Digital Initiatives for Access and Quality in Higher Education : An Overview

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Abstract

Higher education plays an important role to develop good and creative individuals and is viewed as a powerful means to build a knowledge - based society. It is the foundation for growth in productivity, income, and employment opportunities, which enhance the quality of life. The challenges currently before India's higher education system are enhancing access and improving quality. Digital transformation has brought rapid changes in the very nature of the higher education landscape. Digital initiatives are very important and a boon for both increasing access and improving quality in higher education. The Government of India has started digital initiatives for higher education. The launch of these digital initiatives has necessitated evolving strategies for effective adoption and utilization in higher educational institutions (HEIs) to achieve the anticipated benefits and outcomes for sustainable change of these digital initiatives. This paper presented an overview on the digital initiatives particularly launched by the government since 2015 to enhance access and promote quality in higher education. Few suggestions for the effective adoption and utilization to achieve the benefits of these digital initiatives in HEIs were also made.

Keywords : **access, digital initiatives, digital transformation, growth, higher education and quality**

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Higher education plays a pivotal role in the overall growth and development of an individual and a nation. It is an important tool for empowerment to seek both engagement and employment in the society. The role of higher education is considered very important for both individuals and countries. India, a country of 1.25 billion population, is one of the largest higher education systems in the world. The higher education sector in India has developed a base. There are a total of about 903 universities, 39,050 colleges, and 10,011 standalone institutions. The gross enrolment ratio (GER) in higher education in India is 25.8%, which is calculated for the 18–23 years of age group, but it is quite low as compared to other many developing/developed countries. Currently, 86% of the students at the undergraduate level, 12% at the postgraduate level, 1% in research, and 1% in diploma/certificate courses are enrolled in higher educational institutions (HEIs) (University Grants Commission, 2018).

A well - educated workforce is vital to any nation's future economic growth. India is the second largest nation in terms of population, and seventh largest in terms of area. The challenges before the Indian higher education system are to address the concerns of enhancing access and improving quality. To address these, the Government of India has launched several digital initiatives for higher education in teaching and learning processes and research for the benefit of all the learners in HEIs. The government initiated the Digital India project on July 1,

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2015 to transform the entire nation into a digitally empowered society (Department of Electronics & Information Technology, Govt. of India, n.d.).

The Government of India has launched a Scheme : National Mission on Education through Information and Communication Technology (NME – ICT) which has been envisaged to leverage the potential of ICT in teaching and learning processes for the benefit of all the learners in HEIs in anytime and anywhere mode (Department of Higher Education, Ministry of Human Resource Development, Govt. of India, n.d.). It is considered that the three cardinal principles of the Education Policy, that is, access, equity, and quality could be served well by providing connectivity to all colleges and universities, providing low cost and affordable access-cum-computing devices to students and teachers, and providing high quality e-content free of cost to all learners in the country, and NME – ICT encompasses all three elements. The major components of NME – ICT are: (a) providing connectivity along with a provision for access devices to institutions and learners ; and (b) it seeks to bridge the digital divide, that is, the gap in the skills to use computing devices for the purpose of teaching and learning among urban and rural teachers/learners in the higher education domain and empower those, who have hitherto remained untouched by the digital revolution and have not been able to join the mainstream of the knowledge economy.

Digital transformation is bringing in rapid changes in the very nature of the higher education landscape. It is expected that digital initiatives have a possibility to revolutionize the Indian higher education scenario in the near future. Digital initiatives in higher education provide a number of opportunities to educational learners and make teachers aware of their new roles and responsibilities in the teaching and learning process. Digital initiatives in higher education can play a very significant role to meet the changing dynamics of youths' requirements with regards to access (to provide the opportunity of learning) and quality (to equip students with the required skills and knowledge). In the present days of fast expanding information technology services, the emerging technical expertise can be leveraged to address the concerns of enhancing access and improving quality in higher education. The delivery of academic programmes through digital mission holds a promisable future with greater ability to meet the changing requirements of higher education. Digital initiatives are useful for both increasing access and improving quality in higher education. However, at the same time, the launch of these digital initiatives has necessitated to evolve strategies for effective adoption and utilization in HEIs. It is important that a strong mechanism is developed and the required information and communication technology (ICT) infrastructure is created at each HEI level to achieve the anticipated benefits and outcomes for sustainable change of these digital initiatives (University Grants Commission, 2017).

