2.4 Challenges and Opportunities of Globalization for Higher Education in India – Alternatives through e-Education
- 2003

Abstract

The major issue and challenge is to use IT and evolve a new system of education that may enable educational institutions to develop appropriate paradigms of development and education, and to increase coverage by serving larger numbers so as to move towards education for all, so essential for knowledge-based society.

Development and progress of IT and its wider applications in all walks of life and work will create a society, in which every individual, group, community will be linked through internet and others.

The new paradigm of e-education should offer personalized education on a mass scale.
ICT is offering an opportunity of redesigning and developing new models of education. While considering this shift, it is essential to concentrate on five main processes which are important for any educational institution.
e-Education system requires the following framework and infra-structure; network, software tools and techniques, content in e-formats, educational delivery system and quality assurance and certification mechanism.

During the last few years, many colleges and universities are getting ready to face the impact of globalization by forming consortia of colleges and universities – virtual universities.

A National e-Education Network could help in addressing the problems arising out of globalization and liberalization.
(By – CGV)

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1. Introduction:

The Indian System of higher education is facing today many challenges arising out of globalizations and liberalization. The GATS and WTO agreements, which are likely to be signed by the Indian Government soon, will be effective at least in the areas of higher education, allowing foreign universities to market their education in this country. Use of Information Technology in the field of education is eliminating concept of jurisdiction of a

university, and creating IT enabled facilities such as distributed classrooms and many other appliances and applications. This will enable many leading universities from India and abroad, private deemed-to-be universities and other providers of education to offer their educational programs to all students all over India. This creates competition for colleges and universities, and will be resulting into a threat to the existence and survival of weaker institutions.

This is also a period of transitional stage for humanity making transition from industrial society to information society, and developing new social and economic order. The Information Age is also recognized as the Knowledge Age; and Indian Government and leaders are placing high hopes and goals of making India a Knowledge Super Power within the next decade or two. No country becomes a Super Power, unless common people are developed to the highest level of their competencies and capabilities, and empowered though tools and technologies of the age to enable them to participate in developments taking place all over. This can be achieved only through a right system of education for all.

The present paper deals with the Indian educational system with the approach of facing challenges of globalization through e-Education, and discusses possibilities of using existing IT developments in the field of high education so as to enable it to address many problems. The paper also endeavors to suggest creation of a national knowledge network to support weaker institutions, and to offer opportunities to evolve new paradigms of developmental education.

2. Problems and Issues faced by Indian Educational System

India has successfully created one of the biggest higher education systems in the world. Quality of many top institutions is recognized to be comparable to the best in the world. However, Indian education system faces problems and issues that originate from disparities and developmental models adopted. With all the impressive development in the areas of Information Technology, space science, nuclear technology, oil exploration, industrial production etc., India could not solve its problems of poverty, ignorance and underdevelopment completely and successfully due to various reasons. Nearly 25% people are still below poverty line; one-third are illiterate and disparities amongst rich-poor, urban-rural, educated-uneducated are high, which are creating enormous social tensions. The country has to face challenges of globalization and pressures of liberalization while continuing its fight against poverty, illiteracy and disadvantages.

The major problems before the Indian Higher education are:

- **Comodification of Education:** Higher education is becoming a marketing commodity. It is a multi-billon dollar business. Foreign universities are trying to have a share of Indian educational markets, and have prepared for this during the last decade or more. This shift from education as a social good to marketable commodity is against the Indian culture, and sufferers in these changes will be poor and disadvantaged people of India.

- **Global Competitiveness**: The competition will essentially be for offering quality education recognized at the International level and relevant to the local needs . The major issue is how to raise the quality and standards of Indian education and make it

globally competitive, locally relevant and enables it to offer marketing paradigm appropriate for developing societies.

- **Concerns of weaker institutions**: High disparities in educational standards and quality of education offered by Indian universities and colleges is of great concern to all. National and global competition may create problems of survival of weaker universities and colleges.

- **Developmental disparities and unsolved Indian problems:** Many colleges and universities were started in India for removing regional imbalances and for supporting education of weaker and disadvantaged classes, particularly of women. These institutions and other developmental programs for weaker classes are still facing resource constraints, which are further aggravated by ignorance, poverty and disadvantages of the people they serve. This is resulting in widening divides and in keeping many educated from weaker and disadvantages sections outside the job and employment markets. The challenge of these marginalized and deprived to the system of education is enormous.

