

## VOCATIONALISATION OF EDUCATION; WHY, WHEN, AND HOW.

The Divide, India, and Bharat:

The divide between the educated and the illiterate, between the urban and the rural, the successful, and the unemployed, the organised factory worker and the landless labourer, is growing day by day. It is almost that we have two nations, coexisting and cooperating to some extent on the same land; India going towards the 21st century and Bharat still struggling to come out of the 17th century. No nation can progress fast unless there is enough homogeneity and mobility across the society in terms of talent, education, and capability.

We are facing problems; our population is expected to cross the 1000 million mark end of this decade; our food production still need to go over 220 million tons from the present 170, and that too with less land. We will have to provide about 15-20 million new jobs every year to keep pace with the rising population. We will have to struggle hard even to maintain our present quality of life; then how can we plan to raise 40% of our population above the poverty line, and hope to catch up with the developed nations of the world?

Any solutions to give employment through large national development programs are only temporary solutions and will use more labour in the unskilled category and bring relatively less returns and probably get-into financial and organisational problems. The only true and lasting solution is to upgrade the quality of our vast human resource, so that they can work creatively and produce development. Education must lead to development, and not just supply the manpower needs brought out by development.

It is in this context that we have to look at our plan for vocationalisation of education; not at the targets of 10% or 25% only. They are only short-term targets.

Capability To Act

We already have a vast educational system. It covers large number of primary schools, about 40,000 secondary schools and extends to a large number of universities, technical colleges, IITs, National Laboratories etc. We claim to be among the first four in technical manpower, yet we know that we are not able to lift ourselves out of age-old poverty.

What most of our coming out of education, at any level, lack is the capability to act?

They have information but do not know how and when to use it. If they get any idea. One solution to this, is to give everyday hurdles, they lack the skills and the hardware to implement the idea. One solution to this is to give vocational education to a larger segment of the student population. Will it solve the problem? Even those who are getting engineering education; or the trades in the ITIs don't seem to be able to stand on their own; in fact their frustration when they don't get a proper occupation, and can do nothing on their own, is perhaps even more dangerous than that of a simple "SSC failed".

Another approach is vocationalisation of education. Here we are not thinking of vocational training for one stream, but to increase the vocation oriented components of all education for all students. This is what Mahatma Gandhi intended in his "Nai Talim" system; this is what was recommended by the Kothari Commission report through "work experience" and "Socially Useful Productive Work". But these have failed; I believe the failure has been in implementation and not of the concept.

The aim of education is not to give a package of information, but to enable the student to learn by himself thereon. The aim of vocationalisation of education is to give him the skills and confidence that he can make and build things, that he can act on his ideas and that he can acquire many more abilities through his own effort. This is the capability to act and propel himself forward.

This paper will try to indicate an approach that could make vocationalisation of education in this sense, a success, without asking for impossible resources.

Piaget Theory; Its Relevance to Us.

Why vocationalisation of all education? It should give the capability to act. Actually it does something much more fundamental. It stimulates and develops intelligence.

Piaget was a Swiss biologist, who drifted into the psychology of intelligence development, particularly among children and adolescents. Even if there may be some who question some aspects of his theory, it is non-widely accepted that intelligence is not inherited but acquired from interaction with the environment.

This interaction consists in the child/or the human engaging in physical actions on the outside world, and from its reactions he builds a mental model of the "reality" in his brain. With every one of our actions, we anticipate certain reactions in the environment; if our anticipation is correct, the mental model is reinforced; if it turns out wrong, our mind modifies the model to accommodate the new experience and thus assimilates some more of the outside reality. Thus, intelligence is related to the mental structures that each one of us creates in our mind to accommodate all our experiences. Thus these mental structures will be more complete and more useful; the greater the variety of experience it incorporates. Also if we force or induce the child to stop assimilating its experiences in the real world and preserve instead only "snapshots" of them, then it has not grown in intelligence but used up its memory for storing information it does not is now how to use. Its mental model of the "reality" has not grown in this state. This is what most of our present education seems to be doing to most of the students. They have information but not the capability to think and act. Thought comes from using symbols (beginning with Languages, numbers and pictures) in place of concrete objects.

He begins to manipulate the symbols or concepts instead of manipulating the objects in the real world. This is thought. It is much more economical in time and effort than actually handling objects. After some practice we learn how to assemble simple concepts into more complicated structures. This is abstract thinking. But where we cannot do abstract thinking, we fail back on manipulating the concrete objects active work. Thus abstract thoughts can be helped and supported by activity. If we do not do this, as happens in only book learning, the symbols and abstract thoughts lose their meaning and we do not understand what is happening.

