Advances in Technical Education: Indian Scenario

Pradeep shukla
Head of Department, MBA, IET, Alwar (Rajasthan)
-Pradeepks35@rediffmail.com
Mob: 8233849905
Bhuwan Gupta
Head of Department, BBA, IET, Alwar (Rajasthan)
bhuwanalw@rediffmail.com-Mob:-9950842922

Abstract- *Knowledge has become a critical resource in the present globalize economy. There are several new modes and new players in the creation and dissemination of knowledge. Educational institutions have a significant role to play in this context, but in a vastly different manner. This implies that there will not only be a fundamental shift in the way higher education is organized, but also a change in the environmental relationships with decreasing reliance on the Government and increasing interactions with the community of users of the services of the institute. Partnership between the industry and institute is one of the important subjects discussed often in the field of higher education and research. This interaction has been in place in one form or the other for more than a century be it industrial extension service, cooperative education, equipment donation, consultancy, exchange of personnel, research programmes, etc. Research parks, innovation centers, interactive centers, faculty development bodies were established mainly in the west. However, the importance of such interaction was realized only in the later half of 20th Century. These interactions have benefited both the University and the society, sometimes leading to enterprise set up even by the academics. This brings in the role of industries, who are one of the major users of the products from universities and institutes of higher learning.*

Keywords: Technical Education, Programmes, Management, Open Distance Learning.

1. Introduction

For an all round development, both material and spiritual education is essential for all members of society. Education has an acculturating role. It refines sensitivities and perceptions that contribute to national cohesion, a scientific temper and independence of mind and spirit, thus furthering the goals of socialism, secularism and democracy enshrined in the constitution. Education develops manpower for different levels of the economy. It is the substrate on which research and development flourish and thus is an ultimate guarantee of national self-reliance. Education is a unique investment in the present and future and this is the cardinal principle of the National Policy on Education. Based on NPE 1986 with modifications undertaken in 1992, the adoption of the 1986 policy there has been considerable expansion in educational facilities all over the country. More than 90 per cent of the country's rural inhabitants have schooling facilities within a radius of 1 km. There has been augmentation of facilities at all levels. The 10 + 2 + 3 system has been accepted as a common structure of education throughout the country and has been introduced in most states. A common scheme of studies for boys and girls, incorporation of science and mathematics as compulsory subjects

and emphasis on work experience are some of the basic features of the common structure. The country considers the human being as a positive asset and national resource which needs to be cherished, nurtured and developed with tenderness and care, coupled with dynamism. The growth of each individual presents a different range of problems and requirements and these needs to be addressed by the educational system. Education must respond to the national goals of secularism, socialism, democracy and professional ethics, which are coming under strain. The rural areas need attention and rural-urban disparities, in terms of facilities and employment opportunities, need to be reduced. Control of population growth could be achieved through the spread of literacy and education among women. The coming generations should have the ability to internalize new ideas constantly and creatively. They have to be imbued with a strong commitment to human values and to social justice through better education.

2.General Information

2.1 Education:

India has a long tradition of education, both formally organized universities Nalanda and Takshashila, and small and less formal schools like the early hermitages or 'Gurukul' where great teachers took care of their students. The education in these schools covered wide ranging aspects like religion, martial arts, state-craft, logic, philosophy, vocational education etc. A conscious effort in educating the large groups of people through Prakrit, a spoken language of the people, instead of Sanskrit, was made during the times of Buddha. This education was free from prejudices regarding, caste, creed, gender, etc. By the eighteenth century, India had a well-developed indigenous system of education, where-in the institutions voluntarily organized themselves to meet the needs of society organized on the basis of castes. There were religious and general schools. The modern education system was started around 1854 with the implementation of Macaulay's recommendations. The British colonial interests governed the objectives of the education system, and yet it opened up education to common masses.

Gender Analysis of student population in schools is as follows:

Sl.no	Standard	Boys (%)	Girls (%)
1	Primary	58.0	41.4
2	Middle	62.6	37.4
3	High School	66.7	33.3

2.2 Structure of Education System

The structure of the educational system is shown in Charts 1 to 3. Education is a concurrent subject which means thereby that it is the responsibility of both State government and Central Government. Primarily the Ministry of Human Resource Development and Ministries of Education at state levels are responsible for education at primary and secondary levels as well as post-secondary education up to university level in Sciences, Arts, Engineering, Pharmacy, and Management. The Ministry of Health, the Ministry of Agriculture, and the Ministry of Labour are responsible for Medical Education, Agriculture and Fisheries Education, and Vocational training respectively.
1 Pre-School Education
2 Primary Education
3 Secondary Education
4 Technician and Vocational Education
5 University Education