- **Weak linkage of education with developmental processes** is creating frustration amongst graduates when they find that education is not so useful in employment and in work situations. A challenge is to transform the system from its present model of education to developmental education linking education to developments in society, industry and services sectors.

- **High cost of higher education**: The unit cost of traditional education, particularly of professional education, is quite high and has gone out of reach of the Indian middle and lower classes. Many private entreprenuers have started educational institutions for offering creamy courses with marketing approach; and have raised fees not affordable to majority. Subsidy to the education by the state is not the right solution in the present situation, when numbers aspiring for higher education is large and ever increasing. The deprived are already creating pressure on the state to make education accessible; and have raised an issue of socio-economic equity and justice. The issue has already become extremely volatile in some states like Maharashtra.

More of the same will not offer a way out. The major issue and challenge is to use IT and evolve a new system of education that may enable educational institutions to develop appropriate paradigms of development and education, and to increase coverage by serving larger numbers so as to move towards education for all so essential for knowledge-based society.

3. Transitions and Driving Forces for Globalization:

Human society has seen **two major transitions**; one from tribal society to agrarian society and the other from agrarian society to industrial society. The driving forces for transformation are in each case different; for the first transition it is the knowledge of nature about sowing seeds & growing plants and tools and techniques necessary for agriculture. The agrarian society used animal power for doing agriculture and ensuring its security. The second transition came up with the evolution and use of auto-machine (the driving force) and created industrial society. The **third transformation** has begun since 1995, when extensive

use of Internet accelerated development and growth of Information Technology. The Information Communication Technology (ICT) is the driving force for this transition, and is transforming rather, very rapidly, the way we communicate, work, entertain, organize etc. In all these changes now taking place in diversity of processes used in industrial society, one **key process** stands out uniquely; the convergence of communication technologies, integrating computing, tele-communicating and broadcasting sciences.

Development and progress in Information Technology (IT) has created global communication networks and generated globalization. Forces responsible for globalization and liberalizations are/1/:

- **Globalised markets** being made available due to various technology developments and high speed communications.
- **New ways of work and wealth generation** by creating new IT based appliances and applications and IT Enabled services, which are essentially dependent on knowledge and intellectual skills rather than physical and capital resources.
- **Intellectual property creation** is changing concepts of wealth and power of a society or nation.

All these factors have given education as the means for acquisition of knowledge a higher and center stage role in all processes of living, working and developing.

A society like Indian society, which has given great respect and reverence to knowledge and teachers will obviously stands to benefit in the new knowledge based era. This expectation along with the powerful nature of IT is expressed in the Report of '**National Task Force on Information Technologies (1998),** appointed by the Government of India, as follows:

> *"Information Technology (IT) modernizes the economy, expands and deepens the possibilities in education, accelerates growth, creates large-scale direct and indirect employment to the educated youth, and boosts exports. If there is one single technology that can be applied right across all sectors of technology, all areas of administration, all levels of education and all types of services, it is Information Technology. Similarly, if there is one technology where India can emerge as a strong global player in the foreseeable future, it is IT.*
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> ***IT is not just a technology, nor is it merely a new enabling tool for economics and education. Rather it will lay basis for a whole new global civilization in which Indian values and wisdom will play a defining role".***

Education is a subsystem of any society and should meet the aspirations, needs and requirements of the society. Education has, therefore, evolved over the ages.

In Agrarian Age, education was very much at the feet of Guru in the Ashram Schools /Gurukuls. It was very much personalized; and content, level of achievement and objectives of learning were different for different learners. The teacher decided methods of teaching and learning; and learners received knowledge from Guru through oral and personal communication. Memorization was resorted to since books or *pothi* were either not available or were perishable. The education was localized dependent on the teacher expertise available

locally; and students had to move to other places in search of Guru and experts in various field. The same methods continued during the early centuries of second millennium.

