Rural development through education

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The great divide

The people of India, under the leadership of Pandit Jawaharlal Nehru, have given a high priority to science and technology. In over fortyfive years since Independence, we have made considerable progress in agriculture, industry and also in the development of our own technology. But we must admit that the world has been moving faster and the gap between the developed countries and India is, if at all, even wider. And worse still the main problem of poverty is still looming large. The divide among the haves and havenots, has increased. Every step forward that we take in science and technology, seems to even widen this divide. The green revolution, which has undoubtedly helped the nation to be self-reliant in food, is also being accused of being responsible for widening the gulf between the rich and the poor. There is something seriously wrong in our approach, if a great step forward, like agricultural research is also widening the gulf rather than narrowing it. How did this divide arise and what adds to it? How can we bridge it?

Knowledge, like all wealth grows exponentially. Any flaws in the distribution of this knowledge will therefore have a much more visible effect on the distribution of knowledge and wealth among the sections of society. My perception is that a large section of our society is severely handicapped with regard to some intellectual skills and are therefore unable to use the available knowledge that flows past them. They therefore remain poor while the knowledge makes those who receive it, richer. All sections of the society do not receive the knowledge uniformly, because of the flaws in our knowledge distribution, i.e. education system. To make matters worse, those who are responsible for the distribution of this knowledge, the educated in general and the educationists in particular, do not appreciate the quantitative significance of this handicap. They are therefore equating raising of educational standards with increasing the content of the syllabus or increasing the level of literacy. These effects are likely to be self-defeating, as the enlarged syllabus makes it even more difficult for the educationally handicapped to cope with the changes. Similarly, every disillusioned literate can be a disincentive for the neoliterate. What are these handicaps and what can we do about them so that we can remove these hindrances to knowledge flow?

Characteristics of good education

Education should be an enjoyable experience. After learning something new, one should be eager to use that learning in real life and get the satisfaction of having learnt it We see this in children. A child is eager to learn, to walk and to talk. It is a pleasure and it keeps trying, and practicing. A child learning to ride a bicycle enjoys the learning process and would find every excuse to take the bicycle out and use the newly acquired skill. All our learning experience should be a pleasure and we should be keen to use it in everyday life and gather the experience. If we can achieve this even to a limited extent, everybody will have true knowledge born out of practical experience and therefore usable. Moreover, they would be keen to use it. All development springs from human knowledge, and the endeavour to learn more and more. In such a society, development will be a direct consequence of an effective education system. Such a true development will be a constant effort to improve one's own life. A development that is the result of proper education will be a true sustainable development.

Piaget theory

Jean Piaget was a biologist who drifted into the psychology of learning and worked for 40 years to develop a cogent theory that is now widely accepted. This theory has great relevance to India's problems.

Very briefly, the child is born with the human biochemistry and a few instincts – among them the ability to grasp with the thumb and the fingers and to suck. With this and the inherited nervous system and the brain as the 'hardware', the new born child interacts with the environment and gradually builds up a picture of the 'reality' outside, by creating a mental structure in its own brain It continues to learn through such an interaction with its environment and builds up a 'model', by a process of assimilation and accommodation. It continues this learning process throughout its life and uses this model to anticipate results of its actions in the real world

This natural process of learning is analogous to and is perhaps the origin of the scientific approach consisting of observation, recording, study, making a hypothesis and verification by further experiments/observation. It is worth noting that this natural method of learning is never completely lost or given up. Every one continues to learn by this method throughout one's life, experiencing the pleasures of learning as well as the keenness and satisfaction of finding a use for it. The human child or the adult form, however, may not use this method in its formal and conscious learning stage.

