DEVELOPMENT, TECHNOLOGY AND EDUCATION - INDIAN PERSPECTIVE

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Introduction

Human society displays sharp and dangerous contradictions. One third of humanity is on the pursuit of pleasure, often at the cost of reckless exploitation of the resources, irreversible degradation of the environment and even a threat to the survival of humanity through an arms race. The other part has yet to break the bonds of poverty and obtain the basic necessities of life. Of course, there are internal disparities between the two worlds, with islands of poverty and wealth in both, and there are shades of rich and poor countries, but the vast majority have yet to take off.

The underdeveloped countries, which are basically excolonies or countries dominated in the past by the developed countries, got a lease of life when they achieved political freedom after World War II. In the euphoria of freedom, development was often simplistically and optimistically viewed in the image of the western world and considered to be easily realizable through science and technology. Modernization was often identified with industrialization and a "trickle down" strategy based on importation of capital-intensive technology from industrialized countries was often adopted, as in the case of India. Although no doubt substantial progress has been made, such as a remarkable indigenous scientific and technological capabililty and extension of education, the results of more than a quarter of a century, however, show no signs of effective repression of poverty and generation of employment. For instance, 40 per cent of the population live below the poverty line. The socio-economic state, despite some impressive gains in terms of technological achievements, does not display dynamism and commitment of the people. A concerted war has to be waged on poverty and backwardness. Technology and education are indeed the key instruments in this context but

certain basic policy issues about developments, technology and education and their social interrelation are most important. While much of our discussion may be relevant for the less developed countries, the implementation will differ from one country to another in view of their initial and boundary conditions. Ours is the Indian perspective.

Development

Without going into the semantics of the terminology of modernization and development, the central point is that it is a process of directed societal change. It is basically a normative concept, almost a synonym for improvement. There have been cumulative and revolutionary changes in various parts of the world at different times. The modern revolution is a unique phenomenon started in the western societies after the middle ages and has shown remarkable dynamism in all facets of the societal system political, cultural, economic and social. It was often violent and even retrograde but cumulatively it led to the ascent and the dominance of the western world. At different periods, the development has been characterized as Renaissance, Reformation, Enlightment and later the Industrial Revolution which led to a quantum jump in social change which is still going on and has even lead to another phase termed the post-industrial society. Accelerated change, of which science and technology are the principal instruments, is an essential characteristic of modern society. It shapes institutions values and attitudes and in turn is as much shaped by them. The central fact is that the social system of the advanced western countries has developed synergetic, endogenous, organic dynamism and creativity on the whole, shaped over time. Modern technology and the educational system are its historical subsets.

Underdevelopment, euphemistically labelled in various terms, is closely associated with the development of the western world. There have been disparities in wealth among countries and people, subjugations and dominations in history, but with the rise to power of the industrialised world, there was a much higher capability of exploitation, which was exercised ruthlessly through colonisation and other political and economic means. Social fabric of these countries was torn asunder and the entire social change was in the context of exploitation. The society consisted of rulers and the ruled. Psychological attitudes of servility, self-denigration and dependency developed in these people and were reinforced. Social mobility of the natives was possible through subordinate association with the foreign masters and the native elites distanced themselves from the people. Education

itself became an instrument of social cleavage. All activities depending on the government and private entrepreneurship ceased. The bureacracy was not for civil governance as in the west but for extending the grip for the consolidation of power and a corresponding culture of colonial bureaucratic institutions developed (8). The technological activity was for the maintenance of law and order and was minimal, such as for the construction of a few roads, houses for the colonial masters and their local native allies and a few railways for administrative requirements. Almost eighty percent of the population lived in villages in increasingly worsening conditions as their traditional industry lost to the modern imported goods. Industrialization of the colonies was prevented deliberately to use the raw materials and resources for the growth of industry and economy in the metropolitan societies. Thus while in the developed world there were cumulative causative processes of self-reliant dynamism, socio-political integration with resultant structural changes, institutions and attitudes, there was in the developing countries a corresponding process of dominance, disarticulation and poverty (9). Domination implies that the underdeveloped country does not have a capacity for autonomous decision-making and that it exercises little control over its destiny, thus being in an extreme form of dependence. The primary form of dominance is political and economic, although it is closely related to cultural and technical domination, with one of them leading to or implying the other. Disarticulation means that the underdeveloped country does not constitute a homogeneous unit from the cultural, social and economic point of view. It is a highly stratified society with little or no interaction among the various strata. There is a comparatively high-income group alienated from the rest of the society which tries to adopt the values and life style of the colonial masters.