However with the emergence of industrial society, when more manpower was needed in various trades, production and service centers, educational institutions started admitting more students to fulfill the needs of industrial society. The form of education changed from personalized education to mass education; and a mechanism of a classroom with a large number of students instructed by a teacher/lecturer was evolved.

A teacher can teach and interact intimately with a group of 5-6 students. When the number goes beyond 12-15, as is usually prescribed for tutorial classes, the teacher has to resort to different methods of teaching for giving personal attention. Beyond this and particularly when class strength goes beyond 25-30 the education becomes a large number education, and personalized attention becomes rather difficult.

Classroom based education introduced new methods and practices such as common syllabus, uniform examinations, common achievement levels for passing and grading usually decided by the teachers to suit the economy and convenience of the educational system. In the industrial society, the skills and competency levels and content were broadly linked with the needs of the production and service sectors.

The form and structure of educational institution in industrial society is often described as the 'Factory Model' of education. It uses the books, labs to train simultaneously a large number of students, and uses a quality assessment mechanism- final product testing / examinations- wherein some pass with grades/classes and some fail. The education has a form of mass education, is institutionalized and decided by academia. It is therefore teacher-centric. The education is localized in the sense that it is available at the local and nearby institution with all its advantages and disadvantages. Students have to move to other institutions, and even go abroad for further and higher education. The unit cost of higher education is quite high; since major expenditure is on salaries/honoraria of teachers and cost of infrastructure facilities. As education and higher income in most cases are linked, there is a high pressure in developing societies on places in educational institutions.

4. Current Scenario of Education:

India is having one of the largest system of tertiary education with more than 300 university level institutions (single and dual mode universities that include central and state universities, deemed- to-be universities, institutions of national importance, open universities), 14 000 colleges, 9 million students and O.4 million teachers.

The non-formal mode of distance education consisting of 10 national and state open universities, nearly 60 Distance Education Institutes of traditional universities, together account for nearly 20% enrolment. The unit cost of higher education in open universities is about 50 – 33 % of that of the formal education; it is more for professional and technical education and less for general education. In some cases it is as low as 10 %.

The size of the total system appears to be quite large and impressive, but it covers hardly 6% of the relevant age-group. In order to compare well with the developed countries having coverage of about 30-40 %, India has an enormous task of creating huge infrastructure, which will require financial resources not affordable to the nation. It is

therefore necessary to evolve some alternative and new way of increasing coverage and for offering more access to a large number of aspiring learners with less cost.

The single and dual mode universities as well as conventional universities are now using Information Communication Technologies (ICT) for various purposes. This has created a new scenario of modes of education which can be classifies as follows /2,3/:

1. **Formal Education:** Classroom / campus based education imparted by traditional universities.
2. **Non-formal- Open and Distance Education:** Offered by single mode open universities.
3. **Mixed Mode Education**: Offered by Distance Education Institutions (DEI) of traditional universities by using both formal and non-formal components of the two modes.
4. **ICT Based Convergent Mode**: Uses Web Based Education (WBE), Computer Based Education, Center/Classroom Based Education. Some universities are using ICT and Internet extensively in education to supplement the print based /classroom based mode in formal and/or non-formal education.
5. **Entirely WBE - E-Education** : Uses Internet and WBE extensively so that teaching and learning is almost distributed.

No mode described above is going to be in its pure form, and many educational institutions will be using ICT conveniently to serve their purposes in variety of ways.

It should be noted that learning process always take place in the cognition of an individual; and is dependent on the psychomotor and affective development of an individual being educated. Education is therefore very personal process of learning. Learner expresses his/her achievements through the skills and functionalities acquired, which are very much dependent on technologies of the Age or tools and techniques the society uses. Hence basic and fundamental process of learning is very personalized and is independent of technologies and modes of education However, it needs interactivities with other individuals or learning materials, which are dependent on the technologies of communication of the Age.

One of the key issues is, therefore, to identify the processes and methods of education that are **mode and technology independent.** They could then be followed in the emerging and unknown scenario. Usually the practices in teaching, learning, evaluation and management are guided and dictated by the form and structure of the educational institution - either traditional (classroom based) or open and distance (print and study center based). The existing educational institutions are therefore typical of the 20the Century Industrial Society. The educational system are offering education on mass scale without giving personalized attention. They will, therefore, need radically different formulation when ICT is used extensively. In the fast changing scenario covering all aspects of socio-economic and cultural changes, attempt should be made to identify invariant educational processes and practices that will support education – and relate it to support developments in living and working places and people in a self-sustainable way.

