The Limits and Challenges of Educational Technology in the Paradigm of Sustainable Development in India

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THE GLOBAL BACKDROP

Alvin Toffler's *Future Shock* published in 1970 has all come true. His next two books *The Third Wave* and *Power Shift* raised questions beyond the radically changing scenario we encounter on the road, at work, in marriages, in raising children, in the mind boggling economic and political crosscurrents, or in the manner in which **knowledge, wealth,** and **violence** will form the essential and unavoidable triangle of our lives. Obviously, communications technology will play a vital role in the rapidly shifting paradigm of our society. But in the process will communication technology debase and destroy our culture or create a renaissance?

The electronics explosion and miniaturisation has made reality outstrip fiction. Only 30 years ago the first Russian satellite was launched. Today the launching of a satellite in India does not make news until its deployment becomes a commodity for use or sale. Spying, telephones, television, or the mapping of Earth's resources are just a few examples of the satellite's diverse applications. The day may not be too far off when a surgeon sitting in an American hospital may perform an operation in India through telecommunication, computer, and robotics devices.

The population of India rapidly growing to the billion mark has become the target for the developed countries to sell their products manufactured here or in Taiwan, Paris, or New York. In short the inventions of telecommunication and allied technologies are all geared to do business with us, provide the privileged class with the most luxurious products and lifestyle, and nearly all of us with entertainment never ever imagined in the wildest of our dreams. Right now a host of satellites such as ASIASAT;, INSAT 2A, 2B, AND 2C; PANASIA; GORIZONT; STATSIONAR 21; EKRAN; TANGO; and ARABSAT beam more than 30 channels to our homes every day, with more than 500 hundred advertisements for products most of could do without.

If this bombardment is not enough, imagine when a direct broadcast satellite (DBS) will require not an 18 foot or even an eight foot, but just an 18 inch dish antenna, and on it you may receive a mind boggling 150 channels. The two Canadian newspapers Toronto *Globe and Mail* and *Toronto Sun* are so worried about the cultural fallout of American programming that they have described the DBS as the "Death Star" (*Fortune* 1993)). A few years ago when Japan's Sony Corporation purchased the American company Columbia Pictures thereby acquiring 23,000 television episodes, 220 movie houses, and Hollywood's largest library of films like "Kramer vs Kramer" and "Lawrence of Arabia", it sent tremors to heart of the American entertainment industry. Now Sony has moved into India with a channel. Coupled with the news about media barons Rupert Murdoch and Ted Turner planning to create new entertainment channels for the Indian audience, we are in for a major cultural shake-up. The present scenario of Doordarshan channels, five of Star, Pakistan TV, CNN, Sun, Sony, Discovery, and TNT are chickenfeed compared to what may open up sooner than we can predict. In short, communication technology is moving at a pace over which India has little control. It is market-driven and the software to a large extent is going to come from the West. The remaining software is going to be drawn from the 100 year old Indian cinema industry and the rapidly growing television enterprises.

HUMAN DEVELOPMENT

If communication technology and knowledge are going to be ever more a major vehicle for development, then from Toffler one has to move to the series of reports on human development brought out every year by the United Nations Development Program since 1990. The latest Human Development Report (1996) points out that the

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world economy is becoming irretrievably divided into "two unequal worlds": "the unbalances in economic growth, if allowed to continue, will produce a world gargantuan in its excesses and grotesque in its human and economic inequalities". "The gulf between the rich and poor of the world has widened even further." Of the $23 billion global gross domestic product in 1993, $18 billion was in the industrial countries — only $5 billion was in the developing countries with 80% of the worlds people, Out of world population the poorest 20% saw their share of global income decline from 2.3% to 1.4% in the last 30 years, while the share of the richest 20% rose from 70% to 85%. That doubled the ratio of the shares of the richest and the poorest from 30:1 to 61:1. The report says that development that perpetuates today's inequalities is neither sustainable nor worth sustaining. In the name of growth the South Asian countries in particular, barring perhaps Sri Lanka, are experiencing jobless, ruthless, rootless as well as futureless growth. Rampant and uncontrolled industrialisation is damaging our air, water, and forests;, destroying biodiversity; and depleting our limited natural resources. The large migration of rural population into towns and state capitals is creating a massive crunch in terms of resources like energy, transportation, water, housing, hospitals, schools, and colleges. Nearly half the population of Bombay now live in slums and on the street. More than 20% of the people in Calcutta suffer with breathing problems. Delhi, one of the most polluted cities in the world, has more automobiles than Bombay, Calcutta, and Madras put together.