After independence, although self reliance has been the central theme, and although considerable material progress has taken place, the spirit of national commitment and independence in values and attitudes is increasingly eroding and the spirit of independence recedes into the past. Correspondingly, disarticulation is also increasing. Increasingly, the elite urban group tries to ape the life style and consumerist trappings of the western world, creating a dual society, a parallel culture, which exacerbates further stratification and fragmentation of society.

Indeed, in the modern world of shrinking time and space, with modern technology and increasing power and prosperity of the developed countries, the underdeveloped countries face a new threat, a phenomenon which has distorted the entire developmental process. Linkages in the two worlds increase with increasing knowledge, technology, trade and a better international communication system. First, the involuntary impact of the outside

world on a developing nation through radio, TV, books, magazines, consumer goods creates not only unattainable expectations, attitudes, and life styles that are totally unrelated to the developing nation's own situation, but worse, they threaten to overwhelm and stifle indigenous cultural creativity. Second, with the increasing imbalance in power and prosperity of the two groups, technology and education are emerging as significant and forceful instruments for maintaining an existing dominance/dependence relation in the international economic and political system. ("Policy leverage" is the polite phrase used in policy documents of such countries). There is an increasing tendency of vested elite groups to gravitate towards their counterparts in the developed world, as they did towards the colonial masters with increasing dependency and disarticulation of their country. The erstwhile colonial powers and the superpowers may not be directly responsible for continued colonial systems, but they derive economic and political gains from them and naturally tend to encourage and exploit the situation, explicitly and implicitly, perpetuating in more subtle forms the peripherality of the less developed nations.

Technology

Science and technology have been considered to be the main instruments of development in the western world (10). Technology has also been considered to be the primary instrument of development of the underdeveloped world (11). Concepts of technology, developmental policy and technology policy have, however, been varied and often vague.
The political decision makers have often considered technology as a set of capital and consumer goods that are currently on display in the western industrialized nations. Technologists and economic planners have generally identified technology with hardware of production - knowledge about machines and processes. Two assumptions are implicitly made about technology: first, that it is an isolated technological activity to be decided by technological feasibility and efficiency considerations independent of socio-economic considerations. Very often, it is thus visualized in the image of the sophisticated complex modern technology of the west. Second, the technology is neutral with respect to class and country and factor use and any distortions in development patterns resulting from the use of technology must be attributed to misuse rather than to the nature of technology (12). Institutionally, its application in the developing countries is determined by bureaucratic - technological decisions in the infrastructure area and private - profit cost benefit analysis in the private sector area. The demand component is thus

determined by the colonial bureaucracy and elitist sector of society and not by the masses. For instance, despite an easily soluble problem of the supply of drinking water, food supply, simple houses, electricity, mass transportation and other basic needs, elitist consumer goods are often produced and public sector activities are undertaken inefficiently and that, too, without concern for the needs of the masses.

Discussions have taken place about inappropriate western technology distorting the pattern of developing following a particular lop-sided pattern of growth, creating employment problems and skewed income distribution and failing to make use of poor countries natural and human resources. Use of appropriate technology has been suggested. However, often it is an expression of wish rather than a policy. Technology has a wider connotation than mere hardware of production. It includes all the skills, knowledge and procedures for making, using and doing useful things. Technology thus includes methods used in non-marketed activities as well as marketed ones. It includes the nature and specification of what is produced as well as how it is produced. It encompasses managerial and marketing techniques as well as techniques directly involved in production. Technology extends to service-administration, education, banking, health services, housing, transportation, for example - as well as to manufacturing and agriculture. It pervades the total societal system, interacting with it dialectically.

Technology has demands on education, imposes requirements on mental processes and generates life patterns. Technology thus involves in each societal system, through adaptation and indigenous development in a historical cultural context. It depends on socio-political-economic institutions, and motivational mechanisms besides skills (12). In the industrial societies where most technical development has and is currently taking place, technological and educational social change form a positive interconnected and self-reinforcing dynamic cycle.

The technology has therefore to be indigenously developed or adapted for the development and needs of all sections with specific concern for the traditional sector and the poorer section. While the development of technology for the traditional sector has priority and urgency, modern technology is also required so that for a certain period there is a self-sustaining capacity for technological pluralism, but there must be arrangements for integrating the technologies into a coherent and self-reinforcing technological system at the national level (13). As has been noted, of paramount importance will be the need to develop the country's own potential to the fullest extent, promoting a process of endogenous development in which scientific and technological capabilities must play a leading role. It is essential to develop

societal capacities and motivations to release and nurture the creative potential of the country's population, to support the appropriate institutions, to generate, interpret and utilize knowledge for development objectives, and to introduce the necessary social, economic, political, and national transformations that will make these tasks possible. Policy recommendations have been made for self-reliant development (14) but the initiative lies with the government and in appropriate development of the education sector.

