

Kerala Education Grid – a practical approach to bring in quality online assisted learning in Higher Education over a web-enabled environment.

K.R. Srivathsan

KERALA EDUCATION GRID PROJECT

Today, the Internet and web-technologies have become commonplace and are rapidly decreasing in cost to such an extent that technologies such as Application Servers and Enterprise Portals are fast becoming products and commodities of tomorrow. Web enabling any information access and interaction – from Enterprise Portals, Education to E-Governance or for Healthcare, and every thing that one can imagine - is fast becoming all pervasive to such an extent that almost everyone on the world is affected by it, or contributing something in it. However, much of it does not create significant value until and unless, the architecture and services over it are suited to the needs of the organizational and institutional framework of the relevant domains. While IT is getting perfected, there is inadequate work in perfecting the large and complex distributed information systems, associated information sciences and the much needed institutional changes in every organization to effectively benefit from these developments. The Kerala Education Grid is a project specifically addressed to the Higher Education sector of the state to set in place effective IT infrastructure and methodologies and thereby improve quality and standards of learning imparted in all the colleges.

Under the aegis of its Department of Higher Education, the State Government of Kerala has taken a major initiative in establishing an Education Grid across all colleges, universities and premier institutions of research and development (R&D). The Project is called Education Grid for two important reasons: Firstly, it aims to equip the colleges with necessary IT infrastructure, network them among themselves and with premier institutions of R&D. The second and more important reason is that **the online assisted programmes planned to be put in place over the Education Grid enable the knowledge base, and associated benefits of experience and expertise to flow from where it is available – the better institutions and organizations to where it is needed – the teachers and students in the numerous colleges.**

The issues of how exactly this project helps, and how it is to be made a part of regular college or university is explained next. The articulated vision of this project is to provide **“Quality Education to all students irrespective of which college they are studying, or, where it is located”**. Having set this objective, one needs to probe in some depth the key factors that really ail our college education today. Firstly, formal education is conducted in a mechanical way of syllabus – classrooms – lectures – practical – examinations, with little enthusiastic involvement by teachers, or, education administrators alike. Students attend the classes and taking examinations with an aim of getting some marks or grade and a degree. In this process, the primary aim that education should impart scholarship, learning, earning for leaning and capacity for self-learning hardly get the attention they deserve in the formal education system. In this context one may quote Alvin Toffler, “The illiterates of tomorrow are not those who can not read and write, but those who can not learn, unlearn and relearn”. This brings the key question of what exactly are the attributes of knowledge, scholarship and learning that we wish to impart through our educational institutions. The key to India becoming a successful knowledge society lies in the rejuvenation of our formal higher education system. **Education Grid approach appears to be the most practical, cost-effective, and perhaps the enlightened and realistic way to achieve this.**

EDUCATION GRID: ISSUES AND OBJECTIVES

Education Grid Project will ensure the deployment of necessary IT facilitated Educational infrastructure and the necessary backbone network connectivity and server systems across the

colleges and organizations involved. Central to the architecture are two layers of systems and services. The first is the mechanical part of networking the colleges, deploying servers and access systems like Internet Café in the colleges where students sit and do the studies related work. The second is technologically and in the management sense a more challenging one. This is to provide for each subject or course a Learning Management System (LMS) environment that provides every teacher and student a web-enabled course specific area of information and interaction environment that is well endowed with rich courseware with relevant instruction design and teacher's mentoring support. We call this as **Online Assisted Learning Environment (OALE)**. Such an environment needs to take into account the following attributes of the educational process.

1. Our objective is to ensure **maximizing the quality of instruction provided to, and the quality of efforts by all students and learners** concerned and help generate quality teachers, thereby raise the standard of education as a whole.
2. Scholarship is the mastery of both the subject and the capacity to understand its relations with other subjects and world-situations where we apply it. Knowledge is more dynamic than scholarship in that it is the application of what is learnt, i.e., the scholarship, to real problems and thereby create value and more knowledge. As J.D. Bernal says, "Knowledge that is not used to gain further knowledge not only decays but also dies". So knowledge is better sustained in active group environments in each subject. Education Grid architecture must support such a vibrant environment in each subject across the colleges in the different subjects. This is necessary because the "community of practitioners" in any given subject domain is too subcritical to sustain effective learning environment in any given college alone.
3. **Learning, though a highly personal experience for each learner, takes place under formal education under a mix of complex processes where learners and instructors are dynamically involved in structured ways of directed and informal interaction and effort.**
4. Our goal is to restore the true university's purpose, where students learn beyond the parsimonious treatment of subjects as taught in much of today's classrooms and nurture the culture of query and discovery of relation of what is taught to reality.

In other words, Education Grid is deployed to transform the higher education system from its current classroom-examination-marks centric, to learning and learner centric approach.

EDUCATION GRID ARCHITECTURE

When we put the above requirements and role of OALE together, we glean at least one architectural feature of the underlying principle of a knowledge network. It is illustrated in the figure below. In this network, each subject domain of information and interaction is networked across the collection of colleges and organizations. We call each such "across" network a **Transversal Network**.

Every course or program is assigned one such Transversal Network. Through this, each course gets several facilitations, or, the different components of OALE. The methodology and enabling infrastructure developed for the Kerala education grid is based on studies and developments conducted at the new Indian Institute of Information Technology and Management-Kerala (IIITM-K, see www.iiitmk.ac.in) and its proposals submitted to the department of higher education of the Kerala state government. To equip this project, a class of servers that combine LMS capabilities and enterprise portal facilities that need to run on distributed Web Servers is needed.