Advances in Technical Education: Indian Scenario

Advances in Technical Education: Indian Scenario
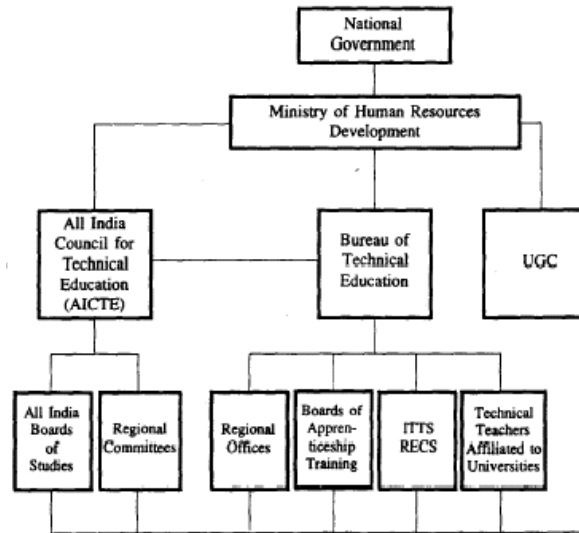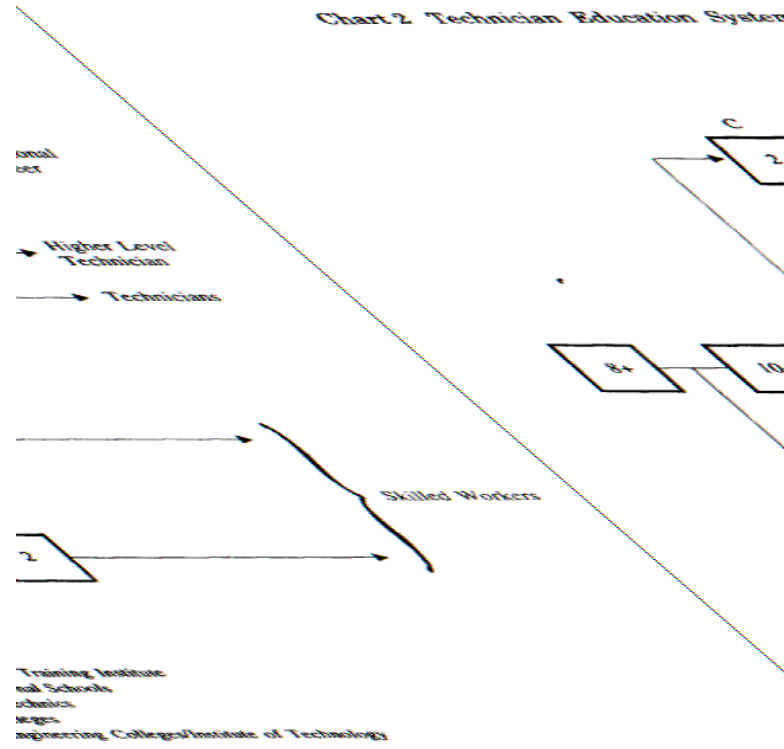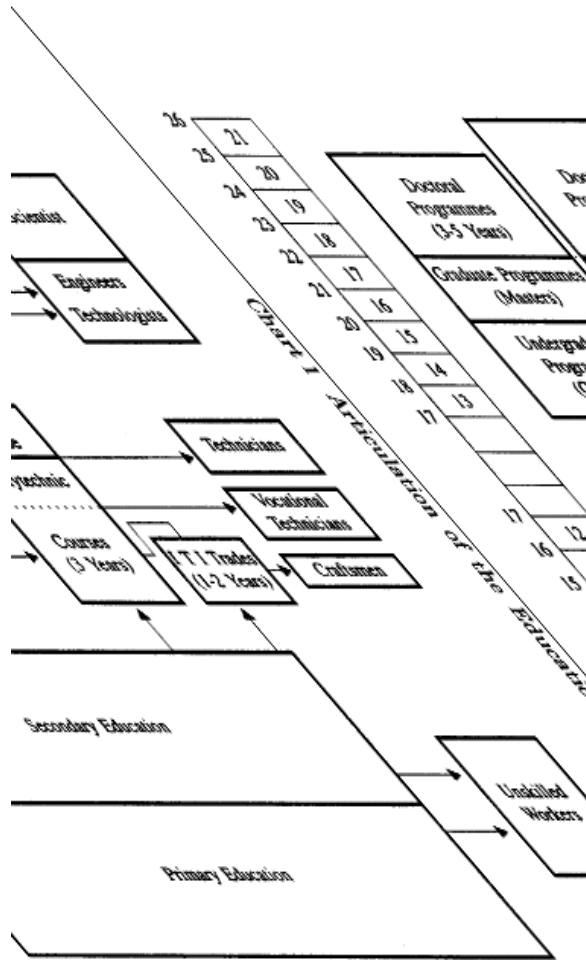
3. National System of Education

