PROPOSAL TO OFFER

TUTORED VIDEO INSTRUCTION BASED OPEN CERTIFICATION AND ADVANCED TECHNOLOGY APPRECIATION COURSES FOR TEACHERS IN ENGINEERING COLLEGES USING NPTEL AND OTHER CONTENT

Submitted to the AICTE Board of Studies, NPTEL and IGNOU

By the

Indian Institute of Information Technology and Management – Kerala

April 2007

1. THE OPPORTUNITY

National Programme on Technology Enhanced Learning, or, NPTEL, in its first phase of content development, has produced video recorded lectures of full course length in over 110 courses of value to the engineering colleges. These lectures systematically cover a typical course having about 40 hours of classes. NPTEL has also produced supplementary content of value in another 120 courses. Both the NPTEL and AICTE are now faced with challenge of how to use this content to improve the quality of technology education offered in the more than 1000 colleges that do not have experienced teachers.

There is this tremendous need to train and orient thousands of teachers (at least 10,000 teachers to get started against a potential demand for 1,00,000 teachers) in the engineering colleges and also facilitate them to conduct the courses in their respective colleges effectively. We have to address the problem of providing engineering education of god quality reaching the nearly 1.5 million students in the engineering alone. The proposed system will immediately benefit at least 20 % of the engineering colleges that have the potential and commitment to offer quality education. This will reduce the pressure on the IITs and the social stress on good students going through agony of entrance examinations will considerably reduce and yet not getting admitted to good institutions. Over the medium term, this will also supply good students for the postgraduate programs.

Tutored Video Instruction, or, TVI is a well established methodology that allows for innovative adaptations to impart quality instruction using video recorded lectures augmented by

appropriate tutored mediation and interaction processes. TVI as a method was developed initially by Prof. James Gibbons, Dean of Stanford University for reaching out Stanford's classroom to working professionals in the Silicon Valley. Subsequently various universities in North America and elsewhere have adopted this method with telling effect. There are studies available over the Internet to show that this method results in students doing better than normal classroom – exams approach. In India, the ElNet-3L training program of IIT Kharagpur under the guidance of Prof. A.K. Ray practiced this method successfully.

Here we propose a two-phase approach to make effective use of the NPTEL initiative. In the first phase, we propose extensive teachers training and appreciation programs using the NPTEL content and offer the young inexperienced teachers in the engineering colleges proficiency certification through a program approved by the Distance Education Council using the Education Grid systems, NPTEL (and other relevant) content and IGNOU's infrastructure. In the second phase, we propose an extensive **Open Supported Learning Network, or, OSLN** that supports diverse **Technology Enhanced Learning and Teaching, or, TELT** services for the universities and colleges.

2. PILOT PHASE RESOURCES & FACILITIES FOR TVI IN THE COLLEGES

The proposed TVI methodology here is an adaptation of the one developed at Stanford, and the one practiced by the ElNet-3L of IIT Kharagpur. **Our adaptation takes into account the availability of modern LMS platforms, wikis, collaboration systems developed under the Education Grid of IIITM-K, online libraries and open publishing gateways and EDUSAT/IGNOU SIT facilities**. We assume that the following facilities/resources are available. The resource requirements for the pilot launch of Education Grid TVI are estimated based on the equivalent of supporting up to 10 of the NPTEL and IIITM-K courses in a sample set of colleges in Kerala and southern Tamil Nadu in the launching, or, pilot phase. The certification/training courses will use the following.

(i) Systematically delivered lectures from expert faculty under the NPTEL and IIITM-K are pre-delivered and loaded to run from a local streaming video server in the colleges. It is enough if the streaming server are run from two basic PCs (for redundancy and performance) on LAN with about 1 GB RAM and 100 GB SATA HDD each.

(ii) A central course wiki is maintained in the Education Grid Portal for supplementary content and to support community driven supplementary content development.

(iii) A discussion forum or blog for the courses is maintained and serviced by the Education Grid for conducting the TVI.

(iv) A Moodle LMS system will be maintained by the Education Grid for the registered teachers/ candidates taking the course.

(v) TVI group learning facility in the colleges: This involves a single multimedia PC with large screen around which about 4 to 8 learners may sit and attend the classes using streamed video lectures.

(vi) IGNOU's Satellite Interactive Terminal facility (or a suitable EDUSAT facility) for conducting interactive tutorial sessions will be used about once a week for each course.

