

**INDIAN INSTITUTE OF INFORMATION TECHNOLOGY  
AND MANAGEMENT – KERALA,  
NATIONAL PROGRAMME ON TECHNOLOGY ENHANCED LEARNING,**

**and**

**INDIRA GANDHI NATIONAL OPEN UNIVERSITY**

**JOINTLY ORGANIZE ONE-DAY CONSULTATIVE MEETING**

**towards the launch of**

**EDUCATION GRID GLOBAL ALLIANCE**

**OF ACADEMIA – INDUSTRY – GOVERNMENT**

**to promote and support**

**TECHNOLOGY ENHANCED LEARNING AND TEACHING  
IN UNIVERSITIES, COLLEGES AND INSTITUTIONS**

**on Wednesday, DEC. 19, 2007**

**at IIITM-K Premises, Technopark, Trivandrum**

1. This is an open invitation to the recipients of this page and associated document for the joint consultative meeting to discuss the formation of an Education Grid Global Alliance (EGG Alliance) of academia, industry and relevant government organizations.
2. The objective of the EGG Alliance is to promote the growth and widespread application of Technology Enhanced Learning and Teaching in the tertiary (or higher) education sector of universities, colleges and institutions.
3. The Education Grid provides a systematically organized suite of networked systems, processes and instructional management that may be termed as Technology Enhanced Open Supported Learning. This is described in this document.
4. The Education Grid provides for the effective deployment of NPTEL and other open content, for utilization and augmentation of web resources by affiliating universities and the constituent colleges and for their application in quality instructional management.
5. We propose that an Advanced Centre for Innovative Learning (ACIL) be established and jointly governed by the academia, government and industry through the Open Forum of EGG Alliance to promote capacity building and establish Open Supported Education in the tertiary sector of education.

**Our goal is to achieve ‘Quality Education to all, independent of geography’ and in the process, modernize and elevate our tertiary education sector and IT industry to become masters of the next generation knowledge-driven industry, society and economy. The approach to be adopted is inclusion of all stakeholders of tertiary education through the proposed EGG Alliance.**

**Contact details for arrangements related to the meeting are given on page 10.**

*You are invited to actively participate in the meeting.*

*The agenda for the meeting will be communicated soon.*

# ON THE EDUCATION GRID GLOBAL ALLIANCE

Draft Proposal for study and discussion

prepared by K.R. Srivathsan, IIITM-K, Thiruvananthapuram

## 1. THE INTENT

**Education Grid Global Alliance** (EGG Alliance) is to establish a collaborative forum of the academia, industry and government to provide a major national thrust in improving the quality of education offered in all our universities, colleges and institutions through effective deployment, management and open support for technology enhanced learning and teaching, taking advantage of the emerging connectivity, content, systems and IT enabled services, in the higher educational institutions, universities and colleges.

Every one of us who appreciates the potential of IT to transform the reach and quality of education, is also aware that effective use of IT or ICT in education is almost non-existent in the Indian higher education system. The industry is also acutely aware that much of the advanced applications of ICT in industry and for socio-economic development are unlikely to fructify unless the education sector itself becomes a smart user and developer of ICT. EGG Alliance is targeted to promote such applications and development of ICT for enhancing the quality of education and research.

Education Grid as a concept of deploying and managing **Technology Enhanced Learning and Teaching (TELT)** with associated systems and processes across colleges has been under development at IIITM-K for more than five years. It originated in the Educational Technology Services and ERNET labs at IIT Kanpur during 1998-2000.

**IIITM-K's Education Grid development has been paralleling the development of content under the NPTEL (National Programme in Technology Enhanced Learning) that is being executed by the IITs and IISc.** While NPTEL develops content, Education Grid provides a disciplined way of using such content in the education and capacity building programs in the colleges, affiliating universities and institutions. Further, Education Grid systems and processes are well developed to facilitate innovation in content and web resources development, in designing/deploying effective instructional methods and instruction/evaluation management that nurture and support better quality in our higher education. With some adaptations it may also be implemented for quality school education.

In Education Grid, similar to a Power Grid where power generated flows to every end system from complex plants to little appliances, we put in such a blend of systems and processes over a network that is driven by experts and academicians such that knowledge, expertise and resources reach from where they are available to whosoever learner seeks it. It is disciplined architecture and management of systems and processes related in a Web 2.0+ framework driven by academicians and institutions with industry participation wherever it is useful. We may say that in every course offered under the Education Grid we have efficient Virtual, or, Web Communities of teachers and learners backed by subject experts and content developers engaged in sustaining quality development and management of content, instructional processes and learning ambience. References cited in this document provide some details on the approaches to establishing and managing the Education Grid.

**Education Grid provides a powerful framework for innovations at all levels of TELT systems and processes in ways that assure good RoI (return on Investment) for all stakeholders concerned – the academia, industry, Government, students, their parents and the society at large.** Education Grid is much more than technology, systems and processes, the three being brought together and managed in such ways that directly address issues of quality education. In the following, we first take a look at what constitutes quality and performance excellence in education. Next, we briefly outline the essentials of the systems and processes in setting up and managing Education Grid for the regular colleges and universities. It also delineates the roles of the different players – academicians from premier institutions, content hosts, the IT solutions suppliers, the affiliating universities, the colleges, their teachers and students. The approach will provide for ‘Virtual Education Programs’ accessible from anywhere. It is also possible to support education in interdisciplinary subjects or areas managed by virtual, or web-communities of experts from multiple institutions.

## **2. EDUCATION GRID AND NATIONAL MISSION ON EDUCATION**

The aim of the EGG Alliance is to overcome the deep crisis in India’s (and as a by-product in other parts of the world as well) higher education. With the NPTEL driven by the IITs/IISc already in place for the engineering education, our initial focus will be on improving the quality of Engineering education first. As stated by Prof. Vijay Gupta of IIT Kanpur, when he was the Director of Punjab Engineering College earlier (see the annexure to this document), almost no real quality teaching is taking place in any of the colleges – even in the highly rated ones. Education has been reduced rote-based syllabus – classes – (tuition) – sessionals – exams, where even good teachers have little role or say in how they teach.

