

Work Education in Schools - Concepts to Implementation

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Abstract

The concept of education through work is deeply ingrained in the Indian Philosophy and Gandhiji's vision of education. Work has been introduced as a component of education through different schemes - Work Experience, SUPW, earn while you learn and so on. Skills are desirable part of education. Also the activity of work needs to be done in a value based method since values are essential need for survival of the human race. But value cannot be taught by preaching. The work environment needs to be conducive for formation of values. The teacher has a key role to play in activity - centered education. The implementation of activity-centred education has not been desirable so far. We should therefore learn from the past experiences and try to give the scheme a second chance. Use of information technology can go a long way in reducing the cost and improving the chances of success. The present paper discusses the thinking process and what constitutes learning, role of work activity in education, the role of teachers in the Basic Education System and finally some implementation strategies.

The Vision

Gandhiji's vision of education:

'(not only)a fine healthy body but also a sound, vigorous intellect that is not merely academic but is firmly rooted in and is tested from day to day experience.'- Harijan, 8 May 1937

"Under Basic Education of my conception, children will learn while playing." –Harijan Sevak 17.3.1946 (Hindi)

"An intelligent use of the bodily organs in a child provides the best and the quickest way of developing his intellect." Harijan, 8 May 1937, p 104.

"All education to be true must be self supporting, that is to say, in the end it will pay its expenses, excepting the capital which will remain intact." - Harijan, 2.11.1947

Introduction

For more than a Century now, many commissions and committees have recommended work as a component of Education at the school level. We have accepted these recommendations and made efforts to implement them.

Many educationists, like Gijubhai Badheka have preached activity as the basis of education. We have incorporated it at the Balwadi level. But at the Primary level we seem not to implement it as a core part of education. Work components were introduced under different schemes- work experience, socially useful productive work, earn while you learn and so on.

But we have not succeeded in integrating education with work/ activity. Scientifically planned studies to pin point the failures and rectify them are not easily available.

But one feature stands out. Most of the programs for implementation have put as their objectives, 'dignity of labour, life related skills, preparation for life, self reliance and such other goals'. The idea of work being an integral part of education or in fact its base has not been incorporated as the primary objective, not even as one of the objectives. But the vision of Mahatma Gandhi clearly had this in mind as shown by some of the quotations above.

It is not surprising therefore, that the role of work in the implementation of the programs was entirely different from what it should have been. The reduced importance given to this in relation to the academic studies lead to its failure. There

were supplementary causes also, as will be pointed out later, but they also arose from the wrong understanding of the role of activity (work).

In this paper, we shall look closely at the thinking process and what constitutes learning and see the role of work activity in education. We shall also consider the non acceptance of the Basic Education System (as propounded by Gandhiji) by the general public and see what lessons it has for us.

We shall discuss the role of teachers in such an education system and finally define the implementation strategy.

Nature of Learning

All our information reaches us through our five senses, viz. sight, hearing, feel, taste, and smell. This information travelling as electrochemical signals produces synapses, linkages between the neurons. Each neuron can have 1000-10,000 such synapses and there are about 10¹⁰ (10 billion) neurons. So the number of items of information can be 10¹⁴.

Whatever is the source of information, signals coming from the senses produce patterns/microcircuits in the brain. This is somewhat like rain drops falling on sand. Next time a similar stimulus comes through, the old pattern is recalled. With some repetition, the pattern gets 'fixed' and the stimuli get responses that we call 'learning'. Thus learning is caused by the outside signals coming through the senses.

Mind is a self-organizing system. It can combine patterns and make new combinations. This is how past experience is used repeatedly.

Nature of Thought

In thought we reproduce an activity in our mind. The old pattern is recalled and we 'feel' the old activity in our mind. Human society has evolved over a few million years. We have replaced groups of patterns by symbols that we call words'. This is the need for language, which thus further speeds up thoughts. Thus when we say 'tree', the mental patterns, relating to the tree are recalled. The thinking process is thus recreating in the mind the activity patterns, without actually going through the activity. We think in languages. This produces savings in time and effort and has made for faster progress. But we cannot forget that new patterns or new combinations must be produced by activity, before they can be recreated in the mind. In other words, we cannot think of some thing of which we have no patterns, because we have never done it. Activity /work is thus the base on which all thinking and learning is set up.

Let us consider some examples:

Example: 1

Case 1: A child has not seen a chair. The teacher describes a chair in the class. The only pattern the child can get is of the sound produced by the teacher. It can reproduce that perhaps, this is like rote learning. It has no value as far as the chair is concerned.

Case 2: The child has seen a chair and has a visual imprint of the chair in its mind. When the teacher says 'chair' this mental picture is recalled.

