Open Courseware: A Unique Opportunity for India

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Abstract

The pivotal role of education as an instrument of social change - by altering the human perspective and transforming the traditional mindset of society is well recognized. The universalisation of education has become the top priority, especially for the developing countries. But the extension of quality education to remote and rural regions becomes a Herculean task for a large country like India with multi-lingual and multi-cultural population separated by vast geographical distances, and, in many instances, inaccessible terrain. Open Courseware (OCW) is part of a comparatively new educational movement in the line of Open Access (OA) and leading institutions and universities around the world are capitalizing it for the betterment of the society. OCW provides learners an opportunity to disseminate knowledge beyond the traditional classroom environment. The present study aims to spread the word of OCW and sensitize the teachers and learners about the tremendous potential of OCW in the context of education in India.

Keywords: Open Access, E-Learning, Distance Learning, Computer Assisted Learning, Hyper Courseware, Courseware Management Systems, Computer Based Education, Open Courseware.

1.   Introduction

The OCW movement [1] began at the Massachusetts Institute of Technology (MIT), USA in 2002 and has now spread to some 120 other universities worldwide. They formed the Open Courseware Consortium [2] in 2005 to share ideas and experiences. Today, the OCW Consortium is a collaboration of more than 100 higher education institutions and associated organizations from around the world creating a body of open educational content using a shared model. The mission of the consortium is to advance education and empower people worldwide through open courseware. It is hailed by self-learners seeking to gain a broader knowledge body but not necessarily wishing to pursue a formal education, university alumni seeking intellectual stimulation and updated knowledge, students of other universities wishing to augment their education, as well as, of course, students without the access or resources to attend a prestigious university like MIT.

Perhaps it is this global reach of the open courseware movement that offers the most radical challenge to the traditional localised method of delivering education. Universia, for example, is collaboration between a number of Spanish and Latin American universities. They are also translating MIT's open courseware into Spanish and putting it online. As a result, member universities see the benefits of putting their own courseware online. This unique initiative enables the open sharing of the experienced faculty's teaching materials with educators, enrolled students, and self-learners

around the world. OCW may contain syllabi, lecture notes, interactive web demonstration, course calendars, problem sets and solutions, examinations, reading lists and streaming video lectures as well.

India's growing student body demands newer, more sophisticated universities. So administrators are starting to rethink their curricula, hire more faculties, and prioritize partnerships with real-world researchers and companies. This push is creating opportunities to introduce new technologies and strategies. India is yet to start sharing its own courseware widely, but certainly IITs, IISc, IISERs would be a great addition to the worldwide body of open courseware. India is a vast country with different culture and languages. If OCW developed by experts can be implemented with proper translation for all regional languages, it will be certainly beneficial for all including students of the regions with inadequate communication facilities. Of course we should not think OCW as a replacement of the current education system but as an addition to that. In this paper we studied different aspects of OCW and its impact on total learning process.

2. Situation in India

Since independence, India has seen substantial increase in the number of educational institutions at primary, secondary and higher levels as well as the student enrolment. But the lack of adequate rural educational infrastructure and non-availability of good teachers in sufficient numbers adversely affect the efforts made in education. Today India is on the brink of a broadband revolution. Although there are fewer than 5 million broadband connections in the country today, the government is planning to provide Internet access at a speed of 2 MB/s in 500,000 of the country's 600,000 rural villages by the end of 2008. After the communication infrastructure is in place, the challenge will be to scale up these education experiments to reach millions of students.

In view of this, Government of India established Knowledge Commission [3] with aim to make knowledge freely available. OCW is such a movement where digital educational materials of high quality would be accessible to everybody wishing to use them at free of cost. The most striking feature of the open courseware movement is that it requires a fundamental switch in institutions' approach to information, one shared by the open access movement in scholarly publishing.

In India, the open source movement has also had a direct impact on education. The distance technical education has been in the making for a while. Under a special HRD ministry programme, the seven IITs and the Indian Institute of Science, Bangalore, have already prepared open courseware and uploaded it online. They have provided online access to five streams of engineering - civil, computer science, electronics and communication, electrical engineering and mechanical engineering. The Indian Institute of Science, Bangalore, partnered them in drawing up syllabi for these streams. These are in two forms — digitally taped classroom lectures, and web-based lecture material, besides links to high-end research works available under the NPTEL (www.nptel.iitm.ac.in) project [4].