**The Government of India has the ambitious plan of increasing the number of students enrolled in higher education by 50% in the 11<sup>th</sup> Plan period through a National Mission on Education. It is supporting some significant initiatives like the NPTEL where in the IITs/IISc are generating authentic and quality e-course materials in the form of recorded video lectures and supplementary web-content for use in the engineering colleges. IGNOU has recently come up with the scheme of ‘Convergence of Open Distance Learning and Conventional Systems’ for enhanced capacity utilization in the colleges to meet the plan objectives. Such huge national initiatives have little choice other than leveraging upon inducting and benefiting from modern ICT systems, NPTEL, Education Grid, the ODL infrastructure of IGNOU, open e-content and innovative TELT systems and processes in the tertiary education sector.**

The present higher education system is in deep crisis. The present model of affiliating university, colleges and their management of education fails to deliver quality education. We have the irony of bright students, poor teaching, wrong learning management, no meaningful postgraduate education in most places, very few quality Ph.D.s coming out of our systems and so on. Although technologies like EDUSAT, CD and video based learning materials, channels like Ekalavya and Gyan Darshan are beaming some educational broadcasts, there impact is far from even scratching the surface of the huge problem of providing quality education to millions of students, or, supporting effective life-long learning to the large pool of employed persons.

Our systems like the UGC, AICTE, the present functioning of accreditation boards and assessment councils have largely become outdated, and unable to facilitate issues related to quality in education and yet to address issues related to technology enhanced learning and teaching. They are yet to feel, understand and address the emerging realities and how to guide the change management that is so urgently needed in the higher education system. Their

incremental approach, if any, to bringing in the necessary change is incapable of addressing the large shortfall in colleges that are capable of offering good education. There is the severe and acute shortage of quality and experienced teachers in education. Where a few such teachers exist, they are also unable to impart quality instruction, as the present examinations oriented system practically ignores the basics of the teaching-learning process. The miserable state controls in education are more concerned with appointments, admissions, quota, transfers, fee, interfering with autonomy, etc. than showing even elementary concerns on supporting quality of education wherever they are offered. They stifle innovations in teaching and learning. The academic councils and boards of studies in the universities have little energy and do not address the systemic issues adequately or have the capacity to apply themselves to issues of quality in education.

**India now must come up with a different approach and squarely face the daunting task of offering quality education to all, independent of geography.** We must leverage on the effective deployment and management of technology enhanced learning and teaching in our higher education. EGG Alliance attempts to do this with fairly comprehensive set of systems and processes.

A bright student today spends two years in the final years at school running to coaching classes to face meaningless competitive examinations, and neglects his/her school studies, thereafter enters a professional college that support only rote learning and unable to excite the creative thinking and learning that ought to be nurtured in higher education. The colleges have poor teaching and learning ambiance. After graduation he/she again goes for a finishing school to pay more for what the college should have taught earlier. **At least six years of a good student in his/her prime years are thus almost wasted in today's education. This is a colossal brain drain** much, much bigger than losing some going abroad. We have enough potentially bright students who are capable of supplying the thinking workforce for the whole world if only we teach well and impart genuine learning. In a functional sense, we, our government and universities and higher education system have failed in our core social responsibility of providing quality education to all independent of geography. There is the talk of India's education attracting foreign students (enrolments here are steadily declining), but this will not be possible until our universities conduct and manage themselves as genuine universities.

**EGG Alliance hereby proposes a 3-Tier & 4-Way system of Technology Enhanced Learning and Teaching (that is explained later in this document) using content from NPTEL and such sources as may be made available as well as open sources like MIT OCW. The Alliance will be an enabling forum. It will assist the change management to effect the transition from the rote-learning cookbook-examination approaches in the universities and colleges to one of enabling them to impart effective education and quality learning ambiance in all our higher education universities, colleges and institutions.**

### **3. STANDARDIZING THE COLLEGE ICT INFRASTRUCTURE**

Much of IT systems deployed in colleges and universities at present are functionally isolated although physically networked over a LAN. Effective practice of e-learning needs coherently managed suite of systems and processes. So we propose a standard suite of systems to be deployed in the colleges. We refer to it as the Education Grid Gateway System (EGGS). This is illustrated in Fig. 1. The IT industries could provide such standardized hardware and systems to all colleges.

To keep up with global developments in the e-Learning, open standards, open architecture and open knowledge initiatives, EGG Alliance will recommend applicable open standards, their Indian profiles and specific version-driven implementations. To achieve this we need to have India has to develop its own open standards profile and a referral facility to maintain, test and certify compliances to the recommended profile. We also need to build capacity in the planning, configuration, installation, commissioning and management of such standard profiles for the many open systems needed in the education sector. **We recommend that an Advanced Centre for Innovative Learning (ACIL) is established under the National Mission on Education to drive the widespread adoption technology enhanced learning and teaching in the colleges and universities.**

ACIL will help provide open support to and capacity building in the diverse services needed like content management, document management, course wikis, LMS, systems administration, open publications and relevant web-resources. Such approach standardizes the training to be imparted at different levels. Further ACIL may drive professionally driven Quality Assessment Methods like the Malcolm Baldrige Parameters for Performance Excellence in Education, our own possible instruction maturity models, etc. The people who manage content like the Librarians, Information Services managers, content and collaboration managers and even teachers are trained in a reasonably coherent manner. This will encourage sharing of best practices across the universities, colleges and institutions. The standard offerings should be as independent of platforms and specific vendor offerings as possible. We summarize here the kind of systems that we are looking for.

