

“A STUDY ON TECHNICAL EDUCATION STRUCTURE IN INDIA”

DR. NANDAKISHOR PATIDAR

Associate Professor

Dept. of Library & Information Science

SSSUTMS, Sehore (M.P) -466001

E-mail: drlib16@gmail.com

Mob. No. 9926816234

MR. ARUN BHALERAO

Librarian

Dhole Patil College of Engineering

Wagholi, Pune (Maharashtra) - 422007

E-mail: arunbhalerao2@gmail.com

Mob. No. 9960430818

KEYWORDS: NIT, IIT, COEP, MIT, AICTE, USA, Technical Education, NAAC, B.Tech, Education Structure etc.

ABSTRACT:

The planning of specific schooling in India was set up nearly simultaneously as in Europe (i.e. around 1794), when the British merchants set up a Survey School at Madras to get ready Indian workforce in current land investigating. The requirement in order to vocational related training was featured in (1854) under the 'Wood's Dispatch'. The recommendations of this report outlined the purpose behind setting up legitimate engineering schooling in the country. The premier engineering Institutes was set up at the Roorkee in the (1847). After a period of time that transformed into the leading engineering university of free India in the (1949) and an Indian Institute of Technology (IIT) in the year (2001). After that the engineering school was set up in Pune COPE (College of Engineering, Pune) in (1854) and a short time later in Bengal (College of Engineering) and Madras (College of Engineering, Guindy) individually in (1856) and (1859). All these colleges gave courses in civil engineering (**Sen, 1989**).

The technical education structure formalized during the 20th century by the authority of All India Council of Technical Education (AICTE) in (1945). The AICTE suggested building up four local higher specialized schooling foundations in the example of Massachusetts Institute of Technology (MIT), USA. Subsequently the premier IIT was set up in (1950) at Kharagpur, West Bengal, directly long followed by IIT Bombay, IIT Madras, IIT Kanpur and Delhi. In (1947), there were only just 38 foundations offering first degree course in engineering in the country (**Sen, 1989, Saha and Ghosh, 2012**).

According to AICTE, the quantity of institutions conferring technical education has developed to around (7202) in the period of (2020-21). This incorporates (23) IITs, (25) Indian

Institutes of Information Technology (IIITs) and (31) National Institutes of Technology (NITs), (23) other government funded technical institutions, and (3500) engineering colleges, (3400) polytechnics and (200) schools of Planning and architecture.

INTRODUCTION:

World's third largest higher education system in India. Next to the United States and China. Since the Independence higher education sector has witnessed a tremendous in the number of universities level institutions and college. World University Ranking 2020 the prestigious Quacquarelli Symonds .Number of only three Indian universities -IIT Bombay, IIT Delhi and IISc Bangalore have been included in the top (200) institutes.

Issues and Challenges in India's Higher Education Sector:

Enrolment: (25.2 %) Percent of the Gross Enrolment Ratio (GER) of India in higher education. And it is quite low as compared to the developed and other major development countries.

Equity: There is no equity in GER among different sections of society.GER for males (26.3%), females (25.4%) and SC (21.8%) as well as ST (15.9%). There are regional variations too in the equity. When the some states have high GER some are far behind the national figures. The density of institutes varies from number of (7%) and in Bihar to (59%), as well as in Telangana state as compared to All India average of (28%). Most of premier universities and institutes are centered in a metropolitan and urban city, thereby leading to the regional disparity in access to higher education in India.

Quality: Higher Education in India is plagued with rote learning and the lacks of employability as well as skill development are due to the low quality of education.

Infrastructure: No Good infrastructures are available for higher education in India. Poor infrastructure is another challenge to higher education. Due to the low budget and corruption as well as education lobbying by vested interest group they call Education Mafias. In public sector universities in India lack of the necessary infrastructure. Private sector in education sector is not up to the mark as per the global standard.

