

National Education Policy-2020: A Driving Force for Higher Education of India

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ABSTRACT

Now is the time to call for an overhaul of India's educational policies. The current educational system should replace the traditional one in order for it to function in this digital age. This shift is required to protect job prospects and maintain the economy on its own. For many, the announcement of NEP 2020 came as a complete surprise. A lot of educators were surprised by the modifications that NEP 2020 had suggested. This article primarily focuses on NEP 2020 and its effects on higher education, even if education policy has had an equal impact on education in schools and colleges. The key components of NEP are also described in this paper, along with an analysis of how they impact the current educational framework. The National Education Policy 2020 aims to transform India's education system into a society of equitable, sustainable, and healthy knowledge. It includes contributions from scholars in fields like mathematics, astronomy, and crafts. The policy aims to increase enrolment to 50% by 2035.

KEYWORDS: NEP-2020, Higher Education, Indian Education System and MHRD

INTRODUCTION

As we live in the current digital era, our only goal is to preserve the greatest advancements made by our civilization, but doing so comes with a lot of duties. The most crucial component that makes it easy to accomplish one's goals among these duties and variables is knowledge. Education is the fundamental component of our society that enables it to be affluent, egalitarian, and healthy. Article 26 of the 1948 Constitution states that everyone has the right to education and that "education for all." This Declaration includes the National Education Policy, which contributes to equalizing educational opportunities and addressing the issue of illiteracy. Minimizing the dropout rate among children enrolled in elementary and secondary schools is the primary goal. India has made great strides in almost reaching 100% enrollment in primary and secondary education through "Samagra Shiksha Abiyana" and "The Right to Education Act-2019." Act on the Right to Education, 2019 The Union Cabinet of India approved the National Education Policy 2020 (NEP 2020) on July 29, 2020, outlining the goals for the country's future educational system. The 1986 National Policy on Education is superseded by the new directive. In both rural and urban India, the

strategy provides a thorough framework for vocational training, higher education, and elementary education. By 2021, the strategy seeks to completely revamp India's educational system.

The Draft NEP had 484 pages. The Ministry undertook a rigorous consultation process in formulating the draft policy: "Over two lakh suggestions from 2.5 lakh gram panchayats, 6,600 blocks, 6,000 Urban Local Bodies (ULBs), 676 districts were received." The vision of the National Education Policy is: "*National Education Policy 2020 envisions an India-centric education system that contributes directly to transforming our nation sustainably into an equitable and vibrant knowledge society by providing high-quality education to all.*"

OBJECTIVES OF THE STUDY

Examining how the New Education Policy 2020 has affected higher education is the main objective of this research project. The paper also looks at the evolution of education policy in India, outlining the key components of NEP and examining how they impact the current educational framework.

RESEARCH METHODOLOGY

This study is descriptive in nature. The information was gathered by methodical research using Scopus, Google Scholar, several national and international journals, and official websites of various institutions. In order to accomplish the study's goal, the author read a lot of papers about artificial intelligence and attempted to implement those methods and resources in library services. A few concepts were borrowed from the real world. After gathering inspiration from different sources author try to fulfill the aims of the study.

HISTORICAL PERSPECTIVE

In 1968, our PM Indira Gandhi adopted NEP first time in India after consulting the Kothari Commission report in 1964-1968. The aim was to restructure the country's education system and provide equivalent education facilities to both rural and urban areas.(Sahu, and Behera, 2022).

Next in 1986, Rajiv Gandhi introduced 2nd NEP which aimed to provide equal education for all. For scheduled Castes [SC], Scheduled Tribes [ST] and Indian women, etc. This policy also introduced a different scholarship scheme, requirements for more SC teachers & construction of new education institutes.(Sahu and Behera, 2022).

