



# NPTEL- Technology Enhance Learning Initiative

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## ABSTRACT

Education for a sustainable future is a topic of intense discussion around the world. In the twenty-first century, providing equal learning opportunities has emerged as a central goal for universities and colleges everywhere. New and innovative educational initiatives, such as Open Educational Resources (OERs) and Massive Open Online Courses (MOOCs), have arisen in recent years to satisfy the requirements of the world's expanding desire for knowledge. The National Programme on Technology Enhanced Learning (NPTEL) was founded in 2003 by the Indian Ministry of Human Resource Development (MHRD), seven Indian Institutes of Technology (IITs), and the Indian Institute of Science (IISc), to provide undergraduate students with access to courses in all of the major engineering and physical science disciplines. The purpose of this paper is to evaluate NPTEL's effectiveness and investigate its efforts to expand its course offerings. The study concluded that NPTEL facilitates creative and inventive thinking, and interactive learning, and satisfies specific learner requirements.

**Keywords:** NPTEL, SWAYAM, MOOCs

## INTRODUCTION

Presently, the entire globe is discussing sustainable education for sustainable living. Accessible and equitable teaching opportunities are the foundation of a sustainable educational system. In addition, providing the learners with the necessary knowledge, training, and skills to be truly productive. Sustainable education would equip people with the information, abilities, and values essential for creating a future that can support human flourishing for generations to come. Higher education institutions around the world have made it a top priority in the 21st century to ensure that all students have access to quality education. Learners, however, deserve the chance to participate in high-quality programmes tailored to their interests and skill sets, ensuring that they gain the most from their educational experiences. Therefore, it is essential to determine whether the education and training are truly focused on learners' needs and adequately skill-oriented to provide them with a minimal quality of living. As a result, government initiatives in education may play a pivotal role in modernising curricula to accommodate students' requirements in the twenty-first century. In light of this, the

government in a country like India are currently debating how education may be made skill-oriented, enhancing the capacities of students and preparing them to become productive citizens in the future. Developed countries have become the epicentre of world-class education due to their judicious use of online curriculum transmission and focus on more realistic educational goals. However, a growing nation like India still faces various difficulties in its efforts to provide everyone with a quality education. Regarding education, India still has many unanswered concerns, such as if the quality of education could be attained; if the inequalities in accessing education can be eliminated, and if new educational initiatives in the form of Massive Open Online Courses (MOOCs) can bring forth opportunities for persistence and reasonable learning. Open Educational Resources (OERs) and Massive Open Online Courses (MOOCs) are the new and modern educational interventions that have emerged in recent years to meet the needs of the world's increasing desire for knowledge. Numerous policies and initiatives have been developed by the Ministry of Human Resource Development to encourage the widespread adoption of massive open online courses (MOOCs) to provide accessible, high-quality education at a low cost to India's large and diverse population.

Technology Enhanced Learning and Teaching (TELT) is a pedagogical framework for the development of educational content and an interactive information exchange system that delivers supplementary learning through interactions. Enabling, educating, and empowering each citizen and community through knowledge is the guiding principle of the TELT programme, which aims to provide quality education to all students regardless of their location. The approach is supported by a web-based e-learning platform that provides the scope of instructions for both students and teachers, facilitating more efficient two-way communication and education. The model was designed with the following objectives in mind:

1. Learning is the process of developing the ability to see abstractions, recognise patterns, make informed judgments, and take appropriate action.
2. Instructional objectives provide students with a sense of purpose, motivation, and direction.
3. Real-world activities should be incorporated into the instruction process.

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4. Bridge the gap between classroom instruction and its application in the real world (Sherly, 2010).

