

A 3-Tier Education Grid Model for NPTEL Assisted Rejuvenation of IT and Technical Education

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Acknowledgements

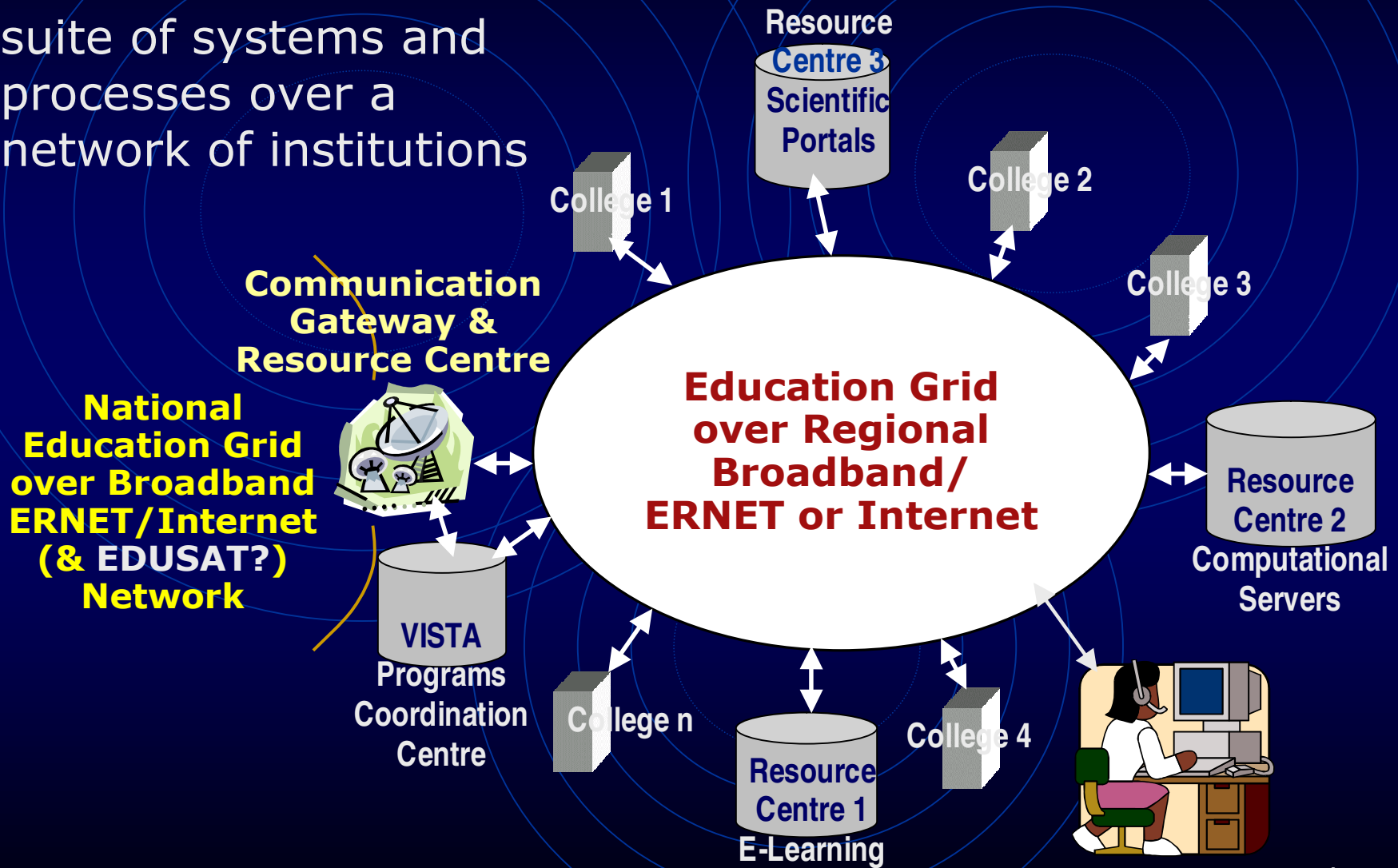
- The works, systems and processes reported here have been carried out under the *Education Grid initiative of IITM-K* in association with the *National Program on Technology Enhanced Learning (NPTEL)*.
- NPTEL is a project for e-content development executed by the IITs and IISc and funded by the MHRD.
- The NPTEL e-Content has been developed by > 320 Professors from the IITs and IISc for subjects taught in the Engineering Colleges as per syllabi of AICTE and Technical Universities.
- NPTEL content is being released for free access by the end-user. License terms are being finalized.
- The systems, services and programs proposed here are being perfected at IITM-K in association with NPTEL₂

Problems in Technical Education

- *Education in Colleges reduced to rote learning and examinations using pre-assigned local text books.*
- *Good teachers, colleges have little role or say in how or what to teach - all teaching focuses on marks, not in learning.*
- *Universities too sluggish and mired in admissions and examinations - no innovations in the curricula or teaching - learning processes.*
- *Education has become 'soft', rote based, descriptive, not analytical, synthesis or capacity for grasping and modeling real world problem.*
- ➔ We have the sad situation of ***a system that wastes almost 6 years of our young graduates*** teaching them incoherently and making society pay a heavy price. ³