## **2.2. WHAT DOES EGGS CONTAIN?**

EGGS is the suite of standardized and version controlled systems recommended under the EGG Alliance. IIITM-K has a preliminary suite of such systems for use in the different colleges and universities. We expect this to evolve as demand for newer applications arise and new systems come into the market. It is a fairly comprehensive suite of hardware and software of relevance to establish and manage TELT services and processes in the colleges. In its current form, EGGS consists of 3 to 4 servers that run Enterprise Linux, Open Solaris or such other open server class OS over which the following suite of applications using Open Source packages are configured, commissioned and managed.

### **1. Main EGGS Servers will support the following applications/services:**

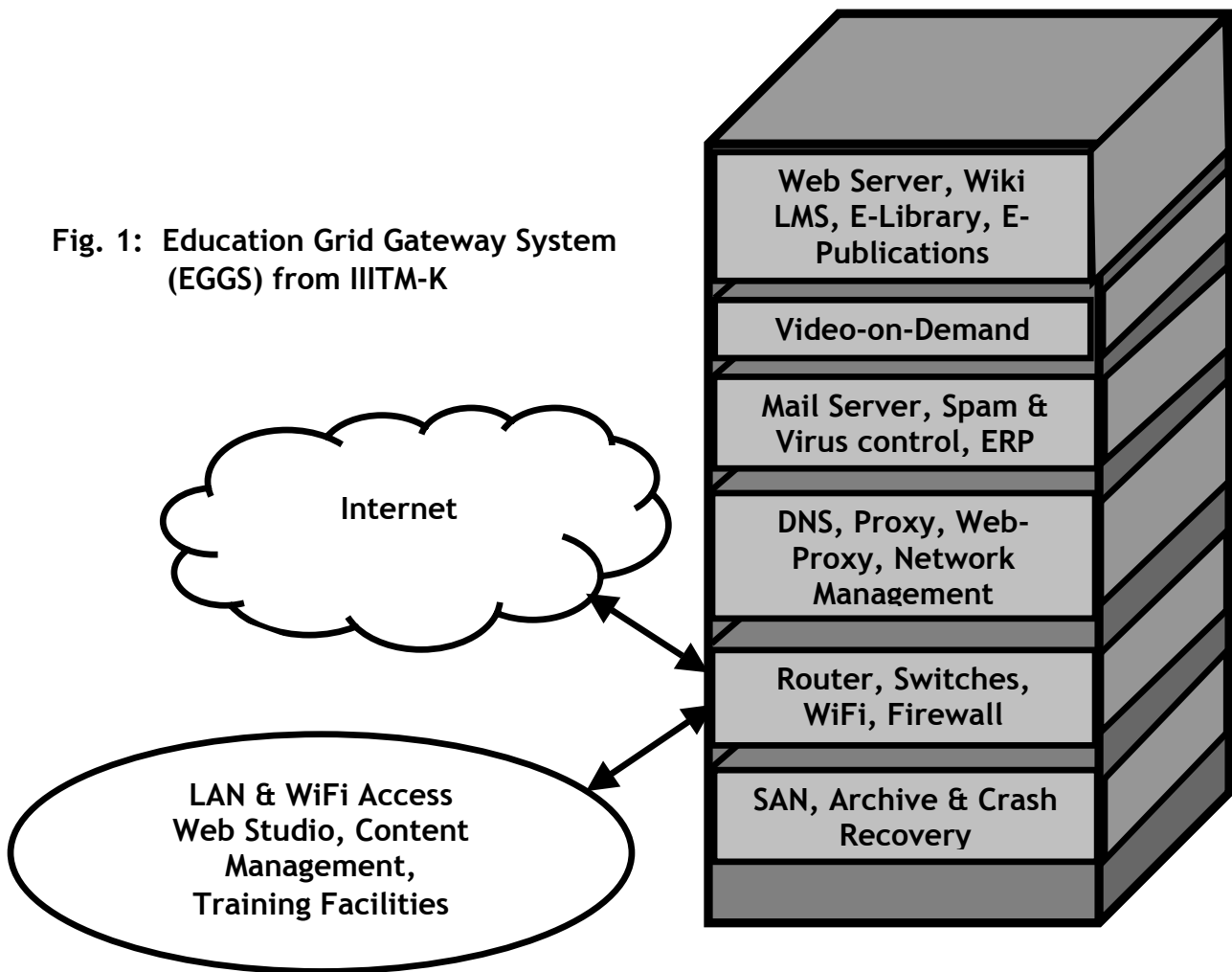
- (i) Main Web Portal for the University/College
- (ii) Course Home Pages, Wiki area associated for each course with Learning Navigator imbedded in the pages
- (iii) MOODLE Learning Management System
- (iv) GenISISWeb based Online Library Information and Publishing Services (OLIPS)
- (v) D-Space and Digital Library related subscribed spaces for published literature

### **2. Video-on-demand Server supports the following services:**

- (i) Uploading and indexing of compressed recorded video lectures from NPTEL and other sources.
- (ii) Multimedia/Flash with audio: Lectures may be audio associated with presentations slides or voice over flash type lectures for rich illustrations.
- (iii) Different common formats of compressed video files – Real, Quicktime, and Winmedia, or Macromedia Flash type multimedia files.

- (iv) Indexing and linking of the video lecture topics with abstract, through the Online Information and Publishing Services (OLIPS). OLIPS and D-Space may both be used. OLIPS is based upon GenISISWeb that is readily understood by Librarians.
- (v) Students/teachers may download or use progressive (http) streaming mode for playing the video (lectures) on demand from the server. Since video/multimedia in education does not use extensively strong streaming, we encourage progressive streaming or download-play type solutions. The method chosen depends on client PC or notebook player's capabilities.