SWAYAM (Study Webs of Active–Learning for Young Aspiring Minds) can be considered an Indian approach to the emerging environment of web-based Open Distance e-Learning. “The Government of India’s Ministry of Human Resource Development (MHRD) launched SWAYAM in 2016 to provide Indian citizens with access to massive open online courses (MOOCs) taught by faculty at institutions like the Indian Institutes of Technology and Management (IITs and IIMs) and central universities. Access, equity, and excellence are the three driving principles of India’s Education Policy. SWAYAM is a government-initiated programme aimed at achieving these goals. Nine National Coordinators including the National Programme on Technology Enhanced Learning (NPTEL) for engineering; the University Grant Commission (UGC) for post-graduate education; the Consortium for Educational Communication (CEC) for undergraduate education; National Council of Educational Research and Training (NCERT) and National Institute of Open Schooling (NIOS) for school education; Indira Gandhi National Open University (IGNOU) for out-of-school students; All India Council for Technical Education (AICTE) for Annual Refresher Programme in Teaching for faculty of the Engineering/University/ Institutions; National Institute of Technical Teachers Training and Research (NITTTR) for the teacher training programme and Indian Institute of Management Bangalore (IIMB) for management studies are appointed to ensure the quality of the course contents produced and delivered through SWAYAM” (<https://swayam.gov.in>). No tuition fee is required for a SWAYAM course, but students must pay for and schedule in-person for the exams at approved testing centres by the due date to acquire a SWAYAM certificate. Students will only receive certificates if they meet the requirements that will be outlined on the course website. Grades or certifications obtained in these courses may be accepted for credit transfer by universities and colleges that have determined to recognise them. The UGC released a credit Framework for Online Learning Courses under SWAYAM Regulation in 2016, requiring universities to recognize SWAYAM courses for which credits may be transferred to students’ academic records. In 2016, AICTE also released a gazette notification approving these courses for credit transfers.

The Ministry of Human Resource Development (MHRD) and seven Indian Institutes of Technology (IITs) (Bombay, Delhi, Kanpur, Kharagpur, Madras, Guwahati, and Roorkee) along with the Indian Institute of Science (IISc), Bangalore launched the National Programme on Technology Enhanced Learning (NPTEL) in 2003 to offer advanced management courses for graduate students and online and multimedia courses for undergraduates in all of the major engineering and physical science disciplines. Courses in engineering, natural sciences, and arts and social sciences can be found on NPTEL, the largest online library of its kind in the world. NPTEL’s YouTube channel is the most subscribed educational channel, with over 1.4 billion views and more than 4 million subscribers. Additionally, it is the most accessed peer-reviewed instructional content repository in

the world. It has provided more than 2400 completed courses and 54,900 hours of videos with English subtitles (<https://nptel.ac.in>).

## LITERATURE REVIEW

A Paper presented at Pan-Commonwealth Forum 8 titled The Journey of SWAYAM-India MOOCs Initiative analysed the SWAYAM initiative and its execution in the Indian context, highlighting the concerns and obstacles involved. It specified that the origins of SWAYAM may be traced back to 2003 with the launch of the NPTEL which was the nation’s first big attempt at E-learning through online and video courses. The paper described that SWAYAM is viewed as a self-actualization tool that offers lifelong learning opportunities. SWAYAM has the potential to play a major role in the government of India’s Digital India and Skill India initiatives if it is properly planned and implemented (Kanjilal & Kaul, 2016). Saravan and Esmail in their study examine the influence of NPTEL on engineering college students and teachers in the Thiruvallur area of Tamil Nadu. It highlights the various perceptions and expectations of NPTEL subscribers. The study concluded that the majority of respondents used NPTEL for educational purposes and they believed that NPTEL is extremely valuable for teaching and research (Saravan & Esmail, 2014).

Nitonde (2018) analysed the numerous facets of NPTEL and the primary achievements of the project NPTEL. He concluded that technology-enhanced education in India demonstrates that NPTEL has fulfilled its mission. University education, technical training, distance learning, and perpetual and open learning have been the focal points of the NPTEL initiative. The well-developed and peer-reviewed core curriculum provided by the IITs and IISc has benefited a large number of those who are efficaciously engaged in industries and other fields and who require additional training and upgradation of their expertise. The author recommended that the content of NPTEL can be used as core curriculum material for training purposes (Nitonde, 2018).

## OBJECTIVE OF STUDY

The purpose of this paper is to evaluate NPTEL’s effectiveness in terms of student enrolment and exam registration in different courses during the years 2014-2020. and investigate its efforts to expand its course offerings. In March 2014, NPTEL launched a programme to provide students with the option to earn certification from IITs/ IISc for their coursework. Additionally, the paper discusses NPTEL’s initiatives to increase student enrolment in the different courses.

## RESEARCH METHODOLOGY

The information on student enrolment in the various courses offered by NPTEL, exam registration and NPTEL initiatives and programs has been collected from the official website of NPTEL and SWAYAM.