The second NEP was modified in 1992 in the administration of the ruling government led by B. Narasimha Rao and was adopted in 2005 under the "Common Minimum Program" (National Education Policy, 1986). They suggested taking the joint entrance exam for admission to technical and vocational courses. (Sahu and Behera, 2022)

It is noted that infrequently, the education system and educational policies are reformulated by the ruling government. It improves new standards of education along with the broader aim of strengthening and upgrading the education system. Recently on 29th July 2020, our Prime Minister Narendra Modi approved the NEP which was formulated by the "Ministry of Human Resource Development" (MHRD) in the year 2019. Incorporating concepts focused on the provision Competency-based education for students. In this education system, students can learn and master a particular skill of their own choice without worrying about the learning environment. NEP1 2020 also focuses on modification of the study path and pedagogical arrangement to design a 5 + 3 + 3 + 4 system i.e. the 1st 5

years of education for pre-school --3 years and school --2 years as a foundation stage; 3 years for the preparatory stage consisting of the third grade to the fifth; and 3 years for the intermediate stage, which includes class 6 to 8; and the secondary stage, which includes teaching classes 9 to 12 of the 10 + 2 system.(Varma, 2021)

HIGHER EDUCATION

The NEP-2020 was started by the Union Cabinet of India on 29-07-2020, which is the modification of the previous policy 1986. Old policy themes were a comprehensive framework for primary & higher education and provide vocational training in both rural and urban India. (Varma, 2021) But in the new policy some modification is done for example, nearly double the gross enrolment ratio in higher education to 50 percent by 2035, as compared to the current gross enrolment ratio of 26.3%. It also provides greater autonomy to academic institutions that offer higher quality to higher education. Honorable Prime Minister Modi Ji said, “Aspects such as widening the availability of scholarships, strengthening infrastructure for open and distance learning, online education, and increasing the usage of technology has received great attention in NEP. These are vital reforms for the education sector.” (**Times of India, 2020**)

The goal of the new NEP is to formally codify systemic changes from the school to the college or university levels. Education content shall hereafter concentrate on important concepts, ideas, applications, and problem-solving approaches in light of the evolving situation. It is anticipated that the country's higher education system will benefit greatly and sustainably from the national education policy. The government's decision to permit international colleges to establish campuses in India is praiseworthy. This will enable the kids to get an international education in the comfort of their nation. The introduction of multidisciplinary institutes will result in a revitalized emphasis on all fields, including the humanities and arts. Students who get this kind of instruction will learn and develop holistically. Students will therefore have a more solid foundation of knowledge.

Another positive development that will lessen the burden of several competitive tests and ease the pressure of studying for so many of them is the adoption of a single common entrance exam. Additionally, it will guarantee fairness for all future student candidates. It is a really good concept to create an Academic Bank of Credit (ABC) to hold the academic credits that students obtain from attending different accredited universities. After finishing a course, a student can receive scores that are credited to their ABC account. Then, if someone so chooses, they can transfer these credits if he or she decides to switch colleges. These credits will not be lost if a student withdraws for any reason, allowing them to resume their studies years later.

The new regulatory framework for higher education will make sure that different, independent, and powerful authorities carry out the responsibilities of academic standard-setting, funding, accreditation, and administration. The Higher Education Commission of India (HECI), which would serve as the single umbrella organization for these four organizations, will be divided into four distinct verticals. NEP has brought forth numerous new advancements and reforms in the field of higher education. Among the noteworthy characteristics are:

HIGHLIGHTS OF NEP-20 FOR HIGHER EDUCATION

1. Internationalization
2. Enhance GER To 50% By The Year 2035
3. Multidisciplinary Education
4. Inclusivity and Equity
5. Focus on Research and Innovation
6. Curriculum Flexibility and Credit Transfer
7. Digitalization Of Teaching-Learning Process
8. Dismantling Of The 'UGC' And 'AICTE'
9. Skill Development and Vocational Education
10. Financial Support To Assist Students
11. Encouragement To Use Indian Languages
12. Technology in Education
13. Rationalized Education Architecture
14. Distance Learning/Open Learning
15. Autonomy and Accountability

Internationalization

By establishing partnerships with foreign universities, a large number of NRI Students are studying in INDIA due to facilitating students like we promoted global study destination providing premium education at affordable costs, facility of research or teaching collaborations & faculty or student exchanges with international institution of high quality and faculty exchanges, well set up campuses from the top 100 universities in the world, NEP 2020 seeks to promote internationalization. To encourage interstate educational exchange, the strategy also urges the creation of a National Educational Exchange Program (NEEP).

