging community of educationists in the country. It is expected that the new policy provisions will commit to leveraging technological affordances for enhancing classroom processes, strengthening the role of the teacher, and creating digital pathways of learning.

The 2030 Agenda for Sustainable Development adopted by the United Nations in September 2015 acknowledged that there is great scope in accelerating the human progress by eliminating digital gaps, which is only possible by educating the society on the spread of information and communications technology. This in turn will require facilitating exchange of thought at all levels between the learners, teachers and the larger ecosystem to build interconnectedness. In the Indian context, the existing inequities in educational opportunities are further exacerbated by a digital divide and there is a need to facilitate connectedness at all levels between the learners, teachers and the larger ecosystem. Technology enabled 'connected learning' has the potential to address geographical and social disparities, but there needs to be a policy imperative to ensure these are used with broader goals of equity and social inclusion. Furthermore, the possibility of "working at scale" provided by these tools can also become a key ingredient to foster connectedness.

National Education Policy – Focus on Teacher Education and ITC capacity building

The National Policy on Education 1986, as modified in 1992, stressed the need to employ educational technology to improve the quality of education. The policy statement led to two major centrally sponsored schemes:

1. Educational Technology (ET)
2. Computer

Educational technology also found a significant place in another scheme on upgradation of science education. The significant role ICT

(Information and Communication Technology) can play in school education has also been highlighted in the National Curriculum Framework 2005 (NCF) 2005. Use of ICT for quality improvement also figures in Government of India's flagship programme on education, Sarva Shiksha Abhiyan (SSA). Again, ICT has figured comprehensively in the norm of schooling recommended by the Central Advisory Board of Education (CABE), in its report on Universal Secondary Education, in 2005.

Information and Communication Technology in School Education

The challenge of developing alternate modes of education, continuing education, teacher capacity building, information systems for efficient management of the school system are being addressed. With Information and Communication technologies becoming more accessible, reliable and mature, the prospect of leveraging ICT for education is becoming increasingly feasible. Information and Communication Technologies in Schools have enabled the convergence of a wide array of technology based and technology mediated resources for teaching learning. It has therefore become possible to employ ICT as an omnibus support system for education.

ICT Literacy and Competency Enhancement

The policy defines ICT Literacy in terms of levels of competence. Based on the stage of schooling at which a student or teacher is introduced to ICT, they may progress to different levels. These levels are suggestive and adaptations must be made to suit local conditions.

The levels do not correspond to specific classes (for eg, sixth or seventh standard) and time duration must also be locally determined. Also, these levels must be revised periodically to keep pace with changing technology.

Stage 1: Basic

Basics of computers and basic use of tools and techniques – operate a computer, store, retrieve and manage data, use a computer to achieve basic word and data processing tasks; connect, disconnect and troubleshoot basic storage, input and output devices, connect to the internet, use e-mail and web surfing, use search engines, keep the computer updated and secure, operate and manage content from external devices (sound recorders, digital cameras, scanners etc.); connect, disconnect, operate and troubleshoot digital devices;

Stage 2: Intermediate

Create and manage content using a variety of software applications and digital devices; using web sites and search engines to locate, retrieve and manage content, tools and resources; install, uninstall and troubleshoot simple software applications etc.

Stage 3: Advanced

Use different software applications to enhance one's own learning – database applications, analysis of data and problem solving, computing, design, graphical and audio-visual communication; undertake research and carry out projects using web resources; use ICT for documentation and presentation; create and participate in web based

networks for cooperative and collaborative learning; become aware of issues of cyber security, copyright and safe use of ICT and take necessary steps to protect oneself and ICT resources.

As each stage is defined by competencies to be achieved by teachers and students, the pace is dependent on frequency of access to the ICT facilities

ICT Enabled Teaching – Learning Processes

ICT enabled teaching-learning encompasses a variety of techniques, tools, content and resources aimed at improving the quality and efficiency of the teaching-learning process. Ranging from projecting media to support a lesson, to multimedia self-learning modules, to simulations to virtual learning environments, there are a variety of options available to the teacher to utilise various ICT tools for effective pedagogy. Each such device or strategy also involves changes in the classroom environment, and its bearing on effectiveness.

Capacity Building of Teachers

Capacity building of teachers will be the key to the widespread infusion of ICT enabled practices in the school system. A phased programme of capacity building must be planned in 3 phases:

1. In service training of teachers may comprise of Induction Training as well as Refresher Courses. The induction trainings can be imparted by the Regional Institutes of Education of the NCERT, State Councils of Educational Research and Training (SCERTs) or such other institutions of the Central and State Governments and will preferably be completed before the commencement of the academic year. The refresher trainings can be carried out every year to enable teachers to share, learn and keep abreast of the latest trends in ICT based teaching –learning processes. The induction training must be followed by teacher's evaluation to ensure that the minimum competency is achieved.
2. Teacher participation in the digital content development - This process will catalyze its broad based usage in the classrooms. Teacher capacities will be developed in instructional design, selection and critical evaluation of digital content, and strategies for effective use of digital content to enhance student learning.
3. All pre-service teacher education programmes will have a compulsory ICT component. The existing curricula for pre-service teacher's training will be revised for including appropriate and relevant applications of ICT. All teacher trainees passing out of teacher education programmes will obtain adequate levels of competency in ICT and ICT enabled education. This proficiency will gradually form a part of the eligibility criteria for teacher appointments.

