

# Online Open Courseware: A Pragmatic Approach to Democratise Education in India

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## **Abstract**

*"The more one knows, the more one will be able to control events." Francis Bacon. Massive Online Open Courseware is open and free course material available via internet which due to their reach beyond the barriers of space and time can be utilized as a tool to democratize education system in India. The National Mission on Education through ICT envisages the creation of such human resources which are capable of transforming Indian economy to knowledge economy with the integration of ICT in education which facilitates new content generation, connectivity and knowledge network, leading to critical thinking. The civilizations, economies, education, teaching methodologies and curricula continuously keep on evolving themselves through the prism of time. New opportunities for growth and overall development in the sectors of human index, education, jobs, industries, infrastructure, wealth creation and cultural amalgamation can only be fuelled through education and knowledge. Open courseware in India for her rich cultural diversities and uneven distributed population in terms of socio-economic-educational parameters can be the best option to plug such uneven gaps. The present paper overviews the open courseware initiatives under National Programme on Technology Enhanced Learning (NPTEL) and also briefly discusses e PG Pathshala for their value addition in the present scenario of higher education in India.*

**Keywords:** OpenCourseware, E Resources, Open Education Resources (OER), NPTEL, E PG Pathshala

## **1. Objectives**

The objectives of this study are:

- i) To spread awareness among students, learners, educators, employers, publishers and governments about the benefits of E open courseware and their capacity to serve the geographically distributed learning community, and
- ii) Introducing the stakeholders in education to free online courseware initiatives at government level specifically designed keeping in mind the needs and requirements of the economy using latest tools and techniques of information and communication technologies to enhance their existing knowledge.

## **2. Introduction**

In India education mainly is imparted at elementary, secondary and higher level. The policy for higher education in India has been largely the outcome of National Policy on Education (NPE, 1986) which was modified in 1992. The framework for NPE was laid on Radhakrishnan Commission Report (1948-49) or University Education Report and Kothari Commission Report (1964-66) or Education Commission Report. The growth of higher education system in India can be clearly understood while going through the following tables and graphic representations based on the Annual Reports of UGC since 2005.



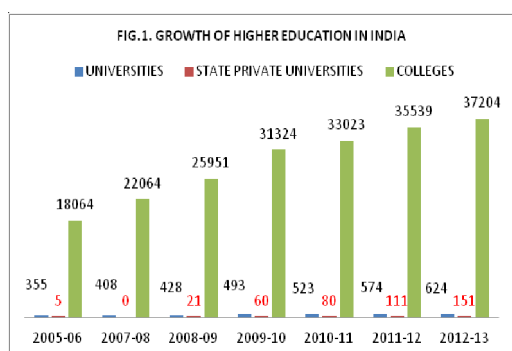
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### 3. Growth of Higher Education System in India

**Table 1: Growth of Higher Education in India 2005-2013**

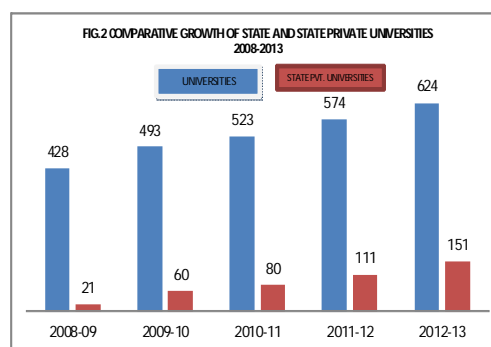
Year	Universities	State Private Universities	Colleges	Enrollment - All Courses & Streams In Lakhs-06
2005-06	355	5	18064	110.28
2007-08	408	-	22064	123.77
2008-09	428	21	25951	136.42
2009-10	493	60	31324	146.25
2010-11	523	80	33023	169.75
2011-12	574	111	35539	203.27
2012-13	624	151	37204	215.01

Source: UGC Annual Reports 2005-06 to 2012-13



**Figure :1 Growth of Higher Education In India**

Figure 2 above clearly indicates that there is a substantial growth in the number of private universities as compared to state universities in the last five years. The state universities which were 428 in numbers in 2008 increased to 624 in 2013 and the number of private universities for the same corresponding years rose to 151 from 21 registering a percentage increase of 619% while state universities increased only by 46% showing government's policy towards privatization of education and squeezing government funding.