The system implies that education of comparable quality be made accessible to all students, irrespective of caste, creed, location and sex. It envisages a common 10 + 2 + 3 structure with a national curricular framework. The framework contains a common core along with other flexible components. The common core will include the history of India's freedom movement, as well as the constitutional obligations and other content essential to nurturing national identity and values. To nurture peace and understanding in the world, education must strengthen world perspective, international co-operation and peaceful co-existence. The core curriculum also must create an awareness of equality and conditions required for its success. In higher education and technical education, the aim is to provide inter-regional mobility and to underscore the universal nature of universities and other institutes of higher education. In the areas of Science and Technology and in the field of Research and Development, measures to network the institutions and to involve them in projects of importance will also be taken. The nation will provide the resource support for implementing the programmes of educational transformation aiming to reduce disparities, universalize elementary education, adult literacy, scientific and technological research, etc. Opportunities for life-long education will also be provided to all sections of people through open and distance learning.

Education for Equality

a) *Education for women*
b) *Education of scheduled castes (SC)*
c) *Education of scheduled tribes*
d) *Minorities*
e) *Handicapped*
f) *Adult education*

4. Higher Education

Higher education provides an opportunity to reflect on the critical social, economic, cultural, moral and spiritual issues facing humanity. It contributes to national development through dissemination of specialized knowledge and skills. In the context of the unprecedented explosion of knowledge, higher education has to become dynamic as never before, constantly entering uncharted areas. Hence, the main emphasis will be on the consolidation of, and expansion of facilities in, the existing institutions. Creation of autonomous colleges and departments within universities on a selective basis will be encouraged. Provision will be made for minimum facilities and admissions will be regulated according to capacity. Extensive use of educational technology and electronic media for improvement of teaching is planned. Research in the universities will be given enhanced support and steps will be taken to ensure its quality. Suitable mechanisms will be set up by the UGC for coordinating research in the universities, particularly in the thrust areas of science and technology, with research undertaken by other agencies. An effort will be made to encourage the establishment of national research facilities within the university system, with proper forms of autonomous management.

5. Open University and Distance Learning

The open learning system has been initiated in order to augment opportunities for higher education, as an instrument of democratizing education and to make it a lifelong process. The flexibility and innovativeness of the open learning system are particularly suited to the diverse requirements of the citizens, including those who have joined the vocational stream. The Indira Gandhi National Open University, established in 1985 to help achieve these objectives, will be strengthened. Support will also be provided to establish open universities in the States. The National Open School will be strengthened and open learning facilities will be extended in a phased manner at the secondary level in all parts of the country.

Indeed, isolation is history where as adaption is a reality. In the modern age through technological revolution the world has become a

global society. In higher education sector rapid advancements are being introduced resulting to substantial changes in ODL system. In this process of evolution advancements of varied nature have been taking place which have mobilized us to rethink about the possession of stock of knowledge we have and how it could be updated with assistance of digital - education technology which is applicable to conventional as well as distance learning irrespective of difference in nature of the systems. We are concerned with the stream of ODL; the means is technology and growth in stock of knowledge is the end. It is admitted that today, higher education is no more a privilege left for a few who are richly blessed with resources. The ODL is a strong device for wide spread of mass access to education that forms a prodigious social phenomenon towards globalized education. With introduction of ODL higher education has approached at the doorstep of distance learners through wide network of ICT. While adopting the strategy for DE system Professor Sir John Daniel has suggested the following three key issues : firstly, identity the real problem, secondly, do not promise more than distance education can deliver, and finally, take a broad view of distance learning. It is admitted that support services form the core component of ODL. They concentrate on academic and personal problems of learners with the objective as how to solve their difficulties and to provide them regularly the feedback of their performance. On merit, the distance education system has gained more popularity so as to cater to the needs of ever increasing number of learners. In fact, correspondence institutions hardly provide any properly organized media support to their students. It is also true that as a consequence of revolution in education technology, a change is imperative in mental attitude towards communication as education is not limited to bookish knowledge rather the dimension of education has multiplier effect.As a distinct feature of open learning there is no regular and direct contact with learners as the clientele is at distance. How to provide them

facilities for open learning, needs a strong support system. Although the support services are numerous but the important ones may be listed as follows :
(i) Counselling and evaluation of learners through contact classes.
(ii) Distribution of course materials.
(iii) Availability of other media (except distribution of print material) to distance learners, and
(iv) Problems faced by learners and their solution etc.