The processes of conducting the TVI based instruction and evaluation is explained in the next section. The suggested process is adapted to the availability of reasonable Internet connectivity, modern ICT tools and systems in e-Learning as already stated. We assume that the participant teachers will have their email and access to a fair quality Internet. If necessary, the same can be provided from the ERNET PoP at IIITM-K.

3. THE PROPOSED TVI APPROACH

The proposed TVI based teachers proficiency certification and advanced technology appreciation programs is also intended to be used for priming the concerned colleges to get equipped and oriented for TELT driven education for their regular students also. We assume that it will take a little while before TELT over the Education Grid is taken as part of the learning infrastructure as part of the knowledge network of the country. There are the three following major areas to be addressed in establishing the TVI based Teachers Proficiency Certification (TPC) Program.

(i) Recognition of the Certification (and other Diploma/Degree program that may come later)

We recommend that these training programs are given due recognition by the AICTE. They may be approved under the Distance Education Council. IIITM-K is ready to offer the certificates under its purview. **The proficiency certificates will be conducted with due assessment**

process and will carry formal recognition of value for teachers' career and growth. The formal certificates may be issued by the IITs/IISc (by anyone of the IITs, or, an empowered V-IIT) under the NPTEL, by IGNOU, or by IIITM-K (with due recognition of AICTE), or an affiliating university.

(ii) Establishing minimal TELT facilities for managing the TVI in the colleges

The objectives of the proposed certification training programs are two fold. **First is to put in place new capacity building processes that result in generating large number of qualified teachers. The second objective is to concurrently ensure that both the college and the teachers concerned become familiar with using TELT effectively to sustain quality education.** Hence we recommend that the colleges that wish to enroll their teachers in the proficiency certification program be also equipped minimally to support TELT environment. This will help the same teachers adopt TELT and TVI methodologies in their regular courses for the students. Typically the facilities include minimal streaming server, a caching web-server (to overcome network response problems for access to the course wikis) and a mail server. IIITM-K Education Grid team is ready to assist the colleges in the setting up of the minimal facilities. It is important that the participant teachers are given facility to play the video-on-demand within the college LAN outside the scheduled hours of the course.

(iii) Checklist of readiness for conducting the certification courses

For effective TVI based instruction we need to have in place following items working in reliable manner.

1. The entire set of about 40 hours of NPTEL video recorded lectures in compressed form for a course is preloaded in the local streaming video server for the college.
2. The Education Grid Wiki for the course is set up with two parallel tracks – one with supplementary content, parts of which may be openly editable, and one with clearly defined course time schedule of modules, learning activities and evaluation to be done in each are indicated.
3. A Moodle instance is created in the Education Grid Portal and assigned to the course for providing the LMS services to all the teachers registered in the course.
4. The course is assigned two or three instructors/associate instructors who are subject experts. The subject experts oversee the conduct of the TVI based course. They support

weekly SIT based tutorial sessions in response to doubts of and observations made by the learners and also to add supplementary examples and solutions to problems.

5. A continuous evaluation is designed that gives weights to the different learning and evaluation activities as stipulated in the course wiki. The course is strictly time bound for each module and the overall course has to be completed within the stipulated period.
6. A term paper and presentation will also be encouraged to evaluate the articulation skills of the teachers as a final test. The subject experts will evaluate this paper-presentation.
7. Places well equipped (like NIT-C, good college labs, IIITM-K, a national lab like the RRL and such others) may offer their facilities for practice sessions associated with subjects that have such curricula.
8. Seminars of state-of-the-art may be recorded in a place like IIITM-K, or the NPTEL Centres of the IITs and broadcast through cable channels and also made available as compressed video files from facilities offered by BSNL and others.
9. A final certificate with a grade is given to each registered candidate.

Thus a complete technology enhanced learning and teaching eco-system is readily established and programs commenced in a very short time, particularly in specific areas like engineering under the NPTEL. Other subjects will take a lead-time about two years. We may note that the same minimal facilities may be augmented in the colleges for the benefit of all students and teachers to benefit from NPTEL content and Education Grid services in all available courses and for inter-collegiate collaborations.

4. ADVANTAGES OF THE TVI BASED EDUCATION

The advantage of the proposed TVI model for teachers certification program is that it augments and supports conventional college education while grooming good teachers. It minimally disrupts the established routines and provides both the colleges and affiliating university the room to improve their own functions.