**Figure :2 Comparative Growth of State and State Private Universities 2008-2013**

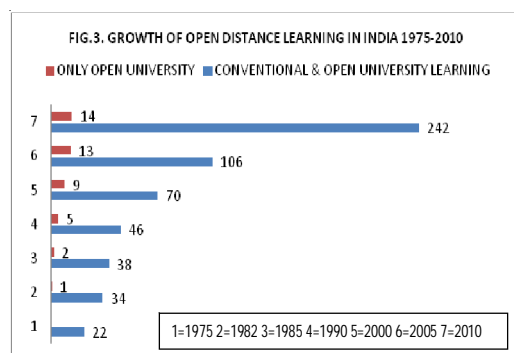
At the time of independence there were 20 Universities, 500 colleges and 2.1 lakh students enrolled in higher education which rose to 691 universities, 37204 colleges and the number of students rose to 215.01 lakh as on 10-11-2014 ([www.ugc.ac.in/pdfnews/6022729\\_English-Report-2012-13.pdf](http://www.ugc.ac.in/pdfnews/6022729_English-Report-2012-13.pdf) pg.7,48). Out of 691 total universities the private universities stood at 195. It is very much evident from the table 1 above that there is a constant increase in the enrolment ratio of students for all classes and streams since

2005 which registered an increase from 10% to 20% showing an increase of 100% and the growth in private universities is alarming which merely from 5 in 2005-06 increased to 151 in 2012-13 showing an growth of almost 30 times. The number of colleges also doubled from 18604 to 37204 in a span of just 8 years.

**Table 2: Growth of Open Distance Learning (ODI) In Higher Education**

Year	Conventional & Open University Learning	Only Open University	Total Distance Learning Institutions
1975	22		22
1982	34	1	35
1985	38	2	40
1990	46	5	51
2000	70	9	79
2005	106	13	119
2010	242	14	256

Source: Growth of Open Distance Learning (ODL) in Higher Education [www.ugc.ac.in/deb/pdf/growthDEB.pdf](http://www.ugc.ac.in/deb/pdf/growthDEB.pdf)



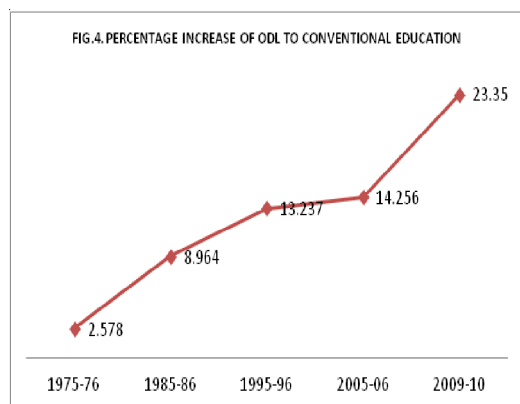
**Figure :3 Growth of Open Distance Learning in India 1975-2010**

Owing to so much vast enrolment ratio the face to face instruction method of teaching cannot match the ever increasing demand in higher education in India so the government formally gave nod to start education via correspondence or distance education and now the emphasis is being given on open distance learning or open educational resources so as to reach out to those strata of the society which for livelihood, time constraints or geographical reasons

could not get the formal education. UGC in 1985 formally laid down guidelines for distance mode of education. There has been a phenomenal growth of open distance learning (ODL) in India as from a single institution that was being run by Delhi University in 1962, the recognised institutions by Distance Education Bureau (DEB-UGC) India are now more than 250. The institutions that were providing education through open learning mode rose from 5 in 1990 to 14 in 2010 showing a growth of 180% as shown in table 2 above.

**Table 3: Share of Open Distance Learning (ODL)**

Percentage Share of Open Distance Learning to Conventional Education	
1975-76	2.578
1985-86	8.964
1995-96	13.237
2005-06	14.256
2009-10	23.35



**Figure :4 Percentage Increase of ODL to Conventional Education**

From merely 1112 students in 1962 the enrolment for ODL programmes rose to about 37 lakh in 2009-10 and the share in gross enrolment ratio of distance learning was about 25%. The percentage share of distance open learning in terms of gross enrolment ratio is showing a continuous upward trend as shown in figure 4 above from 2.578% in 1975-76 to 23.35% in 2009-10. ([www.ugc.ac.in/deb/pdf/growthDEB.pdf](http://www.ugc.ac.in/deb/pdf/growthDEB.pdf)).