Hence, for making the higher education viable and useful to learners structural and organizational changes are to be initiated in the advent of digital education technology, poses a grand challenge to distance education. In a changing scenario the stereotyped education technology has become obsolete in nature, a relic of the past now being substituted by digital education technology. It calls for a complete switch over from conventional higher education to digital one, which requires mass structural change over, in a globalized society.

5.1 New Paradigms the ODL Needs
The old practices prevalent in distance education may form a solid background rather they are not be regarded as instrumental for the excellence in distance learning in reference to fast changing education technology. Hence, modern higher education calls for a change of attitudes towards communication. In place of organizing traditional contact classes, they are to be replaced by frequent educational camps based on digital communication device. Profound computer connectivity has to be encouraged. Teachers and learners should establish a congenial network for digital habit. A new mind- set with a creative environment is essentially imperative. To make use of the modern education technology it is of paramount importance that modern work-stations cum cyber parlor be established leading tremendously to the use of computers.

Advances in Technical Education: Indian Scenario

Besides, more and more close access to IT be sought as it has taken a big leap. Teachers and students should work closely to form a network for enhancement of digital habit enabling them towards more and more use of digital messages. We do not have a magic band rather this change over would not take place spontaneously; overnight change over night is not possible, hence more efforts have to be mobilized so as to make it a reality. A creative environment for open meeting in open world would be conducive for higher ODL system and to give a concrete shape it requires huge investment towards establishment of modern work stations. The higher education contains a number of inputs. Introduction of laptop has brought with it a portable technology in education and this mobility factor has a tremendous bearing on educational practices. Similarly, these days electronic mail systems have gained popularity; thus internet device has revolutionized in the field of communication. It has been observed that printing technology and micro-electric revolution are offering new electronic media of storing and retaining information, which are more economical and accessible to larger section of society. This has registered a tremendous break through in communication and information technology. Further, CD-ROM has proved effective to the new pillars of intelligence and for multimedia. To illustrate, a single CD-ROM has a capacity to contain an entire course beginning from primary to university level; thus it has tremendous preservation capacity. In fact, compartmental education practice approach cannot be considered useful today. To this effect, the pedagogic experts talk about three specific degree of generations or evolution of educational technology. The first generation involved printed material and the despatch of course material by postal services. The second generation comprised of sending of videos, ratio programmes, open TV and Cable TV, and finally the third or the current generation involves video conferences plus networks i.e. intra-net/internet. Now in practice the synthesis of the three could prove a better presentation in ODL and the most common and practical form viewed thus, a mix of all the three generations would be towards a change in the nature and coverage of distance education, consequently, leading to form a data base to become the nodal source of intelligence.

5.2 Evolving A New Understanding Among Teachers And Learners:
In the new dawn of digital based education, it is highly desirable that teachers should fulfill the following basic qualities for furtherance of Q-distance education/ learning in the higher education sector.
(i) Teachers will have to be fully familiar with all distance education technology along with their socio-economic feasibility.
(ii) They should have proper training for using new technology with specific reference to electronic mail and video conferencing.
(iii) They should get their homes and work places well equipped with new technology.
(iv) Teacher's homes to be supplied with standard communication sets, besides equipments must be checked up, repaired and updated periodically.
(v) They should form new digital habits, courses are to be designed on web-sites. On-line info is still to be popularised.
(vi) As far as possible, teachers should decline/ eliminate the use of printed information depending upon the circumstances and should encourage replacement of paper by bits.
(vii) They must become accustomed in practice by establishing a daily routine for electronic correspondence with their colleagues and students. It requires a well maintained a catalogue of e-mail addresses by them, and
(viii) They should develop net criteria for converting remote learning into a creative environment.
It is also essential that distance-learners should be provided with regular tutorial care. Since digital device helps in maintaining a permanent connection between teachers and taught, the

Advances in Technical Education: Indian Scenario

learners can be evaluated and assessed more frequently and that too on a more regular basis.