Education

Development in the last analysis is the mobilization of human resources for human benefit and education emerges as the most important activity in this context. Education has been called upon to endow people with that knowledge, that training, that orientation, that spirit of initiative and social responsibility that can enable them to do the job of development in the circumstances in which they live.

Indeed high hopes were laid on education in the wake of Independence by nationalist leaders. The exponential growth is indicative of the fact that it was implicit faith in education as an instrument for increasing economic productivity that brought about social transformation and social mobility. International experts also placed lot of faith in education as an instrument of development (15). Commissions were set up soon after independence and later education was examined comprehensively and integrally in 1966 to develop an articulated national system that could remove many of the anomalies of the colonial education which were distorting educational aspirations of an emerging independent society (16).

Primary education of five years was proposed to be universal by 1985-86. Policies were envisaged for improving the quality of education and reducing stagnation and wastage to a minimum. Secondary education was proposed to be revolutionized by siphoning off fifty percent to vocational courses. The accent was on gearing secondary education to life situations and social needs. Vocational training was suggested to be organized in part-time courses also at the lower secondary level, classes were to be organized by industrial and agricultural polytechnical schools leading to an engineer's diploma.

The university education was also to be profoundly changed. Six universities were to be selected as major universities, where postgraduate work and research of international standards was to be carried out. In addition, about fifty centres for advanced studies were to be established. For the remaining other

universities also improvements of personnel, teaching materials, methods of evaluation were to be made. Admissions to universities were to be based on manpower requirements.
Unfortunately none of these revolutionary changes for appropriate education have been achieved. Illiteracy continues to be more than 60 percent, secondary education is oriented to university education, which itself continues to be unrelated to manpower requirements in terms of skills or to high standards and generally is conducive to unemployment. Since educational matters have become political questions, the colonial education has only expanded and not changed. Most educational investments enhance the power of those who already have political advantages and deprive those who suffer inequities and lack opportunities (17). These are attributes of the development pattern itself. It is difficult or even impossible to discuss serious changes in an inherent class reproducing educational system - the manner in which education expands, which levels are favoured for expansion, the nature of the curriculum and the value attached to each level of schooling-without structural reforms in production relations and their underlying power relations. Thus, disparities widen and reinforce inequities of the social structure and unless radical political and social transformation takes place, the educational system will continue to accentuate traditional power patterns of the developed societies.

Technology, Education and Society

Technology has a profound bearing on all institutions society-economic, political, and educational. But, the direction of the technological impact depends upon societal values, no doubt with dialectical interaction. For developing societies, in which technology has not as yet acquired an overriding independent momentum, it may be well to take a second look into technology, education, social dynamics so that a proper direction may be obtained to the planned social change.
Education formed part of religious teaching historically, but even when religion started losing its hold with the separation of state and church in the west, and with colonization in the less developed countries, moral values and ethical concepts, both for the individual and for society, remained important aspects of education. The accent on humanism and liberal education were considered basic to the development of character and culture but with technology and growing mechanization, the human factor has been overshadowed, splitting modern education into two heterogeneous worlds, an "active content", embodying a scientific spirit and a "humanist" culture, which is not acknowledged to have any

practical value.

Technology has contributed to increased productivity, and higher standards of living but the vehicle of technology has been private profit. It has, therefore, caused a loss of social and environmental concern. With the development of technology the demand is more for communication of information and for development of skills rather than for development of norms and social ethos. The two are not antithetical, but somehow, science and humanistic studies, have almost developed two mutually irreconciable different cultures. Technical education has suffered even more in terms of the humanistic component of education as, often, it was even kept out of the traditional higher education system.

The technological impact has put serious strains on society and educational systems as the latter are conservative and slow to adjust. On the other hand rapid and persuasive changes are brought about by technology at an ever increasing rate. The question, therefore, arises whether norms and values must necessarily be discarded to modernize educational systems and for enhancing the developmental process. The problems of urban life and environmental degradation are manifestations of this dilemma.