We may go one-step further, announce the formation of a Virtual IIT (VIIT) approved under the DEC mandate and initially launch these Proficiency Certification Courses. This only demands minimal additional effort on the part of the IITs. VIIT over time may focus on building collaborative postgraduate programs. Such a VIIT will be an asset to the country

and vastly strengthen the social responsibility functions served by the IITs, or by the toothless QIP courses today.

The affiliating universities have to give up control of the college education in the colleges over time. There cannot be good education where the teacher is kept away from the evaluation process of his/her own class. Good educational institutions like those of the IITs thrive on the sacrosanct teacher-taught relation that is not questioned by any bureaucratic bodies and centralized examination system, but by the peer pressure of the students, teachers and the society at large. By extending and adapting (not blindly adopting) the TVI model to the regular courses in the colleges, the affiliating universities will enable the colleges teach better and over time steadily increase the autonomy to the colleges. Over time, affiliating universities are morphed into servicing and supporting educational technology and resource centers of excellence. With colleges satisfying some norms like minimal number of teachers with proficiency certification and those with PG qualifications, more and more of them may be given full autonomy.

The direction proposed herein will pave the way for the much-needed educational transformation that is urgently needed if at all India were to move towards the 2020 vision. The process stated herein will ultimately fulfill the true pyrpose of MPTEL, i.e., establishing quality education through appropriate use of ICT.

5. BUDGET REQUIREMENTS FOR THE PILOT TVI

IIITM-K is ready to launch a national pilot along with the IITs using its Education Grid and ERNET facilities. An indication of budget requirements was given in an earlier document titled, “Education Grid Course Support Services for Effective Use of NPTEL Content in the Engineering Colleges”. **The amount requested for the pilot initiative is Rs. 120 Lakh.** IIITM-K is ready to roll out the program within three months of receiving the funds.

Two annexure documents are attached with this proposal. The first provides the details and budget requirements for the Education Grid services to conduct the TVI based certification program. The second provides an outline of the resources needed in the colleges and the mutual relations between the NPTEL, Education Grid services and the colleges systems.

Draft submitted by IIITM-K
Authored by: K.R. Srivatsan
Dated: April 20, 2007

ANNEXURE - I

EDUCATION GRID COURSE SUPPORT SERVICES FOR EFFECTIVE USE OF NPTEL CONTENT IN ENGINEERING COLLEGES

Project Proposal submitted to NPTEL by the

Indian Institute of Information Technology & Management – Kerala

March 2007

1. BACKGROUND

Following the release of the first set of courses by the NPTEL, the Government of Kerala is keen on ensuring that they are deployed in the Engineering Colleges of the state. A letter issued by the Special Secretary (IT) to the Chairman, NPTEL, has communicated the same. This proposal outlines the approach, actions to be taken and the methodology to be adopted in supporting the use of NPTEL content with associated services and programs under Education Grid to the colleges.

The first phase of NPTEL has resulted in making content available in about 230 courses of importance to the engineering colleges. The content is either in video recorded lectures, or as web-accessible/downloadable form authored by subject-experts. These are broadly aligned with the syllabi adopted in AICTE approved colleges. The objective of NPTEL itself is to assist the colleges in improving the quality of instruction provided to the students in the colleges. To achieve this objective we need systems and processes that help the teachers of these courses in the colleges. We also need fairly advanced network infrastructure in the colleges that links to the network. Thirdly we need centrally coordinated subject specific portals for dynamic interaction between the teachers, students, subject experts and the subject world of information accessible across the Internet. This proposal addresses these requirements.

2. PROPOSED SUPPORT SERVICES

There are two major systems components and two types of services oriented programs that constitute the proposed Education Grid Course Support Services. These respectively are stated below.

Systems Component 1: Establishing reference systems and gateway configurations for the colleges that desire to take the course support services. These reference systems in They will follow the general recommendations submitted to the AICTE by the committee on college infrastructure. These will provide the following minimal facilities in the colleges.

(i) College Gateway and Portal Systems

These include the main Internet Gateway access, minimal college portal, firewall and proxy systems, secondary DNS and Mail Server.

(ii) Basic Computational Facilities

For some of the courses, the colleges need packages like Scilab (that is available free, instead of Mathlab that costs license charges), SPICE, relevant scientific and engineering packages for the students to do th exercises.