**Fig. 1: Education Grid Gateway System (EGGS) from IIITM-K**



**3. Productivity Suite and Mail Server will support for the following services:**

- (i) Mail server with anti spam and anti virus filters
- (ii) ERP suite as decided by the concerned college/university
- (iii) Mail Groups and other relevant group collaboration productivity suites
- (iv) Optional Enterprise Integration server for the college/university

**4. Internet Gateway Server System:** This includes the DNS, Proxy, Web Proxy, NAT, DHCP servers and network management system for monitoring and assuring compliance with security and access control policies.

**5. Internet Router, Firewall, LAN Switches and WiFi access network** with associated security configurations. The systems in 4 above and here will be configured broadly in conformance with the recommendations of ERNET India for its Points of Presence.

**6. SAN, archival and crash recovery system:** This will provide for minimal archival, storage and crash recovery system.

Together, 1 to 6 above will serve as a comprehensive integrated enterprise solution for universities and colleges for effectively practicing Technology Enhanced Learning and Teaching. A university or college may have to further invest in facilities for content development/management/training for its teachers and staff. It may also have facilities to support production of recorded video lectures and webinars participation/management.

In addition, a college may install such systems like Campus ERP, accounts/payroll, utilities it deems fit in the same EGGs suite of systems by third parties as decided by the university. The EGG Alliance will benefit all supply parties with different systems vendors (like HP, Sun, IBM, Wipro, HCL, Dell, CISCO, Novell, etc.) offering reasonably coherent EGGs suite and open OS, network management and systems support to reduce the learning curve and create a pool of talent to manage complex e-learning systems. With cell phones SMS applications increasing, we need to standardize applications interfaces for their effective integration too.

We also need standardized PC, notebook or client side suites. Our aim is to ensure that all open applications as needed in EGGs delivery are coherently packaged in the client's suite. To the extent and to reduce cost for students, we at Education Grid will recommend such suites such that they will run uniformly on client Linux (like Ubuntu, Red Hat), and if possible on desktop/notebook Open Solaris solutions, as much as in Windows.

**Later in this document we propose the establishment of an Advanced Centre for Innovative Learning (ACIL).** One role of ACIL is to promote TELT by providing testing/certification, the integration and conformance of systems and applications that go into EGGs and related applications systems and services. ACIL will partially serve like the NIST body for India in the education area to recommend standards for conformance in the large number of applications that are needed in establishing and managing Open Supported Learning (OSL). **EGG Alliance and ACIL will promote such consulting and capacity building services in the universities and colleges so that EGGs is optimised for the budget and standardized training in systems administration and services management are bundled along with it.**

#### **4. STANDARDIZING E-LEARNING SYSTEMS AND PROCESSES**

A necessary condition for the acceptance of the Education Grid – Open Supported Learning (EG-OSL) Framework is the acceptance of standardized instruction design, delivery and management processes that are acceptable to the Board of Studies or Academic Senate of the affiliating university and the enthusiastic participation of the teachers in the colleges. At no level or stage rigidity is imposed by undesirable regulations or ‘over-regulations’ that stifle the innovations by the university, the college, the teacher or even a student. Towards this we propose a three-Tier Framework and Four-Way management Technology Enhanced Learning and Teaching. The three-Tiers are described next.

**Tier-1:** Involves authentic and quality content generation of relevance to teaching and their availability through well-organized dissemination systems for the courses taught in the colleges. This is partially fulfilled by the Recorded Video Lectures (RVL) and supplementary web-content

under the NPTEL by the IITs/IISc. In view of shortage of experienced teachers in the colleges, the RVLs have a significant central role to play in the instructional delivery and management systems of the colleges.

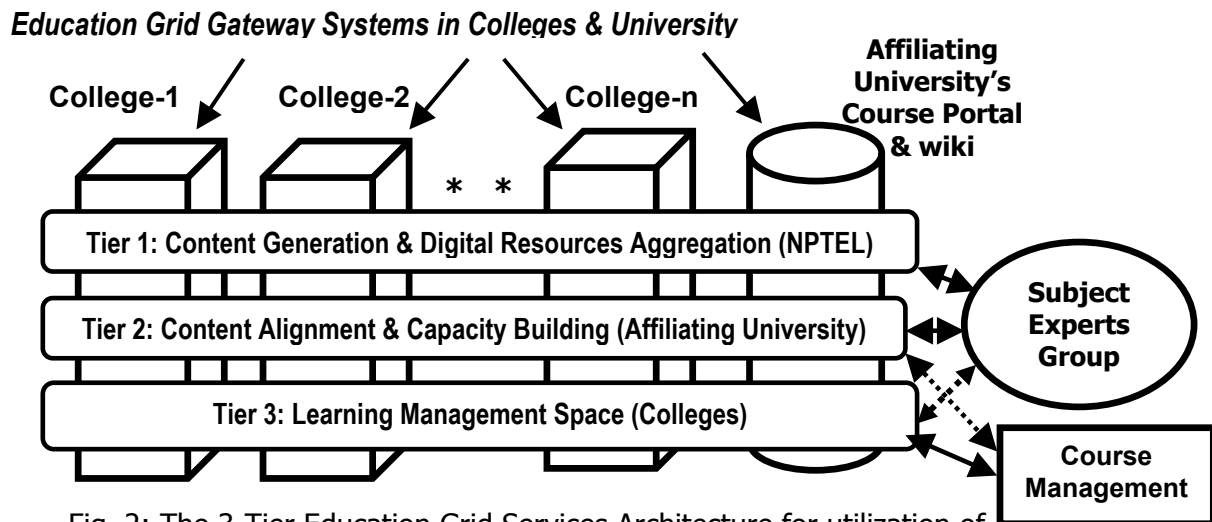


Fig. 2: The 3-Tier Education Grid Services Architecture for utilization of NPTEL/Open content in affiliating university and colleges