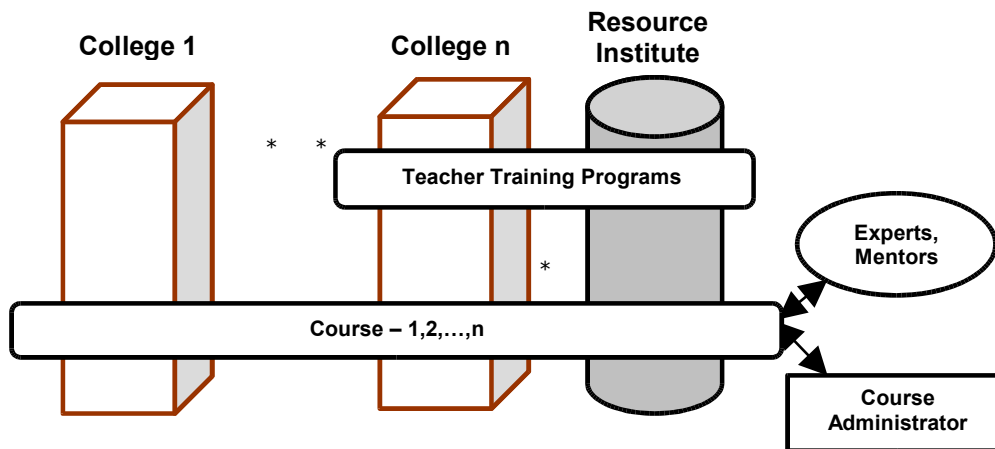


Fig. 1: Transversal networking of different education activities over Education Grid

Such education server packages as available in the market from elsewhere were too expensive and not have the requisite facilities to support a distributed management and usage of OALE. In this context, IIITM-K has pioneered the development of advanced Education Servers through its industry incubation initiative. This initiative has already resulted in one new company born out of IIITM-K and now in Technopark called Transversal E Networks Pvt. Ltd. (see www.transversalnet.com) further developing this technology and marketing these servers. These servers are now proven, and in use by several leading institutions and marketed by industry at a fraction of similar packages from abroad and are already in use by some leading Institutions and some Industry and R&D organizations. IIITM-K itself is fully Web-enabled by this class of servers.

OALE AND WEB ASSISTED PEDAGOGY

The Education Grid project features innovations in pedagogy, instruction design and educational technology developments, and address the need for improving the quality of higher education in colleges and universities of Kerala. The core of this is to develop and set in place the following facilities and content for each course in every college.

- (i) Approved or authorised modular courseware from the best of faculty and conforming as much to the syllabus of the course;
- (ii) Online administration and monitoring of students;
- (iii) Distribution of relevant printable course materials to minimize students' time on terminals;
- (iv) Development of self-tests for each course module that help each student to understand one's knowledge gaps and associated online assistance to fill such gaps;
- (v) Exclusive teachers' mentoring and assistance area;
- (vi) Course scheduling and calendar management;
- (vii) Development of online question bank;
- (viii) Web Portal for each course that helps access to associated Digital Library, FAQs, Glossaries, support for course specific e-publishing and interaction with the outside world; and,
- (ix) Course specific interaction (within and across colleges) through threaded discussion boards, chat, whiteboards, etc. and later real-time virtual classrooms.

Studies in North America (see www.webcommission.org) have shown that when driven with imagination, OALE improves average class performance very substantially and helps teachers in organizing the course related activities. Several advantages such as quick upgrade of syllabi, swift launching of new programs, HR for Industry, industry input to academics, standardized and effective management of practical courses with mass produced lab kits, etc. become possible with this OALE.

CONCLUSION

While it will take time to incorporate all the above features, the project aims to start with the core components to be developed and deployed in a few key courses at undergraduate Engineering and Sciences education levels through Resource Centres to be set up in leading Institutions. The education grid also has subsidiary objectives that will have beneficial fallout on higher education in the comprehensively wired state (pop. 30 million), which boasts the highest literacy (1 percent) in the country. It will assist in establishing the e-governance of the higher education system, assist reputable institutions to offer distance learning programs and encourage collaboration between institutions of higher education to share and spread best practices in teaching, pedagogy and learning environment management. It is hoped that the experiences gained in this project will pave the way to launch a similar national initiative across the country.

There is a general perception that providing internet access to colleges will result in the delivery of better quality instruction to greater numbers of students. But this expectation is not realized in practice. In academic institutions with Internet access, the average student spends more of his/her time on e-mail and browsing sites unrelated to academics. This actually reduces the quality of study and effort as the student is usually confused by the glut of unstructured information on the web. Unstructured interaction over information is not the solution for colleges. In this context, Education Grid is a well thought-out framework taking into account inputs from numerous experts, concerned citizens and teachers. **This project attempts to squarely take up the challenge of appropriate use of IT and Internet in Education using a knowledge enabling approach.** We solicit a national debate and a plan of action on this important issue of improving quality education using state-of-the-art Education and Networking technologies from all concerned.

K.R. Srivathsan is Professor and former Head of Electrical Engineering at IIT- Kanpur and is currently on deputation as the first director of Indian Institute of Information Technology and Management – Kerala at Thiruvananthapuram, India.

Contact:
Director, IIITM-K
Park Centre, Technopark,
Kariavattom P.O.
Thiruvananthapuram 695581

Tel: 0471 527567 (O); Fax: 527568; 9846110058(M)

Email: director@iiitmk.ac.in;

Home: www.iiitmk.ac.in