Faculty: Faculty shortages and the inability of the state educational system to attract and retain well qualified teachers have been posing challenges to quality education for many years in education systems. Shortage of faculty leads to Ad-hoc expansion even in the premier institutions. The Pupil to teacher ratio though has been stable in the country (30.1), however, it needs to be improved to make it comparable to USA (12.5:1), China (19.5:1) and Brazil country.

Outdated Curriculum: Curriculum is an important part of quality education outdated and irrelevant curriculum that is dominantly theoretical in nature and it has a low scope for creativity and new knowledge. As per observe that, There is a wide gap between industry requirements and universities curriculum and that is the main reason for the low employability of graduates in India.

Regulatory Issues: Management of the Indian education faces challenges of over centralization and bureaucratic structures and lack of accountability and the transparency / professionalism. As a result of the increase in a number of affiliated colleges and students the burden of administrative functions of universities significantly increased and the core focus on academic and research is diluted.

Research: Not Sufficient fund allocation in research low levels of PhD enrolment and fewer opportunities for interdisciplinary and multidisciplinary researches as well as low levels of industry engagement, low quality of research work etc. are some of the factors affecting the research ecosystem in India. India's investment in R&D has remained constant at around (0.6% to 0.7%) of India GDP. This is below the expenditure of countries like the US (2.8), China (2.1), Israel (4.3) and Korea (4.2).

OBJECTIVE OF THE RESEARCH:

The main objectives of the Research:

- (i) To study the present Scenario of Engineering Education systems in India.
- (ii) Formulating the national education policy of India and to ensure that it is implemented.
- (iii) Find out the Engineering Technical Committees which are working for the Development of Engineering profession.
- (iv) Find out the growth of intake of technical institutes in India.
- (v) Focused on the role of Human Resource Development which is balancing the socio economic fabric of the country.

RESEARCH METHODOLOGY AND DATA COLLECTION:

Various data collection tools are used for collecting of the data for this study. The questionnaire method is user for maximum data collection. As well as supplemented by mobile interviews and face to face interactions with respected librarians. Google form also prepped and sanded to librarians on theirs email and what's App. The purpose of the questionnaire was to collect the data regarding general information about the library and information product source and services in selected engineering college libraries.

The questionnaires were distributed personally, through email and by post to the librarians of selected NAAC Accredited Engineering College. Personally request to respected librarians for filling the questionnaire. Using the various tools for data collection and analyzed it.

DATA ANALYSIS AND INTERPRETATION:

IIT INSTITUTE IN INDIA: The principal objective of IIT is to conduct research in the respective fields to impart world class education in engineering and technology for dissemination of knowledge. The admissions in IIT are given to the student on the basis of their scoring marks in joint entrance examination (JEE) the candidate who clears JEE main are reexamination. The first Indian Institute of Technology (IIT) was established on 15th May (1950) and was then called Eastern Higher Technology Institute. The present name “Indian Institute of Technology” was adopted just before its formal inauguration on August 18, 1951. A chain of six more IITs were established in different part of India.

Sr. No.	Established Year	Location of IIT	Intake
1.	1950	Kharagpur	1869
2.	1958	Bombay	1360
3.	1959	Madras	1133
4.	1959	Kanpur	1210
5.	1961	Delhi	1209
6	1994	Guwahati	952
7	1847	Roorkee	1353
8	2008	Rajasthan (Jodhapur)	530
9	2008	Gandhinagar	288
10	2008	Punjab (Ropar)	395
11	2008	Hyderabad	505
12	2008	Patna	200
13	2008	Bhubaneshwar	475
14	2009	Indore	360
15	2009	Mandi	326
16	2012	Varanasi	1589
	Total=		13754