Objectives of the Paper

The digital medium can fulfil the motto of reaching the unreached and large scale expansion of the knowledge and high quality education opportunities. The digital initiatives are to raise the GER while addressing the quest to enhance the quality of higher education. Introduction of digital initiatives for higher education have made it possible to achieve the target of enhancing access and improving quality. It necessitates making a strategy for proper implementation and future of the HEI in terms of digital initiatives. This paper ponders on the digital initiatives launched by the government for enhancing access and improving quality in higher education. Also, it provides few suggestions for the effective adoption and utilization to achieve the benefits of these digital initiatives in HEIs.

Background of ICT and Digital Initiatives

Digital transformation is very important to bring changes in the very nature of the higher education landscape and its delivery. Efforts are being made for promoting higher education through the digital mode. The digital

initiatives are expected to create a potential impact on academics, research, and governance activities of HEIs. Digital initiatives are helping students to enhance their understanding level in the field of higher education. This may play a vital role to drive the transformation that HEIs are trying to stay more effective, competitive, and innovative to engage and inspire the new generation learners by expanding their reach and footprint beyond the domain limits. The ICT has tremendous potential to extend and augment quality in higher education and is the best intervention measure to reduce the disparities in access and also the major provider for enhancing the GER. The ICT is instrumental in spreading the digital literacy for teacher empowerment and also to take care of the aspirations of the academic community and facilitate the cost effective options.

A brief on ICT infrastructure and digital initiatives in HEIs through various schemes initiated by the University Grants Commission (UGC), a statutory body of Government of India that is responsible for the promotion and coordination of university education and for the determination and maintenance of standards of teaching, examination, and research is as under (University Grants Commission, 2002a, 2002b, 2007, 2012) :

- The UGC established a Consortium of Educational Communication at the national level to address the needs of Indian higher education through the use of electronic and new media along with the appropriate use of emerging ICT. It addresses the educational needs of the country by creating and disseminating multimedia content and educational videos for higher education through broadcast and non-broadcast modes.

- The UGC set up Educational Multimedia Research Centres in selected universities in the country to produce quality programmes indigenously and on a sustained basis for countrywide classrooms. These centres have been engaged in the production of various types of educational video programmes both curriculum based and enrichment based.

- The UGC established Information and Library Network Centre at the national level to modernize academic libraries and information activities using the state-of-art technologies for the optimum utilization of information. The Centre initiated a major national program with a triple objective. Firstly, linking of library and information centres of universities across the country. Secondly, improving capability in information transfer and access to promote scholarly communication among academicians and researchers in India through cooperation and manpower training in the field of computerized library operations such as networking, information handling, and data management. Thirdly, establishing gateways for online accessing of national and international databases held by national and international information networks and centres, respectively.

- The UGC promoted a Scheme for setting up computer centres in universities as a central facility to keep pace with the latest developments, growth, and challenges in the ICT. The Scheme contributed towards teaching and research in addition to the work relating to administration, finance, examinations, admissions, etc. of the university. Under this Scheme, universities are assisted for : (a) research & training ; (b) application of computers in every field/ subject ; (c) supporting the development of MCA/M.Sc. (Computer Science) programmes and computer applications papers at the postgraduate level in certain disciplines.

- The UGC introduced a Scheme for the establishment of UGC - NETWORK Resource Centre in colleges to procure computers and also for Internet connectivity. The Scheme aims to create awareness among staff and students about the use of the computer in various activities like administration, finance, examination, research, etc.

- The UGC launched a Scheme for developing high quality e-content and expertise for generating such content over the long term. The Scheme provides both financial assistance and technical support to teachers and other

experts based in colleges and universities for the development of e-content. The e-content developed are maintained at the egpathshala.inflibnet.ac.in site and is made accessible to all teachers and students of Indian universities. The Scheme encourages individual teachers, groups of teachers in the colleges and universities, and experts in the IT industry in visualization and multimedia production to develop educational contents. It is useful for the development of partnerships between educational institutions and the IT industry for the continuous development of new content and methodology taking into account contemporary technology.