The HRD ministry put in Rs 20 crore for the first phase of the NPTEL project which ended on December 2007. Five hundred more courses will be designed in the second phase. It was proposed to develop chemical, metallurgical and aerospace engineering and some science departments in "Phase Two", in addition to elective and post-graduate courses in all engineering disciplines. Over 300 faculty members have been involved in drafting the courses of thousands of hours.

As part of its move to promote quality education, the State-owned Indian Institute of Information Technology and Management, Kerala (IIITM-K), based in Technopark, Thiruvananthapuram, announced that it offer its classroom courses in the "open mode".

What this means is that the institute's courses will now be available to a wider range of professionals, especially from the information technology (IT) field. IIITM-K believes that the opening up of its courses to IT professionals and the academia is "an important and logical extension of the Institute's commitment to promote technology-enhanced education in the State."

IIT-Bombay is going one step further and opening its classrooms to the world. Starting January 2008 it will broadcast [5] its lectures live through EDUSAT, the satellite that caters exclusively to the educational sector. EDUSAT is the first exclusive satellite for serving the educational sector in India. It is specially configured for audio-visual medium, employing digital interactive classroom and multimedia multicentric system. The satellite will have multiple regional beams covering different parts of India — five Ku-band transponders with spot beams covering northern, north-eastern, eastern, southern and western regions of the country, a Ku-band transponder with its footprint covering the Indian mainland region and six C-band transponders with their footprints covering the entire country.

Now, students of any engineering institute will now not only have real-time access to IIT-Bombay tutoring, but can also interact with resident faculty at Mumbai. IIT-Bombay and the Indian Space Research Organisation (ISRO) have signed a memorandum of understanding to transmit the lectures to any of the 1,500 engineering colleges across India, which are keen to avail of the service. In fact, even institutions in Bhutan, Bangladesh, Nepal and parts of Pakistan, which are covered by the EDUSAT footprint, can view the lectures by tuning in to the same frequency.

3. Problems

The concept of open courseware is likely to encounter resistance from educators in India who now earn part of their livelihoods from selling textbooks, as well as from politicians who currently control education. **Teachers who are already underpaid are not likely to support a movement to give away** educational content at no cost, and politicians are likely to oppose any initiative that would dilute their control over the budgets for education.

However, that only a tiny fraction of educators actually receive any substantial income from textbook sales, so the real economic impact of open courseware should be negligible for most faculty members.

Again OCW can be accessed predominantly in English despite the fact that there are attempts to translate the project. Worldwide Internet access is limited by all means.

Furthermore, of all the OCW's "course mine" is non-participatory. Scholars in a given field cannot add, or correct the listed material. Present OCW does not live up to the promise of an open source approach. In the open source software development a group of programmers can collectively fix bugs because the code is openly accessible and hence the product becomes more stable. Experts all over the country could contribute to our OCW and improve on it. They could add resources and perhaps edit, and correct existing knowledge chunks.

Again, one might expect academics to be keen to protect and copyright course materials that are the product of years of research and teaching experience. Yet all members of the open courseware consortium make their course materials available under a Creative Commons License, in which people can use the materials freely, provided they accredit the institution as the source of the material and do not use it for profit.

Intellectual property is still the biggest problem with OA in India. When they use third party material they can not publish it. Content can be either in the public domain or under a license like the Creative Commons License [6]. The term is also used to emphasize content that can be modified by anyone, not exclusively by a closed organization, firm or individual.

The intention is to avoid the problems current copyright laws create for the sharing of information. A Creative Commons license is based on copyright and applies to all works that are protected by copyright law, like books, Web sites, blogs, photographs, films, videos, songs and other audio and visual recordings.

In this competitive age, universities are seeking ways to protect their intellectual property for fear that it might be stolen or used by others without financial benefit coming back to the university. Increasingly, universities are using mechanisms of secrecy to secure their property. Public universities are building on tax money and thus have the duty to contribute the produced knowledge back to the public domain.

Besides all the problems we find that OCW had not noticed a significant drop in attendance of students in their respective institutes. They are able to use their class time in a different way, because students can get the material outside the class. The students do come with interesting questions in mind. For this reason, OCW has had a positive impact at IIT and IISc and other institutes.