Thus vocationalisation of education means involving in physical activity in the real world, which is relevant to the life of the student. This reinforces his concepts and helps him to develop his abstract thinking and thus stimulates his intellect. In fact it brings him back "on rails" so that he begins to learn from his experiences and improve his "model" of the reality continuously. This ability to think for him self and to possess skills of everyday relevance, gives him the tremendous capability to act. He can then progress on his own. This is what vocationalisation of education is for not just to teach him one vocation. He will not wait for someone to offer him a job. He will try to seek out the opportunities and create his own future.

Thus what we need is vocationalisation of education and not mere vocational education.

Skills Development or Vocational Training?

Both Vocational Education and Vocationalisation of all education will involve skills development. Where as in the vocationalisation, the skills development is intended to build the capability to act in a variety of real life situations, the vocational education gives skills for a specific vocation under well-defined limitations. Without the general skills development, the specific skill cannot help him to survive in the competition that is life. Therefore vocational education can only be useful on a base of general skills development. A jack of all trades and then Master of ONE. Thus vocationalisation of education is fundamental to all education and vocational education can only build on top of it and not substitute it. This has been the main reason for the problems we are facing not only in our new vocational education programs but also the poor quality of our general engineering and technical education.

Give our youth the capability to act, through general skills development as part of education; then he will not only choose new vocations to suit his own genius but also create new jobs from his enterprise.

When? Secondary or Higher Secondary?

On the basis of what has been said before, it will be clear that vocationalisation of education, in the sense of giving a wide range of skills through real life situations, should encompass all education, from balwadi to university levels. From the point of view of organisation, only at the secondary and higher secondary level will it involve greater investment in facilities and teacher training etc. In the lower levels of education, existing facilities, with a creative look at the syllabus and course content, we could bring in skills development and the intellectual stimulation. He need to give more practical projects for students to do; projects that involve looking around in their environment, measuring, surveying, talking to people, going to library and finding for oneself and of recording ones observations and thoughts. Learning to explore and try out new things. This will need reorientation of teachers, but teachers when they get the skills themselves, will adapt to the new needs.

In the secondary and higher secondary stages, we need to stress socially useful and productive work. They will now need to be given not only the skills but also the hardware required to do socially useful productive work and gain the work experience out of it. How much will it cost? Do we have the funds to make it feasible?

We have enough field data and evidence to show that the investment made in the hardware for the school at this stage, is not only not out of our range but that this can help to provide critical services to the rural sector, through the educational system, with the community paying for them. Thus this can be a good basis for integrating education and rural development. Furthermore these skills allow for the secondary and higher secondary schools to produce assets for themselves and other schools at much lower costs. Such an environment will also encourage inventiveness among the students, which is a very substantial gain.

Thus vocationalisation of education will cover all levels of education, but only secondary and higher secondary education will need to be considered for capital investment on this account. Between these, the secondary school should have only 'broad spectrum' skills training. The higher secondary stage may then give more modules for farther specialisation, if desired.

The Plan

Balwadi to Middle School (7th std)

In this period we shall not need much hardware or equipment but mainly a new look at the syllabus and teacher training.

It is important that the students do more work with their hands and also have acre projects, that involve them in talking to people in the community, visiting places, searching for information in libraries and from elders, writing observations and experiences and discussing with each other on-"technical" matters. They will also have practical work, involving measurement, simple calculations, cutting, sticking, decorating, painting, making models, organising team work, public speaking, playing roles etc. These activities will not cost much but will have to be provided at least 20% of the total time in the timetable, at the middle school level and 40 –60% of the time at the Balwadi and primary level. They will play an important part in allowing the children to discover new-concepts. Many of these activities can be in the form of games, dramas, songs, or travel. For example playing the role of a bank man, or a trader can teach not only simple maths but also more insight into the working of these services.

Secondary Schools, (8th-10th stds)

Here we need to introduce more skills to enable them to manipulate the environment around them. This will need investment of the order of Rs. 180-400 crores to cover all secondary school, at the rate of approx Rs. 40-80,000 per school.

This investment will not only bring about the vocationalisation of all education that is badly needed. It will in addition, also provide many services to villages, where such services on a professional basis are not viable now because of the diffused demand. Such services through schools have an effect of nurturing the demand and thus creating more income generating opportunities, more details and experiences of such-systems will be found in the references. This particular: stage is important because it will cover the proper age group, 12-15 who need the practical work for their intellectual development and also the vocational slant because many of them will not continue their education beyond this.

The Vocational Education:

A large majority of the students do not have the inclination to go for higher studies, if they could start earning a decent living. For them a vocational course at this stage is desirable.