This is where our problem starts. This process of learning cannot be expedited by giving information from others. Where the prerequisite structures or concepts are not formed, we cannot teach anything based on these concepts. Thus for example, a child of 3–4 years that does not have the concept that a volume of a liquid remains constant, even as we pour it from one vessel to other cannot, understand properly the methods of measuring volume in a measuring cylinder. If at this stage we pressurise the child, it will adopt a self-defence mechanism of reproducing to us what we wish to hear, without really understanding it. This is the beginning of rote learning. If this pressure teaching continues long enough, the child and then the adolescent and adult adopt this unthinking 'learning' as the standard method of formal learning

This is what we have achieved in our education system. The same child however continues to learn by the natural and scientific method in its real life outside the class room. One can see the approach to their method of solving simple problems such as untying a knot or repairing small gadgets or devices. Here one always uses one's own observation and previous experience and makes a hypothesis about what has gone wrong and what needs to be done. *A good education system should therefore expose the child to diverse new experiences, so that the child's mental horizon broadens and it can form its own concepts that strengthen the natural (scientific) learning system by a process of observation, hypothesis and experience.*

We have experimented with a course designed for rural areas with the above objectives. We give a wide range of experiences, that excite the child and which it can put to use in its daily life. Such a system allows it to learn without tension and use the acquired knowledge, to some purpose. Admittedly, this happens only partially but the benefits are very marked.

This course has been accepted by the Maharashtra State Education Board for the SSC examination from 1985. Now the State is planning to introduce it in 30 more schools on an experimental basis and if successful, it could be extended to all secondary schools in Maharashtra.

Principles of the RT system

The basic principles are: a. multiskill training, b. using the acquired skills in real life conditions, by giving services to the community, c. the community paying for these services on cost plus basis, d. using the surplus as an incentive to staff and students.

Multiskill training not only broadens the horizon of experiences of the growing child, but also gives it the capability to act – it has now acquired some commonly required skills so that it can concretize its ideas on solving its own problems. The child becomes a handyman. Also the rural problems, and often all problems at the ground level need a multidisciplinary approach to understand and think of a solution.

The multiskill training programme also reduces the cost of education because, at a given time, a batch of students is working with different pieces of equipment thus reducing the number of equipment required to give hands on experience to all students. For the same reason the school equipment has greater utilization. Also being equipped for a variety of jobs, the school is in a better position to meet its own requirements for equipment as also services.

Using the acquired skills in real life is facilitated by giving services to the community. The provision of services not only brings realism to education, but links education to the rural life and also the community. It establishes relevance, gives ample opportunities to allow interaction between the staff and students with the community, and encourages them to understand the needs and use their skills for meeting these. This is development at the base level. It also gives confidence to the student to later start on his own if he wishes. This is a necessary step to encourage both invention and enterprise. Every one is not inclined to do that but given the right environment, the seeds of invention and enterprise can germinate.

The community pays for these services. This economic transaction is necessary. It brings the criterion of economic viability in what the teacher teaches and the student learns. It also reduces the cost for both the user and the giver. For the school, part of the equipment cost and most of the material cost is borne by the community who use these services. Also it is an evaluation and quality control mechanism, by the community. If they do not use these services, either they are not relevant or they are not good. We have found this is the least cost solution for providing services to the rural area. By providing services through the educational system, the demand for these services increases until they become commercially viable; thus it lays the foundation for creating new job opportunities.

By provision of essential services through schools, even in areas, where such services are not commercially viable because of low demand levels, the community benefits and therefore can be induced to pay the cost of the equipment and other infrastructure facilities for starting such a programme for the school. By thus involving the community, the financial burden on the government is reduced thereby making it economically feasible to consider such a system for more secondary schools. This also makes it possible for the community to demand the services from the staff and the school as they have invested in it. The community now has a stake in the proper functioning of the school

Using the surplus as an incentive The distribution of the surplus allows the staff to be given a core salary for the time they spend on actual instruction. The remaining time is then available for giving services to the community, on a cost + basis. The earnings of the staff are then linked to the level of services. At the same time the students have an opportunity to get hands on experience. The community gets the services it needs. All are benefited. There is also a healthy working relationship between the parties concerned.

The experience

This type of system has been under trial through Vigyan Ashram, Pabal since 1983 in one school and in four more schools from 1988.

