

Technology Delivery Through the Educational System

An ideal Technology Delivery System (TDS) must enable the target group to attain the full potential of the technology, even in the face of changing circumstances. This is possible without distortion. The technology must also be flexible enough to overcome small disturbances in the economic environment and the communication must convey this flexibility.

In order to achieve the above objectives, it is necessary to define the target group, know its strengths and deficiencies and match the technology communication to the skill level and susceptibilities of the target group. Generally in printing media and person-to-person communication will depend on print and non-printing (audio-video tapes) has the advantage of being constant and therefore can be referred to again and again. There is therefore no or minimal distortion. But it is not flexible and once recorded cannot be changed with the target group. These are suitable for mass communication – but does not ensure equal effectiveness in all sections of society.

Person-to-person communication on the other hand is slow, expensive and the communication is likely to be distorted during communication. But it has the advantage of being adjustable to the needs of every individual person.

To day in India we use both the above modes in different proportions. The organised sector uses printed technology transfer documents (text and drawings) and person-to-person communication is used to supplement the document. The audio-visual communication through person-to-person contacts.

Let us now see what are the hurdles in these technology communications reaching our target group – the below poverty line and other weaker sections of the rural society. For this we should first define our target group and its capabilities and weaknesses.

Our target groups is mainly the EPL – below poverty line, section of the society, and other weaker sections. The members of this group are generally illiterate or neo-literate, and are not comfortable with the printed matter. Their familiarity with numbers does not go beyond simple additions, decimals and calculations involving direct proportions are beyond most of them. They have an aversion or fear of writing down any information or instructions. They cannot retain a chain of instructions given orally – nor are they inclined to write them or read them. They are generally do not understand symbolic diagrams as against actual pictures. They are generally poorly trained in all measurements and have only a limited access to tools of measurement.

It is obvious from the above description that printed matter cannot be the ultimate technology carrier for the BPL sections of the society – which is our target group. Even the recorded audio-visual communication meets a barrier except in the simplest of communications. Thus the technology that produced the Green Revolution – requires the farmer to use a certain rate of seeds per unit area, apply a definite proportion of fertilisers or pesticides and also make some other simple calculations for deciding on irrigation or calculating profitability. The majority of our target group cannot do any of the above operations and therefore the Green revolution has passed them by – in spite of the loan, subsidy and other government schemes. The lack of simple language and arithmetic skills in our target group leaves only the person-to-person communication as the ultimate delivery system for our target group. But if we plan to organise training and demonstration camps for them, numbering hundreds of millions (nearly 50% of the population) for various technologies – the cost will be prohibitive and the progress will be slow and uncertain. The teachers/ organisers have to be paid and supervised, the participants have to be compensated for attending training camps and the cost of materials demonstrations must be borne. Also in such training camps, the participant is at best doing a "technology" along with others in a location away from his home for a finite time. There is high probability that after going home, where he tries to reproduce the same results, he is unable to do so – and then he has no body to refer to and forgets about the training.

So training camps apart from being expensive and slow are far from satisfactory in delivering the technology that can have a long term effect.

The Transmitter – Receiver Concept: We have a large number of radio and TV broad-casting stations. These communication are all over the world as electromagnetic waves. But only these suitably equipped with "receivers" can tune into them. Different technologies are constantly being "broadcast" in various modes. Only those who are suitably equipped (with prerequisite knowledge skills) can receive them and exploit them. So our ultimate goal should be to raise the mental skills level of our target population such that they can receive and have access to the technologies they need. This is what education really means. But this will take a long time. In the immediate future, can we set up a "received" in every village and hamlet that audio visual messages, master it and then give it in person-to-person contact to the BPL sections in the village ?

The organisation that reach into every village are – 1) The Gram Sevak and the Gram Panchayat in the BDO-Zilla Parishad Chain. 2) The Patwari/ Talathi in the Revenue Departments hierarchy. 3) The village school in the Educational system and 4) The commercial trade and retail distribution network.

In the past we have tried the Gram Sevak as a motivating channel and also as a technology Delivery System (TDS) Even under ideal conditions, there is a limited to the number and variety of technologies that could be delivered through one individual. The patwari route is not available because the Revenue role takes precedences. The commercial – trade network is good for delivering goods but not knowledge. This leaves the Education system as the only option worth exploring.