Recent Digital Initiatives for Higher Education

Digital initiatives in higher education are implemented for innovation in teaching and are used for attaining better understanding of the subjects, promoting academic excellence, and enhancing quality among teachers and students. The government, over a period of time, has made significant gains by developing IT interventions that have the potential to change the delivery of higher education. It has enabled to launch a number of digital initiatives at the institutional end for furthering of higher education. A strategic framework for the digital initiatives for higher education has been developed that can be effectively used in three key and major dimensions – academics, research, and governance.

(1) Academics : The greater success of academics mainly depends upon the provision of a better learning experience. This can be accomplished with creation of digitally transformed learning environments, which not only enhance the classroom access and also explore new ways to drive innovation in delivering the education. The digital era creates transformed learning spaces for establishing new social networks that makes it very easier for educators and learners to connect before, during, and after traditional or virtual classes. The academics are endowed with a number of activities other than pedagogy tools. This includes a number of digital platforms for best quality interactive learning content that can be easily accessed by anyone, anywhere, anytime, and on any device connected to the Internet. The aspiring learners (students) and preparing educators (teachers) can be engaged simultaneously for mutual benefit as per their convenience at home, during travel, or in live classes.

The following are the digital initiatives in academics :

- **Swayam :** An integrated platform and portal for 'Massive Open Online Courses' (MOOCs). It is anticipated to touch 5 million enrolments over a period of time for 1000 + courses and it is the culmination of SAKSHAT, e-PG Pathshala, VLE, NPTEL, etc. (https://swayam.gov.in/).

- **Swayam Prabha :** 32 DTH Educational Channels devoted to telecast high quality educational programs of 4 hours duration on a 24 × 7 basis in repeated cycles across the country using GSAT-15 Satellite uplinked to BISAG, Gandhinagar (https://www.swayamprabha.gov.in).

- **NDA (National Digital Library) :** Single window search facility to access digital contents of books and educational materials. 1.5 crore e-books and documents contributed by 160 contributors and over 30 lakh users from nearly 9000 registered HEIs (https://ndl.iitkgpac.in/).

- **E-Yantra :** Embedded systems and robotic platforms for engineering education — Creating skills by setting up virtual lab infrastructure for project based learning (http://www.e-yantra.org).

- **E-Acharya :** Access to digital content on a repository platform. Hosted on an integrated e-content portal (http://eacharya.inflibnet.ac.in/vidya-mitra/).

↳ **E-Kalpa :** Digital learning environment for design courses - social networking with collaborative learning (http://www.dsource.in/).

↳ **Vidwan :** Premier database of scientists/researchers/faculty profiles for selection of experts. Access to single point database of nearly 20,000 profiles from leading institutions (https://vidwan.inflibnet.ac.in/).

↳ **Vidya - Mitra :** An online learning portal for all the e-content projects developed under the NME – ICT. Vidya - Mitra hosts 62,000+ videos and 45,000+ e-text (https://vidya-mitra.inflibnet.ac.in).

↳ **Virtual Labs :** Remote operation and viewing practicals through web enabled experiments (http://www.vlab.co.in/).

↳ **VLE (Virtual Learning Environment) :** An online environment of e-resources caters to several disciplines taught at undergraduate and postgraduate levels (http://vle.du.ac.in.in/).

↳ **Talk-to-a-Teacher - A View :** Virtual classrooms to the faculty across the country – Involving synchronous delivery of courses and can be viewed absolutely free of charge at lower bandwidths on a personal computer/ laptop having a headphone and Internet connection (http://aview.in/).

↳ **Ask a Question :** A unique platform through which students from science and engineering institutions can ask questions either through an online forum or during an interactive live session (https://co-learn.in/).

↳ **Spoken Tutorial :** Self-paced and multilingual courses offered for any place, any time and in a language of choice using an online computer published on a website (https://spoken-tutorial.org).