After secondary school, they can go for ITIs, Polytechnics, or to Junior colleges leading to degree in Engineering, Medicine, Sciences, or the Commercial or Art subjects. There is an attraction for students to go to ITIs and Polytechnics, even more than for degrees in science or humanities. There is a clear preference for technical subjects. It is therefore unfortunate that the Central Vocational Scheme is linked to Junior colleges.

My suggestion is to link them to schools as of now but call them Junior Polytechnics; this will be psychologically, more conducive than Junior colleges with its implication of going- on to university. This will also give on to university to upgrade the polytechnic standards with more of practical work of higher sophistication. The degree courses will stress more theory and research. There should be no harm if after Junior Polytechnics, those who so qualify through an entrance test, could be admitted to normal Polytechnics.

The vocational course in Junior Polytechnics could be based on core skills plus an elective. This elective could be one of the modules representing a vocation. A better alternative will be the student chose the vocation he would like to practice and then goes on to acquire the minimum competencies listed in the requirement to 2 under Para "How? The Requirements." This will mean less number of different courses but much wider choice for the students to chose his vocations from it assumes that the teacher training and the linkages as mentioned in the above para are taken care of. The budget for such a course will not be greater than already provided for in the current Central Vocational Scheme.

The Junior Polytechnics, need not be attached to the junior colleges. It is better that they are-attached to schools not having junior colleges. It is likely, that many junior colleges, if rural areas may want to switch to such Junior Polytechnics. These Junior Polytechnics will cater for not only engineering, health/medical subjects, but also to agricultural, and commercial subjects. Thus the vocation could be steno, making squashes from fruits or opening a tea stall, or growing grapes; it could even be folk drama. Each Junior Polytechnic will, it is hoped, make a name for certain types at vocations, and students may go to them specifically if they are so particular.

The financial provisions made in the central vocational scheme currently should be adequate for the Junior Polytechnics. It is necessary however to change the training strategy as also the distribution of teachers for different vocations. Linkages with other S & T establishments will have to be provided for.

How? — The Requirements.

There are probably hundreds of thousands of vocations one can chose from. Moreover the list of vocations is not constant, it is ever changing. New ones are being created and old ones disappear. How can any vocational education program give training for any specific vocation? Therefore we need to evolve a strategy by which we can provide access to this ever changing variety of vocations and keep the choice open for the student so that has the horizontal mobility or maneuverability so that he can find a vocation that suits his needs and abilities.

The requirements for our system should be:

1. It must generate the motivation and the self-confidence for him to move forward on his own. He must be self-propelled.
2. He must have the minimum competency in the following
  - a. Survey of local market and economics; feasibility report preparation rudiments. Drafting project reports for bank loan application.
  - b. Identify core skills he needs, the ability to learn and practice those skills.
  - c. Know sources of specialist advice and how to use them.
  - d. Keeping records, accounts and management principals.
  - e. Price fixation, and cost reduction methods.
  - f. Study of competitors and alternatives.
  - g. Raw material sources and equipment selection
  - h. Planning and budgeting
  - i. Performance indices.

Though these terms look as if they are for a top company executive, a little thought will show that even a housewife does almost all the above functions.

3. Teacher Training on a large scale should be feasible. It is more difficult to train teachers in a wide variety of vocations than to train them in certain skills useful in all vocations.

Thus it should be possible to give "hands on" training to teachers in regard to the skills in the minimum competencies listed in No 2 requirement above. Thus they should be able to help the students to locate expert advice from books other individuals and then learn by himself, using the general skills given to him as a basic course.

This is the model that we have for thesis projects in universities. To some extent, project work in the final year of engineering courses is also similar. This kind of self-learning is really the crux of vocational education. Every vocation is undergoing change in methods and markets so frequently that any one who depends entirely on others giving him the new skills or information, will always be out of date and perhaps out of business too.

4. Community Involvement – Any educational program could become stagnant unless there is community involvement in terms of making demands for services and for up to date information.

The community involvement could be ensured by 1) making services available to the community for a fee. and 2) by getting the community to pay for the fixed assets before a new school is given the vocational component.

5. No such program can be successful in isolation. It must have the backing of a large and active group that can meet its knowledge demands. Every vocational school must be therefore interlinked with not only other schools but also with higher level Science and Technology establishments. Thus every vocational school should have access to an exhaustive information database covering technical, social, economic, and commercial information. This will have to be computerised. It must also have access to the experiences of other vocational students through publication in a suitable technical journal.

