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IMPACT OF SCIENCE & TECHNOLOGY DURING LAST FEW DECADES

ABSTRACT

The present study gives a detailed picture of social changes occurred during the last few decades in response to scientific & technological revolution and the need to incorporate these changes into the curriculum because of their affects on family and community life.

The discussion of the role of education is as old as Aristotle, and this discussion is renewed in every period of social crisis. Whether we view the role as that of transmitting the culture socializing an individual or reconstructing a society, we need to study and analyze the structure of society in order to determine what the goals and the emphasis of the complex education should be. This is especially necessary in a rapidly changing technological society where education plays a role in relation to all aspects of social structure like demographic, economic, sociopolitical, ideological as well as spiritual.

INTRODUCTION

The present status of education and available syllabi at the levels are taken in to consideration for analysis in Rawal Pindi and Islamabad situation.

It is not an easy task to establish what demands society makes on education and what contribution education can or should make to culture, especially in a complex society in which vast and rapid changes are occurring (1). Yet it is precisely in such a society that a continuous examination of the goals and demands of society and of the forces operating in it is necessary in order to

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keep education reality-oriented to determine what knowledge is most worth while, which skills must be mastered and which values are relevant. These questions are all the more relevant if one conceives of education as a creative agent of social change in reconstructing society or as serving social or individual *needs* (2).

Analyzing the impact of technology and the changes it has produced or is producing in society has been a favorite way, and up until recently practically the only way of gaining social perspective in education. Underlying this approach to formulating a perspective has been the assumption that technology is the focus and the core of the American culture, the chief initiator and agency of social and cultural change (3).

The most recent readings of the map of social changes introduced by technology have something like the following to say: Technology has changes and is changing not only the face of the earth and the institutions of our society, but man himself. Technology with the institutions it has created, impresses itself on the minds and hearts of those who are using it .Our minds are controlled by technology and by the thought forms and values created by it. While changing the mode of making a livelihood, science and technology also alter the contour of the economy and transform the system of social relation. They have created the possibility of a new union of men by creating facilities for communication and developing interdependence. (4)

We live in an era of accelerating the future becomes increasingly unpredictable. Whereas formally important changes were counted in terms of centuries and generations, now they are counted in terms of five or ten years. The forces of these historic changes are "so vast" their time span "so compressed" and the required adjustments "so convulsive" that it is as if a huge seismic slippage were occurring in the deepest substratum of history (5). But the imprints on our times are not so much by the science and technology as by the unadvertised, and often the inadvertent social consequences of those mechanisms. Science appeals to us as the means whereby we gain control over our environment.

THE CONCEPT OF CULTURE & CULTURAL CHANGE

The culture is a fabric in which beliefs, customs and institutions exist whereas society is an aggregate of organized individuals who have common sentiments and loyalties. Culture varies from society to society and within the same society over a period of time. So the culture and society form one of the important bases for curriculum development. [(6)]

Change involves a shift in position which may go in either a favorable or unfavorable direction.

Cultural change embraces all changes occurring in any branch of culture including art, science, technology, philosophy etc. as well as changes in the forms and rules of social organizations.

Certain aspects of our way of life, certain kind of knowledge, certain attitudes and values are regarded as so important their transmission to the next generation is not left to chance in our society. Certain elements are derived from culture [(7)]. Culture is not constant it continues to change under various influences of Science & Technology such changes influence individuals, family, community and education [(8)].

In the twentieth century science is for the first time on its own. Much more scientific research has been carried out and a far greater number of technological breakthroughs have occurred during the last few decades than in the whole previous history of modern science. The table which follows is a list of some major scientific and technological landmarks .The liberation of nations, the quantity and quality of their nourishment, their standard of living, their time for leisure and perhaps, their happiness have progressed under the direct or indirect impact of science and technology[(9)].

Table: Major scientific and Technical Landmarks from 1965 to 1975

Year	UNIVERSE	MATTER	LIFE	TECHNOLOGY
1965	Microwave background radiation discovered Venera II and Venera III planetary probes Ocean floor spreading		Cyclic-AMP Somatic Hybrid animal cell 3-D structure of lysozymc Four-carbon photosynthesis discovered Discovery of fossils more than 3 billion years old Homo erertus palaeohungarieus	Biodegradable detergents Dwarf rice Opegue-2 maize (high lysine)
1966			Insulin synthesized Repressor proteins isolated	Large-scale integration
1967	Pulsars		3-D structure of ribonuclease	Wankel enginean production
1968	Deep-sea drilling	Granular charge structure within proton	Synthesis of ribonuclease molecule	Audiovisual systems (EVR) introduced Hovercraft in service Krasnoyarsk (USSR) 5,080 NW hydroelectric plant
1969	Moon rocks analyzed First report of gravitational waves Glomar-Challenger expedition Mariner 6 and Mariner 7 photograph eraters of Mans		RNA synthesized 3-D structure of insulin structure of gamma global in Australopitheeus bosel	Man on the Moon Hybrid Barley
1970	Solar neutrino flux measured		Chemical synthesis of a gene Reverse transcriptase Growth hormone synthesized Bodocrine function of hypothalamas discovered structure established of transfer RNA	Hybrid cotton