↳ **ARPIT (Annual Refresher Program in Teaching) :** A unique initiative to offer online professional development courses from the SWAYAM platform for career advancement of 15 lakhs teaching fraternity (https://swayam.gov.in/courses/public).

↳ **NTA (National Testing Agency) :** A premier, specialist, autonomous, and self-sustained testing organization to conduct online entrance exams for admission/ fellowship in HEIs (https://nta.ac.in).

↳ **NAD (National Academic Depository) :** 24 × 7 online store house of all academic awards (degrees, certificates, marksheets) (https://nad.gov.in/).

(2) Research : Research in HEIs fosters professional experience in teachers. It is useful for delivering quality student education and training. The strong and viable research of social relevance is the key parameter for performance and excellence. The HEIs make their best efforts to facilitate in exploring new areas of knowledge and also to advance intellectual power through quality research and publications that will have a positive impact on the socioeconomic progress of the nation. The main strategy for competitive research includes sharing information, promoting innovation, and supporting adaptation in creating an ecosystem that addresses the societal needs. This feature will enable to transform an idea into a product that reaps significant economic benefits. To perform and accomplish better research outcomes through collaborations and engagement, the following digital initiatives have been introduced :

↳ **E-ShodhSindhu :** Consortia of UGC-INFLIBNET, INDEST-AICTE, and NLIST. Access to peer reviewed journals, bibliography information resources, citations, and database in different disciplines (https://www.inflibnet.ac.in/ess).

↳ **E-Shodhganga :** A repository for uploading of electronic version of full-text of master's dissertations and Ph.D. thesis (https://shodhganga.inflibnet.ac.in).

↳ **E-ShodhGangotri :** A repository for uploading of electronic version of approved synopsis of proposed work of Ph.D. research (https://shodgangotri.inflibnet.ac.in).

↳ **INFED (INFLIBNET Access Management Federation) :** Provides off-campus access to e-resources to users in institutes covered under e-ShodhSindhu (http://infeed.inflibnet.ac.in).

↳ **InfiStat :** A by-product of e-ShodhSindhu, InfiStat facilitates monitoring and evaluation of usage statistics of subscribed e-resources made accessible to the member institutes under e-ShodhSindhu (http://infistat.inflibnet.ac.in).

↳ **OSCAR (Open Source Courseware Animations Repository) :** Provides a repository of web-based interactive animations and simulations that refer to as learning objects (http://oscar.iitb.ac.in/).

↳ **CARE (Consortium for Academic and Research Ethics) :** Creates and maintains the reference list of quality journals at the national level through a journal analysis protocol (http://carejournals.in).

↳ **GIAN (Global Initiative for Academic Networks) :** An online scheme that enables to engage the internationally renowned experts to augment the country's academic and research resources through a system of featured guest lectures/ seminars (http://www.gian.iitkgp.ac.in/).

↳ **RIM (Research Information Management) Service :** Web-based RIM Service facilitates the academic, R&D organisations, faculty members, and scientists to collect, curate, and showcase the scholarly communication activities and provide an opportunity to create the scholarly network (https://rim.gov.in).

↳ **IMPRINT (Impacting Research Innovation and Technology) :** An online Scheme that guides engineering and technology research into socially relevant priority areas (https://imprint-india.org/).

↳ **IMPRESS (Impactful Policy Research in Social Science) :** An online Scheme to encourage the policy relevant research in social sciences (http://impress-icssr.res.in).

↳ **SPARC (Scheme for Promotion of Academic and Research Collaboration) :** An online Scheme and it aims at improving research ecosystem in HEIs (https://sparc.iitkgp.ac.in).

↳ **STARS (Scheme for Transformational and Advanced Research in Sciences) :** An online Scheme to fund and support socially relevant research in identified thrust areas of science (https://stars.iisc.ac.in).

↳ **STRIDE (Scheme for Trans-disciplinary Research for India's Developing Economy) :** An online Scheme to identify young talent, strengthen research culture, build capacity, promote innovation, and support trans-disciplinary research for India's developing economy and national development and to fund multi institutional network high-impact research projects in humanities and human sciences (https://ugc.ac.in/smilingbrains.com).