**Tier-2:** With the Indian higher education dominated by the affiliating university system, we need to provide an enabling role for them. We suggest that the Affiliating or Technical University appoint Subject Experts Group (SEG) of two or three academicians in the subject area duly approved by its Board of Studies or Academic Council of the respective university. The SEG will align the recommended NPTEL and other open content by linking them to the prescribed topics under the university syllabus in the course. This alignment will further be augmented by a sequence of approved learning modules for the topics stipulated in the syllabus. Each Learning Module in turn will have a schedule of recommended learning and evaluation activities that are to be practiced by the teachers in the affiliated colleges who teach the course. Autonomous colleges and institutions may adapt the same methodology as best suited for the level of faculty they have. The Course Wiki of the affiliating university will also have associated LMS through which the SEG will train and support the teachers who are teaching the particular course in the different colleges. In summary, the SEG has three broad functions. The first is to populate the Course Wiki with the recommended sequence of topics as per the syllabus with clearly stated instructional objectives, recommended learning activities, exercises and evaluation activities to be conducted by the college teacher and used as feedback to guide students' learning. The second is to orient and train the teachers using the Course Wiki and equip them to conduct TELT in the course.

**Tier-3:** The third tier is where the teachers in the colleges conduct their classes using the reference Course Wiki of the affiliating university and maintained by the SEG. The college will have suitable LMS and other systems to host the relevant NPTEL content, linked online library and publishing facilities and suitable interaction forums. Registered students interact with the teacher and with their own classmates in the LMS. The students also have access to the open affiliating university Course Wiki, open resources and discussion forums. Such environment enhances the learning ambiance substantially.

**The three tiers together enable effective collaboration across institutions, expertise and experts from different organizations to play their respective roles in the Education Grid**

**Open Supported Learning Framework (EG-OSL Framework).** It also allows each individual college and their affiliating university play their respective autonomous role in the teaching-learning-evaluation activities they conduct in their respective premises. We next show how this EG-OSL Framework is established and managed in the three tiers.

#### 4. EDUCATION GRID OPEN SUPPORTED LEARNING FRAMEWORK

The three tiers propose in the Education Grid Framework of Fig. 2 require appropriate systems, processes, instruction/evaluation design and their management with clearly delineated roles for the different parties involved. We must note that our goal is to modernize and strengthen existing institutions, colleges and universities in the light of the state-of-the-art and emerging technologies and systems of ICT and their effective uses in technology enhanced learning and teaching. Fig. 3 illustrates a functionally higher order EG-OSL Framework that is useful in the effective use of open content and aligning it with the syllabus and learning/evaluation activities in each course.

We must keep in mind that increasing number of students are going to adopt the notebooks, advanced cell phones, thumb drives, wireless connectivity, iPods and so on. Our universities and colleges are yet to awake to this reality of advanced technology penetration in society, and their increasing adoption in education in most countries. The proposed EGGS, and 3-Tier – 4-Way systems is eminently suited to take advantage of this ICT spread in the society. The 4-Way system is illustrated in Fig. 3 below.