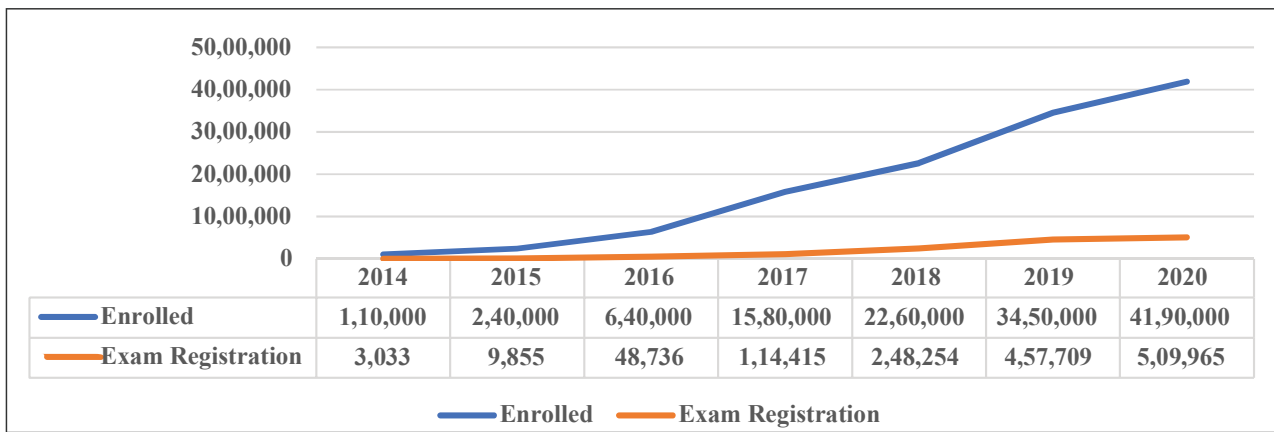


Figure 1: Students Enrolment & Exam Registration

## DISCUSSION

The enrolment of students and exam registrations from 2014 to 2020 are depicted in Figure 1. The slopes of the two curves indicate that the rate of growth in student enrolment between 2014 and 2020 is greater than the rate of change in exam registration. NPTEL has implemented numerous measures to enhance enrolment and exam registration. There is a wide gap between the number of students enrolled for the course and who registered for the examination of that course. Though the exam registration as a percentage of students enrolled has increased from 2% in 2014 to 12% in 2020. This paper examines and discusses the numerous measures that NPTEL has undertaken in this regard.

Source: Compiled from data available on <https://drive.google.com/file/d/1kTFJ51qVmoYQ2Qm0hN-Fld3Gt72B2YG1/view>

Faculty (11%)	College Students (82%)	Industry (7%)
<ul style="list-style-type: none"> <li>Strengthening Foundation</li> <li>Exploring New Domains</li> <li>Faculty Development Program</li> <li>Continuous Learning</li> </ul>	<ul style="list-style-type: none"> <li>Learning From The Experts</li> <li>Learning At Own Pace</li> <li>Networking</li> <li>Better Employability</li> <li>Internships</li> <li>Credit Transfer</li> </ul>	<ul style="list-style-type: none"> <li>Recruitment Of Skilled</li> <li>Job-Ready Hires</li> <li>Training Of Freshers</li> <li>Reskilling Of Employees</li> </ul>

Figure 2: Reason For Joining NPTEL

Source: <https://nptel.ac.in>

Figure 2 displays the learner's demographics, proportions, reasons, and motivations for enrolling in NPTEL courses. According to the NPTEL report, credit transfer is the leading reason for students to join the course. Obtaining an internship or a job, updating one's knowledge in the area, conducting research, and preparing for a competitive examination are additional motivations for joining the courses. In contrast, academic members join NPTEL for research purposes, to expand their knowledge with the newest advancements in their profession or to gain insight into the operation of massive open online courses.

Almost a decade has passed since NPTEL first began offering online courses in engineering, humanities, and sciences. Starting in March 2014, students who complete NPTEL's online courses and pass the certification test will be eligible to receive a certificate issued by one of the IITs. To encourage more students to participate in the certification programme, NPTEL has established **Local Chapters** in colleges, with the approval of college authorities, where one faculty member will serve as the Single Point of Contact (SPOC) would receive all current information regarding NPTEL initiatives and be able to provide this information to students. In addition, mentors for each course would be selected at these centres to ensure that students are actively engaged in the course, have their queries resolved, and submit their assignments or projects on time.