TABLE NO. 1.1.1 IIT INSTITUTES IN INDIA

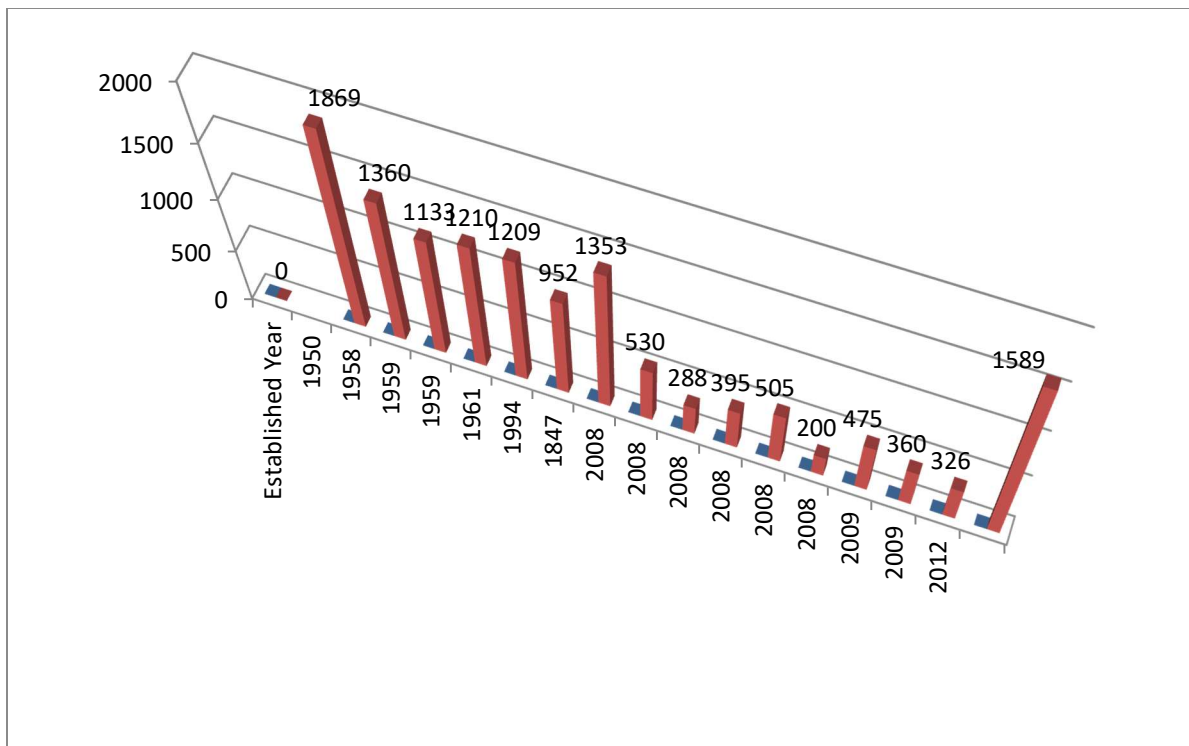


FIG. NO. 1.1.1 IIT INSTITUTE IN INDIA

Analysis: The table shows increase in total number of intake of almost (7000) in between all colleges. For (2009) admissions were made to more IITs namely IIT Mandi (Himachal Pradesh) and IIT Indore taking the seat count to almost (8300). In (2011) with additional courses in several old and new it's the total seat count crossed (9600). In May 15, 1950 to start establishment IIT College. In the (1951) established first IIT Engineering College. Between Period of (1955 to 1965) established new five IIT engineering college. Presently Total (21) IIT engineering colleges are available in the country. There are full controls on courses, degree and examination it is a totally autonomous college. Before (1994) Nine IITs started Maximum IITs started in (2008) Total intake in IITs (9647) per year. In the (2008) numbers of six new IITs were started with (120) seats per institute.

NIT INSTITUTE IN INDIA:

The National Institutes of Technology are the central government owned public technical institutes under the ownership of Ministry of Education, Government of India. They are governed by the National Institutes of Technology, Science Education and Research Act, 2007. During the second five year plan (1956-60). A numbers of industrial projects were contemplated. The Regional Engineering institutes were established by the central government of India to mimic the IITs at a regional level and act as benchmarks for the other institutes in that state.