The problems arise in an even more serious form for the developing countries as the time dimension of change is far more important and regulatory mechanisms are even less developed. Further, where tradition is still adhered to, the basic problem is if an uncritical adoption of technology - but value-free-education - will lead to a good life. As it is, constant exposure to the import of western ideas, through books, and exposure to visual media, are impinging on the thought process, behaviour and attitudes which represent a total break from the accepted social mores and indigenous philosophy of life.

The experience in India has not been entirely satisfactory. The import of education in the colonial context led not only to erosion of values but to the disruption of society itself. The process is being exacerbated with the skepticism and alienation of those who are exposed and succumb to its glitter.

The legitimate question is if one can go on as of now with action and percepts at variance with each other, hoping that enough material satisfaction shall be obtained by all to keep disarticulation checked, or that the system will unwind itself till the poor and unemployed cannot live on hope and embark on violent upheavals with disruption of the past? While the former was the course of history for the currently developed world, the latter path has also been followed in other societies.

An alternative development policy was enunciated by Mahatma Gandhi, in which concept of development was central in the fight for independence. Development was considered as the mobilization

of a hitherto stagnant social system through socio-cultural resurgence, development of moral values and sense of service. It emphasized creativity and self-reliance which required first and foremost generating a sense of natural and cultural identity with the self-esteem and pride that go with it. It was considered that the community's identity, cultural integrity and meaningful systems are themselves the matrix out of which emerge the goals of authentic development for that community. Development must transcend the concept of material wellbeing in terms of a broader purpose of life as crystallized in the traditional culture of the nation, so that the impulse for change, creative adjustment and innovation is continuous and self-sustaining. The elites were to develop identification with the masses through austerity and social service to inhibit disarticulation. Education was to emphasize values and character besides skills.

Development could not therefore be in terms of a trickle down of material benefits, but a war had to be declared for the eradication of social injustices and poverty. Education and technology were to have priority for redressing ignorance and abysmal poverty. Technology, traditional and modern, and education, basic or advanced, were there first and foremost to humanise, meet the basic needs and redress the social and economic inequities which had enmeshed the social system over centuries of exploitation. Development was not the mere acquisition of the trappings of western education and technology. It meant the discovery of India and the advancement of culture and values through education and technology, which were to be developed indigenously.

Conclusion

Technology and education have not served the development process well so far. The benefits have not reached the masses and very often violent radical political transformations have taken place. Democratic norms have often been replaced by different ideologies and systems have emerged where masses continue to suffer. Technology and education are being exploited by the elites who through rear guard action have managed to preserve their power and wealth in collaboration with foreign interests. Technology may have mitigated much of drudgery, but in societies with subsistance economies, one cannot expect to encourage consumerism, which only touches the fringe of society. An alternative approach was followed in India. It embarked on a socialist democracy under the enlightened leadership of Gandhi and Nehru. It was not self-interest but service of the masses which formed the basis of this approach. The policy,

unfortunately, got distorted and the calculus of modern capitalistic technology and education took over the command. The achievements so far have not put society unmistakably on a self-sustaining path of non-violent development. Increasing materialism has its own hazards, and technological advancement its own abuses. Thus, the need is for the emergence of a new culture, a civilization that not only places faith in exponential growth and affluence but dignified work and self-reliance, spirituality, and contentment.

Notes

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3. Hindustan Times, New Dehli, April 1983.
4. India Abroad, New Dehli, March 1984.
5. Adelman, Irma and Morris, Cynthia Taft, "Economic Growth and Social Equity in Developing Countries", Stanford, Calif,: Stanford University Press, 1973.
6. The matter has been discussed by many researchers. For example, see Pradip K.Ghosh (ed), "Development Policy and Planning", Westport, Greenwood Press, 1984; George Abonyi, "Development and Technology: a Review and Overview" in Richard A.Goodman and J.Pavon, (ed) "Planning for National Technology Policy", New York, Praeger, 1984; Robert S. McNamara, Address to the Board of Governors, Washington, D.C., World Bank, September 26, 1977, p. 7.
7. For details see Ramesh K.Divan and Dennis Livingston, "Alternative Development Strategies and Appropriate Technology", New York, Pergamon Press, 1979; Pradip K.Ghosh, (ed), "Appropriate Technology in Third World Development", Westport, Greenwood Press, 1984.
8. See for example, B.B.Misra, "The Bureaucracy in India", New Dehli. The Oxford University Press, 1977.

9. The dependency theory has been discussed by several authors. For example see, Celso Furtado, "Development and Underdevelopment", Los Angeles: University of Cambridge Press, 1962.
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