1971	Moon exploration	Wider energy range available	Experimental creation of a new species of Drosophila.	Assuan dam inaugurated. First polymer with nitrogen bond. A big plant in Scotland produces proteins from petroleum.
1972	Pioneer 10 flies to Jupiter.	104, 105 elements discovered.	Organic matter found in rocks older than 2.6 million years	NAL, inaugurated at Hatvia. Power laser Fourth generation computers. Nuclear energy powered pacemaker.
1973	Pioneer 10 sends photos of Jupiter events pioneer 11 files to Jupiter and saturn skylab and three manned vehicles in orbit: Sun Kohoutek comet observed Two quasars observed whose red-shift is more than 3	Neutral current events New list of recommended atomic weights Big European bubble chamber of CERN	Discovery of a bacterium which could live in the (presumed) environment of Jupliter Tridimensional structure of a t-RNA Bidirectional growth of the chromosome of Escherichia coli Atomic resolution of double-—elix structure Second artificial gene synthesized	Superconductive Nb, Ge alloy at 22,.4 K New titanium alloys prototype of an electric generator based on superconductivity
1974	Helios flies to Sun Venus and Mercury photographed by Mariner 10 Mars 5 on Mars Jupiter's 13th satellite discovered Radio message sent from Arecibo observatory to M31 Methylammine discovered in interstellar space	106, 107 elements discovered LAMPF (meson factory) in function New heavy neutral particles discovered: signs of the existence of fourth (charmed) quark?	End of the third phase of international Biological Programme Conference on world population at Bacarest a-thalassemy due to genic deletion	First superplastic alloy discovered Silicon strips for solar cells Raw materials (Managenese) from ore deposits in ocean floors
1975	Jupiter photographed by Pioneer 11 Apollo-Soyuz mission in orbit	Neutrons obtained by means of laser implosion		Big Tokamak designed for nuclear fusion

THE IMPACT OF SCIENCE & TECHNOLOGY ON CULTURE

The approach to social change through technology has a particular appeal and significance for our own age. The rapid changes of our society are obviously related to and somehow dependent upon the development of new techniques, new inventions, new modes of production, new standards of living. We live more and more in cities and in the city and particularly in great cities the external conditions of life are so evidently contrived to meet man's clearly organized needs that the least intellectual are led to think in deterministic and mechanistic terms. (10) The most novel and pervasive phenomenon of our age is not capitalism but mechanization of which modern capitalism may be merely a by-product. We realize now that this mechanization has profoundly altered our modes of life and also of thought (11).

Mechanization and Social Changes

Attitudes, beliefs, traditions, which once were thought to be the very expression of essential human nature, have crumbled before its advance. Monarchy, the divine ordering of social classes, the prestige of birth, the spirit of craftsmanship, the insulation of the neighbourhood, traditions regarding the spheres of the sexes, religion, politics and war, have felt the shock. The process, beginning with the external change and ending with the social response, is easy to follow and to understand. Take for example, the profound changes that have occurred in the social life and status of women in the industrial age. Industrialism destroyed the domestic system of production, brought women from the home to the factory and the office, differentiated their tests and distinguished their earnings. (12)

Direct and Indirect Effects of Technological Changes

That the tendencies these described are at least accentuated by the mechanization both of work and of the means and conditions of recreation is clearly established by a great mass of evidence. It can scarcely be a mere coincidence that in the periods and in the countries of rapid technological advance there