The important conclusions from the past 10 years experience are as follows: (i) There is better academic performance by students, in spite of diversion of 20% time to this 'prevocational' training. (ii) Where the cooperation of the school is not forthcoming, this can become a farce; some benefits still accrue and the students do feel the interest. The programme failed miserably in one school located in Khamgaon, where our link was poor and the school did not operate according to our procedure. (iii) The school and the community has immense potential for benefitting and is willing to collect funds for it. This was shown in 3 schools where we posted our trained teachers, but left the management to the school. (iv) Community services can rise up to Rs 30–50,000 per quarter or be as low as Rs 200–300, depending on the initiative taken by staff and the Headmaster. (v) It has an indirect effect on the community, it reduces superstition, brings a modern outlook etc. (vi) It provides for non-formal training of school dropouts, in the same system, and the two complement each other.

Table 1 shows the kind of services the community gets through the school at moderate charges.

The real significance of these services will become clear by considering some of them closely They show the potential

Table 1. Services provided through school

Workshop fabrication and repairs	Blood and urine medical tests*
Electrical wiring and repairs	Agricultural products tests*
Water prospecting, electrical method	Soil analysis*
Hand pump repairs	Pest management
Construction work	Poultry & dairy* products sale
IC engines and tye service	Drinking water tests & treatment*
Plumbing and sanitation	Sewing and knitting

*Theses have not yet been extended to all the schools

of the system. A feature that has brought flexibility into this course is the project work Each student selects four projects to be completed in the final year – these are designed to consolidate his learning and should result either in an asset for the community or a significant service.

This years' (April 1994) school students in Pabal have built two WC units. completely from making the bricks to the finished units with hand flush system. septic tank. etc. The girls have built a water tank and piping for the same Another group of girls have done blood grouping for 106 students of the school, who paid the Rs 5 charge.

Earlier. groups of girls have done haemoglobin estimation in primary school children and advised parents of anaemic children about diet changes and made tests again after 3 months. A group of girls have also built for the Balwadi kids, a cement slide and a steel see-saw and merry-go-round.

Boys in another school have built a steel roofing for a farmer at a saving of Rs 10,000 which prompted other villagers to place orders for similar roof structures. and the school completed these orders Loni and Dhamari schools have built all the steel roofing for their own workshop building. Loni has built the drinking water system with piping for the primary school in the village They have done hand pump repairs, tested drinking water quality microbiologically, studied alternative methods of treatment for purification, have built wheel barrows. to improve productivity, built their own class room and workshop sheds, bench and pipe vices and a host of other items that satisfy some rural need. Many of these have been thought of by themselves

A programme like this has not only encouraged invention among the students, but also among the farmers. Having a possibility of concretising their ideas, many farmers come to the schools for fabrication of something to their design; it can be a farm tool or a modification in the housing design. It has fought superstition and ignorance, for example, by providing the villagers an electrical resistivity method for locating groundwater or making available a laboratory test. for confirming pregnancy. Where scientific methods are brought in, superstition disappears.

The potential of these youth. once labelled, 'dropouts' is opened out. They are now the mainstay of the programme; they are the teachers who train the formal school students: they are the ones who did the development work on the geodesic domes and other new construction techniques; they are the ones who have developed the micro tractor, of 6.5 HP, available at a cost of Rs 37,000 a truly multipurpose farm implement; they use the computers and manage all accounts to the satisfaction of the professional accountants, manage all databases, do costing on spreadsheets, etc.

The spirit of the system is seen from the fact that the workshop is a beehive of activity, often even at night; every one is learning something new. And the learning and application go together.

This illustrates how the system makes the education more relevant by serving the community. It is thus clear that this education system brings development to the rural society. through the school as the change agent

A system is now being set up by which the communities who opt for such a system of technical pre-SSC education can be provided with teachers and guidance in starting and linkages for the progress.

Already plans have been made to involve higher technical education establishments as resource groups for the training of instructors for such Rural Technology schools. The students and the staff of the polytechnics and engineering colleges will do development projects in real life situation, that sharpen their technical expertise. A network of such institutions is being built so that sharing of experiences and their documentation is taken care of. An information and referral system is being built involving the S&T establishments so that needs are defined in technical terms at the grass roots level and then the problems along with the background economic and social data are presented to the group where the challenge matches the talents. The R&D scientists and engineers should therefore not have to worry about how to deliver the new technology to the field user. This programme has been made a part of the programme of action of the Ministry of Human Resource Development as approved by the Parliament.

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