5. IT Development:

Information Technologies are fast changing and might take a decade or two till they get matured when further developments in IT have hardly any significance. During this period the educational system and for that matter any system has to be designed to be open to the changes both in IT and socio-economic processes.

The major trend-setting technologies that will affect educational communication between teachers and learners are given below.

- **Broadband and Mobile Internet**: With the emergence of broadband and mobile Internet, current efforts by various Internet Service Providers (ISP) are to connect all cities, towns and villages, and offer Wireless in Local Loop (WLL), Direct to Home (DTH) and other latest technologies to all.

- **Networks** are being created by various communication, production, financial and service sectors with a view to offer speedy, economical and cost-effective products and services to customers. For this purpose, building LAN and WAN and creating sectoral networking – Banking network, railway booking network etc- is progressing fast in India. The UGC has also started building Indian Educational Network by linking all universities and colleges in India.

- **The last mile problem of Connectivity:** In the near future, electronic networks offering 2 Mbps connectivity, based on Right of Way, by leveraging on existing networks of ISPs and telecom providers are going to come up to provide voice-data-telephony multi-services. The last mile problem will be solved by offering all available connectivity solutions, namely, dial-up, ISDN, leased line, DSL, cable modem, wireless, etc. ISRO's Educational Satellite (EduSat) scheduled to be in the Indian sky by the end of 2004 with more that 50 channels offering ku-band reception and broadband connectivity all over India will make DTH (Direct to Home) communication a reality.

- **Networking Architecture** is moving from cluster to **grid networking**. The grid computing network is a new advancement in high-performance computing which has moved from cluster of multiprocessor server architecture to a network of geographically distributed heterogeneous desktop, server and storage resources. A state-of-the-art computing and network grid will provide for multi-service convergence (data-voice-video) services. It is a distributed server network connected to every computer.

- **Software and Personalization Technologies:** Development of software tools and technologies for various functionalities of people and institutions engaged in various pursuits in various walks of life and work is the basic necessity of the Information and Knowledge Based society. The IT enables customization and hence development of personalization technologies is being given high priority in the IT development for success in any sector of activity.

All these advances in communication technologies offer fantastic possibilities of developing new processes and new ways of communications in education. The issues of inclusion of deprived learners due to rural inhabitation, poverty or illiteracy and access to IT (digital divide) are tasks, which need special attention- political as well as socio-economic. It

is however conceivable that within this decade, the problems of network access and inclusion of the disadvantaged in India could be solved.

The **broadband Internet** with **grid network** enables us to create educational programs that could:
- Make teaching and learning possible from Anywhere, Anytime,
- Link education - learning with life and work related processes and places,
- Create National /Regional Grid network of educational content and services, which can flow in the network and support the processes of educating- learning, teaching and evaluating- anywhere anytime; and
- Enable educators and educational institutions to create new paradigms of education dependent on various developmental processes and models

Perspective of Networked and Knowledge Based Society:

Development and progress of IT and its wider applications in all walks of life and work will be creating a society, in which every individual, group, community will be linked through Internet with others. People will be using small hand-held and table-top devices to communicate, access and send information, participate from a distance in talks, seminars, workshops and small/big group activities from a distance. In such a networked society, all communications and information could be stored some where, which could be accessed, sorted out, analyzed and useful information could be found out. Useful information or knowledge could be utilized for value addition or wealth generation. The persons who could find useful knowledge by using various IT tools and techniques, and could have related functionality to convert that knowledge into wealth will be successful in 21st Century. Education has therefore, to cultivate skills and competencies in using IT tools and techniques in the networked Globalised context with a view to creating and nurturing innovativeness and entrepreneurship to convert knowledge into wealth. Education has to help in identifying and creating work and employment opportunities that would lead to new types of self-employment opportunities such as, knowledge workers, information service providers, tools/technique developers, process/system software designers, developers and implementers etc.