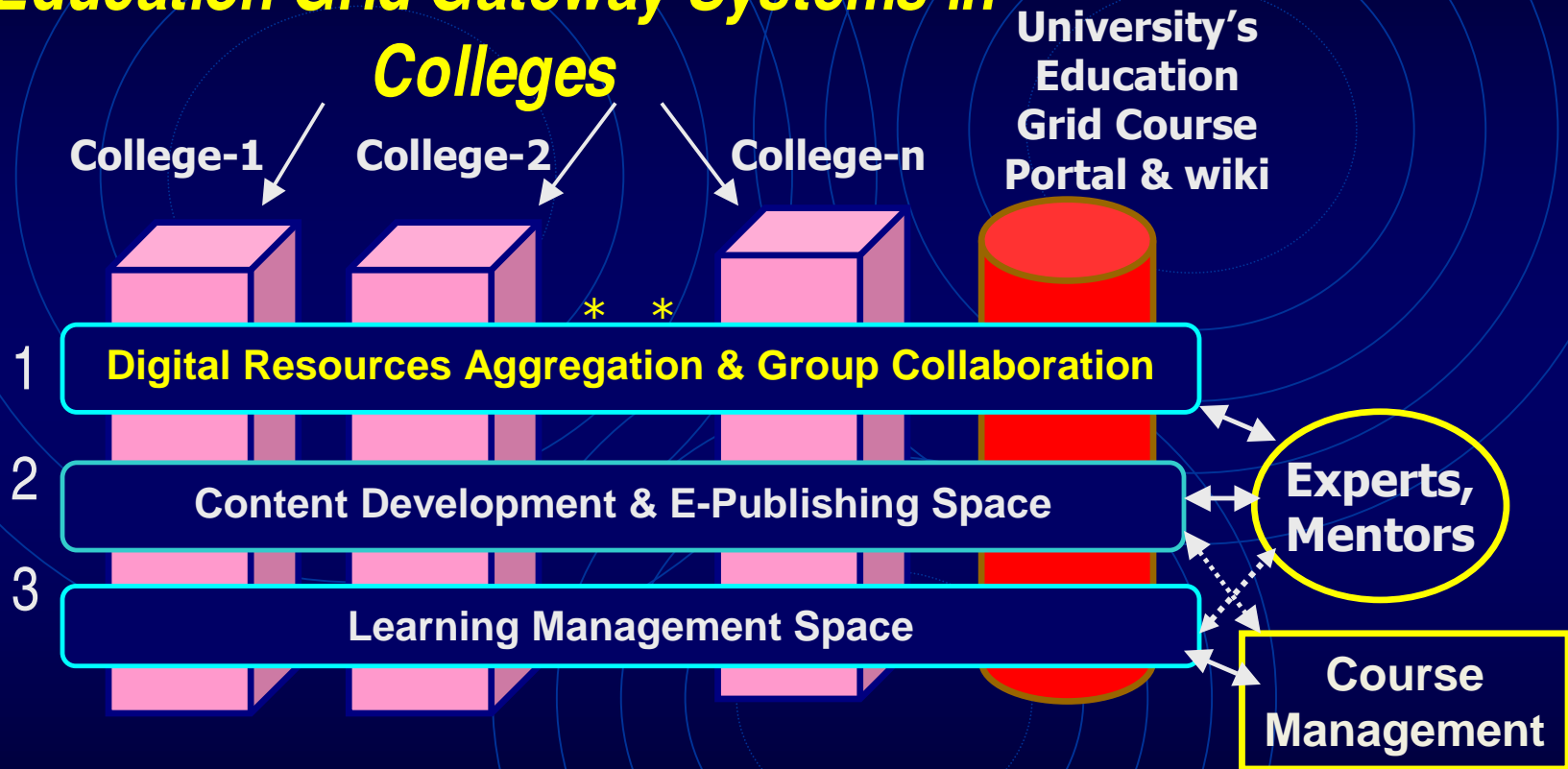
What is Education Grid ?

Education Grid is a suite of systems and processes over a network of institutions



Recall the Education Grid Approach

Education Grid Gateway Systems in Colleges



→ How does Education Grid put the education system back on the rails, support 'man making education', producing 'thinking graduates' and 'life long learners'⁵?

Managing the subject community of experts, teachers and students

Subject Experts

Teachers & Students in the subject

Subject Community Education Services & Programs

External world content and program links

Subject related Library, e-Journals and open access publications

Knowledge Intensive Course Management Services

→ Each course will have above environment from a **SINGLE COURSE ADDRESS.**

Roles of players in a Networked TEL Environment for Tech. Education

Consider different resources, systems and processes in the different organizations.

- NPTTEL: Content Creation, upgrade & Dissemination
 - Education Grid & ERNET: Content Deployment Systems, Management of Networked TEL processes and web-resources Augmentation
 - Tech./Affiliating University: Content Alignment with Curriculum, Instruction Design & scheduling; Capacity building of teachers in colleges.
 - Affiliated Colleges: Conduct classes and schedule of evaluation using university approved/maintained content and effective practice of TEL in courses.
- ➔ Teachers & students have open access to content.