Enhance GER To 50% By The Year 2035 in Higher Education Institutes (HEI)

As of 2018 India has one of the largest higher education systems (993 universities, 39,931 colleges, and 10,725 stand-alone institutions) but maintains a low gross enrolment ratio (26.3%) much lower than that developed countries (AISHE, 2018-2019) but as NEP 2020 the government of India plans the gross enrollment ratio to enhance to 50% up to 2035. To make this plan successful, around 3.5 crore new seats will be allocated to HEIs, said Dr Pokhriyal, while addressing the virtual session.

Multidisciplinary Education

The UG educational programs in this educational system can last for at least three or four years. A novel feature is that students can benefit from gate credentials and various exits. For instance, a student might graduate from the first year of study with a certificate in hand. An advanced diploma will be given for two years of completing courses, should he decide to leave after the second year. As per normal, a bachelor's degree will be awarded after the third year of UG completion, and a bachelor of research degree will be conferred after the fourth year of UG completion. A digital academic credit bank will also receive the credits obtained at various levels. Students can use the credits

they have obtained for admission to another institution to continue their studies for the remaining year(s) of their graduate courses.

Autonomy and Accountability

To enhance the caliber & efficacy of higher education, the NEP 2020 proposes greater institutional autonomy and decentralization in decision-making. To ensure that organizations adhere to quality standards, the strategy also stresses the importance of accountability, transparency, and regulatory systems.

Inclusivity and Equity

We think that denying access to education to any member of the public damages society as a whole, the nation's economy, and societal advancement in addition to harming the person. We are happy to hear that to guarantee equitable access to higher education for women, people with disabilities, and members of ethnic minorities, the NEP (2020) will assiduously promote equity and inclusive education in higher education. (In 2021, Varma) For students, a college education is essential because it equips them with the knowledge and skills needed to succeed in the workforce. Consequently, the government has decided to actively support inclusion and equity in higher education, which is, in our opinion, a very important and appropriate reform. This strategy has been carefully planned to guarantee that higher education is inclusive and accessible to everyone, including the Sustainable Development Goals (SDGs) to tackle important barriers like the cost of pursuing higher education and geographical and linguistic limitations. (Times of India, 2020).

Focus on Research and Innovation

According to NEP-2020, our central body called National Research Foundation encourages all universities to give priority to research & increase investment in Sc. & Technology of making India for Research & Innovation on a global scale. Our Government is also taking steps establish “Multidisciplinary Education and Research Universities” (MERUs), to globalized educational systems like IITs & IIMs.

Curriculum Flexibility and Credit Transfer

A flexible curriculum that enables students to select from a variety of courses and subjects to suit their unique interests and professional aspirations is recommended by the National Education Policy 2020. A credit transfer system is also suggested by the policy. Additionally, a credit bank for academic progress will be established to record the credits that students have earned throughout their schooling. It improves mobility and fosters academic excellence by allowing students to move between universities without losing academic credit. When a subsequent academic year is over, credits earned in one year will be transferred to the next level. (AISHE, 2018-2019)

Digitization of the Teaching and Learning Process

In Digitalization a well trained Team was established to develop digital infrastructure, including electronic content, digital libraries, etc., to meet student's needs and maximize learning outcomes. Now we can find maximum information from different sources like YouTube, Facebook, Wikipedia, Google, etc. Digitalizing the teaching-learning process means new information & communication technologies like cable and satellite transmissions, audio

and video conferencing, PC software and CD Roms, and in particular internet sources. (Chatwal. 2019) By using this process lots of benefits are achieved to HEIs like time, effort and money will be saved, creating interest in learning many concepts through interactive audio-visual teaching concepts, no more traditional classrooms are required, planning to conduct exams and release results online, etc. It also increases the responsibility of the student that they become more actively involved to know the new methods of communication of technology for their learning. (Varma, 2021)

Dismantling "UGC" and "AICTE"