The Human Development Reports have become the conscience-keeper of policy makers across the world. What must now be done is to write a script for human development into the 21st century. Policy choices must be made on the premise that human development is the end — economic growth and technological innovations are only the means.

EDUCATIONAL DEVELOPMENT SCENARIO

The educational scene in India has been expanding ever since independence in 1947 and the promulgation of the Indian Constitution in 1950. The number of primary schools have grown three times from 200,000 to about 600,000(NCERT 1995). Today the number of secondary schools in the country is 66,000 compared to 7,288 in 1950. From 24 million primary and secondary pupils in 1950, , the number had grown to about 150 million in 1993. Yet out of every 100 children enrolled in Class 1, 40 reach Class VI, 25 reach Class VIII, and only 8 reach

Class X. Though literacy had increased from 14% in 1947 to 36% in 1993, the number of illiterates had grown from 247 million to about 400 million in the same period. Out of a population of 800 million there are 150 million illiterates in the 15 to 35 age group., Thus a sizeable population of the country is deprived of high school education — total or partial. The drop out rate at the primary or secondary level is significantly pronounced in rural or tribal areas and among, lower income groups and working class people who are below the poverty line. The Human Development Report of the United Nations Development Program, a treasure-house of research data, says that there are 229 million income poor but 554 million are capability poor.

Only 2% of the population gets through school or college and goes on to reach university, In India about 220 universities, 7,000 colleges, and 50 correspondence colleges provide university education to those who wish to have a second chance at a university degree. At the school level, an open school system offers the 15 to 35 age group a second chance to educate themselves and improve their levels of skill and information. All these systems have undoubtedly brought some of the first generation learners into the fold of education, but 70% to 80% of the population still remains outside the domain of education and development.

RURAL DEVELOPMENT AND EDUCATION

The real development of India cannot be achieved without developing its half a million villages....

Mahatma Gandhi

Development plans in the country for the last 50 years have focused on heavy industry, agriculture, science, and technology. This investment has paid off in many respects, resulting in export earnings and sophisticated technical knowledge. However, in a country where 75% of the population lives in villages, this development has also given rise to an increasing gap between the urban and the rural populations. Most of the developments are focused on cities. The very basic amenities of health, sanitation, housing, roads, transport, communication, and education have hardly reached the villages. Many of the rural programmes have failed because very few trained personnel are available within the rural community. Therefore, people who do not wish to live in the hard conditions of rural or tribal life have to be drawn from the city. The present educational system tends to draw rural youth towards the city, state capital, or metropolis, which proves counterproductive for the development of the rural or tribal areas.

India is a vast country with enormous diversity of culture, language, and geographical conditions giving rise to different agricultural practices and products. Except for perhaps some religious beliefs and customs, the Kashmiris have very little in common with the fishers of coastal Kerala. The division of the country into 25 states and 7 union territories does not provide a clear distinction of culture and way of life. For example, the 17 different languages in the country are subdivided into hundreds of dialects spoken in different parts of a state. The environment is as diverse as their culture. From heavily vegetated and lush green areas of Darjeeling in the east, there are vast deserts in Rajasthan in the west.

Thus, unlike many parts of the western world, the educational needs of rural or tribal people in India varies from place to place due to their culture, environment, vocational, and linguistic needs and aspirations. The educational objective, therefore, should not be to destroy their culture or to urbanise them but to preserve and enrich their heritage with new ideas and scientific methods. The music, theatre, dance, and puppetry carried on from generations through oral traditions is now at a critical stage of extinction due to the influence of the cities. Handicrafts have been somewhat revived but many face oblivion due to the growth of industries some of which may be inevitable. The fact remains, however, that development in India has made little impact on its half a million villages. Neither has technology been optimally deployed to its 550 million "capability poor" to eradicate literacy or to impart the three Rs and skills to strengthen their vocations and enhance economic growth. We need to design an alternate system.