↳ **UAY (Uchchatar Aavishkar Yojana) :** An online Scheme to promote innovation of higher order that directly impacts the needs of manufacturing and design areas of research through a coordinated action between academia and industry and also to strengthen academic labs and research facilities (https://uay.iitm.ac.in).

↳ **EBSB (Ek Bharat Shreshtha Bharat) :** A portal hosts details of events on cultural and academic programmes being organised by different states (https://ebsb.gov.in).

↳ **UBA (Unnat Bharat Abhiyan) :** A platform-cum-database for all institutes who are participating in Unnat Bharat Abhiyan (https://uba.gov.in).

(3) Governance : The quality of HEIs is linked to the governance structure and function. The ICT enabled digital initiatives facilitate the adherence of good governance practices with transparency and accountability. The effective intervention measures enable the smarter use of data in governance and are useful for the access and quality of higher education. The development of integrated information systems based on network connected and secure environment will help to serve more effectively for larger number of stakeholders by saving time and operational costs. The following digital initiatives have been introduced in governance in HEIs :

↳ **Campus Connect :** Enables HEIs to have a network facility having features of structured, resilient, secure, highly available, scalable, flexible, and speed covering academic, administration, and amenities areas of campuses. It has a passive network for applications like surveillance, ERP, virtual classrooms, MOOC, IP telephony, video conference, skill activities, etc. and wi-fi network with provision of wireless hot spots for access to the Internet by the faculty, students, and staff at any specified location of campuses (https://www.nmeict.ac.in).

↳ **BAADAL :** An Open Source Project hosted in NIC/NKN data centre to setup a private cloud that was mainly utilized for development and deployment of e-governance applications meant for administrative and academic needs of HEIs (https://baadal.nmeict.in/).

↳ **DBT (Direct Benefit Transfer) :** A web portal to disburse fellowships/scholarships through DBT mode (https://epayment.canarabank.in).

↳ **FOSSEE (Free and Open Source Software for Education Enrichment) :** Use for FLOSS Tools to reduce the dependency on proprietary software in meeting the academic and research needs (https://fossee.in).

↳ **SOS Tools (Software, Opensource, and Simulation) :** Used for analysis of systems and solving problems of varied disciplines through customised packages built from open source software (http://sos-tools.org).

↳ **Vidya Lakshmi :** An educational loan portal developed to apply and track the status of applications seeking educational loan (https://www.vidyalakshmi.co.in/).

↳ **NSP (National Scholarship Portal) :** A one-stop solution for diverse scholarships to students are enabled under National e-Governance Plan (NeGP) (https://scholarships.gov.in/).

↳ **PFMS (Public Financial Management System) :** A web based portal to monitor the public funded receipts and expenditure of HEIs (https://pfms.nic.in).

↳ **GeM (Government e-Marketplace) :** A user friendly portal where goods and services can be procured (https://gem.gov.in/).

↳ **NIRF (National Institutional Ranking Framework) :** Ranking of Institutions across the country through an online computation of data of ranking parameters (https://www.nirfindia.org/).

↳ **ARIIA (Atal Ranking of Institutions on Innovation Achievements) :** An online application assessment of

innovation, entrepreneurship, and start-up eco-system in established HEIs through weightage parameters (https://www.ariia.gov.in/).

↳ **AISHE (All India Survey on Higher Education) :** Portrays the status of higher education in the country through annual web based data survey on defined parameters for evaluating educational development (http://aishe.nic.in/).

↳ **NAAC (National Assessment and Accreditation Council) :** An online application portal for HEIs' accreditation (http://www.naac.gov.in/).

↳ **KYC (Know Your College) :** A portal that enables to access information of colleges (http://www.knowyourcollege-gov.in/).

↳ **Digi Locker :** Cloud based storage space platform for issuance and verification of documents and certificates in digital way e-signature facility (https://digilocker.gov.in/).

↳ **CUP (Central University Portal) :** An integrated portal for planning, financing, and coordinated development of Central Universities (www.ugc.ac.in/cup).