Keeping pace with new education teaching and learning methods many Indian Universities and other educational institutions started providing education through distance mode which was particularly beneficial to those who for one reason or the other could not attend classroom teaching. With the introduction of Information and Communication Technology (ICT) in education, static educational institutions have started functioning as mobile information centres through World Wide Web (WWW) and internet. Libraries transformed themselves into electronic or digital libraries and started acquiring E resources and providing E services. The conventional or classroom teaching and learning slowly are giving way to smart learning in the shape of smart classrooms.

#### 4. E Teaching and E Learning

Education in its Online Avtaar involving teaching and learning is E teaching and E learning. Communication to the learner is facilitated purely through ICT based tools in classrooms or on tablets or both.

The University of Sheffield, U.K. describes E learning as an learning which has all the parameters of face to face learning namely clear aims, learning outcomes, evaluation and assessment but with additional flexibility of using technology. "Technology Enhanced Learning (TEL) or E learning describes broad approach of using technology to support teaching and learning processes, design and delivery."

Sangra (2012) quoted E learning from e learning portal as "the use of technology to deliver learning and teaching programmes."

Some of the E learning and E teaching courseware resources are- e Gyankosh (IGNOU), e PG Pathshala (INFLIBNET), NCERT text books Online, Learnhub, You Tube Edu, Scitable, Commonwealth of Learning, W3 School, Coursera, and many more.

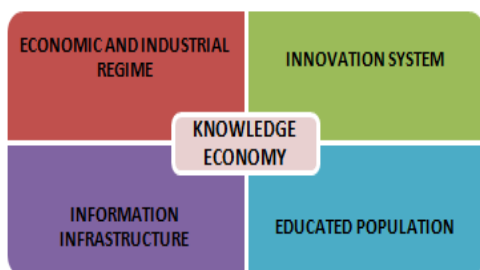
Education is the "act or process of acquiring knowledge especially systematically during childhood and adolescence" and "A particular kind of instruction or training." (Collins English Dictionary).

Knowledge has the following attributes –

- i. The facts, feelings or experiences known by a person or group of people,
- ii. The state of knowing,
- iii. Awareness, consciousness or familiarity gained by experience or learning,
- iv. Informed learning,
- v. Specific information about a subject.

Knowledge Economy is an economy which uses data as raw input or material (of human resources, education, technology, skills, information, infrastructure, funds, policies, and so on) and transforms that data for an enhanced productivity in all spheres of human activities by processing it using IT tools, analytical methodologies and human expertise into knowledge, new knowledge and innovations. The Organisation for Economic Cooperation and Development (OECD), Paris defines knowledge economy where “the role of knowledge (as compared with natural resources, physical capital and low skill labour) has taken on greater importance.”

The World Bank’s Knowledge Economy Framework or the K4D (Knowledge for Development) programme mentions that a successful knowledge economy must be based on strong foundation that is laid on following four pillars:-



- i) Economic and Industrial Regime encourages the use of existing and new knowledge efficiently for policy changes.
- ii) Well Educated and Skilled Population creates, shares and uses knowledge effectively in education especially in scientific and engineering fields.
- iii) Information Infrastructure makes provision for communication, dissemination and processing of information.

iv) Innovation System involves research centres, firms, universities and think tanks to assimilate scattered knowledge in the world and then use it according to local needs and conditions.

### 5. Open Courseware or Technology Enhanced Learning

Open courseware are the educational initiatives (courses and material) “open and freely available worldwide for non commercial purposes such as research and education, providing an extraordinary resource, free of charge, which others can adapt to their own needs.” (whatis.com-techtarget)

Wikipedia defines open courseware as those course lessons which are created at universities and published for free via the internet.

Open courseware (OCW) is based on the following principles:-

- ▶▶ Free and open digital publication of high quality educational material available for free use and adaptation,
- ▶▶ Normally published under open license, and
- ▶▶ Does not provide certification.