(iii) Basic Streaming Video Server

The college needs streaming video servers to host on its LAN the video recorded lectures for easy access and distribution to teachers and students in the colleges. This will complement the main streaming video services that NPTEL itself is likely to host at the national level.

(iv) Digital Library and Open Access Publishing facility

Each college needs at least a Dspace and WinIsis/GenIsis type library packages and facility for linking subscripted e-journals that it may subscribe to.

(v) Learning Management System

The FOSS based Moodle LMS will be installed for each course within the college. This provides for group discussions, student interactions, personalization of the course content as suited to the college itself, question banks, quizzes and such facilitations needed to run the courses effectively within the colleges.

(vi) Server for Automation of Students Affairs

There are several office automation and other packages that many vendors and developers support for managing students registration, registry functions and students counselling. An Open Linux server will be made available to support these functions. Vendors may have their products certified for use and have college staff trained in these functions.

All the above functions will be packaged into one vertical rack of servers, their configurations integrated and versionized. The same will be recommended as recommended FOSS solutions that complies with the Services Oriented Architecture (SOA) that is needed for the colleges to benefit from modern networked systems of information and collaboration. Colleges will be encouraged to procure hardware by themselves and have the systems integrated by the Education Grid team.

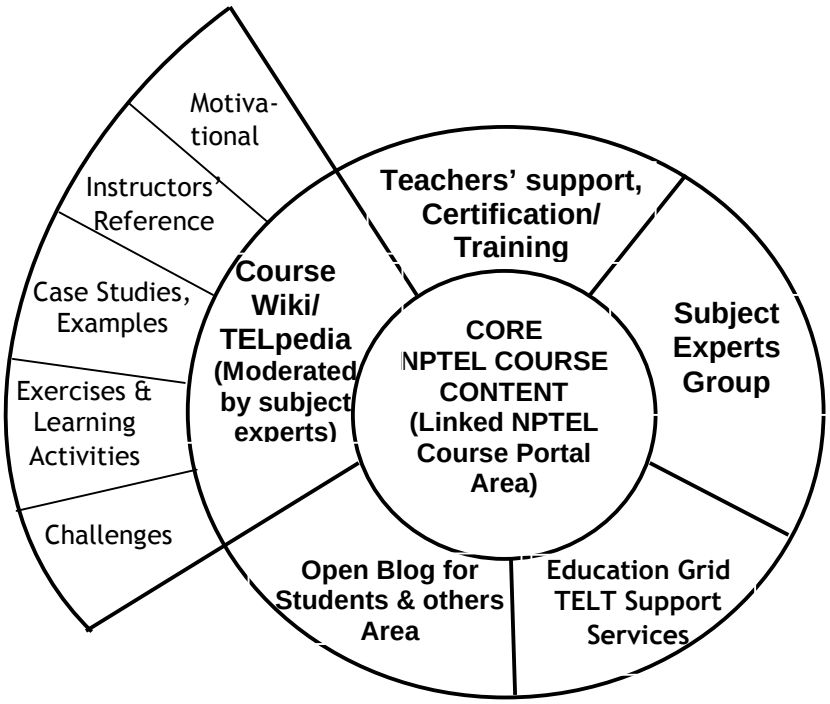

Fig. 1: EDUCATION GRID TELPEDIA COURSE SUPPORT SYSTEM – A Functional View

Systems Component 2: Developing the Education Grid Course Wiki and Blog support systems that provide the feedback driven supplementary content development and teachers – students - experts interactions. This supplementary content system is essential to invite content development and effective utilization of the NPTEL content already developed. The components of the TELpedia systems are illustrated in Fig. 1. The Education Grid team at IIITM-K will develop, configure and commission these systems for use in the state's colleges.

TELPedia SERVICES: Supplementary content through an TELpedia established and managed over the Education Grid Portal. The components of the TELpedia as it would appear on the Education Grid Portal are illustrated in Fig. 1.

Teachers Orientation, Training and Certification Programs

This forms the second set of services to be supported under the Education Grid. For every NPTEL supported subject, a group of two to three subject experts will be constituted to referee and guide the TELpedia evolution, respond to teachers queries and monitor the open blog discussions. Further, they will be encouraged to conduct teachers' orientation and proficiency certification programs.

3. BUDGET REQUIREMENTS FROM NPTEL

This proposal solicits support for seeding the above four developmental and services activities.