Open Content from NPTEL, Others

- Over 320 Professors from IITs/IISc have created
 1. Full suite of 40 Hrs. of Recorded Video Lectures (RVL) in > 110 Courses.
 2. Supplementary Web Content in > 130 Courses.
 3. IITM-K has RVLs in several topics, courses and training modules.
 4. Others: MIT Open Courseware, CMU Online Learning Initiatives, many universities abroad available.
 5. Open web content of high high value from special sites - S.O.S. Maths of Drexel University, Wolfram, British and Australian universities and R&D organizations available.
- ➔ **Challenge: Augmenting and Aligning scattered content to focused learning modules and class teaching.**

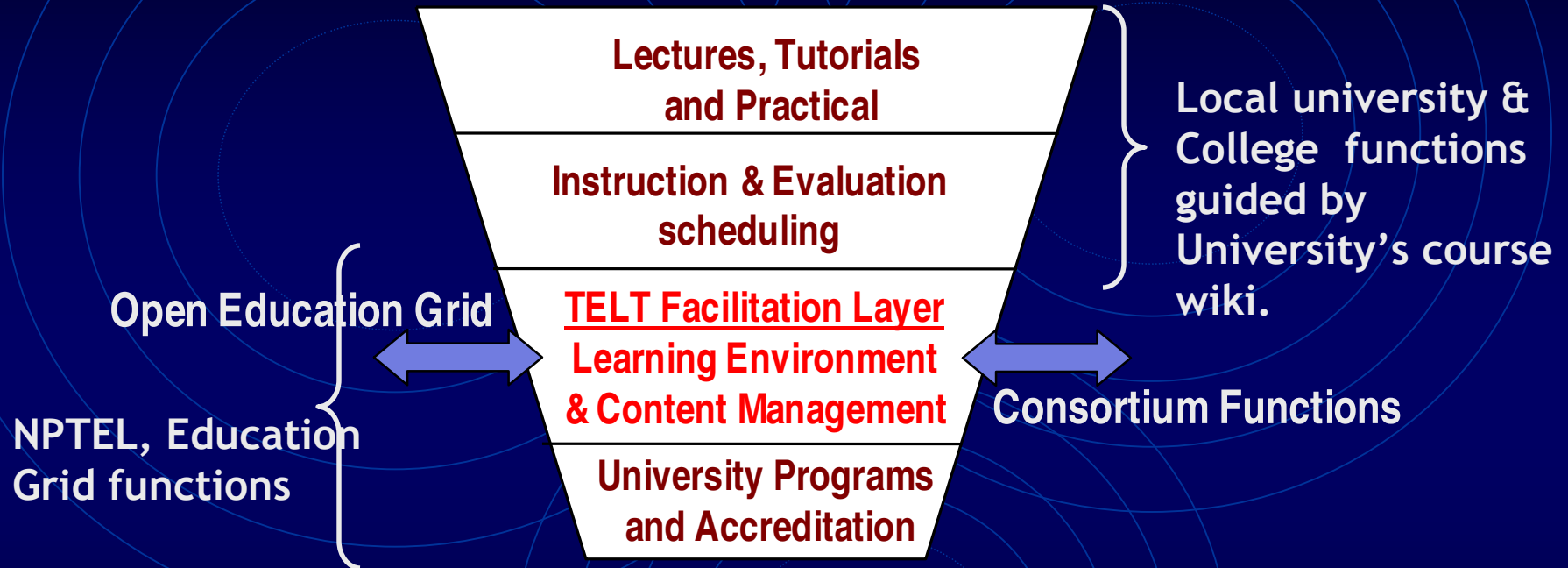
Key Technology Systems and Components for TEL Environment in Colleges

1. TEL needs three kinds of systems for benefiting from NPTEL & other e-content & applying it in the universities and colleges.
 2. Streaming/download Servers for Recorded Video Lectures (RVL) in each Tech. University and colleges.
 3. A Course Portal and Wiki area for each course maintained by Subject Experts Group of the Technical/affiliating University in Education Grid Portal.
 4. An LMS area for each course in every college (Moodle, Acado, such others).
 5. Plus a few other systems.
- ➔ All necessary systems developed, configured and used at IITM-K and serviced by the Education Grid facility. 9

Importance of Course Wiki for affiliating University

- Wiki systems are openly editable.
- Control or editing rights may be given only to members approved by Subject Experts Group (SEG).
- Structured flow of content in each course is hosted in wiki by the Tech. University appointed SEG.
- Each wiki is structured as per instructional model adopted in the different modules.
- ➔ *Course Wiki maps the University's own instruction/evaluation sequencing of a course and the flow of content in NPTEL and other open content or in digital library.*
- ➔ *Tech. University has control of instruction/evaluation sequencing in all its colleges.*