should have developed corresponding or congenial ways of thinking and of living. Nevertheless, we should be way off concluding too hastily that social relations are in al important respects predominantly determined by technological changes. This conclusion would hold only if culture also the values men set before them as ends for which to live were essentially the product of technology. But culture in turn seeks to direct technology to its own ends. Man may be the master as well as the slave of the machine. He has already rejected many of the conditions that accompanied and seemed to be imposed by the earlier technology of the industrial revolution. He has taken some steps in all civilized countries to place a variety of controls on factory toll, on the sequtor of factory towns on the shoddiness and ugliness of many factories made goods n the risks and fatigues of many factory operations. Men are critic as well as a creature of circumstances. (13) Therefore we should distinguish between the more direct and less direct social consequences of mechanization or other technological process. Certain social consequences are the inevitable results of technological change, such as a new organization of labour, the expansion of the range of social contacts, the specialization of function, and the encroachment of urban influences on rural life. Other concomitants, not being inevitable conditions of the operation of the new techniques, are more provisional or more precarious, such as the increase of unemployment, the intensified distinction between an employing and a wage-earning class, the heightening of competition, and the prevalence of mechanistic creeds. In the remaining sections of this chapter we shall endeavour to show that the deterministic theories which make technological change the dominant or overruling cause of social change are one-sides or misleading, but first it is well to insist on the positive aspect and show by citing some recent developments how real and how important an agency of social change is the quest of modern man to discover and to utilize new techniques, new and more efficient methods of accomplishing his ends.

INTERPRETATION

Every technological advance by making it positive for men to achieve certain results with less effort or at less cost, at the same time provides new opportunities and establishes new conditions of life. The opportunities or some of them are frequently that anticipated in the development or exploitation of the new devices, the new conditions of life are in large measure the necessary and unanticipated adjustments to the new opportunities. A few illustrations will bring out to distinction.

New Agricultural Techniques and Social Change

The improvements in the breeds of cattle, in the use of fertilizers, in the varieties of seed, in mechanical labour saving devices, and so forth, have had as their direct objectives. The increase in the quantity and quality of agricultural production, but as concomitants of the attainment of this objective there have been changes in farm economy and in the manner of life of the farming household and these changes in tern have stimulated new and difficult economic problems [(14)].

Advances in Communication and Social Change

Even more far-reaching and complex are the social changes that spring from the development of the techniques of communication. For communication is at once a primary condition of social relation and a basis of nearly all other forms of technological advance. The course of civilization has been marked by constant development of the means of communications, but never so rapidly as in our own days, when electricity is not only being adopted as motive power in place of steam, not only is a factor in the improvement of automobile and airplane, not only makes the motion picture a vast commercial enterprise and television a promising adventure, but also resuming its distance–annihilating range, becomes in the radio a voice that is heard simultaneously by millions over the face of the earth[(15)].

The radio, for example, affects a family situation greatly influenced by modern technology, on the other hand by enabling an individual to address great multitudes, it makes the rapid rise

of new parties of social movements possible, provided the broadcasting system is not itself politically controlled. In the latter event it tends to produce the opposite result, becoming a most powerful agency of propaganda monopolized by the ruling power. This last illustration should serve to show that what we call the 'effects' of invention are in large measures dependent variable of the social situation into which they are introduced.

The Control of Atomic Energy and Social Change

The most spectacular illustration, however, is that offered by the epoch-making discovery of a way to make atomic energy serviceable to human objectives. Like so many other discoveries of modern science, this new agency is available equally for destructive or for constructive purposes, as an agent of war forebodes the most appalling annihilation of all the works of man. As an agent of peace it may ultimately bring an unprecedented era of plenty.

The Modern Significance of the Technological Factor

It is scarcely too much to say that every major problem of modern society is either initiated by or at least strongly affected by technological change. Conflicts between states, as they strive for dominance, for security, prosperity are in so small measure concerned with committed ambitious to secure or control areas rich in oil other resources crucial importance to modern industry. Again the specialization of functions in a modern economy gives rise to a multitude of organized groups, each of which seeks its own economic advantage and each of which has the power of withholding a service that modern interdependence renders indispensable. On the other hand these groups are affiliated with or incorporated into massive federation or combinations (16). These in turn exercise a correspondingly greater power, so that the disputes arising out of their clashing interest sometimes threaten to disrupt the whole social order.

Interestingly, most of the changes (17) that projected did not occur in the twenty- fifth century but in the twentieth century not

in six hundred years but in approximately thirty years .In other words, these developments were a part of the experience of many people living today people whose experiences have carried them from the horse-and-buggy life of the early part of the century to the electrical, nuclear energy and space travel world of the seventies. Kenneth Boulding [18] views our present century, as the middle period of a great transition in the history of the human race. Within this period and within the memory of living people is a kind of dividing point or watershed that separates the history of man into two parts. During the first part man moved from a pre-civilized to a civilized society. At present he is involved in a second great transition one moving from a civilized to a post-civilized society. Every day of every year there are new advances in human knowledge, man's cultural heritage is enriched and the potential content of education as a whole increases accordingly the new forms of knowledge are often accorded greater importance than older forms.