(i) **Systems Component for Colleges:** Rs. 15 Lakh - first version to be completed in about six months. (Rs. 10 Lakh for hardware & systems + Rs. 5 Lakh for integration, training and deployment initiatives)

(ii) **TELpedia Development:** Capital expense: Total Rs. 30 Lakh (consisting of Rs. 15 Lakh for server upgrade + Rs. 10 Lakh for software developments and integration + Rs. 5 Lakh for launch related awareness and training programs over a one-year period.)

(iii) **TELpedia Services:** Budget of Rs. 30 Lakh proposed. We propose to launch fairly comprehensive TELpedia services in selected 10 NPTEL Courses. The cost per course per year is estimated at Rs. 3 Lakh. This will support the courses for a period of one year.

(iv) **Orientation and Teachers' Certification Programs:** Budgeted at Rs. 25 Lakh for a period of one year. Formal Teachers orientation certification programs will be announced in the selected ten NPTEL courses. The programs will be designed with due process of evaluation carried out by the subject-experts nominated by the NPTEL and the state DTE. The certificates may be issued by the IIITM-K under its extension services, if possible in association with the concerned affiliating universities.

Under (iii) and (iv) above, IIITM-K along with NPTEL will also convene national workshop with the AICTE on how we propose to establish the Technical Education Grid and reach the benefits of this project to all the engineering colleges of the country.

(v) **IIITM-K Services Overheads:** Rs. 20 Lakh: IIITM-K will also summarize its experiences and findings of this project. It will propose a similar initiative under the AICTE to cover all the engineering colleges of India.

The total budget for the Education Grid Support Services for utilization of NPTEL content in the engineering colleges therefore comes to Rs. 120 Lakh. This program will cover the engineering colleges of Kerala and neighboring Tamil Nadu region.

This proposal is submitted to the NPTEL for inclusion under its Phase-II implementation.

Submitted by

[Director, IIITM-K]

Dated: March 19, 2007.

References

1. K.R. Srivathsan, "Management of Refereed Content Generation and Utilisation in Formal Education", Global Journal of Flexible Systems and Management, Vol. 4, Nos. 1 & 2, Jan.-June 2003. Available for download from the following link. **http://www.edugrid.ac.in/webfolder/download/paper_1.pdf**

2. K.R. Srivathsan, "Future ICT Infrastructure for Education", A report prepared for and presented at the ISRO Edusat Southern Regional Heads of Institutions Consultations, held Jan. 19, 2004 at Anna University. Download from **http://www.edugrid.ac.in/webfolder/download/paper_7.pdf**

3. K.R. Srivathsan, "Concurrent instructional services over NPTEL content for quality education in the colleges". Download from **http://www.edugrid.ac.in/webfolder/download/cis-nptel-92k5.pdf**

ANNEXURE - II

DEPLOYMENT OF NPTEL CONTENT AND MANAGEMENT OF TECHNOLOGY ASSISTED INSTRUCTIONAL DELIVERY AND EVALUATION PROCESSES OVER A NATIONAL EDUCATION GRID

Proposal by the

Indian of Information Technology and Management – Kerala

April 2007

1. THE NPTEL OPPORTUNITY

Under the MHRD's National Programme on Technology Enhanced Learning (NPTEL: visit: http://nptel.iitm.ac.in/), the IITs and IISc have generated content in over 230 courses of relevance for improving the standards and quality of education in the engineering colleges. These contents are in the form of recorded video lectures and web-accessible supplementary material for the courses. NPTEL is also planning Phase-II to continue such developments in more courses. **Our immediate need is to come up with methods of deploying the content and augmenting the teaching – learning methods in the AICTE accredited colleges** so that they will overcome the several deficiencies in the present system and support quality education to their students.

In parallel to NPTEL, IIITM-K had been developing the Education Grid (www.edugrid.in) as a reference and collaborative portal for the colleges, teachers and students in the colleges. Combining both, we had earlier suggested in [1] the launching of **'Concurrent Instructional Services (CIS) over NPTEL Content'** as process to enhance the quality of instruction in the colleges. This paper may be downloaded from the following link.

http://www.edugrid.ac.in/webfolder/download/cis-nptel-92k5.pdf

The same is appended with this proposal. In this paper we state specific approaches that AICTE may launch for reaching the benefits of NPTEL to all the colleges. In the next section we state the systems and process requirements for effective use of NPTEL content in the colleges.