6. IT Enabled Transformation of Education:

Main Features of Learning and Education are:
- Learning is a personalized process and includes internalization of knowledge by a learner.
- Teaching is a dialogue between a learner and teacher & is best when it is with one-to-one.
- Learning can take place anywhere anytime; one should know how to learn. Learning to learn is a basis of education.
- Basic learning and teaching process should be independent of modes of education - formal, non-formal & informal.

Information Communication Technology could assist in ensuring personalization of education and increasing intimacy in dialogue between teacher/tutor/expert/guide and learner.

E-Education is used to denote both the shifts from the traditional and open and distance education to e-content based educational system in a convergent mode – **E-Education in Convergent Mode or Convergent E-Education,** which will be relevant during the transitional period. It is assumed that this transition will be complete when broadband Internet connectivity and IT appliances are available to Anyone, Anywhere, Anytime.

There are mainly **two mega paradigm shifts** in education. The first is from traditional university to open and distance education (ODE), and the second is from ODE to E-Education. Both the traditional and ODE universities are essentially based on industrial models of education – offering **mass education**. The new paradigm of e-education is however of a non-industrial form and should offer **personalized education on a mass scale (Mass Personalization)**.

The first transformation – the first paradigm shift - is from institution centric localized education to education at the door-step of a learner offering a lot of flexibility in place and pace of learning and choice of courses. The open universities developed well-structured pedagogically designed instructional materials, packaged them in the conventional form of courses and programs, and delivered them through study centers/workshops with local instructor support; and gave certification after course-end examinations. Indian open universities used Study Center approach to extend educational services and support to distant learners. .

A Study Center of a open university is a device of giving learning /academic support and learning opportunities to distant learners (non full-time students) by replicating or by renting some of the campus facilities-academic as well as physical – of a conventional college or university. The Distance Education Institution of a traditional university used affiliated or other university colleges for offering lecturing and lab support to their distant students, and used the same type of instructional materials such as study texts and reference books and conducted similar examinations, which were common to both the regular and distant students. Hardly any different choice of courses or their combination was offered to distant learners than that given to the full-time regular students, except the freedom not to attend the lectures. Major contributions of open universities to education system are its pedagogically well designed instructional materials with content written by renowned teachers and experts. Raising the quality of instructional materials, and making best of teachers and teaching available at the doorstep of a learner is the greatest contribution of open universities, and has helped to increase coverage of students. Increased enrollment of distant learners at tertiary level and its low unit cost as led the nation to adopt policies to increase coverage rate y employing open and distance education.

However packaging and delivery of the courses is the same as that of the traditional universities, and hence processess and model of education has on the whole remained the same.

ICT is offering an opportunity of redesigning and developing new models of education. While considering this shift it is essential to concentrate on the **five main processes** that forms main processes of any educational institution.

- **Educating:** Teaching, Learning, Evaluation**,**
- **Creating Knowledge Resources,**

- **Developing Infrastructure Facilities**,
- **Creating Educational Environment and**
- **Managing Education**

While using IT, the processes have to be designed and developed in such a way that education can successfully address the problems of quality, quantity, equity, access and even success of large umber of students that Indian educational system is facing.

7. e-Education:

e-Education is essentially the same education with the same basic processes of educating, creating, developing and managing which are carried out by individuals, institutions and communities for achieving the goals of education. In the information age it is supported by IT enabled and IT driven processes made accessible through IT tools and techniques to make education globalised, localized and personalized. The outcome of this application of technologies would be in a form of organizations and institutions, which may be quite distinct and different from the existing institutions.

Networked society will require educational system that will be able to offer educational opportunities to all anywhere, anytime. The IT developments and emerging technologies are ensuring such communication. The development processes and activities now supported by IT are driven by market forces and wealth they create. India can become Knowledge Super Power, if it succeeds in offering learning opportunities and necessary education and support of tools and technologies to all people of India. E-Education is expected to fulfill that role of education for all and simultaneously enable people to address many of the issues and concerns faced by the nation..

Any **networked society** will need.

- **Network** with broadband connectivity linking hardware and appliances at various places for giving access to anyone, anytime, anywhere.
- **Software tools**, techniques and applications for enabling people and groups to communicate with others quite intimately.
- **Content** needed and shared by groups of people, organizations/institutions, which enables providers to offer services to users and customers.