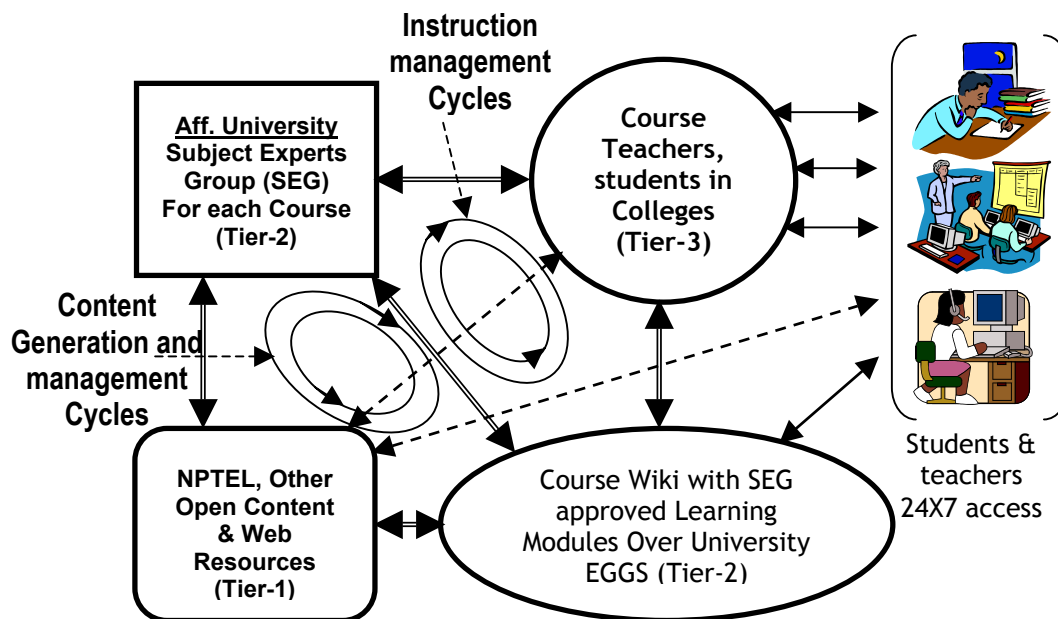


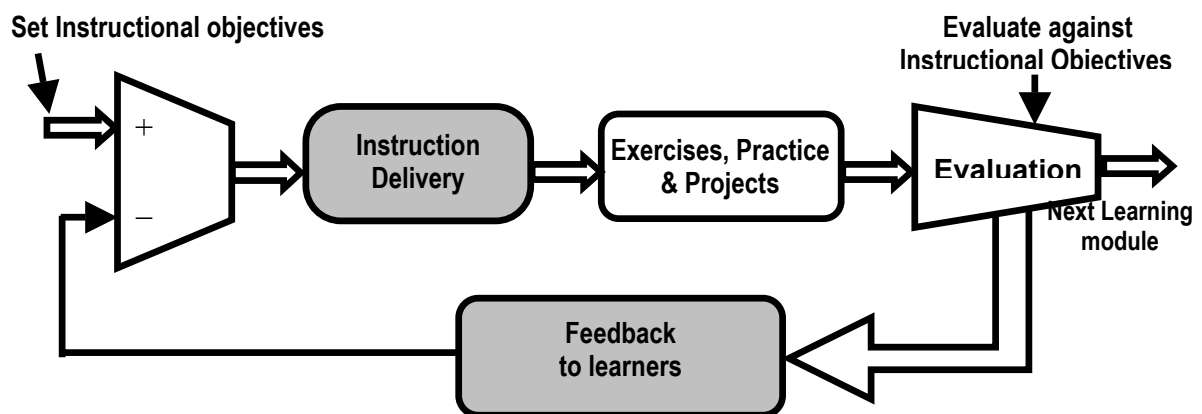
Fig. 3: Proposed Education Grid Framework For Affiliating University

In the 4-Way system of Education Grid, under the Tier-1 function, academicians from premier institutions develop content as learning modules (LMs). These modules will have both recorded video lectures from the best faculty available and also supplementary web-content. A collection of such LMs will be made available and a university may recommend use an appropriate subset of these modules (and some additional content as deemed fit by its SEGs). Tier 2 is supported by two entities. One is the SEG developing and maintaining the Course Wiki. The second is the EGGS system and the support services needed to run the TELT systems and processes. The 4<sup>th</sup>

way is the local teacher conducting the course using the University Course Wiki as the guide and reference. A local LMS in the college is used as the interaction space between the students and the teacher. Teacher also gets asynchronous interactions support from the university appointed SEG,

We may note that our present artificial affiliated college education is essentially an open loop ‘conveyor belt’ system that neither respects the substantive role that teachers have to play in imparting education nor provides the room for the necessary teacher-learner interaction that is central in a quality learning environment. These are concisely stated in Prof. Vijay Gupta’s notes given in the annexure. Due to years of bureaucratic approach to the management of education, our present system has reduced to a ‘syllabus-classes-(sessionals & tuition) examinations’ approach. It is a system where the teacher has very little role in bringing his/her creative and innovative approach to teaching. Students too have succumbed to thinking getting marks and passing the subjects without necessarily immersing in learning activities is education. A good education system is driven with adequate feedback to guide the learners and the teachers may have the structure shown in Fig. 4.

The 4-Way system we propose is eminently suited to nurture and service the kind of quality educational processes, with the different levels of the processes – quality content generation, quality instruction design, capacity building and supporting the teachers in the colleges and quality instructional delivery and evaluation management with feedback to learners assigned to the different content and instructional management functions that we enunciated earlier.



**Fig. 4: Model of Good Education Systems**

We refer to the above 4-Way supported quality education system as the Education Grid – Open Supported Learning Framework.

## 5. ON THE EGG ALLIANCE MEETING

IIITM-K is inviting some of the key players – NPTEL, IGNOU, Government representatives, industries to jointly discuss the issues in forming, announcing and managing the EGG Alliance. We propose an inclusive approach. Our goal is to facilitate establishing TELT based quality tertiary education in every college, university and institution of India. We need to evolve an approach for the deployment of Education Grid and charter for the EGG Alliance. We also feel that a sophisticated concept like Education Grid needs a Referral Institution for capacity building, profiling of standards, develop and maintain sophisticated web-resources, scientific

databases management, as a meeting ground of academia, industry and government, hosts the office of the EGG Alliance and serve as a technical and academic consulting organizations for the tertiary education and research sectors. We propose to establish the Advanced Centre for Innovative Learning as the institution to build and service the national Educational Grid under a Mission Mode Program.

The participating organizations of the meeting are requested to provide their inputs in advance regarding their views on the launch of the EGG Alliance. These will be tabled and presented in the meeting. This meeting is also a sequel to the one on Education Grid that was held at IIITM-K in Nov. 2006.

## 6. REFERENCES

Considerable work on Education Grid has been carried out. Educational institutions in India today use very little IT in ways that address quality education processes. Education Grid is a significant attempt in developing and deploying systems and processes that leads to use IT effectively for raising the quality of education through TELT. The approach of Education Grid to deploy is outlined in the following papers. They are available for download from the Education Grid Portal [www.edugrid.in](http://www.edugrid.in).

1. K.R. Srivathsan, "Management of Refereed Content Generation and Utilization in Formal Education", Global Journal of Flexible Systems and Management, Vol. 4, Nos. 1 & 2, Jan.-June 2003. Available for download from [http://www.edugrid.ac.in/webfolder/download/paper\\_1.pdf](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](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>

Dated: Nov. 26, 2007

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## ANNEXURE – 1

### **VALUE PROPOSITION OF EDUCATION GRID GLOBAL ALLIANCE**

**Vision: “Enable, Educate and Empower Every Citizen and Community Through Knowledge.”**

We propose to form an EGG Alliance of interested industries, academia and representative Government Organizations with the broad objective of serving the following.