Science and technology need to be included in the curriculum not only because these are important forms of knowledge, but also because they are the kind of knowledge which is particularly relevant in our society for economic survival, for participation in decision making about such key aspects of life as pollution, hunger and conservation. And more fundamentally for an understanding of modern man, educational policies reflect the aspirations of a nation [19]. From the very beginning in all our educational policies the education of science and technology has been stressed, because curriculum development is directly linked to human development and its unbounded potentialities. Under such circumstances both the field of curriculum planning and the work of curriculum co-ordinates are modified.

Until a few decades ago it was reasonable and proper to think of the past fading into the present and the present flowing into the future. But now there is reverse of the tide, the future has become so jammed with potential and variable that there is an overspill from the future into the present.

The improvement of learning can be induced through chemical and electronic means the transfer of experience is now possible. The possibility of manipulating human behavior and modifying personality is not only by the use of drugs but through systematic stimulus control and neurosurgical intervention.

Experimental drugs use perfected so as to control perception, mood, fatigue, alertness and fantasy as well as for more radical personality changes. For personal problems 'artificial' relaxation thereby is used to relieve tension when harmful levels are reached. The use of drugs to enhance the efficiency of learning have already achieved limited success along with chemical control of some mental illness. Current projections also include means to raise the level of intelligence [(20)].

Many individual, physically helpless can have their handicaps reduced or eliminated by,

- Human organ transplant
- Plastic Surgery
- Electronic implants
- Improved there by

Promising medical research and experimentation has contributed to our understanding of immunology transplantation of healthy organs to supplant those of the individual's which are diseased or injured through accidents. Genetic controls of birth defects and leseclitacy factor influencing the physical nature of the child as well as prenatal selection of the sex of the unborn infant are now a possibility [(21)]. We are now only beginning to understand how our biological potentialities can be improved, varied and more fully utilized.

Technological developments have a vital role in making the world unimaginable. One possible system relates to the encompassing social implication of the growth of computer technology. The computer is an extension of human mind. The

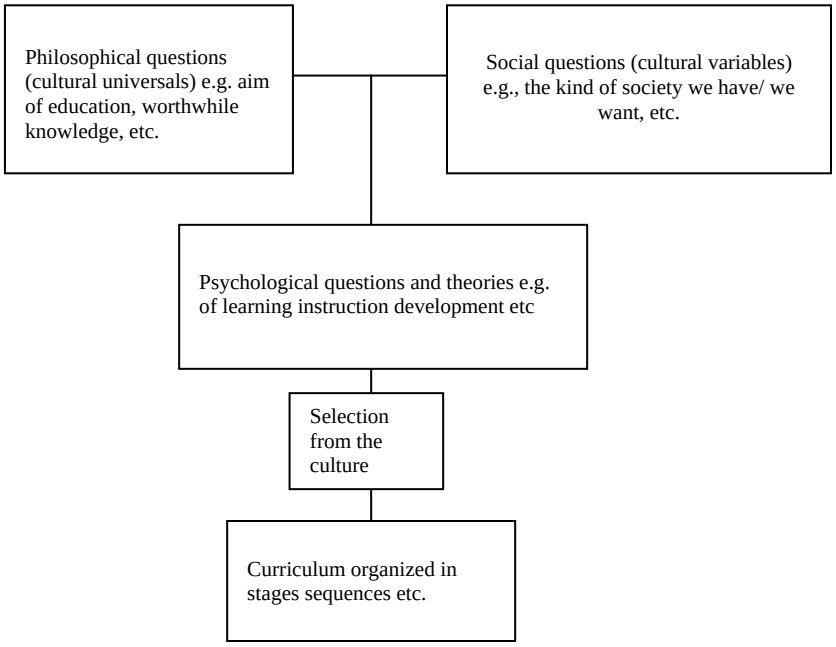
impact of computer is just as great and indeed of the whole world electronic network which represents a human extension of human nervous system.

CONCLUSIONS

It can be concluded from the above survey that:

- At the end of 20th and beginning of 21st century people looked ahead with optimism and hope. They believe that the relation application of scientific knowledge and technical skill would remake the world in an era of peace and prosperity.
- New Pakistan's image of future is intimately tied up with advancement in science and technology. If we want to modernize the social order and keep pace with the fast changing world this shall have to be reflected in our education.
- Educationists especially the policy makers and curriculum developers must look for the cause of present human unrest all over the globe.
- In spite of STR, economic gap is widening between developed and underdeveloped countries. There are conflicts today among nations and as a result of these conflicts the whole world is suffering from 'TERRORISM'. The root cause of which are poverty, dehumanization and injustice, as a result of these major problems it is the responsibility of educationists especially the curriculum developers and planners to introduce concept about 'TOLLERANCE' in the curriculum.

Relationship Between Culture and Curriculum



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