THE ALTERNATE SYSTEM OF SUSTAINABLE DEVELOPMENT

The alternate system design must emerge from the following tasks:

- identify the basic needs of the society;

- set policy and plan for sustainable development;

- create work and employment opportunities within a rural framework;

- plan educational goals, targeting the knowledge and skills required for work and employment;

- design curriculum for different regions to suit their cultural requirements;

- replan the school, college, and teacher training programme;

- plan infrastructure, personnel, budget, facilities, and schedule; and

- arrive at instructional design in terms of:

  – correspondence material,

  –direct contact, and

  –mass media.

PAST EXPERIENCES OF TECHNOLOGY IN EDUCATION

In the past 50 years the Education Ministry, departments, and institutes have moved from one technology to another without building adequate software (neither in quantity or quality) nor integrating it with the curriculum and teacher training. As a result there was insufficient and ineffective production and utilisation of blackboards, charts, posters, maps, and science kits in the 1950s and 1960s. In this period of filmstrips and slides, a lot of equipment for production as well as film projectors were imported through various development schemes. Unfortunately a mechanism for good film production was never worked out. Consequently, the projectors supplied were never utilised at the state, district, or school level.

India has been among the largest film producing countries in the world and is currently celebrating 100 years of cinema. Two major institutes were set up in the 1950s. The Films Division at Bombay got off to a magnificent start with documentaries and newsreels shown in 10,000 cinema houses in all official languages of the country. It even sustained its excellent work until the 1980s when the arrival of television pushed it into oblivion. Similar fates were met by the Uttar Pradesh Education Expansion Office in Allahabad, the National Council of Education Research and Training, and the Central Institute of India Languages at Mysore. Sixteen millimetre film projectors were purchased at all levels of government but only a few good Indian educational films got made. Consequently the business of selling very old McGraw Hill, Coronet, and Encyclopaedia Britannica films thrived more to utilise the annual audiovisual budget than to make use of the films.

Radio, which was set up before independence, happens to be one of the most professional systems of India, even though it is relegated to third place today, after television and the press. Radio has spread its reach to all corners of the country, regardless of terrain or population. Its

educational potential has not yet been fully realised nor deployed. Neither has All India Radio made its excellent and rich audio material available to the country's booming business of audiocassette players. The battery system of two in one, though a bit expensive, are ideally suited to the country where electrification reach is only to the extent of about 60%.

Television in India began in 1960 with Delhi School TV, which has all but faded out. But then school television, which spread in the 1960s, has lost momentum globally. Educational television for rural audiences, however, got a major boost in enrichment mode with the Satellite for Instructional Television Experiment (SITE) during 1975/76. Instead of building on this unique experiment for the wider spread of education, we diverted our attention to advertising and feature films. With INSAT-1B in 1984 India once again came back to utilise transponder, terrestrial, and microwave links to reach out to primary children and university undergraduates, links which have now sustained for 12 years. With the launch of INSAT-2B and "Gramsat" — Village Satellite (to be launched), India is ideally poised, technologically at least, to expand in a major way its base for education and development. However, some analysis must be made arising from the historical perspective presented above.

Analysis

Educational technology has largely been technology dominated rather than development, education, and pupil based.

Money and grants have been made available for hardware, building, and office expenses but not enough budget for quality software development has been allotted

Quality software, which requires a strong concept, well-written script, trained personnel, well maintained technical facilities, ample budget, and flexible administrative and financial arrangements, has not been sustainable in government set ups.

Hardware (for software production) has been easy to acquire (through foreign aid) but has been both difficult to maintain (through a lack of spare parts and trained personnel) and inefficiently utilised.