Case 3: The child has used a chair, and perhaps has built one or worked with it in some way. The word chair brings back all these experiences and the child can use the new information from the teacher usefully.

Thus the same teaching by the teacher is more useful if the child has a variety of patterns related to the topic.

Example: 2

A child of say 1-2 years is playing with water on the roadside. He is completely absorbed by its 'study' (learning while playing). He tries to catch the water, squeeze it between fingers, lift it on its palms, feels the cold, when the water has flown away and the wet arm is exposed to the wind. He sees how the water runs away in different directions when the hand is turned differently. Children play like this again

and again until the novelty wears off - the experience is fully internalized. The child has now learnt the properties of water, how it is different from a solid. Later he will see some other liquids, may be milk and learn that milk also behaves like water. So gradually he gets the concept of a 'liquid'.

He has thus learnt the properties of liquids, and knows many liquids- but he does not have the words to describe the experience. But he has constructed his own knowledge, based on his activities.

Years later, a teacher teaches what liquids are. The child recalls his earlier learning. What the teacher says makes sense to the child. He will absorb it.

The teacher thinks he taught the properties of a liquid to the child. But what he taught was really only the articulation of experience the child already had. If he describes what happens when milk is spilt and you wash it with water, may be the child has learnt some thing new. But again it depends on his past experiences of activity.

Observation, logic and creativity

We all agree that these skills are desirable part of education. But let us see how these are also related to activity.

A scientist goes into the laboratory near a table and observes. He comes out. A child is seeing this. What it observes is that he bent over something, peeped in and then came out. The scientist searches for his glasses. The child says he has left them on the table in the room.

Who has greater observation? The scientist who took the reading on the instrument or the child who saw the activity of the scientist and noticed that the glasses were left on the table. Both have observation. But it was focussed differently. Depending on their past experiences, both the scientist and the child focussed their mind on different areas of the same room. Thus observation is just an ability to focus our mind on some part of the visual signals coming in, based on our past experiences.

Logic also is recall of past patterns. If we never had felt the heat of fire, we can never conclude that fire heats up. Thus logic is the ability to link many past experiences in terms of cause-effect relationship.

When we have a new situation, we can link the cause-effect learning from another situation and use it in a new circumstance. This is creative. After doing it a few times, we learn which experiences can be used where. Creativity is this ability to take different patterns and link them to make a 'new' pattern. May be we need to test this new pattern. That also after some experience we know which are useful and which are not. Thus not only thought, but also qualities such as observation, logic and creativity are dependent on activity/work and formation of mental patterns or microcircuits.

Value System

It is well known that a mountaineering team that has gone through a traumatic experience together forms lifelong bonds. Similarly, army Jawans who have fought battles alongside form deep bonds. Growing together, is a way of forming these bonds. Working together to grow together is the dream of any well organized company. Consider any trader who cheats. Will he succeed and prosper? May be when there is no alternative he will continue to get customers. But if he has an honest trader to compete, where will customers go? So in an open market, only those who are honest will attract customers.

Why should any one speak truth? Is it because a religion says so? What will happen if our senses, say eyes and ears give us false messages. We shall stumble and get into problems all over. What if a company has many employees who give routinely

false information. This company will not prosper. Thus a nation that lives on falsehood cannot prosper. May be any organization can tolerate a level of untruth, but beyond that it will decline. That is why truth and honesty are needs for survival. All values are built up from needs of human society. And any one who works will soon find the need for these values from his own experience. Then why does a society, for example India now, feel it has gone down in values? The values of human race are permanent need for survival. They will temporarily fluctuate, and so will prosperity along with it. The society will soon find for itself that they have to have better values if they want to prosper as a nation. That is why-'Satyamave Jayate'. The point is there is no value formation without feeling the need for it in the world of work. Classroom teaching will never inculcate values. It may even be counter productive, if the teacher is not a model for the values he preaches. Work environment is essential for formation of values. Stories of great men can help but it is not a substitute for testing the values in a real life work environment.

How the activity effects can be multiplied

If we were to depend on activity for learning every thing we have to learn, it would be a very inefficient system. In fact, the early civilization progress was slow for this very reason. But our brain is not just any computer, but a self-learning computer. This means that with the given information we can increase the useful output by many permutations and combinations. Let us suppose, we have learnt from our work that the mango tree flowers better after a period of drought. If we have this experience, human brain has the capacity to extrapolate this information to other flowering trees and test the conclusion. This is the basis of scientific research. It is in-built in the human brain to extrapolate and test earlier results. In all activity, we try to anticipate results, and then consolidate or modify our 'hypothesis' depending on how it stands the test. The major importance of this is that rate of acquisition of new knowledge becomes related to the amount of knowledge already present. This is exactly the situation (as a mathematical equation) that gives exponential increase of knowledge. In common language it means, like compound interest the knowledge grows explosively. Thus keeping up with work activity, the knowledge growth keeps increasing and therefore we cannot rest and say we have enough mental patterns and we shall keep playing with the same old patterns. This is what we do now in our school education, we keep playing with a small stock of experience.