5.3 The Indian Scenario:

India primarily an agricultural country which depends on vagaries of monsoon. During the VIII and IX Five Year Plan period on an average the GDP was at 6.5%. Average Annual rate of growth of value addition during 1990-99 had been 3.8 (agriculture), 6.7 (Industry) and 7.7 (Service sector). A negative growth being -0.7 was registered in agriculture. On the other, Human Development Index (HDI) in 1998 ranked as 128 in the world. According to the Population Census 2001 the literacy is 65 percent. More than half of children 1-5 years old in rural areas are under nourished and infant mortality rate is about 72 per 1000. On Current Daily Status (CDS) the incidence of unemployment is above 7 percent. Population living below poverty line (BPL) during 1999-00 was 26.1 percent and in terms of standard of living indicator it recorded just 2496 calories in 1997. As many as 60 per cent rural households and about 20 percent urban households do not have a power connection. Only 60 percent urban households have taps within their homes and far fewer have latrines inside the house. Similarly, with regard to environment indicator, in 1996 carbon dioxide emissions per capita was 1.1 (metric tones) corresponding to 19.7 MT in US. In fact, deterioration in environment especially in urban areas increases in slum population. Besides, pollution in air, river and water has vastly affected the quality of life of the urban poor. Land and forest degradation in the rural areas and over exploration of ground water had been seriously threatening substantially of food production. Besides, in many states of India, we have engineers but no fund for construction or maintenance, doctors but no medicines, teachers but no school building. Very little capital expenditure and asset creation, little funds for maintenance or repairs of assets. India a developing country lacks adequate infra-structure due to paucity of resources which poses a limit to adoption of digital technology in higher education sector. As a result, distance learners in the country are still close to chalk and black-board devices. For sending messages to their respective homes, postal services are extensively used. Majority of students lack connectivity to computers, and ownership of personal computer is still far away, may be a day dream and utopain idea due to financial crunch, lack of technical knowledge and availability of other basic facilities. In ODL manual practices are still prominent, print material is widely used and quite popular among distance learners. For evaluation annual examination/ periodic tests are conducted. In general, printed question papers are distributed to them and they are required to answer those questions on answer books supplied to them by open institutions - on line computer education is not in vogue. However, in certain universities such as IGNOU, Delhi, VM Open University, Kota, APOU, Hyderabad etc. have been gradually switching over to modern education technology, but the change is not rapid, quite slow which does not cope with modern advancement in education technologies. Through widening infra-structural facilities the extensive use of digital education platforms could be possible.

5.4 Separating Degrees from Jobs

A beginning will be made in de-linking degrees from jobs in selected areas. This will be applied services for which a university degree need not be a necessary qualification. Its implementation will lead to a re-fashioning of job-specific courses and afford greater justice to those candidates who, despite being equipped for a given job, are unable to get it because of an unnecessary preference for graduate candidates. Appropriate machinery will be established to determine the suitability of candidates for specific jobs based on comparable competencies across the nation.

6. Technical and Management Education

Although the two streams of technical and management education are functioning separately, it is essential to look at them

together, in view of their close relationship and complementary concerns. The reorganization of Technical and Management Education should take into account the anticipated scenario by the turn of the century, with specific reference to the likely changes in the economy, social environment, production and management processes, the rapid expansion of knowledge and the great advances in science and technology. The infrastructure and services sectors, as well as the disorganized rural sector also need a greater induction of improved technologies and a supply of technical and managerial manpower. In order to improve the situation regarding manpower information, the recently set up Technical Manpower Information Systems will be further developed and strengthened. Continuing education, covering established as well as emerging technologies, will be promoted. As computers have become important and ubiquitous tools, a minimal exposure to computers and a training in their use will form part of professional education. Programmes of computer literacy will be organized on a wide scale from the school stage. In view of the present rigid entry requirements to formal courses restricting the access of a large segment of people to technical and managerial education, programmes through a distance-learning process, including use of the mass media, will be offered. Technical and management education programmes, including education in polytechnics, will also be on a flexible modular pattern based on credits, with provision for multi-point entry. A strong guidance and counseling service will be provided.

In order to increase the relevance of management education, particularly in the non-corporate and under-managed sectors, the management education system will study and document the Indian experience and create a body of knowledge and specific educational programmes suited to these sectors. Appropriate formal and non-formal programmes of technical education will be devised for the benefit of women, the economically and socially weaker sections, and the physically handicapped. The emphasis of vocational education and its expansion will need a large number of teachers and professionals in vocational education, educational technology, curriculum development, etc. programmes will be started to meet this demand. To encourage students to consider "self-employment" as a career option, training in entrepreneurship will be provided through modular or optional courses, in degree or diploma programmes. In order to meet the continuing needs of updating curricula, renewal should systematically phase out obsolescence and introduce new technologies or disciplines.