4.   Government's Future role

The government is attempting to increase competition in education but noted that proposals for major changes in education will encounter strong opposition. Government urged industry leaders to find the regions of the country that are most receptive to experimenting with new models and

sponsor pilots that can demonstrate clear success. The idea is that we focus initially on one state and demonstrate the new concepts there before attempting to expand them to the entire country. Government expressed their enthusiasm for the power of geographic information systems (GIS), which has described as "a revolutionary tool to change the lives of common people." It is also noted that GIS can be used to excite students and engage them in new kinds of learning about their own communities.

We know that one of India's greatest challenges is to bridge the urban/rural divide. So, Government of India expressed interest in the idea of the Knowledge Learning Centre (KLC) [7]. The KLCs would address the individual needs of companies in the Special Economic Zone (SEZ) and nearby areas, and prepare the local population with a host of skills to serve community needs within and outside the SEZs. These skills include healthcare, education, agriculture, hospitality, catering and retail, among others. The proposed KLC would thus have accomplished two goals: provide the local population with more opportunities and reduce the shortage of skilled human resources, thereby beginning to bridge the gap between the supply and demand for skilled human resources.

The KLC will be a tripartite partnership between 1) industry that will serve as the coordinating and implementing partner, 2) a recognized institute as training partner, and 3) government as the funding partner. For the KLC to be successful, an industry partner and the Government would need to form a partnership and develop training modules based on the major focus area of that particular SEZ. The KLC would adopt both conventional teaching from tested models like NIOS (The National Institute of Open Schooling), The NIIT Institute of Information Technology (TNI) and IGNOU. At the same time the KLC could also take advantage of new collaborative "Learning 2.0" models, which exploit the potential of the inter-active Web 2.0 [8]. For example, they can take the approach of Hole in the Wall at one level, and of the freely available OCW offered by MIT, and the Open Courseware Consortium of universities throughout the world, at the higher education level. Though a KLC would initially train the displaced inhabitants of SEZs, the model needs to be scaled up for broader sustainability. In addition, the KLC must be made accessible and promoted throughout the entire population.

Learning 2.0 is about more than just providing free access to courses and educational tools. It also is a "participatory architecture" for creating and supporting communities of educators and learners. In the spirit of the open source movement, these online communities intentionally blur the line between creators and consumers of educational content to foster collaboration in learning and expanding the range of resources that are available to all. In addition to being a course management system, for example, "Moodle" is intended to "help educators form effective online communities." The Multimedia Educational Resource for Learning and Online Teaching (MERLOT) is a repository of higher education learning materials whose stated vision is "to be a premiere online community where faculty, staff and students from around the world share their learning materials and pedagogy."

Curriki ("curriculum" + "wiki") [9], which has been championed, is intended to be a global collaborative community for educators and students. The result of all of these efforts, is the development of a rich "educational eco-system" that links educators with other educators, educators with students, and students with other students who share mutual interests in learning.

5.   Learning 2.0 Resources in India

5.1   India: Corporate Education Initiatives

5.1.1   Shiksha India (URL:http://www.shikshaindia.org/)

Shiksha India is an initiative of the Confederation of Indian Industry (CII) and is managed by the Shiksha India Trust. Shiksha India works with schools and institutions across India to promote the use of technology to make teaching and learning more effective. Shiksha operates a portal, built with open source tools, to allow teachers to collaborate and engage in discussions concerning e-learning, e-teaching, and creative teaching and learning.

5.1.2   Cisco Networking Academy (URL:www.cisco.com/web/learning/netacad/academy/ About.html)

The Cisco Networking Academy Program is a public-private partnership between Cisco Systems, education, business, government, and community organizations around the world aimed at nurturing IT professionals. The education program uses an e-learning model, with a combination of Web-based and instructor-led training, along with a hands-on lab environment to teach students how to design, build, and maintain computer networks. Cisco currently operates 155 Networking Academies in 23 states in India.

5.1.3   Intel Computer Clubhouse (URL:www.intel.com/cd/corporate/education/APAC/ENG/in/ communityed/communityed2/239088.htm)

The Intel Computer Clubhouse is an after-school program where youth ages 8 to 18 have access to high-tech equipment and mentoring to develop skills that open up opportunities, encourage self-confidence, and foster creativity. Youth who visit the Computer Clubhouse learn by doing. They create digital artwork, produce their own music CDs, film, write and edit their own short movies, and design Web sites. The first Intel Computer Clubhouse in India was launched in New Delhi in December 2001 at the Katha Khazana, a nongovernmental organization (NGO)-run school that is open to children from the Govindpuri slum area in Delhi. The second clubhouse was opened in Bangalore in December 2002.