By the NEP-20, our government has chosen to establish the National Research Foundation (NRF) as an independent organization. It will oversee financing, provide guidance, and raise the standard of research in India. Establishing India's Higher Education Commission (HECI) for HEIs is another paradigm shift for NEP. Except for legal and medical research, it serves as a single regulator for entire HEIs. All other regulatory bodies, such as the UGC and AICTE, would be superseded by it. It is a process to formally acknowledge whether the establishments adhere to the guidelines and criteria established by the government organizations, such as in India. The organizations that offer HEIs accreditation and regulatory oversight are UGC, AIU, NAAC, AICTE, NBA, DOEACC, and NBE. (Skill Development and Higher Education)HEIs must strike a compromise between adhering to national apex organizations and agencies, such as AITE, AIU, UGE, NAAC, and NIRF, and their goals of gaining a competitive edge through international rankings and accreditations.

Skill Development and Vocational Education

The importance of vocational and skills-based education is rising in the modern era. Compared to academic degrees, vocational courses are usually more hands-on and skill-based. Along with colleges and technical schools, universities are where they are frequently taught. A significant component of the country's education program is vocational education and training, or VET. The NEP 2020 recognizes the need for skill development and vocational education in preparing students for the workforce. The policy calls for the gradual integration of the VE program into regular education to subvert the social status hierarchy that is connected to vocational education. A smooth transition from quality VE in middle and secondary school to higher education will occur, starting with early exposure to the workforce. (Munish Saini...[etal].(2021 Publication). To help students acquire the necessary skills, it advises integrating work-integrated learning activities and apprenticeships into regular schools. Every child will be guaranteed to acquire at least one vacation and the essential gate skills. Certain higher education institutions, such as agricultural, health science, independent technical, and low universities, are moving toward becoming multidisciplinary establishments.

Financial support to help students

The government would make every effort to ensure that students from the ST, SC, OBC, and SEDG groups receive scholarships based on their merit. Higher education institutions will be encouraged to grant scholarships to bright students, according to officials. The National Scholarship Portal's function and actions in monitoring the performance of students who have been given scholarships will be enhanced. (Saini, 2021). Private higher education institutions will be pushed to provide more free ships and scholarships to their students. (From the MEDC Economic Digest)

Encouraging the use of Indian languages:-According to NEP-2020, the emphasis is on the promotion of Indian languages because RTE Act 29 requires that the mother tongue be used as a medium of instruction whenever practicable and does not make any language compulsory. 2020 (Gohain). The NEP requires teachers to take a bilingual approach when teaching and the medium of instruction must be in the student's home language, mother tongue, or local language. AICTE-developed Automation Artificial Intelligence Tools translate the English language into 11 Indian languages in online courses and on the "SWYAM MOOCS Portal," where all translated reference material for engineering courses is available in regional languages. The AICTE released recommendations that allow technical education schools to provide courses in local languages. (2021, Ministry of Education). NEP has recommended the establishment of various bodies, such as the National Foundation for Pali, Prakrit, and Persian, the Institute for Translation and Interpretation (IITI), and higher education institutions that allow students to use their mother tongue, regional language, or local language to help them understand the concept better. (Saini, 2021)

Reasonable Education Architecture

The fundamental structure of universities will be reconfigured. Different types of universities will emerge based on the vision and goal of educational institutions, such as teaching-intensive universities, research-intensive universities, and independent degree-granting colleges. College affiliation procedures will be phased out gradually over the next 15 years, and institutions will be given autonomy.

Distance Learning or Open Learning

As per the Regulation 22 of the UGC (Open and Distance Learning Programmes and Online Programmes) Regulations, the degrees at the undergraduate, the postgraduate and, the post-graduate diplomas awarded through ODL or Online mode by Higher Educational Institutions, shall be treated as equivalent to the corresponding degrees and postgraduate diplomas offered through conventional mode. The method of ODL provides a more flexible and dynamic environment for the students. (Nayak, 2020). It has been noticed that ODL provides a more practical approach to learning, unlike the traditional norm. It has become mandatory for any Higher Educational Institutions to seek NAAC accreditation with a minimum score of 3.01 or above for offering ODL and online mode programmes /courses. The concerns regarding quality and standards in ODL have already been addressed. Hence, there is no denying the fact that NEP-2020 has opened a new horizon for ODL and Online education. Exp :(NETF), (CIET), NIOS, IGNOU, IITs and NITs. The existing e-learning platforms such as SWAYAM, DIKSHA and others will be extended to provide teachers with a structured, easy-to-use and rich set of assistive tools for monitoring the progress of learners. As the current pandemic has shown, tools such as two-way video and two-way audio interfaces for conducting online courses are a real necessity.