The Bachelor of Technology (B.Tech) degree is the most common undergraduate degree

in the NITs in terms of student enrollment. The B.Tech course is based on a four years program with eight semesters. List of NITs Institutes are given below:

Sr. No.	Year	Location	State	Intake Capacity
1	1886	Patna	Bihar	943
2	1956	Raipur	Chhattisgarh	1159
3	1959	Warangal	Telangana	989
4	1960	Bhopal	Madhya Pradesh	1203
5	1960	Jamshedpur	Jharkhand	751
6	1960	Nagpur	Maharashtra	933
7	1960	Mangalore	Karnataka	959
8	1960	Durgapur	West Bengal	909
9	1960	Srinagar	Jammu and Kashmir	899
10	1961	Allahabad	Uttar Pradesh	1074
11	1961	Kozhikode	Kerala	1241
12	1961	Rourkela	Odisha	1097
13	1961	Surat	Gujarat	1091
14	1963	Kurukshetra	Haryana	1147
15	1963	Jaipur	Rajasthan	888
16	1964	Tiruchirappalli	Tamil Nadu	1038
17	1965	Agartala	Tripura	1084
18	1967	Silchar	Assam	884
19	1986	Hamirpur	Hamachal Pradesh	944
20	1987	Jalandhar	Punjab	1112
21	2010	New Delhi	Delhi	363
22	2010	Farmagudi	Goa	188
23	2010	Karaikal	Arunachal Pradesh	275
24	2010	Imphal	Manipur	226
25	2010	Shillong	Meghalaya	165
26	2010	Aizawl	Mizoram	190
27	2010	Dimapur	Nagaland	198
28	2010	Ravangla	Sikkim	160
29	2010	Srinagar	Uttarakhand	899
30	2010	Yupia	Arunachal Pradesh	190