- (i) To facilitate delivery of high quality education in our universities, colleges and institutions by establishing the Education Grid and supporting Technology Enhanced Learning Teaching environment in all of India’s institutions, universities and colleges.
- (ii) Upgrade our education system to benefit from the growth of connectivity, content and knowledge intensive services arising from the wide penetration technologies like notebooks, web accessed services, next generation cell phones, thumb drives, micro projectors, digital TV, EDUSAT, iPods, compressed videos, Google, YouTube, 2<sup>nd</sup> Life, immersive Virtual Reality and Education Grid itself!
- (iii) This is to be started with engineering education first using the content developments under NPTEL and such other initiatives as well as open content accessible over web.
- (iv) Establishing the Education Grid through deployment of Education Grid Gateway Systems (EGGS) in the universities and colleges.
- (v) Undertake widespread and appropriate capacity building exercises for teachers, staff and management of colleges.
- (vi) EGG Alliance to create value for all concerned parties – the students, teachers, colleges, universities, academicians, premier institutions, R&D organizations, the IT and Knowledge industries, and employed professionals anywhere.
- (vii) To establish Educational Grid as a Mission Mode program under the 11<sup>th</sup> Plan National Mission on Education. This Mission will be serviced by a Mission Coordination Center that we refer to as the Advanced Center for Innovative Learning.
- (viii) ACIL and EGG Alliance will develop, provide technical and academic consulting services and undertake capacity building in TELT through several products, packages and programs.
- (ix) ACIL will serve as an Open Referral Institution that bridges the academia and industry to help diverse institutions with appropriate industry partners to offer continuing education programs in many state-of-the-art subject areas of interest to existing and potential new industries.
- (x) ACIL and EGG Alliance will serve as the facilitator for promoting a number of knowledge intensive products and services that may be offered and/or serviced by diverse institutions and existing/new knowledge industries.

**Our goal is to achieve ‘Quality Education to all independent of geography’ and in the process modernize and elevate our tertiary education sector and IT industry to become masters of the next generation knowledge driven industry, society and economy. The approach to be adopted is inclusive of all stakeholders through the EGG Alliance.**

## ANNEXURE - 2

We have included a few supplementary points and tidbits in the annexure particularly with reference to some of the immediate concerns to be addressed in the formation and initial activities of the EGG Alliance.

### **2.1. ON TECHNICAL AND ACADEMIC CONSULTING SERVICES**

As an immediate start of the EGG Alliance, we propose to offer Technical and Academic Consulting Services (TACS) to any university/college/institution seeking the same. Sample services are cited here.

- (i) Setting up of the Education Grid Gateway System as stated in the enclosed offer document.
- (ii) Systems integration of EGGS (Education Grid Gateway Systems) and preloading such e-Content as made available from NPTEL in different courses.
- (iii) Training of necessary systems and information systems management staff – including Library Staff to manage the complex systems and use them effectively for the purpose of managing e-content and supporting Technology Enhanced Learning and Teaching (TELT) in the courses.
- (iv) Orienting the teachers and college management on establishing and managing Course Wikis and effective practice of TELT in the regular courses using Learning Management Systems.
- (v) Establishing Digital Library and Web-accessed Publishing Services through OLIPS (Online Library, Information and Publishing Services).
- (vi) Liaising with ERNET, INFLIBNET and other publishing company/consortia for Digital Library, journals, E-Books acquisition and management.
- (vii) Establishing an Academic IT Services, content development, content management and TELT training facility in the institution and orienting the staff and teachers in developing effective supplementary content as needed in managing quality learning activities in the courses. This facility will also boost the infrastructure for many students' projects and innovative IT developments.
- (viii) Liaising with NPTEL faculty in the IITs/IISc and other expert faculty as mutually identified and facilitate the offering of short courses for teachers in different subjects.
- (ix) Lead to offering full length Open Supported Courses for teachers using NPTEL content and awarding them Proficiency Certificates on successful completion of such courses.
- (x) Launch part time PG Diploma/PG degree programs to teachers in the concerned colleges.

TACS may be extended to more areas like promoting collaborative programs in advanced areas by multiple institutions and interested industries, for government programs that need advanced ICT systems and services and such others.

### **2.2. ON FINANCING THE EDUCATION GRID**

EGG Alliance and Education Grid are best run as a Public-Private Partnership. We may note that EGG Alliance is a NASSCOM alliance like body, but its scope is much more. Any institution becoming a user member of EG services will agree to collect Rs. 20 per week per student (or, Rs. 1000 per year per student) to cover the cost of technology and services. It will be best if Government of India enacts a clause asking colleges to deposit this amount from the fee they are collecting. In engineering alone we have 2 million students, this collection will come to Rs. 200 Crore per year. Each college will be issued an open web-pass book. 5% of this fee will run the ACIL. Another 1% will cover the EGG Alliance office and Mission Coordination expenses. The amount will cover training programs, capacity building programs, supporting SEGs in the different courses, access to some of the paid web-resources, etc.

We may innovate the open web-passbook credit and debit against services cost as method of live running audit of accounts for each of the member institutions.

### **2.3. WHAT IS IN IT FOR THE INDUSTRY AND GOVERNMENT?**

IT industry has little choice but to nurture and build something like the Education Grid. For one, they need quality graduates well aligned with modern and emerging systems and processes of the knowledge economy. With engineering education alone IT enabled using the Education Grid approach, there is a million quantity market for laptops alone! What about the EGGS (Education Grid Gateway Systems), organized web accessed content repositories like YouTube, innovations opportunities for Second Life, Web Resources promoting scientific computing, management of very large scientific databases and so on. India's IT industry covers only narrow segments like the financial solutions, BPOs, ERP and a few others. The vast areas of social sector applications, science and Technology, in healthcare, Informatics in diverse disciplines and IT applications in communities for governance and development are all begging for attention. Vast areas of potential future IT industries are yet to get into the radar screen of the industry investors. All these require imaginative and enabling approaches to the deployment and applications of ICT in education and research.

The time has come to carry out the second wave of liberalization by the government. This is to liberate our universities and colleges in the education sector. Remove irrelevant state controls that have landed our education system in a mess and release the vast potential of our youth to address our country's development issues and build next generation systems and solutions. We need to do this in a disciplined way. EGG Alliance will pave the way for the same. This second liberalization moderated by a disciplined approach is a necessity to achieve our Vision 2020 and more. Then our education system will produce much more empowered scholars, enlightened workers, entrepreneurs, innovators, thought-leaders and thinking social activists and make India a true Knowledge Superpower.