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standards have already been expressed. As a result, there is no doubt that NEP-2020 has opened up a new horizon for ODL and online education. Experiential learning: (NETF), (CIET), NIOS, IGNOU, IITs, and NITs. Existing e-learning platforms, such as SWAYAM, DIKSHA, and others, will be expanded to give teachers with an organised, user-friendly, and comprehensive collection of assistive tools for assessing learners' progress. As the current pandemic has demonstrated, capabilities like two-way video and two-way audio interfaces for conducting online courses are a must. (Singh, Singh & Nermend, 2022)

Academic Bank of Credits

With the appropriate credit transfer mechanisms established by these regulations, the Academic Bank of Credits will serve as a national hub to support flexible curriculum frameworks and students' interdisciplinary or multidisciplinary academic mobility across the nation's higher education institutions. It will also enable students to select their learning path toward earning a degree or diploma, postgraduate diploma, or academic qualification, operating under the tenets of multiple entry-multiple exit and any time, any-where, and at any-level of learning.

The Academic Bank of Credits will facilitate the integration of several higher education disciplines, resulting in the intended learning outcomes, such as improved critical thinking, creativity, and innovation.

Academic Bank of Credits will give students a great deal of autonomy by offering a wide selection of courses for a program of study. The curriculum **offers flexibility as well as creative and interesting course options offered by various higher education departments or institutions.**

OBJECTIVES OF ACADEMIC BANK OF CREDITS

- ✓ To encourage a more interdisciplinary approach to higher education and to advance student centricity with learner-friendly methods nationwide.
- ✓ To allow students to choose the courses or courses combined that best fit their abilities and pursue information.
- ✓ To allow students to select their own study pace and handle the related logistics and prices.
- ✓ To give students the freedom to customize their degrees or add particular courses or specializations instead of following a single university's or independent college's rigorous, regularly mandated degree program.
- ✓ To allow students to finish their degrees at their own pace, multiple entry and exit options are provided, allowing mobility between different fields and HEIs for the degree, diploma, postgraduate diploma, or coursework for the Ph.D. program.
- ✓ To procedurally facilitate distributed and blended teaching-learning activities by integrating across campuses, universities, or independent colleges with greater mobility.
- ✓ To support all students, full-time and part-time, formal and informal, in their pursuit of a lifetime of learning.
- ✓ To fulfill students' curiosity and give them the flexibility to select and alter their academic path
- ✓ Provide guidance, and make connections across various knowledge disciplines, and assist them in acquiring the necessary foundations and building blocks to achieve their life objectives.

CONCLUSION

The Education Policy of India 2020 aims to develop professionals in various fields, including agriculture and AI, to prepare India for the future. The policy focuses on improving quality, attractiveness, affordability, and supply by opening higher education to the private sector. It encourages merit-based admissions, continuous faculty members, and technology-based monitoring. Overall, the NEP 2020 addresses the need to develop professionals in a variety of fields, ranging from Agriculture to Artificial Intelligence. India needs to be ready for the future. And the NEP 2020 paves the way for many young, aspiring students to be equipped with the right skill set. The policy aims to fulfill its objectives by 2030, making it a defining moment for higher education. Effective implementation is crucial for its path-breaking impact.