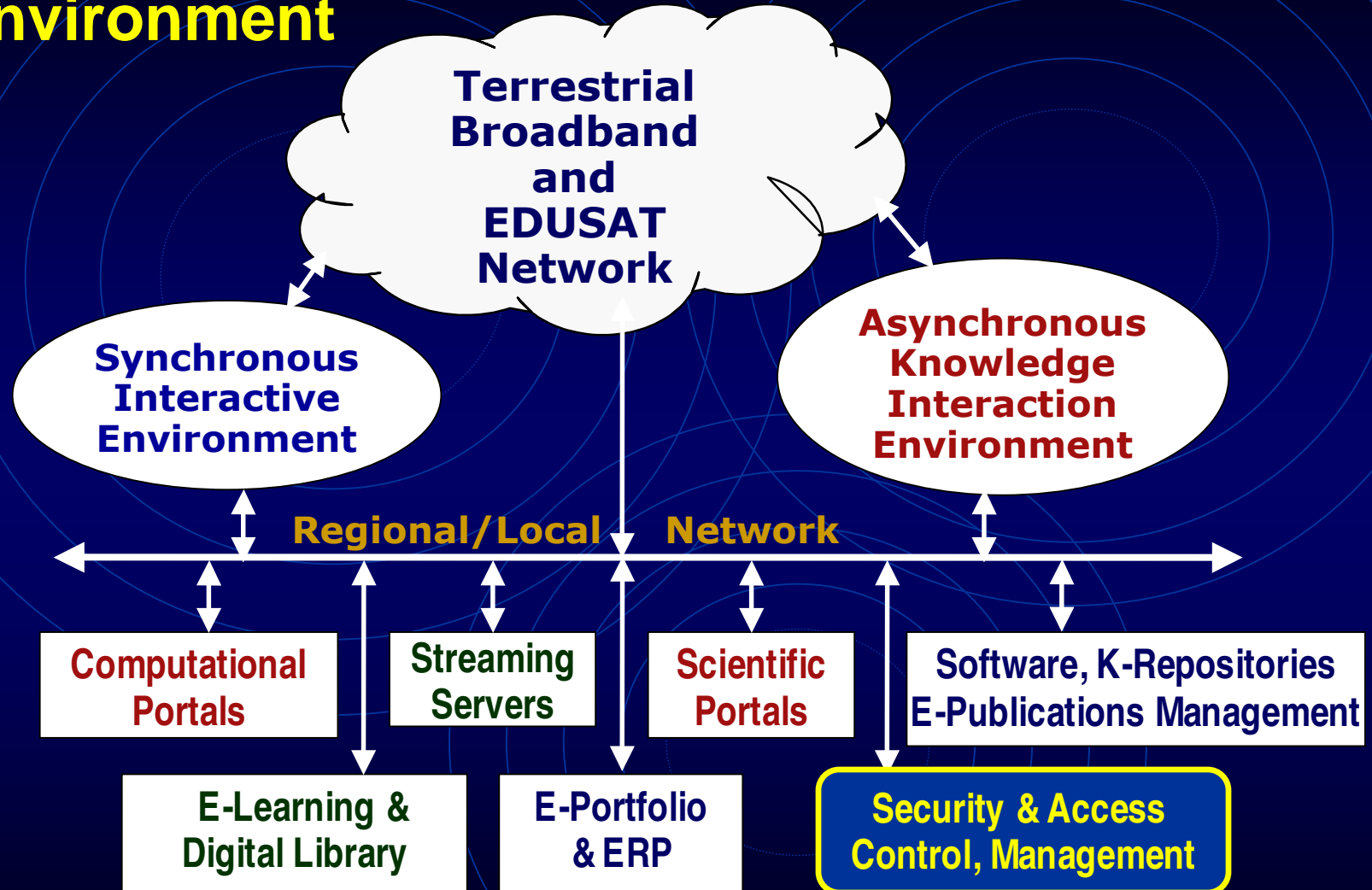
EDUCATION GRID: Distributing TEL Roles & Responsibilities



A Layered View of University System and their Management

- Important: AICTE initiatives for ensuring University Systems make Education Grid an integral Academic Infrastructure.
- Public Private Partnership through an Education Grid Consortium.