Hardware (for software use) is seldom utilised for various reasons such as erratic power supply; poor synchronisation between broadcast or telecast and teaching time; and the non-involvement of teachers, as well as poor maintenance. Often hardware for software

use is acquired without planning for the availability of relevant software.

We have not been able to sustain a comprehensive training centre for educational media with space, budget, personnel and relevant programmes to develop staff.

Educational media producers who have strong production skills, education, and knowledge, have not been nurtured in the Indian system. Neither have we been able to groom media managers who have sensitivity and experience in hardware, media forms (print, sound, theatre, radio, film, television, and computers), production, communication, interpersonal relationships, administration, and finance.

Hardware acquisition has been ahead of software development or co-ordination, planning, and management.

And this is where the major difference of educational media development comes about between the developed countries and the developing ones. Some of the significant variances could be listed as in Table 1.

TABLE 1. BASIC DIFFERENCES BETWEEN DEVELOPED AND DEVELOPING COUNTRIES REGARDING EDUCATIONAL MEDIA

Developed	Developing
Hardware and software developed with one side promoting the other.	Hardware imported and developed; software not developed.
Software also developed by commercial organisation.	Software development undertaken by government only.
Nearly uniform language and culture.	Diversity of culture, socio-economic conditions, and language.
Geared towards individualised instruction.	Application more in the mass media.
Sometimes teacher not necessary.	Teacher- or school-dependent.
Co-ordination with support facilities (telephone, transport) easy.	Co-ordination difficult.
Maintenance of hardware easy.	Maintenance difficult.
Approach of total system design (equipment, personnel, space, and budget).	Piecemeal approach undertaken.
Personnel culture exists.	Educational media culture does not exit; personnel inadequate.

The frequent pattern in developing countries has been to get foreign aid to acquire hardware, a few experts for the short term, and to send staff abroad for training or exposure. Staff sent abroad are either too senior or they are bureaucrats, and neither stay on the job long enough to apply their gained knowledge to local media issues. The local media staff, who require continual upgrading, encouragement, budget for production and facilities, keep struggling to produce, but eventually the emphasis on quality recedes and gives way to quantity. The Open University in the United Kingdom expects a producer to produce a series of thirteen 50-minute programmes in two years, whereas media centres in the Consortium for Educational Communication (CEC) or National Council of Education Research and Training (NCERT) expect a producer to produce forty-eight 20-minute programmes in the same period. The time and budget for research, script, travel, sets, locations, graphics, animation, lighting, costumes, and music are cut to the bare minimum. The programmes may be high in content but remain low in production values. Yet the best of our programmes compete in the international festivals and win awards, proving that some talent exists in radio, television, and film documentaries produced by various organisations.

Another point of concern has been the lack of co-ordination among the media libraries of the country to publicise their products and possibly exchange products. A wealth of excellent short films in the Films Division are not used in education nor in the national telecast. The compilation and sale of the products of four organisations —CEC, Indira Gandhi National Open University (IGNOU), NCERT, and National Open School (NOS) — has just begun on a national and international scale through the Ministry of Human Resource Development project *Education International*.

In all there may be about 50 institutes or centres within the education sector in India where heavy investments in television have already been made.

TABLE 2. EDUCATIONAL INSTITUTIONS THAT USE TELEVISION

Educational Institute	
University Grants Commission — Consortium for Educational Communication	18
Indira Gandhi National Open University	1
National Council of Education Research and Training — Central Institute of Educational Technology	7
Indian Institutes of Technology	5
Technical Teachers Training Institutes	4
Development Educational Communication	1
Other Institutes (approximate)	14
Total	**50**

In this framework only half of the centres have a telecast slot whereby productions reach a larger audience. The other half carry out limited productions for in-house training or to cover important functions.

This brings us to the question: If we have the satellite and transponder and we have about 50 television studios with professional television equipment in the education sector, what prevents us from planning and executing an educational channel meant not only for the urban but the "capability poor" (70% of India)? In addition we also have a network of radio stations spread regionally, locally on medium, short wave and FM totalling about 400, reaching to 97% of the 900 million population having about 120 million sets. Doordarshan's 700 television transmitters claim to reach about 86% of India's coverage. If there can be a determination in the Gandhian way, we can deploy the technology that we have built over the last 50 years, to move up in human development.