OCW movement was started in Germany when University of Tübingen published certain videos of lectures. But the movement really took off with the educational materials developed by Massachusetts Institute of Technology (MIT) in 2012 to make core teaching material of all MIT graduate and undergraduate classes available at no cost to internet users around the world.

#### 5.1 Need for Technology Based Learning

The ever rising demand for higher education, mismatch between demand and supply of quality educational resources, paucity of funds at the state and

central government levels, higher costs of higher education, diverse social-economic-political-geographical patterns, very less fresh recruitments in higher education, compromised standard of education in private institutions, pressure of creating skilled and competent work force as per needs of local economy and transiting itself into world knowledge economy and ever increasing Gross Enrolment Ratio (GER) in ODL are some of the basic factors that prompted the government to redesign the education system by introducing ICT based specific open courseware.

Technology based learning have a number of benefits over conventional learning as listed below:-

- ▶▶ It facilitates 24x7 global connectivity and accessibility to information.
- ▶▶ Independence of time, space and pace of study.
- ▶▶ Multiple format accessibility.
- ▶▶ Platform to collaborate where one can share and create new ideas.
- ▶▶ Lifetime experience of skill development and working with digital content.

Conventional Set Up	Technology Based Set Up
Individual Information	Globalised view
Classroom Teaching	Occupation specific/ Workshop oriented
Information Based (Teacher centred)	Competitive and Skill Based (Learner centric)
Personal Development	Professional and Vocational development
Comprehensive Curriculum	Specified and Differential Curricula

## 6. Literature Review

The challenges to open education courses as highlighted in a report to The William and Flora Hewlett Foundation, by Atkins, et.al., (2007) are sustainability, preservation, diversity, intellectual property rights and quality assessment. They also reported that spread and convergence of mobile technology and computers are dominating the ICT application in education in developing nations.

Syed (2009) in his study concluded that with enhanced professional skills for managing knowledge particularly in IT and management sectors libraries and librarians can play a major role in making India a knowledge economy.

In their view on 'open future for higher education' (McAndrew, Scanlon & Clow, 2010) opined that the sharing and communication through open education enables and impacts the faculties of a learner to the extent that he applies his knowledge for further research. However the initiatives of openness at the same time brings challenges of shifting towards "Content is the King", bringing in effective designs and way of learning rather merely providing a content (teaching).

Clayton (2010) has argued that teaching, which is surrounding the education system in the form of Massive Open Online courses (MOOC) is going to disrupt and change the existing system of education.

Imran (2012) concluded that in the present scenario of rising demand for higher education and university system being reluctant to change their conventional academic programmes E learning becomes highly important.

An Open Education Resource (OER) framework emphasised (Nikoi & Almelline, 2012) that 4Ps- 'Purpose, Process, Product and Policy' must be taken into account from societal and higher education perspective before designing an OER. This concept has tried to find out the viability, sustainability and policy of OER for higher education.

Presenting her views on 'technology literacy for today and tomorrow' (Jain, 2012) strongly viewed ICT in education as an informative (data format-text, audio, video), situating (real time situations), constructive (data analysis) and communicative tool. Jain also enumerated various benefits of introducing ICT in education for students (enhanced access, learner centred course material, upgraded communication tools); for employers (cost effective upgradation of skills & professional development, new learning techniques and environment) and for governments (cost effective education and training, quality and targeted supplements to conventional teaching courseware, life time enabling).

In a study conducted on 114 under graduate students at Ming Chuan University, (Wen & Di, 2014) concluded that the students who received open educational resources along with their traditional classrooms teaching got higher grades as compared to those students who opted classroom teaching only.

Dov (2014) goes a step further when he proposed that during the process of evolution and transition across the global economies from agricultural to knowledge economies a time has reached where the economies have matured themselves to a level where they are shifting towards "human economy". In human economy best brains are hired from any part of the world for enhancing productivity by big corporate houses.

