

# Experiences in Effective Utilization of ICT Tools for Developing Scientific Content for e-Learning: A Case Study

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## Abstract

Objective and useful scientific content development using instructional communication technology tools is a difficult, time consuming and professionally less rewarding exercise for faculty in institutions of higher learning where scientific research (leading to publications) and consultancy (leading to product/patent development) are given primary importance over teaching and research and methodology developments in teaching. However, content development requires a certain pedagogical approach and clarity of thought processes and nuances best left to experts in the specified area of scientific knowledge who are often found in such institutions. Thus in order to build a useful and exciting electronic course on the web or distributed through a CDROM or any other media, the effort seems to far outweigh the benefits, other than intellectual satisfaction.

For quite some time I have been paying attention to the development and use of visual aids which are developed using some of the best ICT tools, and have been experimenting them in class rooms at all levels, from 9th standard to a PhD course. The student response has been the only prime motivation to develop visual aids in chemistry which are plentiful, but rarely used in education in India where the form and quality are much less emphasized than quantity leading to a plethora of poorly trained and motivated scientists and engineers.

This paper will describe the difficult processes that a faculty member interested in developing teaching /learning materials is likely to undergo before accomplishing the task meaningfully as well as effectively. The difficulties can be broadly classified into three aspects, the mindset of colleagues and peers around one, the lack of appropriate infrastructure for both

development and dissemination of content and the usually lackadaisical response of the students for whom it is ultimately meant because of the requirement of examinations and credits to be obtained by them which are independent of the whole exercise, albeit sadly!

A more disturbing recent development due to economic and social pressures from all corners of the society in India also warrants that all of us who teach to build a future repository of intellectual resources pay serious attention to the use of technology in teaching. Engineering institutions have been permitted to run in recent years in India with little or no facility for students and with poorly qualified teachers. There are almost 500 or more such institutions in three provinces in India alone, Tamil Nadu, Andhra Pradesh and Karnataka. Added to this are already more than 1000 or so arts and science institutions.

The Ministry of Human Resource Development seems to have recognized the problem on hand and at the insistence of a forum of all IITs and IISc, has granted a uniform content development program for engineering two years ago. The National Programme on Technology Enhanced Learning (NPTEL) is a project funded by the Ministry of Human Resource Development, Government of India to the seven Indian Institutes of Technology and Indian Institute of Science, Bangalore for creating content in an electronic format for approximately 240 one-Semester courses in five branches of engineering and core science and management courses required for all engineering disciplines. In its first phase, the programme envisages creation of web based and/or video based lecture materials which would be distributed to Institutions in India free of charge with a course content equivalent to 40 lecture hours for each course. The subjects covered are Civil engineering, Computer Science and Engineering, Electrical Engineering, Electronics and Communication Engineering and Mechanical Engineering and basic mathematics, physics, chemistry, language and communication, elements of management techniques, basic electronics and engineering design for all undergraduate students. The first phase will

be completed by June 2006 and the peer reviewed course materials will be made available through a national grid located at several places. This paper will highlight the goals and deliverables of this programme, the philosophy of this programme, the difference between an open University or an open courseware model and this programme and future directions for effective communication between Institutions of national and international importance in India and hundreds of thousands of aspirants who register every year in Indian professional colleges and Universities for a quality engineering and science education.