One of the common example of network is that of railway and air travel network, in which content is the information of places, schedules, services etc. that enable one to make reservation from home for travel from any one place to another. With greater ICT use, now trends are to offer services that would fulfill customer requirements (personalization of services) and ensure customer satisfaction.

Education can now use the networking technologies for developing educational system (e- Education).

e-Education System requires the following **framework and infrastructure**:

1. **Network** with latest hardware and technologies along **with broadband connectivity and grid architecture** giving network access to anyone, anywhere, anytime.
2. **Software tools and techniques** that enable creation of databases and information flows, offer facilities to learners, teachers and institutions to receive / give personalized education on a mass scale.
3. **Content in e-formats** on a knowledge grid that enables teachers and students get personalized curriculum of high quality, relevance and utility.
4. **Educational delivery system** that ensures quality and developmental relevance of educational offerings (Developmental Education) for individual, institutions and community.
5. **Quality Assurance and Certification Mechanism** to maintain competitively high and acceptable standards at national and international levels.

The Framework given above can serve as a national and regional infrastructure to support educational processes of any provider institution, individual and organization in India. The five basic educational processes identified above could find their delivery channels through the e-Education Framework for any educational offerings and their management.

8. Content development and delivery:

By using all the media of print, audio, video, animation and simulation, content in e-education can be developed in the formats of :

- E-lectures
- Multi-media materials in distance education formats.
- Interactivity based content out of
  - Questions & Answers, Seminars, workshops
  - Assignments & projects done by students

Content output could be stored on servers at various places in the network.

In formal & non-formal systems, content packaging is done through a course of a program, and delivered to a class of students or a group in a college / university. It uses the principle **'one size fits all'** and does not take into account personal background, needs & requirements, prior learning & experiences as well as outputs and outcomes essential for a learner to be successful in a life and work situations. It is, therefore, essential to store content in such units that it can allow packaging of various units to suit the learner needs. Such methods and technologies are getting developed in e-Education.

- Content Storage- Meta-database:

In e-education, content has to be developed and stored in such a way that a teacher or learner should be able to combine various small units or granules of contents (reusable content) with definite learning objectives and outcomes. A granule could be conceived as the smallest learning or teaching unit with single definite objective and output /outcome. A granule may contain a large number of content items, often called objects, in the form of texts, pictures, graphs, audio, video, animations and simulation; each one requiring study

time of one to fifteen minutes. Each object could be tagged to reuse it in different contexts and at different levels of learning.

A database could be created in which a large number of learning objects and granules are created and deposited by all the teachers and experts (**universal content contributions**) with tags attached to each object and granule. The tags will enable a search engine to select appropriate objects and granules to form a syllabus/curriculum needed by a student. This leads to a personalized syllabus for a student.

Database of such a transformed content will be extremely big- **meta-databases**- and could be made available and accessible to all learners and teachers. International norms are getting evolved in developing databases (SCORM compliance) so that databases could have wider accessibility, transferability and usability.

- Content Delivery:

Technologies are essential for offering personalized curriculum to each individual. They are being developed for various customizations. Such Personalization Technologies allow teachers and providers of educations to dynamically recognize the role and profile of each learner and respond according to the needs and requirements of a student. A good teacher will formulate a curriculum for the student (**personalized curriculum**) by prescribing learning (**Prescriptive Learning**) by identifying learning and knowledge gaps; and setting a correct learning path for the student. This will enable student to build on whatever is known and achieved earlier and reach the objects / goals set for him/her in the curriculum. Such a learner-centricity achieved through educational technologies will ensure success for every student. The e-education framework and infrastructure through personalization technologies will ensure 'access and success' in the field of education.

- IT Enabled and IT Driven Education:

Many formal and open universities are at present using IT for fast communication between institution/teachers and students, and for administration of student and teacher activities. These are the 'first generation' technologies and help provider institution to achieve better efficiency, reduce costs and extend outreach and coverage to larger number of students outside the usual jurisdiction of an institution. This may be called IT Enabled education (enabled by 1st Generation Technologies), since it basically does not change the model of education, and retains the earlier methods and processes of teaching-learning and evaluation.