### ANNEXURE - 3

#### PROF. VIJAY GUPTA'S VIEWS ON REFORMS IN TECHNICAL EDUCATION

Communicated when he was Director of Punjab Engineering College, Chandigarh

Feb. 2007

The observation by Ms. Sushma Berlia, President of PHD Chamber of Commerce and Industries, that only 25% of the engineering graduates are employable is quite correct. In fact, a large proportion of even these 25% are employable only because the engineering skills required for most of those jobs are minimal. The teaching of engineering in our colleges is quite dismal, and bears no relation to the technology of the modern industry.

I have done quite a bit of work on this issue, and in my judgment, the major factors contributing to the situation can be classified into two major categories: (a) those that flow from a very deficient organizational scheme of technical education, or for that matter, most education in our country, and (b) those factor that flow from inadequate faculty motivation or training.

Under the category (a), I include:

- The antiquated affiliation university set up, wherein the person designing the course is quite different from person teaching it, who again is not the one examining the students.
- The affiliation university set-up has completely eroded the dignity of a teacher. A teacher in an affiliated college today is one of the most pathetic figures imaginable. He does not have any control on what he teaches. He does not have any control on what a student learns, because what a student learns is controlled totally by what he is examined on. An external examination system suffocates any initiatives by the teacher in improving the course or its delivery.
- A very large portion of our engineering education establishment is driven now by purely short-sighted commercial considerations.

Under the category (b) factors, I include:

- Absence of any interaction between industry and academia. Because of this, most of the faculty in our engineering colleges have no exposure to technology of any kind. They are teaching what they have learnt from those who did not know any technology in the first place.
- Most of the faculty in our Colleges have had a very indifferent education themselves. They have not been exposed to modern teaching processes, and as a consequence, know nothing about them. Reproducing on the blackboard the material contained in the textbooks is the only method of teaching being used in our classrooms. Most of the faculty is not even aware of how engineering is taught elsewhere: through discussions and through project mode.
- An almost complete absence of faculty with any passion for teaching. In fact, most have never seen what a good teacher can do to excite students. Today, teaching is seen as the last choice of professions by graduating students. We all remember the time when the toppers of a class chose teaching. Today, it is no longer true. The low relative wages is only a part of the story. A Student who has not seen a teacher he can truly respect will never chosen to be one herself/himself.

Once we recognize the contributing factors, the prescription is fairly obvious:

1. Give complete autonomy to all colleges. Let me hasten to add in the current scenario with a large number of privately managed engineering colleges, there may not be much improvement in most of the colleges. However, there is no fear of further deterioration, since there is hardly any scope for that. But it is certain, that those few that can improve, can improve only if they are given autonomy to experiment.
2. An essential part of that autonomy is the autonomy to teachers to experiment, and not just autonomy for the management. The external examination system should be wound up as quickly as possible. It may be instructive to note that this affiliating university set up with external examination system is extant only in a very few countries that were earlier under the British rule that did not trust the natives.

3. The above steps will empower the teachers to experiment with teaching methods, with innovations in contents. Even if not all teachers today are competent to exploit this, the situation cannot worsen from what it is, because today no teacher can contribute to improvement.
4. I believe it is important to realize that small, commercially driven colleges that are imparting the bulk of engineering education in this country cannot be, and need not be research institutions. We should make sure that they become good teaching institutions without worrying about what research is being carried out. There is absolutely no basis for the frequently made assertion that one cannot be a good teacher (*at undergraduate level*) without being a good researcher. For every Caltech, MIT or Stanford there are a large number of very efficient colleges in the U.S.A and Canada that do very commendable job teaching engineering without any pretensions to research. The insistence of our AICTE and various state DTEs on research outputs of small colleges is highly counter-productive. To satisfy the requirements of research and PhD degrees for promotions, much of fake research is being reported, vitiating the atmosphere. This also prevents colleges from giving teaching capability of teachers any weight in assessment and promotions.
5. If we accept the proposition of the point above, we can design appropriate training programmes for the teachers of engineering colleges. The current training is conducted along three well-worn lines: One, completing Ph.D. (with no course-work requirements) which at best of time trains one in very narrow areas, quite opposite to the requirements of a teaching faculty which necessarily has to be broad-based; two, short-term courses again with narrow specialty focus; and three, orientation courses run by faculty development centers of various universities which are ill-designed very soft courses or research oriented.
6. The true requirement of training of teachers for undergraduate programmes is the breadth, which is not imparted by Ph.D programmes, or even by M.Tech. programmes that are increasingly acquiring narrow research focus. These, incidentally, do not even produce good researchers (again because of very narrow focus of course work). Contrast it with American doctorate programmes which impart much more breadth through extensive course work (I personally was required to take 25 courses for my

PhD programme at University of Minnesota, USA). The redesigned training programme for teachers should be M.Tech. by purely course-work (each course having its own project, as every good course must have, even at undergraduate level).

7. The short-term training programmes must also be re-oriented towards teaching focus. We need to train our teachers in the basic courses that they teach, both in content and in delivery. These training programmes can lead to workshops for re-orientation of syllabi, academic contents, and teaching methodologies. This is not a very difficult task once the faculty is convinced that it is this, and not their ‘ research publications,’ that will count towards their promotions.

In summary, the concrete action points are:

- ❖ It is important to restore the dignity to the teaching profession by giving complete charge of a course to a teacher to experiment within very broad guidelines. This can be achieved only by disbanding the external examination system. This will obviously necessitate strict transparency requirements, working models of which are easily available.
- ❖ The insistence on research that is being placed for teachers of small colleges must be removed, and replaced by requirement of increased breadth, teaching and communication skills, and exposure to working of industries.
- ❖ We need to train our teachers in the basic courses that they teach, both in content and in delivery. (No such training is being imparted currently).
- ❖ The issues relating to proper competitive emoluments have not been mentioned herein, not because they are not very important, but simply because they are quite talked about and well understood (though not resolved).

Vijay Gupta \*

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Feb. 2007

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