TABLE: 1.1.2 NIT INSTITUTE IN INDIA

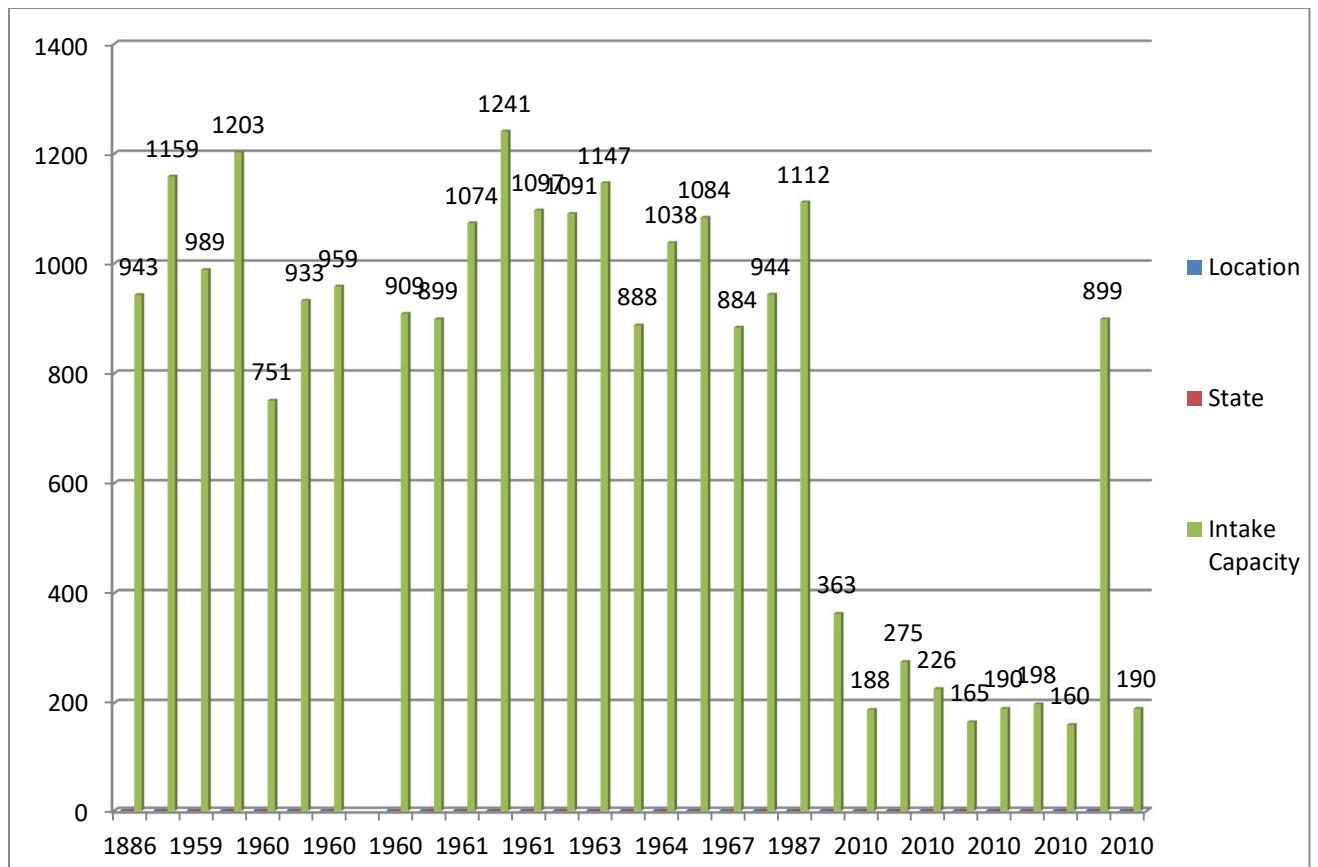


FIG. 1.1.2 NIT INSTITUTE IN INDIA

Analysis:

- (i) In the (1959 To 1969) number of (14) regional engineering colleges started and first engineering college was established in (1959) in Warangal.
- (ii) They are fully funded by central government and are controlled by act of parliament.
- (iii) These colleges conduct their own curriculum development program.
- (iv) Only one NIT College was established before Independence in Patna. (1886)
- (v) Two new NIT college were started in the (1956) (Raipur) and (1959) (Warangal).
- (vi) Six new NIT colleges were started in (1960) (Bhopal, Jamshedpur, Nagpur, Mangalore Durgapur and Shrinagar)
- (vii) In the (1961) four new engineering colleges were started. (Allahabad, Kozhikode, Raurkela, Surat)
- (viii) Between the years of (1961 to 1970) five new engineering colleges (Kurukshetra, Jaipur, Tiruchirapalli, Agartala, and Silchar.)
- (ix) In (1986) and (1987) in Hamirpur and Jalandhar (2) Engineering colleges were started.
- (x) As per the 11th five year plan in (2009) number of (10) newly NIT institutes were started and funded by central government under the MHRD.

(xi) In (2010) new (10) NIT (REC) colleges were started at following location Delhi , Gao, Pondicherry, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Uttarakhand and Arunachal Pradesh.

(xii) Total Intake of students in the NIT engineering institutes is (15485) per year.

(xiii) NIT admission is depending on All India Engineering Entrance Examination (AIEEE) which is conducted by the central board of secondary education (CBSE).

IMPORTANCE OF THE STUDY:

Recent initiatives taken by the government:

Education Quality Upgrading and Inclusion Programme have been recently launched. This is a five year vision plan to improve the quality and accessibility of higher education over the next five years (2019-2024). Double the Gross Enrolment Ratio in higher education and resolve the geographically and socially skewed access to higher education institutions in India. Position at least number of fifty India institutions among the top (1000) global universities.

(i) Revitalizing Infrastructure and systems in Education (RISE) by 2022:

Qualitatively upgrade the research and academic infrastructure in India to global best standards by (2022). Make India into an education hub by making available high quality research infrastructure in India higher educational institutions. To allow access of HEFA funding to institutions like central universities , AIIMS, IISERs and newly created institutes of National importance and without creating any additional burden to the students. Higher Education Financing Agency has been tasked to mobilise cost of (100000) Corers for this for this initiative.