College Infrastructure & Technology Environment



→ Establish new type of MSPs to manage the above infrastructure across colleges in each locality.

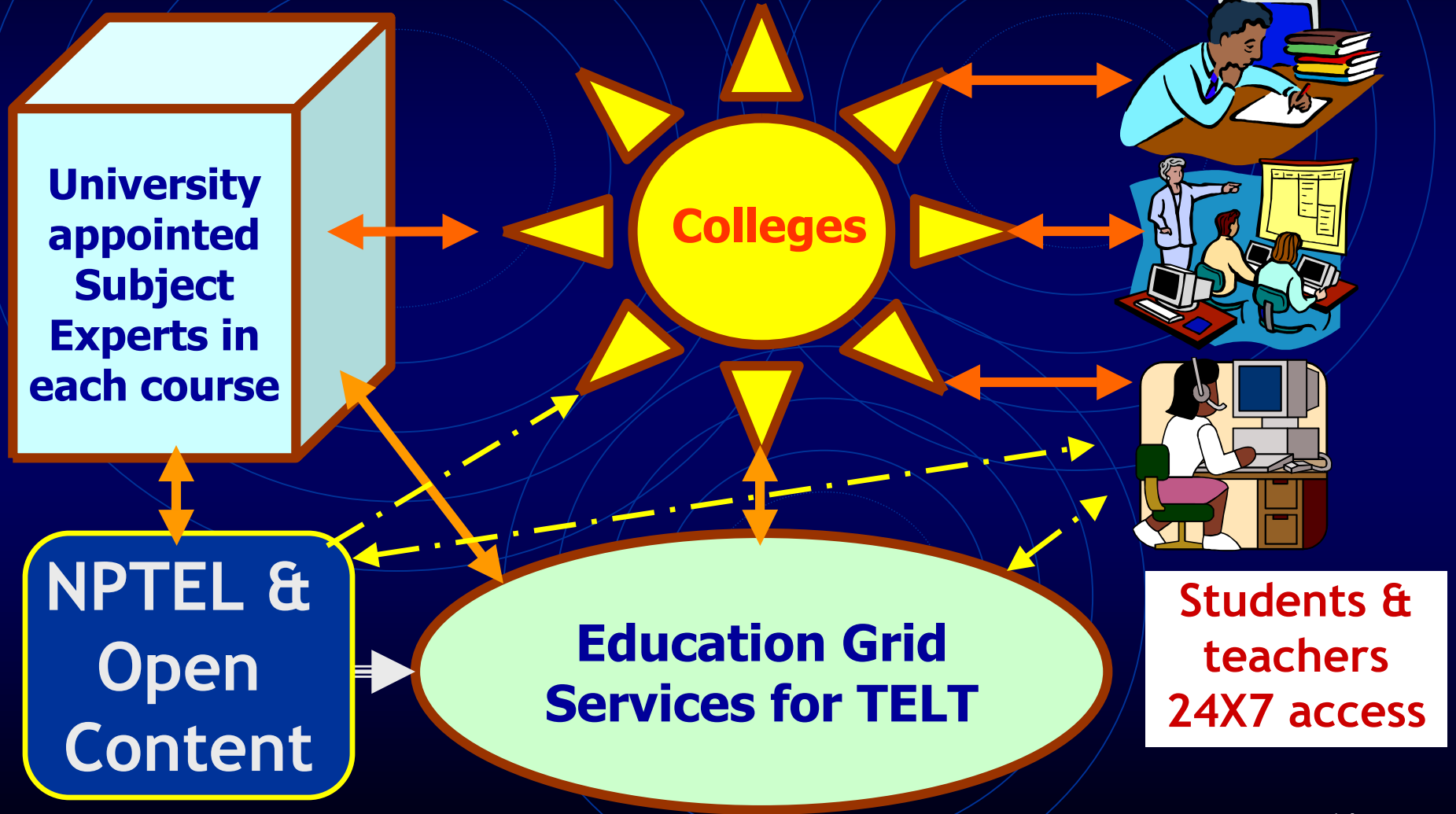
EDUCATION GRID GATEWAY SYSTEM (EGGS) from IIITM-K for TEL SERVICES IN UNIVERSITIES & COLLEGES