2. INFRASTRUCTURE AND LOGISTICS REQUIREMENTS FOR TELT AND OSL

Our goal is to improve the quality of instruction very substantially through Technology Enhanced Learning and Teaching (TELT) in the colleges that is serviced by the NPTEL Portal and Education Grid for **Open Supported Learning (OSL).** We call this as OSL because it supports the more conventional classroom teaching and education by TELT driven open support processes. The resulting consequences in terms of quality of education offered in all the colleges will be far reaching.

The first requirement is that the NPTEL institutions of IITs and IISc have to set up effective open courseware repositories of the content generated (and new content being added) in the NPTEL web sites. The work towards this has already commenced. The web-

content is being made available. The video content is being suitably edited and compressed for distribution to the colleges. A broad agreement has been arrived at that the video lectures will be made available in compressed H.264/MPEG-4 format at 512 Kbps. this may be played using the free Quicktime player.

The second requirement is that we need a master National Technical Education Grid Portal as a web-accessed collaborative and coordination forum. The role of this portal is to service the query management, subject or course specific collaboration moderated by experts, add contextually linked content in each course, and invite the teachers, students and the subject community at large to participate in discussions and blogs. The portal will also have a reference template on how each module may be taught with associated instructional delivery considerations with associated feedback, learning activities and recommended evaluation processes.

The third requirement is that each college has a minimal Technology Enhanced Learning and Teaching Infrastructure for effective practice of NPTEL content facilitated OSL over the Education Grid framework. A note on the second and third requirements [2] has already been sent to the AICTE and some members of its Board of Studies. The same document is also appended with this paper.

The fourth requirement is that AICTE has to nominate about three subject experts to steer and moderate the OSL in each course. They, as subject experts will ensure that the queries and requirements of of teachers are responded promptly. They will also help conduct appropriate teachers orientation and training programs in the colleges. The experts will be backed by the Education Grid Portal and serviced by professionals deployed under the TELT services of Education Grid.

There are reasons for separating the content and learning resources development under the NPTEL and the servicing of content, its deployment and utilization in the colleges. The first part is best served by highly qualified academicians in premier institutions. The TELT driven OSL part is a major virtual institution itself. An independent National Technical Education Grid best serves this role. The second one will provide the necessary feedback as relevant for content upgrade and learning resources development. The total system of a national TELT driven OSL framework appears as illustrated in Fig. 1 below.

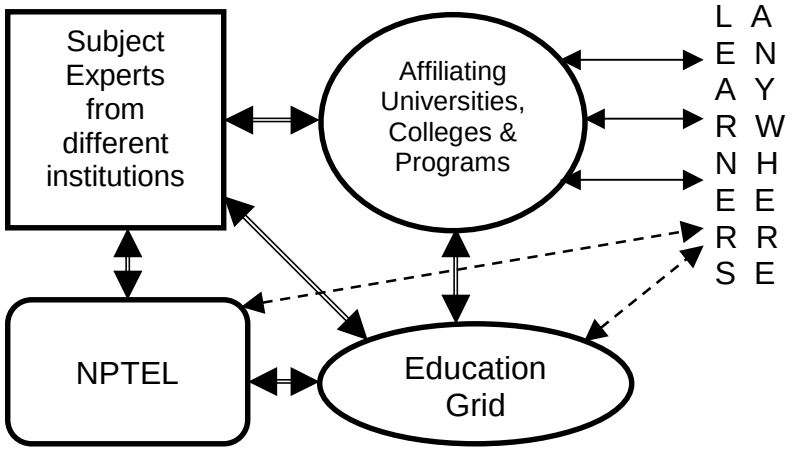

Fig. 1: Proposed National Open Supported Learning System for Technical Education

The figure illustrates the different systems that have to be in place to drive the OSL in the colleges. The dotted lines are used to show that the concerned portals are openly available to the concerned learners.

3. LAUNCHING OF OSL SERVICES – IMMEDIATE TASKS

AICTE can benefit immediately from three programs that can be launched by the collaborative systems as outlined in Fig. 1. These are summarized below.

(i) Deployment of Basic Systems in the colleges

The concerned minimal systems were outlined in an earlier document and the same is appended to this proposal. The systems conform to the recommendations of the AICTE-Industry Conclave held at Infosys Bangalore and given by the IT Infrastructure Group. IIITM-K in collaboration with ERNET India is ready to provide the base configuration systems for the colleges. AICTE should provide a directive to the colleges to establish the recommended configuration. The basic systems will provide the following facilities: Video on demand streaming server, Learning Management System, Internet Gateway and Mail Server Systems and associated discussion forums. We may also add any INDEST or INFLIBNET consortium recommended e-library facilities.