METHODOLOGY

The educational objectives of the alternative school or college system are conceived as part of the total development plan for the community (district or block). At the national level only broad outlines may be framed so as to involve the central ministries. The budgeting and planning may be done at the state level but then the execution responsibilities are given to the district or blocks to make it operational. In other words, the size of the area is kept small enough to be manageable. The community development authorities are not only responsible for developmental but also educational input, and they operate all the subsystems required for education. Therefore it is not one but several systems that are visualised to fulfil different community needs at the state and national level. The system does not operate under one giant umbrella but within a manageable area and population that has its own goals and methods to achieve them. The experience can be shared at the state as well as the national level for cross fertilisation of ideas.

The syllabus or curriculum and courses for such an open school or college related to different environments have not yet been designed. In order to grant high school certificates only students who already can read and write would form the first generation of learners. The open school would not provide literacy skills in the beginning. The multiple entry system could operate for those who left after classes III or IV onwards. The courses could be in the different areas, as follows:

- Health: to become rural doctors or nurses in food, nutrition, minor ailments, and emergencies;

- Agriculture: crops, fertilisers, soil, diseases, appliances, and marketing;

- Construction: low cost housing, sanitation, roads, wells, and gas plants;

- Handicrafts: skills, processing raw materials, and marketing (local, state, national, and international);

- Animal Husbandry: nutrition, artificial insemination, and marketing;

- Law: panchayat, district, state, civil, and criminal; and

- Culture and Sports.

The courses are designed to meet the needs of the community. Some may be common but a large number would vary from one district to another or one state to another. The courses would have to be designed with the help of retired teachers, the educated unemployed, craftspeople, and farmers from rural community and scientists, doctors, economists, and educators from the city. Young university graduates and those who have graduated from high school and are unemployed in the village could form the first generation of teachers and course designers as well as trainers for the next generation of teachers. The first level of teacher training may be

given through short-term contact, centrally at the state level.

PRODUCTION OF LEARNING MATERIALS

The educational material required in the open school or college system may consist of the following:

- Printed matter such as textbooks and charts;

- Models and kits for demonstrations and experiments;

- Radio programmes and audio tapes;

- Photographic material such as slides, filmstrips, and overhead transparencies; and

- Videotapes.

The production of materials would require facilities for printing, reprography, sound recording, photography, and video. It may not be possible to set up all such facilities at the district or block level because of cost. Hence one may set up facilities for print material and demonstration kits at the state level and facilities for radio programmes at the district level. Facilities for photographic and videotape material could be on regional basis.

Much more detailed planning would be required to operate 500 such district centres. All would require a massive involvement of community, extensive use of government controlled media for education, putting into operation the developmental plants at district levels to create jobs, professional management controls, use of regional language and culture, efficient maintenance system, periodic evaluations and corrective systems, and above all a strong political will.

Now comes the million dollar question: Is it possible that democracy as it exists in India today can turn itself towards its villages or would this programme require a different socio-political order? There are success stories of literacy drives in non democratic countries or those which are small enough. From all accounts available about China, one gathers that it has been successful in developing its villages. Whatever the political framework may be, the country does not have to look for the technical, educational administrative expertise required for its rural growth. All this know-how exists within the massive personnel of the country. The question is: How can the people of rural India get involved in the process of educational renaissance that is best suited for their culture and scientific growth?

It is now well understood that the objectives of communication could be one or more of the following and become increasingly difficult as one goes down the list. They could be to:

- entertain;

- inform;

- teach skills;

- present concepts and knowledge;

- stimulate imagination and provoke thinking;

- provoke creativity to solve problems; and

- bring about change.

If state-of-the-art communication technology reaches only the first two objectives,— entertainment and information —for the privileged 30% of the population and does not apply to the remaining 70%, then the global vision for ET-2000 would remain myopic, cliché-ridden, and self defeating. Human development must be the end, with economic and technical growth as only the means.

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