## 7. National Initiatives on Technology Based Learning

The Government of India in its efforts to keep pace with the advancements in ICT especially in education has initiated several projects from time to time to make India a world leader in all parameters of socio-economic index. In such a continuation, a Sectoral Innovation Council has been constituted on February 2013 under MHRD to find, create and provide tools for innovation, research and new knowledge. Some of the recommendations of the first meeting of the council (2nd September 2013) to central government are as under:-

- ▶▶ Innovation should be encouraged in all spheres of academics and should not be confined to sciences only;
- ▶▶ The education should be for innovation and promote critical thinking;
- ▶▶ Innovations to be supported by Public Private Partnerships;
- ▶▶ Open Learning system should be promoted which are "future education";
- ▶▶ Massive Open Online Courseware (MOOCs) and Certification should replace existing open learning systems due to their inadequacies;
- ▶▶ Online Teaching/ Lectures should be recognised for awarding degrees;
- ▶▶ Curriculum for higher education should be pro-industry; and
- ▶▶ 'Digital Inclusion' is fundamental to all innovative efforts.

### **National Mission on Education Through Information And Communication Technology (Nmeict):**

NMEICT is a centrally funded mission which aims to reach out to existing learners, teachers, policy makers and potential learners through ICT, primarily for teaching and learning in higher and technical education in anywhere anytime mode. It also aims to provide low cost quality connectivity to all colleges and universities on the principles of i) access, ii) equity and iii) quality whereby it endeavours to provide E content free of cost to all learners in the country to plug the gap between rural-urban digital divide.. It has two major components:-

- ◆ Provision of connectivity and access devices for the stakeholders;
- ◆ Content generation.

It plans to,

- ▶▶ Redesign the learning platforms ( methodology and curricula) for e learning;
- ▶▶ Establishment of virtual real time laboratories;
- ▶▶ Starting of online testing and certification,;
- ▶▶ Online availability of teachers to guide and transform learners, and
- ▶▶ Empower teachers with new technologies of teaching and learning.

SAKSHAT has been planned to act as main platform for the free delivery of e contents to the information seekers. INFLIBNET has been given the responsibility to deliver and develop e content. It aims to cover each and every inch of academic field across all the streams through connecting and extending computer infrastructure.

### **8. National Programme on Technology Enhanced Learning (NPTEL nptl.ac.in)**

The National programme on Technology Enhanced learning (NPTEL) is a Central Government of India funded project under the Ministry of Human Resource Development (MHRD). The project was conceived in 1999, basically to enhance learning of basic science and engineering concepts by using multimedia and web technology.

In the first phase of NPTEL project (June 2002- June 2007) seven Indian Institute of Technology (IITs) and one Indian Institute of Science (IISc) worked together to develop web and video based material for basic undergraduate science and engineering subjects to enhance the research and quality of technical education in the country. July 2007 to June 2012 was the period fixed for second and third phase for the project.

#### **8.1 The Objective of NPTEL**

The primary objective of NPTEL is to enhance quality of engineering in the country by providing FREE ONLINE material called COURSEWARE. It provides E learning through web and video courses in engineering, basic sciences and humanities. The broader objectives include facilitating and empowering the Indian industries for global competition through improving quality and research of engineering education; enhancing the methods and way, the students learn concepts; enhancing learning concepts and reducing the mechanical concepts of some of current learning methods through computer, multimedia and ICT applications.

#### **8.2 Budgetary Provisions and Programmes**

For the first phase till June 2007 the government approved a budget of INR20.47 crore for develop-



ing digital video lectures and web based courses. Second and third phase till June 2012 was sanctioned funds to the tune of INR 96.0 crore. Even the Indian Institute of Managements (IIMs) were allocated separate funds for digital education in core areas of management.

110 video based courses, 129 web courses were prepared for distribution in India by December 2007 and these courses were broadcast via Eklavya Channel provided by Gyan Darshan on Doordarshan. In the first phase 800 plus courses available at NPTEL were accessed by more than 140 countries across the globe.

### 8.3 NPTEL Courses

The courses at NPTEL are being generated by Consortium of Educational Communication (CEC) and can be searched at site by discipline, courses by coordinating institutions and through find course search within the video options. Some of the certification courses at a very nominal fee are now open to registration for any Indian student. Previous year exam papers of GATE are also available along with the mock test for 2014 preparation. At present fol-

lowing courses are available with NPTEL with their number mentioned in bracket.