In a sense the Education is itself a "technology" delivery operation so there is a commonality and nearness between the two operations that has yet to be exploited. The Education – Development link has always been recognised. Teachers have been at various times given the "additional" assignments, considered to be of national importance e.g. motivation or family planning etc. The students also are supposed to be involved in social service, socially useful productive work (SUPW) or work experience, social forestry etc. But their role in converting Education as a TDS is entirely different.

What is envisaged is 3-tire technical education schools in the rural areas. The three levels will be at 2 level (11 and 12 stds) at block level minimum the secondary schools level (8th – 10 stds, at least 2-3 per block) and work experience sections in other schools, also at 8-10 level, but in all secondary schools. These schools will be equipped with Agro-engineering facilities to differing levels. These schools will have trained instructor who will give practical instruction to students, who in turn will provide service as part of the curriculum and take part in field trials/ demonstrations of new technologies – teaming up with farmers/ villages who can use the new technologies.

The curriculum for Secondary and Higher Secondary schools covers water resource development, construction, workshop technology, energy and Environment agriculture, animal husbandry and home and health.

These topics provide ample opportunities for the students to give community services in the following areas. Water shed survey; water prospecting; pump repairs; plumbing; low cost construction; fabrication and repairs of engineering/ household goods; conventional and non conventional energy devices; diesel and petrol engine maintenance; and minor repairs; electrical services motor rewinding; irrigation systems; nursery plants; agriculture consultancy (practices for various crops); pest control services animal health services; poultry services; first aid and health surveys etc..

The skills taught in the school work experience classes will be these that need minimal equipment facilities. Starting from simple measurement, calculations and recording, conducting surveys and collecting information, they can cover electrical wiring, biogas maintenances, bicycle and moped servicing and repairs, tyre-tube vulcanising service, fertiliser and pest control services, low cost construction and petty repairs, etc. The prevocational education will give more substantial and wider range of skills than work

experience, and prepare a wider base of experience after which the students can specialise in any one of the vocations in the 2 stages.

The school-villager transfer takes place at person-to-person level. This will be more effective than a training camp because – (1) these will be one to one student villager team testing out and learning a new technology/ skill. (2) the difficulties of the villagers (computations/ reading/ measuring etc.) will be made up by student and vice versa. The staff member of the school will be constantly available for reference and help if problems arise. (3) Any problem not solvable at school level could be referred to the institution of higher experience, engineering or agriculture colleges etc. (4) there will be cross utilisation of experience within the village groups. (5) No extra costs of training camps etc are incurred. (6) training period extends until the technology is fully internalised in real life situation.

Now we shall consider the question of how the multiskill staff in the school can be trained and fed new skills or technologies. After a basic course in rural technologies, the multiskilled instructors are quick in learning –even self learning of new skills in very short training periods or from audio-video and printed material. They need some time to practice these skills to reinforce what they have learnt and they are ready to give their service to others. We have shown this when our staff learnt many skills, vulcanising of tubes, moped repairs, diesel repairs, motorised prayer repair, motor rewinding, poultry, artificial insemination of goats, etc without outside teachers. This is a tremendous advantage. Apart from reducing the cost substantial growth possible. This in fact will be the take off stage for the individual, because he grows by himself thereafter.

The multiskill instructor at the secondary and higher secondary level can be initially trained through the community Polytechnics scheme, Krishi Vigyan Kendras and Health Extension Services. Both instructor can handle 20 students in the practical lessons and can handle six batches per week, each for six hours. That is can give instruction for 120 student days per week. The equipment cost a per school at different level are given later in this note. A system like this integrating education and development/ community service, acting as a technology delivery system has the following advantages potential pitfalls.

Advantages :

1. The system can reach every village at minimum cost.
2. It can handle villages of different levels of skills/ development.
3. The system not only delivers the technology also. This will be a great advantage.
4. The technology carrier being a local resident is always available for consultation. This inspires confidence.
5. The technology is taught in the place and environment where the recipient is gain to practice it.