Capacity building of School Heads

School heads will play an important role in establishment and optimal utilization of ICT and ICT enabled education practices in the school. All school heads must undergo appropriate orientation in ICT and ICT enabled education training programmes. This will also help them in building up digital resources for the school.

The 'Shiksha' Experiment

A private foundation has been implementing 'Shiksha', a project in 340 schools across 244 villages, mostly rural, covering 15,000 students of Grade 1 and 2, in different parts of Uttar Pradesh, for the past two years. An extract from their report (according to them independently verified) is reproduced below:

"SHIKSHA Initiative" is a unique replicable and scalable program designed to enhance the education standard in primary education (Grade 1 and 2) with high-quality consistent content based on State Board syllabus and a technology-based mode of dissemination to instil learning retention among children. The pedagogy involves teaching with the aid of IT material, assessment of the student, querying, and augmentation – based on a procedure has been developed. The critical metric of the Shiksha Initiative is to ensure that 90% of the students (Grade 1 and 2) under the program retain 90% of the content taught in the classrooms.

According to the Foundation, independent assessment of the programme (the Committee did not have an opportunity to explore the evidence in depth) has demonstrated:-

1. Increased enrolment in schools and increase in attendance percentage;
2. Average attendance increase from 30% to 80% in Government schools and 90% in Private Schools;
3. Increased education standards in grade 1 and 2 – Students now able to write in grade 1, not normally demonstrated by students even in grade 3;
4. increased level of confidence in students;
5. motivated teachers/students; and
6. sharply increased scores in assessments.

IT Modules as Learning Tools in Higher Education

There is immense possibility of harnessing the power of IT in teaching / learning processes in higher education. In many western systems, even from senior school classes onwards, the basic lecture by the teacher is sent on the internet to be seen at home by the student, to be followed up in the classroom by a discussion, question-answer session and analysis – to sharply enhance the learning experience.

IGNOU has been a success in Indian conditions. As elsewhere pointed out, opportunities should now be available for private initiative in spreading E-education. Much experimentation will surely be useful in this regard, using the experience of IGNOU, and nominating IGNOU as the leader of this national initiative, with appropriate safeguards and directions.

It is clear that the above potentially path-breaking initiative, and perhaps other experiments elsewhere in India, will open new vistas for enhancing quality of learning, particularly in lower classes (primary). Further experiments need to be embarked upon to test the methodology, with suitable adaptation, for higher classes, in the secondary level – the efficacy in conveying concepts relating to say physics or mathematics surely should be explored.

Further Reforms

First, there is a need to reformulate the vision of role of ICT in schools and education as a whole. The current vision for ICT (as reflected in the National Policy on ICT in School Education) is largely limited to provisioning of infrastructure and setting up of ICT labs. While availability of both core and enabling technology infrastructure is a prerequisite, there is a need to focus on curricular resources. There is a need to move away from pre-packaged ICT resources meant for passive uptake to providing access to tools and open resources which learners (both teachers and students) can actively engage with for their own learning.

Second, with respect to teachers, instead of using technology to teacher-proof the curriculum, there is a need to respect teacher agency and build her 'technology, pedagogical, content knowledge' so that technology actually empowers her by connecting her to curriculum specialists as well as peers. There is also a need to work with teachers and engage them actively in shaping the use of technological tools in the classrooms and labs.

Third, the government should ensure that students and teachers have increased access (before and after school hours) to computer labs backed by pedagogical resources to achieve purposeful integration of ICT in schools. Teachers need more time on the computers themselves to be able to integrate technology in their teaching. The government should also think of providing separate access to computers for the teachers, requiring that all faculties will have and use computing devices.

Fourth, there is a need for an integrated system of collaborative knowledge structures, strengthened by technology which works in tandem with what is being transacted through the structured curriculum. Such knowledge structures should be made available to schools in both English and regional/state language.

Conclusion

Major developments in communication and information technology in recent decades have brought in new dimensions in the fields of transmission of data, use of IT as a vehicle for monitoring and management; also to directly assist in enhancing the quality of teaching and learning. Many new international applications possibilities have emerged; many of these have been tried out in Indian conditions. ICT should be made an integral part of school education where it is used as an aid to teachers and students. For this a beginning has to be made in the Teacher Training Colleges. Unless teachers are comfortable using computers and internet, they will find it difficult to use it as a teaching aid, or to guide students on its use, Teachers have to gradually become facilitators and encourage self-learning by students. Education can no longer be confined to what is in the text books; internet has removed all barriers to learning and made available sources of knowledge not accessible so far. ICT can no longer be treated as a school subject; it has to become a way of learning process. This field is to be

explored seriously and rolled out, in an appropriate manner, synchronizing with the Digital India Programme; such an approach will yield major dividends in a relatively short time.

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