6.1 Innovation, Research and Development

All higher technical institutions will undertake research as a means of renovation and renewal of educational processes. It will primarily aim at producing quality manpower capable of taking up R & D functions. Research for development will focus on improving present technologies, developing new indigenous ones and enhancing production and productivity. A suitable system for watching and forecasting technology will be set up. The scope for co-operation, collaboration and networking relationships between institutions at various levels and with the user systems will be utilized. Proper maintenance and an attitude of innovation and improvement will be promoted systematically.

6.2 Promoting Efficiency and Effectiveness at all Levels

As technical and management education is expensive, the following major steps will be taken for cost-effectiveness and to promote excellence:

1. High priority will be given to modernization to enhance functional efficiency and to the removal of obsolescence.
2. Institutions will be encouraged to generate resources using their capacities to provide services to the community and industry. They will be equipped with up-to-date learning resources, library and computer facilities.

Advances in Technical Education: Indian Scenario

3. Adequate hostel accommodation will be provided, especially for girls. Facilities for sports, creative work and cultural activities will be expanded.

4. More effective procedures will be adopted in the recruitment of staff. Career opportunities, service conditions, consultancy norms and other pre-requisites will be improved.

5. Teachers will have multiple roles to perform: teaching, research, development of learning resource material, extension and managing the institution. Initial and in-service training will be made mandatory for faculty members and adequate training reserves will be provided.

6. Staff Development Programmes will be integrated at the State and coordinated at Regional and National levels.

7. The curricula of technical and management programmes will be targeted on current as well as projected needs of industry or user systems. Active interaction between technical or management institutions and industry will be promoted in programme planning and implementation, exchange of personnel, training facilities and resources, research and consultancy and other areas of mutual interest.

8. Excellence in performance of institutions and individuals will be recognized and rewarded. The emergence of substandard and mediocre institutions will be checked. A climate conducive to excellence and innovation will be promoted with full involvement of the faculty.

9. Selected institutions will be awarded academic, administrative and financial autonomy of varying degrees, building in safeguards with respect to accountability.

10. Networking systems will have to be established between technical education and industry, R & D organizations, programmes of rural and community development, and with other sectors of education with complementary characteristics.

7. CHALLENGES AND FUTURE PERSPECTIVES

7.1 Economic Scenario

7.1.1 *Agricultural Sector*
The Indian economy is predominantly agriculture based and contributes 30 per cent of the GDP and 10 per cent of the exports. Though the agricultural production has increased three and half times over the past four decades, it has to meet an additional 70 million tons due to population increases by 2000 AD with a projected loss of 180 million hectares of agricultural land. Thus, besides the efforts in agricultural practices and genetic engineering to increase crop yields, it must pay more attention to post harvest technology, food processing, packaging and preservation, recycling of wastes, etc.

7.1.2 *Industrial Sector*
The country had a highly protected economy until 1991 and until its share in the world economy was less than 1 per cent. The low production, productivity and quality is due to lack of competition. With the break-up of the Soviet Union and the integration of the European common market and South-East Asian economies, the country faces a great challenge to improve industrial production both quantitatively and qualitatively to augment exports.

Besides the contribution of industry to GDP and to exports, industry plays a vital role as the engine of growth, stimulating all developmental activities. The Indian industry needs to have a high level of diversification and expansion and should particularly concentrate on the manufacture of value-added products rather than export of raw materials. It needs to adopt and adapt technologies suitable to the local

manufacturing conditions. This will have a great implication on variety, number and quality of technical manpower needed for the industrial sector. A high level of upgrading in skills is called for if the industry is to be competitive in the world market. This calls for a drastic change in the orientation of the industrial sector so as to be competitive both in the domestic and international markets. The knowledge, competency and skill profiles of future technical manpower will have to be correspondingly enhanced by changes in the technical education system at all levels.

7.1.3 *Infrastructure and Service Sectors*
The development of infrastructure and service sectors is crucial to industrial development and the key sectors like transportation, power generation and distribution, communication and water resource development were essentially with the government. One of the major changes envisaged for the development of these sectors is to allow private participation in most of these sectors in order to mobilize resources for the overall development of these key sectors. Improvement in productivity in these sectors and increasing the efficiency by the use of high technologies, calls for the development of technical manpower capable of adopting and adapting these technologies in the Indian context. These are the priorities. The technical education system will have to correspondingly introduce updated courses in these areas for developing appropriately trained manpower at all levels.