(ii) UGC's Learning Outcome-based Curriculum Framework (LOCF):

In the Year (2018) LOCF guidelines issued by UGC. The aims to specify what graduates are expected to know understand and be able to do at the end of their programme of study. This is to make student active learner and teacher a good facilitator. Graded Autonomy to universities & colleges: Third tiered graded autonomy regulatory system has been initiated with the categorization based on accreditation scores. Category –I and II universities will have significant autonomy to conduct examinations and prescribe evaluation systems and even announce results.

(iii) Global Initiative for Academics Networks (GIAN):

The programme seeks to invite distinguished academicians, entrepreneurs, scientists and the experts from premier institutions from across the world to teach in the higher education institutions in India.

(iv) All India Survey on Higher Education (AISHE): The main objectives of the all India higher education survey are to identify and capture all the institutions of higher learning institutions on various aspects of higher education. National Institutional Ranking Framework was developed in year 2015. The rankings are published annually since year 2016. It outlines a methodology to rank educational institutions across the country based on five broad parameters:

- (a) Teaching learning and resources.
- (b) Research and professional practice.
- (c) Graduation outcomes.
- (d) Outreach and inclusivity.
- (e) Perception.

(v) Regulatory and governance reforms: Restructure or merge different higher education regulators (UGC, AICTE, NCTE etc.) to ensure effective coordination. Amend UGC Act to give legislative backing to regulatory structure. Allow foreign institutions to operate joint degree programmes with Indian institutions. Link University grants to performance. Select Vice-Chancellors of universities through a transparent and objective process. Increased focus on vocational and profession led education: Including the vocational subjects in mainstream universities to allow for greater acceptance and utility for vocational learning.

(vi) Accreditation Framework: All higher education institutions must be accredited compulsorily and regularly by agencies, empanelled through a transparent high- quality process.

(vii) Performance linked funding and incentives: All central universities should develop strategic plans for getting into the top of the five hundred global universities rankings in the next (10) years. Funding to these institutions should be linked to performance and outcomes through the MHRD and newly constituted Higher Education Funding Agency.

CONCLUSION:

Establishment of Education Committee: India became independent in the year 15th August 1947 and Indian Government has formulated various educational Commissions and various committees for development of technical education in the India. Engineering Technical Committee is working for the development of the engineering profession it is the aim of engineering education. The engineering programs and the development of the profession

through collaboration with different educational establishments and organizations. In the engineering education the committee will work towards excellence. The motto of to bring the profession into higher levels in research and development as well as focus on the accreditation for the mobility of Engineering professionals, sustainability and globalization of engineers around the world. Following table is showing the summary committees.

Committee	Title	Year	Recommendations
R.N. Sarkar Committee	Title under the Higher Technical Institutions for the post-war Industrial Development	1985	For the Setting up of Indian Institutes of Technology (IITs)
M.S. Thacker Committee	For the Postgraduate Engineering Education and Research	1959-61	Recommendations for Funding for 100 PhDs annually
Nayudamma Committee	For the Postgraduate Education in Engineering & Technology	1979-80	Committee recommended of PG minimum qualifications for industry , R&D etc.
Nayudamma Committee	IIT Review	1986	Committee recommended of Greater flexibility in Academic programme, Focus on engineering research, Faculty mobility.
P. Rama Rao Committee	Reshaping Postgraduate Education in Engineering & Technology	1995	Committee focus on 21 Months M. Tech, Increased scholarship amount, Assured employment for M.Tech, National Doctoral Programme.
R.A. Mashelkar Committee	Title of the committee report is Strategic Road Map for Academic Excellence of Future RECs	1998	Important recommendation of committee is Conversion of RECs into NITs with the status of a Deemed to be University and structural changes in governance

U.R. Rao Committee	Revitalizing the Technical Education is the title of Committee Report.	2003	Following points are recommended from committee Regional inequity to be removed Faculty shortage to be addressed, Need for planning and coordination in the working of AICTE
P.R. Rao Committee	Review of IIT (Indian Institutes of Technology)	2004	Most importuned recommendation from the committee is the Increase UG output of IITs, Fund infrastructure increase, Add New IITs but maintain quality.