Possible Hurdles :

1. The multi skilled instructors have to be taught through community polytechnics, voluntary agencies, Krishi Vigyan Kendras etc. co-ordination will be slow.
2. The schools need to be given initial equipment – a capital investment. The estimate to cover the whole country are as followings:
5,000 higher secondary schools @ Rs.2.5 lakhs each 12.5 X 10 or 125 crores
10,000 secondary schools @ Rs.1 lakh each 10X 10 or 100 crores
40,000 other schools for work experience @ Rs.20,000 each 80 crores

Total of 305 crores for covering the entire country.

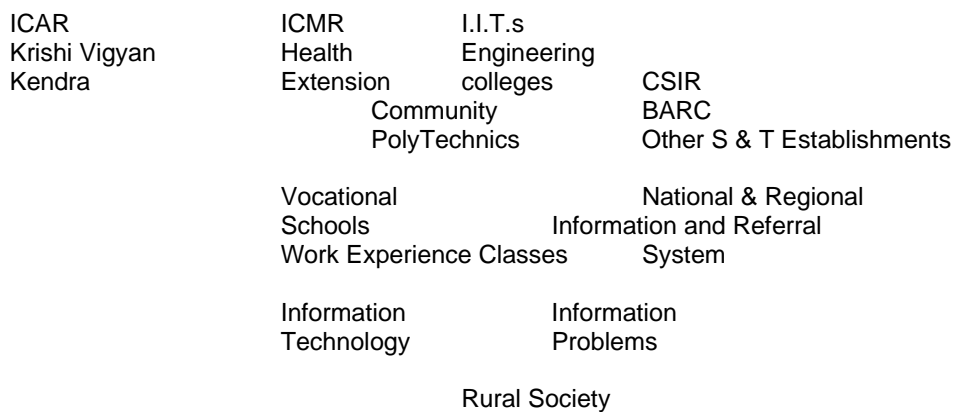
This is relatively small sum to invest, a one time investment, to cover the entire country with a far reaching educational and technology delivery system that does rural development at the same time. It will besides generate more assets located in rural areas and operated by rural youth. None of the structures will be huge concrete buildings built by urban contractors.

3) The recurring costs of these will be about 150 crores per year, going into rural areas. This may ultimately reduce by the community that gets the benefits agreeing to bear part of the costs.

4) A possible objection can be that "so many schools do not even have a blackboard or a teacher, how can they be delivering technology?"

- a) It is secondary and higher secondary schools who will be the TDS not primary.
- b) Even the secondary schools are far from satisfactory. But if we give them up for a lost cause, can India have any future? We can't write off the education system as a whole. On the other hand this scheme giving a relevant technical education is actually designed to stimulate the intellect and will do wonders to the educational system, if it is worked as planned. This will be a greater gain from this than the to technology it delivers.
- c) The school workshop is ideally suited to give the class room building and the blackboard sanitary facilities etc. at less than any contract ors costs. In fact this should be the first Technology delivery assignment to this system. It will boost morale of all teachers.

Net work Diagram Education – TDS system.



A Technology Delivery System will not function long term unless it is also linked to the information system that feeds grass roots information (technical economic and social) into the Research and Development Wing. That is it must receive as also transmit information.

For this purpose again the rural youth, the students, the Nehru Yuvak Kendras and the Jana Shikahan Nilayams and all villages youth groups should be involved and trained to discuss their problems, collect relevant data quantify it, identify the problems, spot opportunities, and then use the referral system for their solution. In the referral system, the problems and the relevant information travels in the direction of increasing expertise and the problem is referred the group where the challenge of the problem matches the talents of the research group. Such a scheme has been elaborated for the Ministry of HRD during the appraisal of the community Polytechnic Scheme, in 1987.

The proposal for the Technology Delivery System through schools, described here, really involves only networking or the various schemes already included in the programs of the various Ministries viz.

1. Community Polytechnic Scheme.
2. Vocationalisation of Education
3. Jana Shikshan Nilayams & Neharu Yuvak Kendras all the from Ministry of HRD
4. Krishi Vigyan Kendras from Ministry of Agriculture.
5. Health Extension Programs Health and Family Welfare.

Additional funds will required only to the extend the coverage is to be extended beyond present plans. But the networking of these schemes will increase the benefits beyond these of the individual schemes. And then Education will really lead the development.