↳ **SOUL 2.0 :** Contributes towards automation of libraries through SOULD software – SOUL has more than 3,400 + installations across India (http://www.inflibnet.ac.in).

↳ **Students' Grievance Portal :** An online portal facilitates students to lodge their grievances to ensure transparency in admission and prevent unfair practices in higher education (https://www.ugc.ac.in/grievance).

↳ **Uniportal (Database of Universities) :** To update database of the universities by using the login id (https://ugc.ac.in/uniportal).

↳ **UAMP (University Activity Monitoring Portal) :** To serve as a one point stop for events/activities undertaken by HEIs from time to time. This portal facilitates universities to upload details of various events/activities undertaken by them (http://www.uamp.gov.in).

The Way Forward and Policy Implications

Higher education is considered as a gateway for the promotion of knowledge, skills, and better human resources. Keeping its importance in the pace of development, the Government of India has conceived and implemented several digital initiatives to enhance access and improve the quality in higher education. The implementation of digital initiatives is a first choice of intervention measure that impacts higher education. The approach for effective use of implementable digital initiatives is based on the envisaged strategy. Every HEI is expected to have a system for appropriate and effective use of ICTs to work in tune with the digital initiatives and has to engage teams, develop solutions, and solve problems through greater understanding of concepts with reference to structure and processes of HEIs. A strong support can stay relevant and leverage new digital know-how, which will benefit in the era of digital initiatives. To achieve the full benefit of digital initiatives launched for enhancing access and improving quality in higher education, a Centre for Digital Technology Applications needs to be established in each HEI with the following mandate :

↳ ICT has become indispensable and will remain as such with the growth of higher education. The implementation of digital initiatives requires the creation, maintenance, and upgradation of ICT infrastructure in

the HEIs. The essential features include smart and green buildings having broadband connectivity massively networked to digital labs with provision of wireless charging stations and wi-fi facility everywhere in the campus. The creation of ICT infrastructure is to be viewed as one of the major components of the institution's larger strategy and vision. This includes not only the passive and active network cabling and hot spots, the most sophisticated and costly equipment in addition to computer systems. The Centre will be entrusted with the task of IT infrastructure creation and its maintenance to leverage the power of ICTs for implementing the digital initiatives and also ICT upgradation to prepare HEIs for the future in terms of digital initiatives.

- The Centre will help HEIs to optimize the ICT enabled services for academics, research, and governance. The Centre will develop and acquire new softwares (from both market and open sources) and will provide training on a regular basis for effective use of open source software and other office management and administration tools. The Centre will help in solving problems faced by the stakeholders in HEIs from time to time in implementing digital initiatives. It will guide and provide mentorship to stakeholders in HEIs to achieve the complete benefit of digital initiatives. The Centre will also coordinate with various institutions at the national level involved in the digital tasks for higher education.

- The study will be useful for students, researchers, teachers, policy makers, and government officials as it lays emphasis on enhancing access and improving quality of higher education through digital initiatives. It will boost the digital initiatives of the Government of India in higher education. Through this paper, an attempt has been made to promote digital initiatives in higher education in attaining access and quality in higher education.

Conclusion

Higher education plays an important role in the development of a country. The Indian higher education sector is currently undergoing a rapid transformation process. Access and quality are the major challenges before the Indian higher education system. HEIs are compelled to improve the quality of service and delivery while striving for cost-effectiveness and global competitiveness. Digital technology reshapes the fundamentals of the higher education sector. The integration of ICT at every level of higher education is needed for large-scale expansion of the high-quality education opportunities. Digital Initiatives launched by the government are a boon for enhancing access and improving quality in higher education. As a prerequisite for sustainable success in the use of digital technology, a strong support, digital leadership, and a suitably skilled workforce at each HEI level are needed. The adoption of digital culture in HEIs will eventually encourage stakeholders for successful implementation of digital initiatives as a central core of the system with an informed approach enforces the optimal utilization of ICT in various functionaries.

Author's Contribution

Shakeel Ahmad contributed to the design and implementation of the research, to the analysis of the results, and the writing of the manuscript.

Conflict of Interest

The author declares that there is no specific conflict of interest.

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