7.1.4 *Information and Computer Technology*
Industrial and economic development cannot take place unless a sufficient information base has been built and the requisite information is made available on time. The information concerning resources available, technologies practiced, production standards, sales and marketing need to be well documented to enable the industries to take advantage of the incentives for improved productivity, quality and technology improvement. The developments in information technology and computer applications need to be adopted by the Indian industrial sector. Increased use of information technologies and computers is required for improving industrial efficiency and productivity. This calls for well-trained manpower to set up information databases, and retrieve and process information effectively for making day to day decisions and for long range planning. The education and training of manpower in information and computer technology needs to be strengthened and quality improved to meet the challenges of the present information era.

7.2 New Economic and Industrial Policies

7.2.1 *Economic policy*
Since 1991, Indian economy has been undergoing large structural changes as a result of the changes' taking place in the global economy. Sweeping market oriented reforms in industry, foreign trade and investment are being introduced to liberalize the economy. The following major economic policy initiatives are being implemented:

1. Free market economy will replace the regulated economy of the past.
2. Public sector industrial units, which are inefficient, and a high drain on the public exchequer will be closed down.
3. There will be more free entry for the private sector in many new industrial production areas and infrastructure.
4. Foreign capital and investment, including foreign technology transfer, will be encouraged in the Indian market. Restrictions on the investment areas are being removed.
5. Channels will be opened up for entry of resources from the parallel economy (black money), into fruitful investment.

These developments in the economy will hopefully set in motion a series of structural changes in trade, industry and finance and will boost the economy for sustained growth.

Advances in Technical Education: Indian Scenario

7.2.2 Meeting the Requirements of Sectors of the Economy

7.2.2.1 *International Competitiveness*
A major component that will help to increase productivity is the quality of technical manpower employed by the industry. Industry will have to demand and contribute in the training of highly competent technical manpower at various levels, in order for this modernization programme to succeed. The existing manpower in the industry will have to be retrained and re-oriented in modern technology, production techniques, testing, quality control, marketing, sales, etc. The industrial production will have to undergo a manifold increase in quantity and quality to compete in the world market and increase its share of the world trade.

7.2.2.2 *Improving Quality of Life*
Seventy per cent of the population lives in about 500,000 villages. All the industrialization and economic reforms will have to improve the quality of life of these people through the provision of shelter, drinking water, electrical power, sanitation, transportation, communication and an environment that promotes fruitful socio-cultural activities. To respond to the needs of people living in these villages, appropriate technologies that fit in with the development needs of the villages are to be developed. This means that the focus of education, training, research and development must include the needs of the people living in villages.

7.2.2.3 *Environmental Concerns*
Unplanned large scale industrialization and other developmental activities are likely to lead to ecological disaster with depletion of forest resources, loss of genetic diversity, degradation of soils, depletion of fossil fuels, massive pollution of biosphere elements like land, water and air and exploding human population. Since sustainable development is that which meets the present needs without compromising the ability of future generations to meet their own needs, it must be integrated into the developmental strategies. Sustainable development is a challenge to scientific and technological research and development. Environmental studies should become a part of education at all levels.

7.2.2.4 *Implication for the Technical Education System*
In order to respond to the changes and challenges envisaged, the technical education system will have to undergo major changes in its curricula and approach. Apart from providing appropriate education and training to students, it must emphasize aspects like problem solving, learning-to-learn and continuing education. Different technologies require different orientations such as R & D, practical engineering, maintenance, etc. Evidently, such a situation would, call for a reorganization of the academic programmes, providing opportunities for broad based, and selectively multidisciplinary education to the individuals. It might also be expected that demand for technical manpower in future would be exercised not in terms of narrow disciplinary names, but in terms of composite skill and knowledge areas. In such circumstances, one would only be allowed to visualize change broadly in terms of manpower groups and *inter-se* proportions. In view of the above requirements, the technical education system will have to provide for:
i) Initial engineering education of different categories of personnel like R & D scientists and engineers, technologists, field engineers, technicians and craftsmen;
ii) A strong system of continuing education for professionals working in industry whose requirements for further education will depend upon the needs of the individuals and employers;
iii) A variety of programmes at different levels and of different durations leading to a certification or skill upgrade without certification;
iv) A high level of flexibility in the technical education system to meet the requirements of

different target groups with a short turn-around time.

v) Reorganization of the academic programmes, providing opportunities for broad based multi-disciplinary education incorporating composite skills and knowledge.

vi) Efficient management processes with better procedural configurations.

vii) Sustaining motivation of teachers with a better, appropriate work environment.

viii) Better sensitivity and responsiveness of the system to meet changing needs.