REFERENCES

- [1] Right to Education Act (2019), available at www.education.gov.in/en/sites/upload_files/mhrd/files/upload_document/rte_2019.pdf , Accessed on 20/06/2023
- [2] Nirmala Sahu , Harekrushna Behera, (June 2022). “National Education Policy 2020: A Historical Perspective.” International Journal for Research in Applied Science & Engineering Technology (IJRASET), Volume 10 Issue VI June 2022- Available at www.ijraset.com Dr. Amirullah , (10th January 2023).“NATIONAL EDUCATION POLICY-2020 IN OPEN AND DISTANCE LEARNING THROUGH ICT” INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH, DOI: <http://ijmer.in.doi./2022/11.12.84>
- [3] Arup Varma, Parth Patel, Verma Prikshat, Deepak Hota, Vijay Pereira. (2021)"India's new education policy: a case of indigenous ingenuity contributing to the global knowledge economy?" , Journal of knowledge Management, VOL. 25 NO. 10 2021, pp. 2385-2395,DOI 10.1108/JKM-11-2020-0840
- [4] Times of India (2020), “New education policy will make India a knowledge hub, says PM Modi”, Retrieved 2 August 2020, from, available at:<https://timesofindia.indiatimes.com/india/new-education%02policy-will-make-india-a-knowledge-hub-says-pm-modi/articleshow/77251698.cms>
- [5] Emerald Publishing Limited,(2021):JOURNAL OF KNOWLEDGE MANAGEMENT; <https://www.sciencedirect.com/science/article/abs/pii/S0738059321000092>, DOI 10.1108/JKM-11-2020-0840 ; VOL. 25 NO. 10 , pp. 2385-2395
- [6] By: Express News Service Chandigarh August 29, 2020 ; <https://indianexpress.com/article/cities/chandigarh/target-of-50-enrolment-in-higher-education-in-india-by-2035-says-pokhriyal-6574198/>
- [7] MEDC Economic Digest. (December 2021), “HIGHER EDUCATION & SKILL DEVELOPMENT.”; Vol. IV No. : 3, 8` 80 ISSN 2581-995X HIGHER EDUCATION & SKILL DEVELOPMENT Vol. IV No. : 3 December 2021 Page: 28 <https://www.medcindia.com/upload/MEDC-Digest-December-202120211208103700.pdf>
- [8] AISHE (2018-2019), All India Survey of Higher Education (AISHE) 2018-19, Ministry of Human Resource Development, Department of Higher Education, GOI, New Delhi.
- [9] Tanya Chatwal (2019). Digitalization of Higher Education in India: A Boom or A Bane. Res. J. Humanities and Social Sciences. 2019; 10(4): 1083-1088. doi: 10.5958/2321-5828.2019.00178.5
- [10] Sudhir Rana...[etal], “Conceptualizing international positioning strategies for Indian higher education institutions” Review of International Business and Strategy Vol. 32 No. 4, 2022 pp. 503-519 © Emerald Publishing Limited 2059-6014 DOI 10.1108/RIBS-07-2021-0105

- [11] Prof. Rajkumar Jaiswal, "VOCATIONAL EDUCATION & SKILL DEVELOPMENT IN INDIA."Tactful Management Research Journal, ISSN: 2319-7943 , <http://oldtm.lbp.world/SeminarPdf/114.pdf>
- [12] Saini, Munish (2021). "Analysing the tweets to examine the behavioural response of Indian citizens over the approval of national education policy 2020". International Journal of Educational Development, <https://doi.org/10.1016/j.ijedudev.2021.102356>
- [13] Gohain, Manash Pratim (2020). "NEP language policy broad guideline: Government". *The Times of India*. Archived from the original on 31 July 2020. Retrieved 31 July 2020.
- [14] Ministry of Education, (13 DEC 2021) by PIB Delhi, "Promotion of Indian Languages" Ministry of Education, <https://pib.gov.in/pressreleasepage.aspx?prid=1780969>
- [15] Subash Ranjan Nayak, (2020). "Strategy of using ICT in ODL to disseminate higher education in tribal communities: a case of MP, India". DOI 10.1108/AAOUJ-05-2020-0029, <https://www.emerald.com/insight/2414-6994.htm>
- [16] Anamika Tiwari, (Apr, 2021)"Study of NEP 2020: Issues, Approaches, Challenges, Oppurtunities and Criticism." Ignited Minds Journals, <https://ignited.in/I/a/305793>
- [17] Swapnil Singh,Uma Shankar Singh&Malgorzata Nermend, (2022). " Decision analysis of e-learning in bridging digital divide for education dissemination."26th International Conference on Knowledge-Based and Intelligent Information & Engineering Systems. 10.1016/j.procs.2022.09.256
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