- Each Tech. University to have a complete Suite of EGGS.
- Backed by a core TEL Services Development, Training & Management Under a dedicated wing.
- Each college to have a minimal EGGS and WiFi access.
- Use ERNET PoP, NPTEL to maximum
- ➔ Systems up 24X7



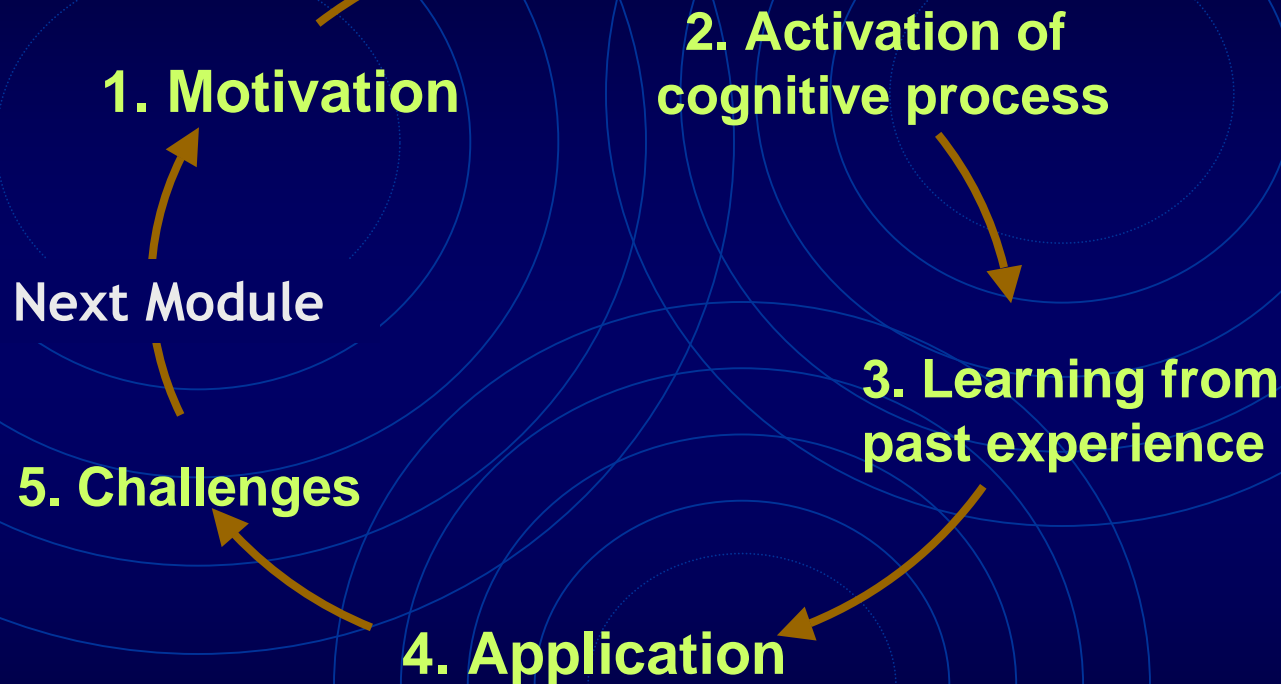
➔ *An MSP Industry?*

The 4-Way Education Grid Open Supported Learning Ecosystem



Organize Content to drive Instructional Processes

“Instruction is not Information” – Merrill

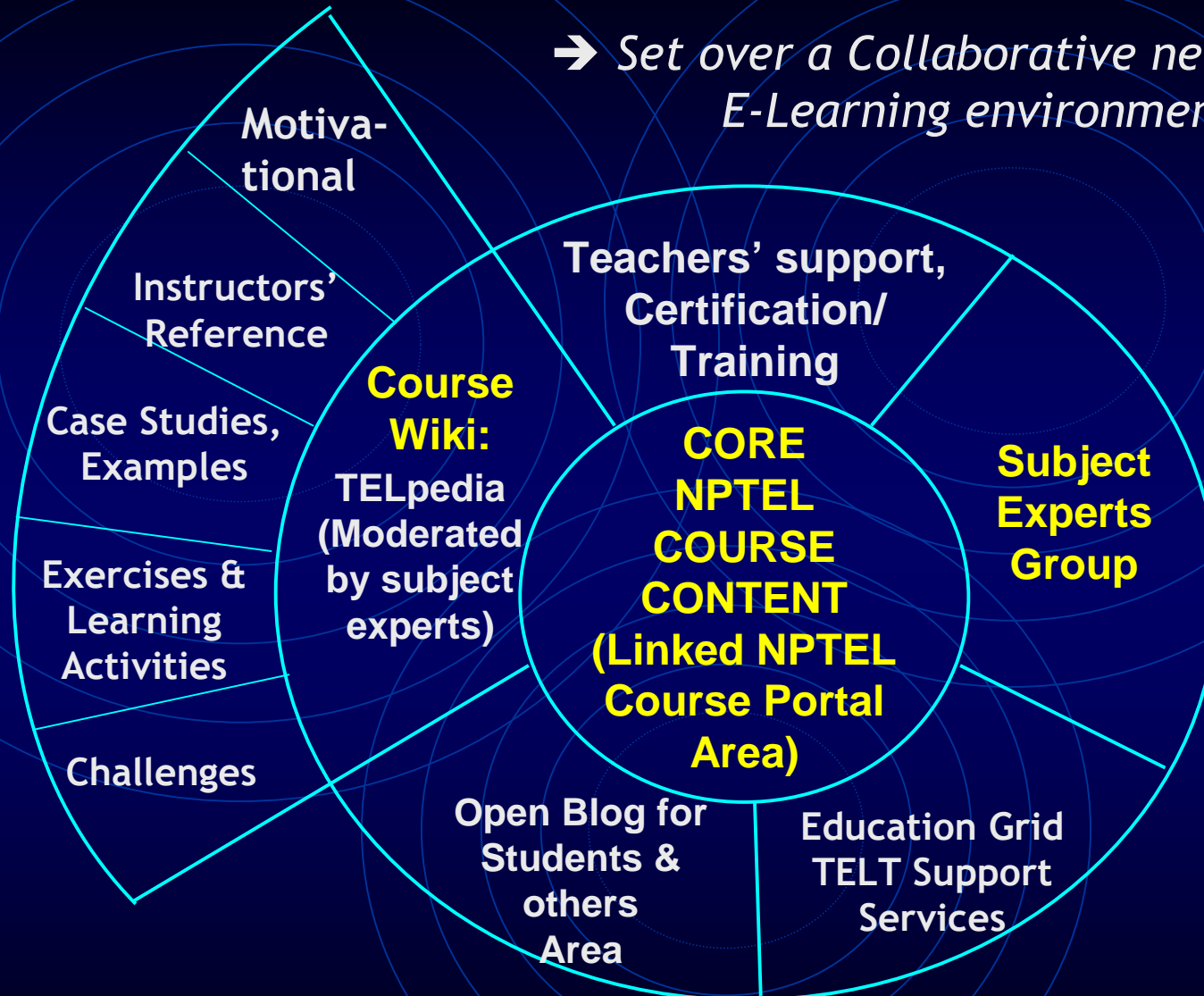


Problem Based (MALAC) Learning Model

→ Education Grid has a downloadable html template for cont organization.