TABLE NO. 1.1.3 MAJOR COMMITTEES AND RECOMMENDATIONS**REFERENCE:**

1. Research Methodology: An Introduction, C.R. Kothari, NEW AGE INTERNATIONAL (P) LIMITED, PUBLISHERS, ISBN (13): 978-81-224-2488-1, Pp. 31, 32.
2. Sedwal M. (2008). Technical Education in India: From past to present. Recent trends in technical education, R.Hariharan, McMillan publishers, Delhi, 495.
3. Agarwal,P.(2005). Engineering Education in India: Changing Global Realities and Responses .University News,43(39),35-41
4. Custer, R.L. and daughtery, J.L. (2009) Professional Development for Teachers of Engineering: Research and Related Activities. K-12 Engineering Education. The Bridge, 39, 18-24.
5. Donna, J.D. (2012) A Model for Professional Development to Promote Engineering Design as an Integrative Pedagogy within STEM Education. Journal of Pre-college Engineering Education Research, 2, 2. <http://dx.doi.org.org/10.5703/1288284314866>
6. Leclercq, F. (2002), The Impact of Education Policy Reforms on the School System: A Field Study of EGS and other Primary Schools in Madhya Pradesh. Occasional Paper No.5 CSH, Delhi: India.
7. Govinda R.and Josephine,Y. (2004). Para Teachers in India: A Review. National Institute of Education Planning and Administration, New Delhi: India.
8. Biman Sen, Indian Journal of History of Science, 24 (4): 224-248 (1989), Development of Technial Education Education in India and State Policy- A Historical Perspective.
9. Education Commissions And Policies Since Independence
<https://www.slideshare.net/pinkibarman1/various-educational-commissions-reports>

10. Aggarwal Y. (1998). Access and Retention the Impact of DPEP: National Overview. New Delhi: New Educational Consultants India.
11. Altekar A.S. (1965). Education in Ancient India. Nandkishore and Bros Varanasi: India.
12. Govinda, R. and Bandyopadhyay, M. (2008). Access to Elementary Education in India: Country Analytical Review. CREATE and NUEPA, New Delhi: India.
13. Kumar, K. Priyam, M. and Saxene, S. (2001). Looking beyond the Smokescreen, DPEP and Primary Education in India. Economics and Political Weekly, Vol-36, No.7 (Feb.17-23, 2001), pp.560-568.
14. MHRD,(2010-11) .Annual Report 2010-11, Dept. of School Education and Literacy, Govt. of India.
15. MHRD, (2009-10). Report to the People on Education 2009-10, MHRD, Government of India, New Delhi: India.
16. Ministry of Social Justice and Empowerment, (2009). The Right of Children to Free and Compulsory Education Act-2009, Government of India, New Delhi, India.
17. Mukharjee, S.N. (1964). Education in India Today and Tomorrow, Acharya Book Depot, Baroda: India.
18. Naik, J.P.(1947). Policy and Performance in Indian Education Indian Council of Social Science Research, New Delhi: India.
19. NCERT, (2005). National Curriculum Framework (NCF, 2005), New Delhi India.
20. Pritchett, Law and Pande, V. (2006). Making Primary Education Work of India's Rural poor. A Proposal for Effective Decentralization, Social Development Papers. South Asia Series, 95, World Bank, Washington DC.
21. Report of the University Education Commission (Dec48-Aug49) (PDF) (Report), Vol-I (First Reprint ed.) Ministry of Education and Culture, Government of India, New Delhi (Publication No.606), 1962, Archived from the original (PDF) on 18 November 2017.
21. <https://testbook.com/ugc-net-paper-1/different-committees-and-commissions-of-higher-education-in-india>
22. AICTE Website
23. AICTE Handbook 2021-22
24. DTE Website