Education: Infrastructure for Development –

We are faced with the problem of finding new jobs for nearly 15 million new persons that join the workforce every year. Most of these will go into the unorganised sector. Planning for new jobs on this scale every year, even while continuing to use them for future years is not possible for any scheme, whether it is the land army or huge plan projects. No infrastructure for industry, like transport, or railway etc can help generate new industries that can absorb so many every year. This is apart from the finance that has to be found for all those big projects.

The population growth projections for India, along with the problems of overcrowding in the cities is bound to lead to more urbanisation of smaller towns and with the advent of TV and the mass media, the city culture is going to invade the rural scene.

The farmers lobby will grow in strength and demand for modern services in the rural areas will grow rapidly. All over the world, service industry is the fastest growing sector. And this is where the human element is the most important. We can therefore expect that if we have a vast pool of people with multi skill training they could provide all sorts of services, thus creating new jobs that we are looking for, This will not happen all by themselves. The present science and technology establishment finds that for all the technology they have developed, there are no takers. These multi skilled youth will be ideal receivers for those technologies - they will even participate in their selection and adoption to local conditions.

Thus our giving the capability to act, as part of education should make Education. The most important infrastructure needed for all development. The planning for facilities in different disciplines, will not be in relation to plan needs of different sectors, but the perceived and expressed demand for them from students in a free society, who should have the training and capability to act and implement their own programs.

#### Summary

Vocationalisation of all Education is recommended for giving the youth the capability to act. This is differentiated from vocational education, which deals with selection and training for a specific vocation. Such capability to act, coming from a wide variety of intellectually stimulating experiences and skills, is expected to make the student more self reliant for his progress. Vocational education, which follows, can then be simpler to organise. It is also suggested that this be provided through Junior Polytechnics and not Junior colleges. Apart from the psychological effect of Sinking to Polytechnics, it will enable to upgrade the present polytechnics. It is claimed that such vocationalisation of education, followed by Vocational education at the Post SSC level, will involve a capital expenditure of approx Rs. 300-400 crores 16 cover the whole of India, (ref. no. 4 and 7).

#### References:

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#### SUMMARY

Physical activity stimulates intellect and can give services to the community. This has been demonstrated as a basis for integrating education and rural development. Such a system takes modern services to the village at an affordable cost, makes the school a community centre and builds up assets in the village as part of the learning process. Possible approaches for covering all schools are discussed.

#### Appendices;

Pabal is a village of 3000, with hamlets around adding another 6000. It is situated about 60 kms, north of Pune, 20 kms off the Pune-Nashik highway and also the Pune-Aurangabad highway. It has a high school and a junior college, is electrified and has a sub-health centre.

It lies in the rain shadow region of the Western Ghats, has an average rainfall of 460 mm, which is very irregular. Because of the rolling terrain, there is no canal system

even visualised. There is a piped water system but because of draught it did not operate for three years from 1985-88.

The Rural Technology course program is now given to about 500 students in 4 schools in the Pabal region. It is given as a three years course in 8th-10 stds. In the non-formal system this same course is given to about 15 students per year as a full time one year course. This latter gives more community services and money to the students. The same facilities are also used to give short non-formal courses to another 200-250 students per year.

The capital cost per student for a unit of 120 students per year output, is 750/student and recurring is Rs. 300/student year. But in the same cost, at least 30 more non-formal students can be trained and community services rendered, assets built up etc. The detailed syllabus can be had from Secretary, Maharashtra Board, of Sec. and Higher Sec, Education, Shivajinagar, Pune 411010.

Services Provided to Community Through School System.

Prospecting for Water Pest control

Land measurement & survey Nursery plants

Plumbing and laying pipelines                      Animal health services

Borewell Pump repairs.                      Sewing and Knitting

Workshop repairs & fabrication                      Electrical services

Tyre and tube vulcanising

Building up Assets and Potential Services.

Low cost Housing;      Electric Motor Repairs

WC pans; septic tanks; soak pits;      Biogas plant maintenance

Water Tanks, silos, etc.      Design Development

Diesel / petrol engine services      Laboratory for clinical, water and soil analysis,

Development Projects; in hand/completed.

Geodesic Dome house kits;      Pneumatic wheel bullock cart

Low cost workshop sheds;      Diesel driven carts,

Power Hack saw;      Green Houses for intensive cultivation

Table vices, bench vices etc; Drip irrigation system.

Hand carts, wheel barrows etc;      Milk cooling system.

Earth Resistance meter;      Filament lamp protectors,

Single phase welding machine;      Chokeless tube-light.

Motorised bike;      Goat and cow dairying.

Modular Poultry Houses;      32 bird layer cages.