Development of Meta-Database with reusable content granules and packaging of the content to suit individual needs is creating personalization of education enabled only by the use of technologies. The learning technologies developed and used for learner-centricity and personalized education are termed as 'second generation' technologies /4/and offer IT Driven Education. They are changing the methods of content generation, content storage, content packaging and content delivery and hence offer a new paradigm of education.

With appropriate models of development and delivery it is possible to employ IT driven education to achieve:

- Access and success to all
- Substantial cost reduction.
- Quality education for all
- Just-in-time education.
- Learner autonomy

The learner autonomy would employ learner freedom in deciding the goals, content and outcomes of education and the path of development to achieve the goals.

Many of the problems and concerns could be addressed successfully by creating National and Regional e-Education Network with a framework and infrastructure. By promoting teachers, experts, educational managements, industries and social and community leaders to use the Network for evolving various developmental models that could addresses the problems of disparities, underdevelopment and disadvantages.

9. Existing Efforts in Networking and Infrastructure Developments:

Many national bodies and organizations have taken initiative to create infrastructure and facilities to support education in various ways. Some of the initiatives are listed below.

- UGC has taken initiative to create network, which could connect all universities and most of colleges in India by creating network and by offering resources for developing IT infrastructure in universities and colleges. UGC has also undertaken a program of e-content creation and development of guidelines and program, which will enable students to take courses or degree/diploma from more than one university. Universities, jointly in partnership, can offer courses and certification.

- Indian Space Research Organization (ISRO) is developing an EduSat with more than 50 channels with ku-band transmission. EduSat will have footprint on all over India and will be launched around December 2004 or beginning of 2005. ISRO has already started pilot projects to create distributed classroom, e-content and educational applications in three states: MP, Maharashtra and Karnataka. The pilot program in YCMOU at Nashik aims at creating network of distributed classrooms with teaching end at Nashik and receiving rooms at about 100 places in Maharashtra.

- IGNOU is having a national TV channel for education, and is going to have about 5 more channels to support higher and school education as well as agriculture education.

- Maharashtra Knowledge Corporation (MKCL www.mkcl.org, www.parivartan.net) in Maharashtra has established a network of about 3500 network access centers, which covers 330 blocks out of the total of 360 in the state, Network uses e-governance, works entirely on paperless environment and has enrolled half million students within 15 months period. MKCL is also developing software for digital college and digital university, learning /content / delivery management systems and is engaged in developing e-assessment and accreditation system in partnership with NAAC.

All these efforts could be integrated and a national network could be built by providing direction of development and support for infrastructure.

10. New Age New Education:

Development and extensive use of network would enable to incorporate enabling functionality and related values in the programs of the learning social groups and organizations using the Framework. Networking enables convergences of services offered by various providers. One obvious impact will be the convergence of modes of education. Formal and nonformal institutions – traditional universities and open universities- will be using distributed classrooms and distance education technologies for reaching out to a distant learners.

Networking and extensive use of IT enables:

- Integration & Convergence
- Globalization
- Decentralization and localization.
- Personalization
- Transparency and openness.
- Omnipresence of information and knowledge.

If these principles could be incorporated in the design and development of IT enabled and IT driven process of social mobilization and organizations, the nature and character of the emerging society could be different.

Such a system can promote culture of participatory democratic decentralization, accountability and local relevance and help in efforts for total development of a locality and local community.

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Paradigm Shift in Education is essentially:

Learning – Teaching - Evaluation

From Teaching	To	Distributed and group Teaching
From Classroom	To	Distributed Classroom
From Learning from a teacher	To	Learning from Resources, group of teachers /experts and through Interactivities.
From Content Learning	To	Objectives and Outcome Oriented Learning
From Course Content	To	Granulated Object Based Content forming - Meta Database
From Examinations	To	Continuous Formative and Summative Evaluation.

Educational Management

From Education	To	Development Education.
From Whole Time education	To	Just-In-Time Education
From Campus education	To	Distributed Education
From Campus Environment	To	Virtual Educational Environment

From a Single Institution	To	Consortia of Institutions / Distributed Institutions / Virtual Organizations
From Mass education	To	Personalized Mass Education

Distinction between formal, non-formal and informal education will disappear once transition to IT Driven education is complete and the process may take a decade or two.
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Classroom.