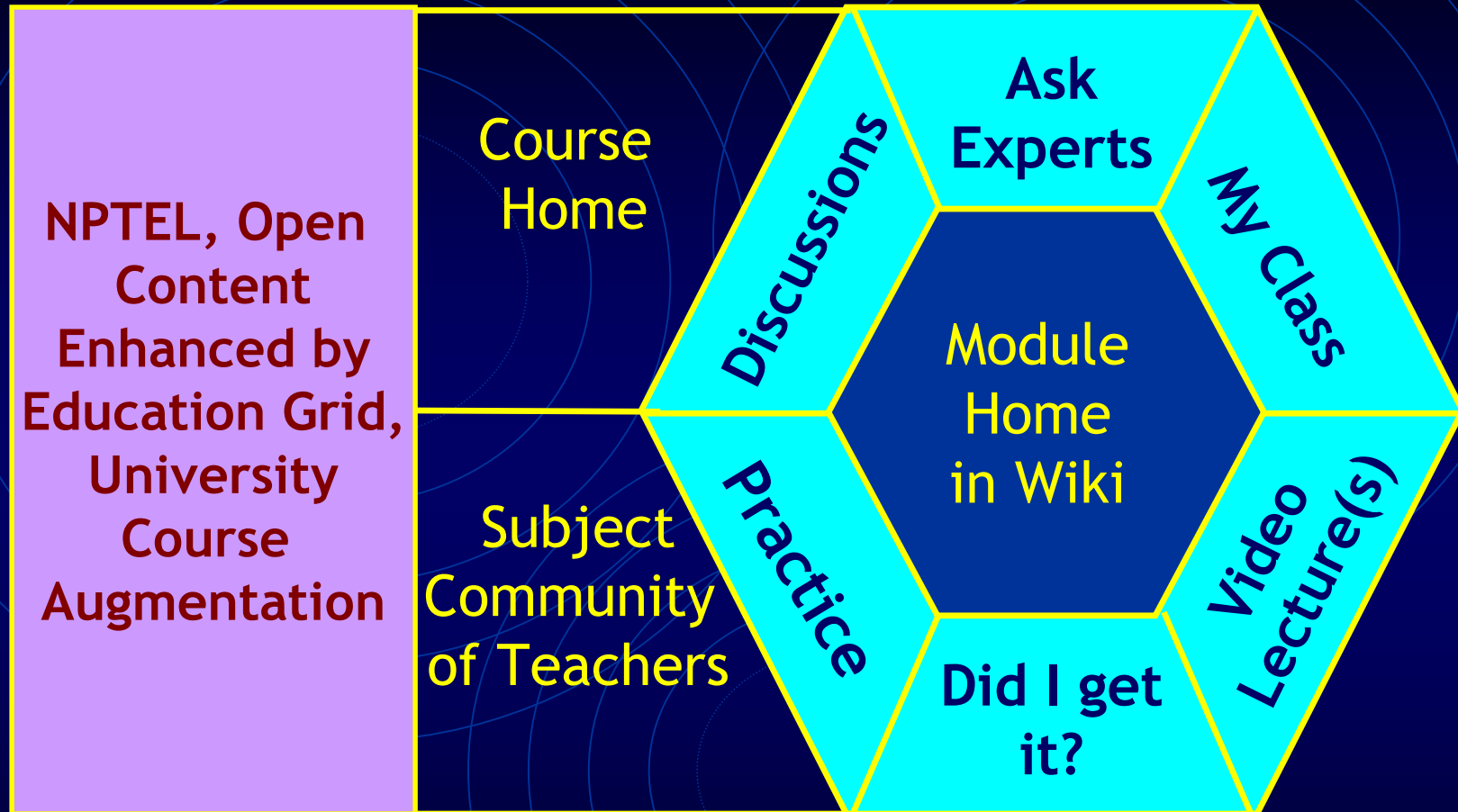
THE EDUCATION GRID SUPPORT SYSTEM

→ Set over a Collaborative networked E-Learning environment



→ How do we manage the above collaborative learning environment?

Develop & Use Learning Navigator!



- LN set for each course, placed in every module wiki page.
- Harmonizes the 3 systems: RVLs, Wiki & LMS

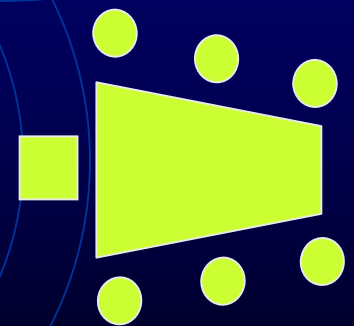
IITM-K to Commence Teachers Proficiency Programs over Education Grid

Programs leading to

- (i) Short term training on TEL in chosen courses for teachers.
 - (ii) Proficiency Certificate Programs in different NPTEL courses for teachers in colleges with of NPTEL and IITM-K.
 - (iii) Certified Instructor Program.
 - (iv) PG Diploma in Technology Enhanced Learning – in different areas.
- ➔ **Use of TVI and weekly interaction classes.**
 - ➔ **Open to all interested teachers and employed engineers.**
 - ➔ **Initially for Engineering College Teachers.**
 - ➔ **Universities, institutions, R&D organizations may expand the scope to other subject areas.**

Establishing Tutored Video Instruction

- Tutored Video Instruction (TVI) was commenced by Prof. Gibbons at Stanford in the 70s. Steps in TVI
- *Video records of lectures played and listened to by groups of 4 to 6 learners → ATTENDANCE MANADATORY.*
- *EACH GROUP TO POST THEIR COMMENTS/DOUBTS IN LMS.*
- Supplementary content posted in TELpedia of Education Grid.
- ➔ Establish a Course Wiki with two branches:
 1. Supplementary content organized as units/modules with instructional objectives & content with learning activities.
 2. Schedule of weekly learning activities.
- ➔ Have WEEKLY TUTORIALS over EDUSAT, or IGNOU SIT type facilities.
- ➔ Local Teacher as Facilitator.



Typical TVI Group setup

Establishing & Managing TVI

1. THE THREE SYSTEMS NEEDED

2. Group the class with 4 to 6 students per group.
3. Groups attend RVL as per the lecture schedule posted.
4. Each group to post comments/doubts in the LMS.
5. Local instructor assisted to prepare for weekly tutorial – deliver the tutorials

- Recorded Video Lectures (RVL)
– preloaded in servers
- Open Course Wiki
- Use LMS: Moddle, Acado, etc.
- Groups to be same for the entire course period.
- Engage students in Learning Activities, quizzes, midterm and end-term tests.
- Encourage students participation

➔ **Align instructional objectives with instructional processes**

Practice of Quality Instructional Processes

Example: Gagne's 9-steps of instruction vs. TELT support

1. Gain Attention
 - Real-world Introduction
2. Inform learner of objective
 - Instructional objectives
3. Stimulate Recall of Prior Knowledge
 - Citing previous class, pre-req. & anecdotal material
4. Present the Material
 - **ACTIVATION Part**
5. Provide Guidance for Learning
 - Include as teacher's and students material in the Activation Part.
6. Elicit Performance
 - Provoke students, Online quiz, **APPLICATIONS Part**.
7. Provide Feedback
 - Discuss online quiz perform.
8. Conduct formal module test
 - Add into cumulative score.
9. Enhance Retention and Transfer
 - Demonstration, Case study, self study content.

➔ **Align instructional objectives with instructional processes**

SOME KEY POINTS OF MANAGEMENT

1. Each University to establish a dedicated EGGs with content development and management facility and a dedicated Services Team. This may be established as a TEL Services wing.
 2. Host NPTEL content in ERNET PoP, or just link (if feasible) the components into a course-wiki.
 3. Establish university's own Course Wiki - organized for each course following the free Education Grid Template; All Teachers in a course under the Tech. University Wiki and LMS.
 4. Instruction and evaluation scheduling follow the Course Wiki.
 5. Each College / University has minimal EGGs; operates relevant LMS for registered learners.
- ➔ University to have a TEL Academic Committee nominating Subject Experts Group in each course.
 - ➔ Lots of work in developing evaluation systems and assuring quality of educational processes.