NPTEL has signed a Memorandum of Understanding (MOU) with 70 industry partners to find ways to reduce the disparity between the academic world and the business world. The main objective of the **Industry Associate Program** is to access, nourish and develop human resources. To achieve this objective NPTEL collaborate with industry partners to co-offer courses that will help to upskill or/ and reskill the current workforce. NPTEL offers a variety of courses that corporations can utilise to educate new hires in a variety of fields. Enhancing Soft Skills and Personality, Programming, Data Structures and Algorithms, Database Management systems, and Business English Communication are all useful courses in this respect.

NPTEL primarily produces instructional resources in the English language. The vast majority of citizens (96.71%) are fluent in one of the 22 recognised languages. Many students have only had an education in their native language and may struggle to learn English to enrol in a technical programme. NPTEL has begun **translating course materials into eleven languages**: Assamese, Bengali, Gujarati, Hindi, Kannada, Malayalam, Marathi, Odia, Punjabi, Tamil, and Telugu. NPTEL has completed 16,690 translated hours and 4,520+ in progress (<https://nptel.ac.in>). Students would benefit from having access to translated NPTEL content since it will help them adjust to their new environment and make full use of India's technical expertise. To ensure that the translated

materials are suitable for students, they are reviewed timely. Students that make use of this resource help evaluate the translated information even further. The NPTEL platform allows students to rate and comment on each translation. The procedure benefits from this enhancement, being more efficient and error-free as a result. PDF scripts, E-books, captions, scrolled text, and audio recordings are the formats accessible for automatically created translations into numerous languages. One can get these add-ons free of charge and download them at any time.

To help students better **prepare for the Graduate Aptitude Test in Engineering (GATE)**, NPTEL has launched a new initiative with CSR funding from Amadeus Labs Bengaluru. The purpose is to compile all information one would need to succeed in the GATE exam, from the fundamentals to tricks, from comprehensive video lectures covering the complete GATE curriculum to in-depth video explanations of previous GATE exam problems. The resource will also provide extensive feedback on the student's strengths and weaknesses through an online assessment conducted using a large question bank.

Since 2018, NPTEL has been providing paid winter/summer **internships** to learners from various colleges, universities, and institutes who have topped any of the NPTEL Online Courses (NOC) under the guidance of faculty from the IITs and IISc.

NPTEL, in conjunction with its industry partners, **waives fees** for students from low-income families. Through the support of CSR partners, more than 1,20,000 students have obtained exam fee waivers (<https://nptel.ac.in>).

To offer the NPTEL course toppers an opportunity to experience world-class facilities and encourage them, NPTEL initiated providing week-long **laboratory workshops** at some of the top institutions, such as the IITs, IISc, and IIITs.

NPTEL encourages students to develop a wide range of abilities through online courses, not simply their technical competence. NPTEL provides a **Soft Skills Training Programme** that helps students prepare for careers in their chosen fields through activities including online mock interviews, aptitude tests, English language assessments, and other interactive sessions.

NPTEL's goal is to link qualified people who are looking for new opportunities with businesses that can provide them. The plan is to accomplish this by facilitating a meeting of the minds between NPTEL-certified interested individuals and company recruitment teams at mutually convenient locations around the country. Industry partners **recruit from NPTEL toppers**.

Coordinators from various local chapters will have their registration and travel expenses covered by NPTEL to attend the annual technical conference. As a result, they will be better able to help their students by upgrading their

knowledge and staying current on the latest advancements in the industry.

## CONCLUSION

The advent of massive open online courses has revolutionised teaching and learning, especially at universities. NPTEL provides a platform for continuous learning, enabling learners to improve and upgrade their skills and knowledge. The data revealed that both enrolment and exam registration has increased over time. This shows that NPTEL has successfully addressed the various challenges to the implementation of MOOCs in India including lack of technological infrastructure, funding, diverse population, the efficiency of courses, acceptance of MOOCs among learners and acknowledgement by academic institutions through various initiatives as discussed above. However, the ability of learners to self-motivate and self-direct is one of several factors determining the popularity and utilisation of MOOCs. Learners could be motivated more if they were asked to develop and state specific learning objectives (Milligan et al., 2013). Additionally, the success of MOOCs must not be assessed by completion rates, but by learning advantages (Murugesan et al., 2017). In conclusion, NPTEL facilitates creative and inventive thinking, as well as the exploration of novel pedagogical techniques for learner motivation, interactive learning, and the satisfaction of specific learners' requirements.

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