11. New Age New Organizations- Virtual Universities:

During the last few years, many universities and colleges are getting ready to face the impact of globalization and emerging competition in marketing education by forming consortia of colleges and universities. The major approach employed is to partner with other colleges and universities and to offer the best available educational expertise, courses and services to students both on-campus and off-campus. This is also aimed at survival of small institutions against the competition from the big ones; and is using first generation technologies. Many colleges and universities have formed partnerships- virtual universities- by using essentially 'first generation technologies' for becoming competitive and earning resources to support their institutional development.

- **The Concept of a Virtual University /5,6/:**

   The concept of a virtual university is of a <u>consortium of institutions</u>, enabled by appropriate ICT applications, working together in practical ways to plan programmes, develop the required content and ensure the delivery of those programmes and support services to learners.

   Three features of the university need to be underscored:

   - The virtual university is not being proposed as a university in the conventional single institutional sense. It will, in fact, be a "virtual organization."
   - The virtual university will carry out its functions by optimizing ICT applications, particularly those that enable the creation and deployment of content databases based on learning objects and granules..
   - The virtual university will be as much concerned with "adding value" to conventional on-campus instruction as it is with serving learners at a distance.

It is therefore a bold and challenging vision of a virtual university that has the promise of enabling the consortium of member institutions to become leaders in development of education models that can be tailored to the realities of the learners they serve

The virtual university is a concept at the initial stage of development and operations, and offers an opportunity to radically transform the existing models and practices education. Education can now be made central to all the human developmental activities by developing radically different paradigms of education.

New organizations appropriate for 21ˢᵗ century are getting developed; and Virtual University for Semi-Arid Tropics (VUSAT) by ICRISAT, Hyderabad and MS Swaminathan Foundation, Chennai, Virtual University for Maharashtra Agrarian Prosperity (VUMAP) by Agriculture Department, Government of Maharashtra, Virtual University for Trade in Kerala and MS Swaminathan Foundation's Virtual University for Food Security are some initiative at their initial stages of development. Virtual universities use broadband connectivity and second generation technologies,

12. Evolving National e-Educational Network:

By employing IT expertise and experiences of IT industry and IT educational institutions, it is possible to design the **National e-Educational Network** prescribed earlier that would support all universities, colleges, teachers and learners in their pursuit of knowledge and development.

Development of such a network would create infrastructure and framework, which could help weaker and disadvantaged colleges & universities to join regional/national consortia and offer best educational services to their local students by offering personalized services.

The major components of the National Network will be: -
1. **National educational network connecting** all institutions and their classrooms through broadband connectivity.
2. **Indian Knowledge Grid** to enable content to flow to anyone anywhere and anytime.
3. **Granulated Object Based Content** in a Meta-database
4. **Promotion of national and region level consortia of colleges and universities**
5. **National quality assurance and accreditation mechanism.**
6. **National and regional credit banking and certification** mechanism for students to take education from different universities/colleges,
7. **Movement for giving services to weaker and disadvantaged for ensuring quality, justice and quality for all.**.
8. **Promotion of public-private partnership** for creating self-employment for graduates in various fields of human activities.

Such a National e-Education Network could help in addressing the problems and concerns listed at the beginning.

13. Concluding Remarks:

Since independence India is struggling to evolve its Indian National System of Education, which is capable of addressing the issues of quantity, quality and access & success on the basis of Indian culture, heritage and value system. The National /Regional e-Education Networks will enable the Indian educationists to evolve new models of education that can shape emerging new society; and new strategies in 'marketing' of education with developmental models appropriate to the developing society.

National and social objective of the e-education in a developing society has to fulfill aspirations of the people and nation and to address the age-old problems of poverty, ignorance, underdevelopment and disadvantages. If the education system is given right framework and national infrastructure, it can have a great opportunity to come up to the center stage in every activity of human endeavor and give academic leadership in a knowledge-based society. The crucial test lies in addressing age-old problems successfully by mobilizing common people and creating learning communities to achieve *Antyodaya* (upliftment of the lowest) with equity and justice. This is an opportunity to build a New Indian Education System and new society obtained only once in a millennium.

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