Many Merits of the proposed Education Grid

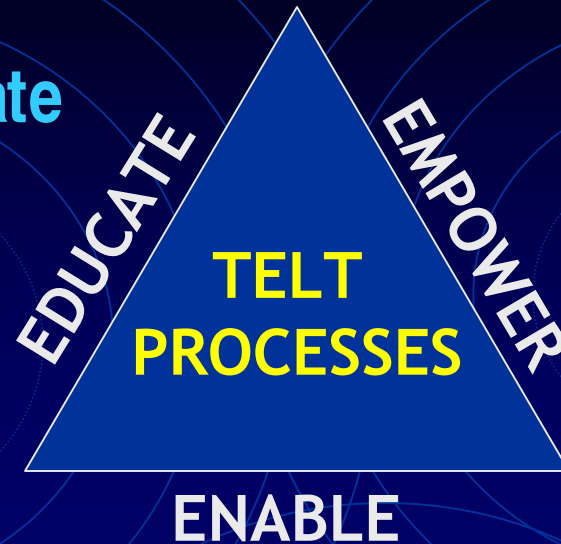
1. Education is restored to academicians and teachers.
 2. Emphasis on Learning Centered Education through managed instructional processes with evaluation as feedback to scholars helping to identify knowledge gaps.
 3. *We will help all academic institutions and all students – 20 Lakh in Engineering alone - at one go.*
 4. *Focus on Quality of Instruction and Instructional processes.*
 5. *We may even remove the pain of entrance exams and reach quality education on demand to all.*
- Use Education Grid for Quality Finishing School Programs also!**

A suggestion to NASSCOM

1. Education Grid consists of layers of services – from systems and networks to applications like Virtual Labs and supercomputing.
 2. IITM-K, NPTEL, ERNET and NASSCOM may launch a **NATIONAL EDUCATION GRID CONSORTIUM (EGC)** for driving this.
 3. A well designed EGC Charter and management with open accountability will take care of open accountability.
 4. **PROPOSED CONSORTIUM SYSTEM WILL PROMOTE INNOVATIONS IN LEARNING AND TEACHING.**
 5. **Will be self-financing @ Rs. 100 p.m./college student**
- ➔ It will also be the base for the next gen knowledge and educational processes industry.
- ➔ **Is NASSCOM Ready?**

Triple Role of Education Grid Initiative

Recall: “Enable, Educate and Empower Every Citizen & Community through knowledge.”



TELT:
Technology
Enhanced
Learning and
Teaching

Visit: www.edugrid.in

- **ENABLE**: Equip & Capacity build in TELT related systems
- Recommend a PPP approach.
- **EDUCATE**: Ensure quality TELT Educational Processes in the colleges.
- **EMPOWER**: Support the teachers and colleges to practice *quality INSTRUCTION and LEARNING AMBIANCE.*²⁵

IITM-K emphasis on IT for Social Sector, Science & Technology

IT: The Technology

Computers,
Networks, Systems,
Devices, Systems
Software ...

IT for Social Sector

Education, Agriculture,
Health, Water
Resources, Trade,
Environment,
E-Governance,...

ITES, SW Services

BPOs, Business
Solutions
Transcription,
Call Centers, ERP

IT in S&T, R&D

Datawarehouses,
Computational
Sciences, Knowledge
Management, CAD,
CAM, Entrepreneurship



An Intro. To IIITM-K's TELT Services

- www.iiitmk.ac.in - Institute
- www.edugrid.in - Kerala Education Grid
- www.kissankerala.net - KISSAN-Kerala Agri. Portal
- ➔ Watch our TV Serial Krishideepam! Friday 5.30 PM, Repeat Saturday 9 AM on Asianet.
- (www.tvmcitypolice.org - Trivandrum City Police)
- www.compchem.in - the pilot Comp. Chemistry Portal
- www.vuatkerala.org - Virtual University for Agriculture
- (www.e-krisshi.org - Farm Trade Portal)
- (Incubated and launched TeN Company; now Torque.)

More to come:

Community Portal for Panchayaths.

Portal for Scilab India and Scientific Computing.

TIME TO ACT IS NOW!

QUALITY EDUCATION TO ALL IS POSSIBLE !

Recall Albert Einstein:

"There exists no solution to problems within the conditions that created them in the first place".

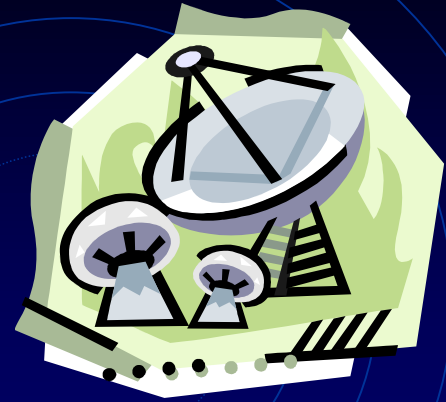
- Peter Drucker

"Knowledge has become the key economic resource and the dominant - and perhaps even the only source of competitive advantage."

**→ Chris Galvin (former CEO Motorola):
"Motorola no longer wants engineers with a four-year degree. We want engineers with a 40-year degree program!"**



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Thank You