7.2.2.5 *Funding*

There are three types of institutions in the country, namely: Government Institutions, Private and Government aided institutions, and self-financing institutions. The polytechnics are generally funded by the State Governments both for initial capital expenditure and for recurring expenses. In the case of aided institutions, the Government provides grants to the extent of about 90 per cent of the recurring expenses. Self-financing institutions are not provided with any funds from the government. Polytechnics were generally starved of funds and the system as a whole had very meagre allocations in all the five year plans. The amount provided was hardly sufficient to maintain and run the institutions. Developmental needs and modernization could not be met. There were some central intervention schemes like Direct Central Assistance (DCA) which provided some funds to selected polytechnics for modernization; but the amount of funds provided was low and could not support many of the institutions. There were no institutions to generate resources by offering their services to the community and industries around. Any income generated was taken as a part of general revenue and the budgetary allocation was correspondingly reduced.

7.2.2.6 *Management Structure*

The Bureau of Technical Education, in the Ministry of Human Resource Development, is the main funding agency at the national level. The Bureau of Technical Education funded some polytechnics through central intervention schemes for modernization, removal of obsolescence, community polytechnics, establishment of audio-visual centres, advanced diploma courses, industry-institute interaction, computerization, continuing education, etc. At the State level, the State Directorates of Technical Education are the funding and administering agencies of polytechnic education. In some States, there is a Board of Technical Education, which has functions of an academic nature like: curriculum development, conducting examinations, institutional evaluation, accreditation and certification. In most of the States, State Boards do not exist and where they are established, they function as a part of the Directorate. State Boards of Technical Education function independently only in a few states. Through an act of Parliament, the All India Council for Technical Education has been made a statutory body and is vested with powers to control the development of technical education. AICTE is just beginning to perform the statutory role vested in it by the Act of Parliament. One of its roles will be to establish a National Board of Accreditation (NBA) which will have the exclusive function of accreditation of institutions and programmes. The NBA, functioning independently, will have statutory powers to inspect institutions and evaluate programmes for accreditation.

7.2.2.7 *Linkages*

The current linkages between the different sectors of technical education, such as engineering degree education, diploma education and certificate training, is very limited. Polytechnics, in particular, have little interaction with the industries who employ their graduates. No mechanism or strategy exists for the industry to participate actively in the management, curriculum development, instructional processes or evaluation procedures in polytechnic education.

8. Conclusion

The ODL system has to travel faster so as to compete internationally. Today in ODL thrust has been for use of multi-media approach but the switch over by the nation is very slow. It is also admitted that in distance education system the digital network forms the nervous systems. Indeed the education that is restricted to classroom will have no future. Besides, how to provide support services more efficiently poses a big challenge to higher open learning institutions. The situation is delicate which has to be handled with full precautions In the globalized society of today, open learning will include inter connectivity, inter changeable element and multi cultural tissues. The ODL has become the necessity of day which should be purposeful and functional to the community. We can not show miracles through ODL system, rather we have to base our expectations on ground reality.

References:

1. Daniel, John, 'Achieving Education for all: the contribution of open and distance learning, 21st ICDE World Conference on Open Learning & Distance Education.(Feb. 18-21, 2004, Hong Kong).
2. Govt. of India, Planning Commission Approach Paper of the Tenth Five Year Plan (2002-2007) Sept., 2001, Planning Commission.
3. Hilary Perraton (2000) Open & Distance learning in the developing world - Routledge, London, NY.
4. IGNOU, New Delhi Various volumes of the journal Staff and Educational Development International, New Delhi.
5. Keeves, J.P. (1996) Introduction: Towards a unified view of educational research - New York : Peramon.
6. Knowles, M.S. (1975) Self directed learning, A Guide for Learners and Teachers -New York: Cambridge.
7. Macdonald, H. Ian - Academic objectives, Occupational Preparation and the Learning Process -Strategies and Policies for the Future, 21st ICDE World Conference on Open Learning & Distance Education (Feb. 18-21, 2004, Hong Kong.
8. Tata Services Ltd., Mumbai Statistical Outline of India (2002-03) 29th Edition, December 2002.
9. Gupta L.N.- New Paradigms for ODL Based Higher Education Sector in the New Millennium : A Case for India (July 4-8, 2004)
10. National Profiles in Technical and Vocational Education in India UNESCO Principal Regional Office for Asia and the Pacific,Bangkok, 1995