5.1.4   Hole-in-the-Wall (URL: www.hole-in-the-wall.com/)

Breaking the traditional confines of a school, Hole-in-the-Wall Education Limited (HiWEL) takes the Learning Station to the playground; uses a unique collaborative learning approach; and encourages

children to explore, learn, and just enjoy. The first Hole-in-the-Wall computer was installed in 1999 in New Delhi; today, more than 100 are in operation around India.

For experts, Hole-in-the-Wall is a "shared blackboard" that children in underprivileged communities can collectively own and access to express themselves, learn, explore together, and at some stage even brainstorm and come up with exciting ideas. For villagers, it is more like a village well, where children assemble to draw knowledge and, in the process, engage in meaningful conversation and impressive learning activities that broaden their horizons. For children, it is an extension of their playground where they can play together; teach each other new things; and, more important, just be themselves. Established in 2001, HiWEL is a joint venture between NIIT Ltd. and the International Finance Corporation (a part of the World Bank Group).

5.2   India: Government/Academic Initiatives

5.2.1   Digital Library of India   (URL: http://dli.iiit.ac.in/)

The mission of the Digital Library of India is to create a portal that will foster creativity and free access to all human knowledge. A proposed first step in realizing this mission is to create the Digital Library with a free-to-read, searchable collection of 1 million books, predominantly in Indian languages, available to everyone over the Internet. This portal will also become an aggregator of all the knowledge and digital contents created by other digital library initiatives in India.

5.2.2   National Program on Technology Enhanced Learning (URL: http://nptel.iitm.ac.in/)

The objective of NPTEL is to enhance the quality of engineering education in India by developing curriculum-based video and Web courses. Seven IITs, the Indian Institute of Science, and other institutions are carrying out this program as a collaborative project. The goal of the project is to provide learning materials, digitally taped classroom lectures, supplementary materials, and links to state-of-the art research materials in every subject possible. Samples from approximately 70 courses offered by faculty in various departments to students at all levels are currently available, and approximately 140 courses are in various stages of preparation and distribution.

5.2.3   Sakshat – The one stop free portal for education (URL: http://www.sakshat.ac.in/)

It aims at providing vocational skills to empower the youth through e-learning courses apart from providing routine information such as board/university examination results, addressing education and learning related needs of students, scholars, teachers and in distance education. The National Mission on Education would provide broadband access to each Indian with zero charge for bandwidth for accessing this portal and its links. Through this initiative, Ministry of Human Resource and Development (MHRD) has synergized efforts amongst educational organizations such as UGC, AICTE, IGNOU, NCERT, CBSE, IITs, and IISc to provide content for various stakeholders.

In addition, the Government is considering the following two set of recommendations [10]:

Structural Recommendations

1. Promote competition in education through multiple models,
2. Provide autonomy to educational institutions,
3. Ensure mentoring and a safety net,
4. Enable equitable access to learning through skills vouchers,
5. Establish "Teach for India" for college graduates.

Technology-Based Recommendations

6. Implement universal broadband and e-education,

7. Sponsor self-directed open collaborative learning by establishing "Minds on Fire" Knowledge Learning Centers,

8. Exploit the 100,000 Common Service Centers (CSCs) currently under development as Knowledge Learning Centers (KLCs),

9. Incorporate Knowledge Learning Centers in Special Economic Zones (SEZs).

6. Conclusion

OCW is a relatively new and evolving concept immensely helpful to the entire learning community. We need dedicated good teachers who will volunteer to contribute their course contents in OCW system as well as supportive institutions/universities to motivate those teachers. Proper mechanisms are needed that will provide the appropriate educational content and the means that will allow millions of Indians to access it. A good deal of useful content is already available online [11] as part of the open courseware/open educational resources movement, and more is being put online every day. A substantial effort will be required, however, to adapt these materials to the needs of India and make them widely accessible. The most interesting point from the Government called for establishment of a network of Knowledge Learning Centers (KLCs) to support open learning. These centers would contain Internet-connected computers that would provide access to open learning resources. Even more important, people who were attuned to the needs of the local residents would staff them served by each KLC. In some cases, this assistance could include technical training to "up-skill" workers to qualify them for jobs in the high-tech sector. In other cases, it might involve providing access to more fundamental skills such as basic literacy that could help millions of poor Indians to break out of the cycle of ignorance and limited opportunity that has trapped them for centuries.

We believe this model of open source education is the only scalable solution to the talent crunch facing the education and technology sector in India.

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