

# E-Learning Technologies for Rural India

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## **Abstract**

*E-learning technologies have great potential to spread learning however, the benefits of these technologies have to reach the Rural masses of India, otherwise they will be one of the causes of the Digital Divide. This paper presents two emerging technologies - The Next Generation Internet and Natural Language Interfaces and discusses their potential for E-Learning in Rural India.*

## **1. Introduction**

Computer based training and video based training have been very common for several decades in India in the Software Industry. Specific software applications have been built and Computer based training has been developed for them using easy to use Authoring tools.

Today the Internet has enabled such CBT's to be made available on-line with a high amount of interactivity and also has helped increase the reach and widened the applicability of such training. Technologies to enable e-learning have tremendous potential for India. However, the benefits of these technologies must be made available to the Rural masses of India, otherwise, they will only widen the Digital Divide. Various technologies have been used over the years to propagate Distance Learning including the Radio, TV and now the Internet. There are several problems which affect Rural India but amongst them, a major problem is that literacy amongst farmers and Rural folk of India is very low. Emerging technologies such as Natural Language Interfaces and the Next Generation Internet will enable several innovative applications in e-learning and enable parallel learning by helping to break the cycle of literacy followed by computer literacy.

This paper will bring out these two technologies - The Next Generation Internet and Natural Language Interfaces and discuss their potential for e-learning applicability in Rural India.

## **2. The Next Generation Internet:**

The Internet has grown so fast and wide that there is tremendous clogging happening on the Net. This choking has actually restricted the usage of the Internet and has not permitted applications such as Virtual Reality to be made available for Distance Learning purposes. The Next Generation Internet hopes to rectify that by providing higher bandwidth and better quality audio and video to enable Multimedia as well as a high amount of interactivity which is so essential in learning.

The main projects currently leading the initiatives are the University Corporation for Advanced Internet Development which is monitoring two projects - the INTERNET 2 and the Abilene Project; the United States Government led Next Generation Internet Project and the National Science Foundation vBNS Backbone project.

The Internet 2 project is a joint project of Industry, Academia and Government. The basic purpose of the Next Generation Internet is to increase bandwidth and quality of service so that a new generation of applications could be possible on the Net. Some of the major initiatives of the Internet 2 Project include improving the Quality of Service, Middleware Initiative, Distributed Storage Initiative and Digital Video Initiative.

Amongst new applications which can be enabled with the Internet 2 are applications in Teaching and Learning. Learning is extremely easy when it is in the form of Virtual Reality, Multimedia and Collaborative interactivity. The Internet in its current form is unable to handle such heavy loads to enable such high quality distance learning to the Rural masses. Furthermore, as more and more users get on the Net, clogging is happening and the Net is unable to provide the level of quality needed for high-end interactive e-learning applications.

Applications which can be enabled by this technology include Virtual Laboratories and Digital Libraries. An interesting application of the Next

Generation Internet is the area of Digital Libraries. Very high bandwidth and improved quality of service will permit applications such as continuous digital video and audio to be used for a very wide range of Library applications. Images and Multimedia can supplement text based reading and learning at the Rural level. The Advanced Internet will also permit Multimedia interfaces to the user of the Library as well as real time Consultation with experts over video conference. In addition, computer companies like Sun Microsystems are collaborating with the Internet 2 project to create a testbed for higher education. As, of today, this is restricted to the USA, but it could be extended to remote parts of India as well in future. Through this Testbed, students will be able to find and communicate with experts and other interested students through instant messaging and video conferencing. The Advanced Internet will also facilitate the development of Multimedia courseware across various development platforms in a highly distributed environment.

The student based in Rural India will be able to access the best Libraries and Laboratories in the World. The Carnegie Mellon University's Informedia project is already a step in the direction of Digital Libraries. The Next Generation Internet will also permit Virtual Laboratories by which students using Laboratory instruments connected to the Advanced Internet will be able to conduct a Laboratory experiment remotely. Therefore, a student in a Village in India will be able to virtual access the best Laboratories in the world. The University of North Carolina has already attempted the setting up of a Virtual Laboratory on the Advanced Internet.

### **3. Natural Language Interfaces:**

Natural Language Technology is another area, which could be of great use in e-learning. The technology, though in a nascent stage today, has a tremendous potential for Rural India. There is already a lot of work going on in this technology in India - prominent among them being the projects at CDAC, NCST, and at IIT Madras, Kanpur, Bombay.

Natural Language Interfaces is a way by which humans can communicate with the machine in a language that is natural to them. The Interfaces to Natural Languages can be to various areas including Intelligent Tutoring systems and Virtual Reality systems. In an e-learning environment

these technologies could be of great use to build various customised training applications for the Rural Indian. Rural based NGO's which are working for Rural development in India could then build such training applications directly without needing to wait for the IT industry to develop applications for them. Natural Language Interfaces along with touchscreen technology and voice enabled inputs could be a way by which the National Literacy mission could be achieved through a process of parallel learning and the cycle of literacy followed by computer literacy and usage can be broken. In addition, automatic translation systems are available today on the Web, which enable automatic translation of messages and content from English into several International languages. Developments can be made by which our villagers will be able to access the Net in their own language and hence dependency on an English translator will be reduced.

The Ministry of Information Technology is already involved in several projects such as Bharat Bhasha Kosh, Web based learning system in Indian languages, Speech Synthesis system at CEERI Pilani and Multilingual dictionaries. IIT Madras have developed an Indian Language word processor which has been tested at an NGO in Madras. Similarly NCST'S MATRA project 's focus is on man-machine synergy.

Natural Language interfaces can be used as front ends to databases as well as with Speech based systems. Both these technologies have great potential for Rural India since especially speech based systems since E-learning can actually be voice enabled through this technology and the villager will be freed from his lack of literacy and therefore inability to communicate.

### **4. Conclusion**

There are several technologies available to enable distance learning today. Two such emerging technologies which have great potential for E-learning in Rural India are The Next Generation Internet and Natural Language Interfaces. Both these technologies are still at a very early stage both in India as well as abroad, however, our Industry and policymakers can take advantage of these technologies and utilise them for the benefit of the rural masses of India.

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