(ii) Teachers Orientation and Proficiency Certification Programs on TELT

In association with IGNOU and using its Satellite Interactive terminal (SIT) IT classroom facilities, IIITM-K and NPTEL are in a position to conduct a series of teachers' orientation programs across the country. The large IGNOU infrastructure and s IGNOU's experience in managing SIT driven classrooms are an asset and better suited than the current EDUSAT support. The programs over this network will orient and train the teachers on effective use of and practice of OSL. IGNOU is also coordinating the massive Open Distance Learning programs under the 11^{th} Plan. Further, we are in a position to design and conduct effective proficiency certification program for teachers in the different subjects using the NPTEL content as guided self-learning course with term papers and presentation work. A large national exercise in this is called for to bridge the gap in the availability of experienced teachers. We may create an autonomous entity under the Distance Education Council for certification and degrees under these programs.

(iii) Launching Tutored Video Instruction (TVI) in the colleges

TVI is a well established and proven methodology that uses the recorded video lectures for effective instruction in the colleges even in situations where the teacher is not that well experienced. Prof. James Gibbons of Stanford University developed the system for delivering courses to working professionals in the industry. The method involves groups of 4 to 6 students listening to a video recorded lecture with provision for pausing and discussions. A local tutor helps steer the discussions in the different groups. We may post the group's discussions and doubts in a course discussion forum. Today, using SIT facilities experienced teachers may conduct tutorial sessions answering posted doubts and responding to comments once every week. Prof. A.K. Ray and his team practiced such method with great effect under the ElNet-3L program of IIT Kharagpur. The local teacher acts as the tutor to respond to student's queries.

Bundled with teachers' proficiency certification and TVI, over a few years we will be in good position to make good the shortfall in the number of reasonably competent teachers.

(iv) Curricula Integration and OSL in the Affiliating and Technical Universities

Ultimately, the evaluation processes are conducted by the affiliating and technical universities. Hence, we suggest that each affiliating university or autonomous college to have its own courses portal hosting relevant content taken from the NPTEL and Education Grid Portal posted in its own server and LMS systems. Each of them may practice their own version of the 'Concurrent Instructional Services' driven TELT methods. The affiliating and technical universities in turn need to understand and practice the OSL methodologies for enhancing the quality education in their colleges. These OSL methods support both the teachers and students in several ways as given below.

- Video streaming in the colleges provide recorded lectures-on-demand for use in TVI system of teaching and for students or teachers to review lectures as and when necessary.
- The master Education Grid Portal and wherever possible local affiliate university Education Grid portal provides the detailed course content that provides NPTEL content, course wiki with links to relevant e-content anywhere and students blogs for collaboration.
- Course wikis to have pedagogically structured framework of course related instructional delivery, feedback driven interaction facilities, learning activities and evaluation processes.
- Ready availability of subject experts for teachers to interact with.
- Proficiency certification and postgraduate educational opportunities for teachers through OSL.

5. PROPOSAL FOR A JOINT NPTEL – EDUCATION GRID – AICTE WORKSHOP

What is being implied in this proposal is that the higher technical education system in the country will have to be modernized in the light of recent developments in community computing environments like the wikis, web services over Internet, collaboration systems of Education Grid, NPTEL and open courseware systems. This is not difficult to implement of all concerned parties – NPTEL institutions, AICTE, IGNOU, affiliating universities, the colleges and IT industry act in concert over an Education Grid framework. This coming together and working in concert needs enabling framework like a consortium of academia – industry and government. The financing of such TELT driven OSL framework for all the colleges is likely to cost not more than Rs. 2000 per student per year – a sum that is readily recovered from the current fee structure in most colleges. In return, what the colleges and students get is *'Quality Education independent of Geography'*.

We propose that during the next NPTEL workshop for teachers, we shall devote an additional day for an NPTEL-Education Grid-AICTE-IGNOU conclave where we invite specific recommendations on each of the items in section – 3 above and pass the same to AICTE for issuing the necessary directives.

Submitted by

K.R. Srivathsan

Director, IIITM-K, Coordinator Education Grid
NPC and PIC Member, NPTEL
April 09, 2007.