Aerospace Engineering (49) Atmospheric Science (6) Automobile Engineering (2) Basic courses (Sem. 1 and 2) (38) Biotechnology (35) Chemical Engineering (93) Chemistry and Biochemistry (57) Civil Engineering (131) Computer Science and Engineering (94) Electrical Engineering (77) Electronics & Communication Engineering (103) Engineering Design (14) Environmental Science (4) General (5) Humanities and Social Sciences (70) Management (50) Mathematics (75) Mechanical Engineering (163) Metallurgy and Material Science (54) Mining Engineering (2) Nanotechnology (11) Ocean Engineering (29) Physics (73) Textile Engineering (28) Currently there are 378 web courses in html and pdf format and 331 video courses in mp4, flv and 3gp formats (up to July 2014) are available for downloading and the complete procedure for downloading is given at the website of NPTEL. In phase I it has made available e content modules in History (356), Botany (276), Anthropology (194), English Language (131), Hindi Language (124) and Environmental Sciences (75). In

SUBJECTS	PROGRAMMES AS ON 30/09/13	SUBJECTS	PROGRAMMES AS ON 30/09/13	SUBJECTS	PROGRAMMES AS ON 30/09/2013
BA Hons. URDU	08	BA Hons. POL. Sc.	-	BA SPANISH & FRENCH	-
BSc Hons. FOOD TECH.	15	BSc Hons. MICROBIOLOGY	49	BEd. ENGLISH	-
BA LLB	96	BA FILM STUDIES	-	BSc. Hons. HOME Sc.	-
B PHARMACY	-	BA VOCATIONAL MASS COMM. & FILM PROD.	47	BSc. ANALYTICAL METHODS CHEM. & BIO-CHEM.	-
BA Hons. MUSIC RAVINDRA SANGEET	-	BA PSYCHOLOGY	141	BA Mgt. & Mktg. Of INSURANCE	101
BA Mktg. Mgt. & RETAIL BUSINESS	121	BSc. Hons. ELECTRONICS	38	BA VOCATIONAL BOOK PUBLISHING	-

NPTEL through National Mission on Education through Information and Communication ([www.it.iitb.ac.in/nmeict/home.do](http://www.it.iitb.ac.in/nmeict/home.do)) provides text transcription of all NPTEL video lectures in engineering sciences from phase I and other metadata for video indexing and searching.

#### 9. ePG Pathshala ([eggp.inflibnet.ac.in/about.php](http://eggp.inflibnet.ac.in/about.php))

National Mission on Education through ICT has assigned UGC to develop and deliver quality e content, in 77 subjects at post graduate level covering all disciplines- humanities, social sciences, arts, fine arts, natural and mathematical sciences, linguistics and language. The e contents uploaded and developed by UGC-INFLIBNET are interactive and curriculum based.

E PG Pathshala is working on the motto - "to provide connectivity up to the last mile". It aims to extend connectivity to over 32000 colleges and more than 550 universities, deemed universities and institutions of excellence in the country.

So far 1016 e content modules have been uploaded covering the subjects of Anthropology, Biotechnology, Biochemistry, Chemistry, Botany, Environmental Sciences, Library and Information Science, Commerce, Computer Science, Computational Science, Computational Social Science, Earth Science, Economics, Education, Linguistics, Language, Mass Communication, Forensic Science, Food Science, Hindi, History, Law, Philosophy, Physics, Political Science, Psychology, Public Administration, Social Work, Statistics, Sociology, Zoology, English, Geography, Mathematics, Management and Audiology.

A click on student corner tab takes the searcher straight to the searches under subject, title or to single word search mode. The guidelines for those who can contribute e content proposal have been provided on the website.

#### 10. Conclusion

Education System in India through Online Open Courseware can surely overcome some of the failures by virtue of their being innovative, collaborative and interactive. The new pedagogy in education is able to provide skill teaching enabling a person for lifetime. NPTEL with its engineering, basic science, humanities and e PG Pathshala with free e content courseware for post graduate courses is undoubtedly doing a great job in providing the technology enhanced learning to learning communities and educators in India. An effort may also be made to start new online open courseware initiatives, with certification that suits multi disciplinary higher education scenario where comprehensive curriculum is shifted towards specified or differential curricula

"Let knowledge grow from more to more and thus be human life enriched." Encyclopedia Britannica.

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