The implication of exponential growth (as against linear growth) is two fold:

A: Even if we go slow in the primary school, but make sure the learning is proper, the acquired knowledge will grow fast later. On the other hand if our learning is not proper in the primary, it will not give exponential growth and later growth will be slow. So give a firm foundation to the primary school education.

B: Any differences between students, at the primary stage should be removed by paying more attention to slow learners. If this is not done the differences between the slow and the normal will enlarge and result in permanent inequality of opportunity in the different sections of society. Therefore attention to slow learners in the primary will be the main route to reduce social imbalance, more effective perhaps than all the subsidies and reservations we think of now.

Role of Teachers in Activity Centred Education

- Analysing the kind of learning that takes place through activity and give complementary support for the children. Select new activities for the children to reinforce their learning.
- Supplementing activity learning with skills in articulation.
- Widen the horizon of activity, arrange for materials, helping in skill development etc.
- He should be a guide, friend and philosopher.

In the primary section, this activity will be only learning oriented. In the secondary school it should be production oriented in addition to learning goals. This will involve handling purchases, keeping accounts etc., which will also be the role of the teacher coordinator.

The teachers role here should be only as a facilitator. He sometimes will find the students ahead of him in certain skills and he should openly learn from them. This will help to raise his image among the students and also to form values.

Where did We go Wrong in the Basic Education Experiment of the Fifties?

The Basic Education system propounded by Gandhiji, seems identical to what has been suggested now. To understand him, we have to read between the lines of the many writings by Gandhiji on Education. Unfortunately, those who implemented the programme went more by the apparent form rather than the deep thinking behind it.

A. The programme gave the impression to the society at large as being divorced from the direction of Science and Technology and therefore retrograde. This was mainly because of the activities chosen to be given in schools.

B. The second effect was that the ruling elite did not opt for it and created the impression that Basic Education was for the Masses and the normal 'academic' education was for the Classes.

C. The third mistake was that we stressed the ideology and not the performance of the system. If we had data to show that Basic Education could produce better results than the normal education for the common man, we could have gradually got acceptance for the system.

D. Lastly we do not monitor performance indicators to judge the results of any educational experiment we do.

We should now take precautions not to repeat these mistakes if we give these ideas a second chance.

Can Information Technology make the Breakthrough?

Yes, a big difference. It will help us to reduce the cost and time and improve the chances of success.

Every one is clear about how Video and TV can help in education. Video and TV are non interactive and so are not a good substitute for activity. They are lectures with a picture. Nothing more. Suppose we want to teach a child how to connect an electric lamp and a switch. The video will show how this is done, but cannot say whether the child is able to do it correctly. Computer lessons can show the correct method and ask the child to do the wiring on the computer screen. If it does not do it correctly the lamp will not light. What is more the computer can even let the child play with the lamp and the switch until it finds the best way to connect so that it lights, when the power is on. So the computer can even allow the child to construct its own knowledge, the ideal form of learning. We have in fact a computer lesson that does exactly this. Such a system is called simulation. Airlines pilots are routinely trained by such flight simulators. Industry uses them for training Plant operators. The cost of such software is now so low that we can use it for training in education fields. But we must remember that just as a flight simulator is not a substitute but only a preparation for real plane flying, so also these computer lessons are only a preparation for real life work. It will save cost and time in training.

Computer lessons are interactive, videos are not. That makes computers next only to real life work. So as a preparatory method it is extremely good.

Computer based lessons can also be used for showing by animation what cannot be seen in real work. This is useful in developing concepts. (for example how the space bodies, stars and planets, behave or how micro-organisms or molecules and atoms behave.) It saves the time and effort in arranging demonstration experiments. Also

after testing the effectiveness of a lesson, we can replicate it very easily millions of times, obviating the need of training so many teachers.

Another area for use of IT in Education is the fast communication system and the Internet. If we want progress, we must know where the problems are and find solutions fast. But in the present situation, we don't have a fast feedback system and therefore the solution does not reach the needy for months if not years. This will be a major help in improving the education. Secondly, with the Internet, all schools can interact with each other very frequently, as if they visit each other. This will also greatly promote good education.

The main advantages of IT will be cost effectiveness and fast replicability of results. Computers are today almost half the cost of a primary school teacher on per student-hour basis.

Recommended Implementation Strategy

1. The present Prevocational Scheme of MHRD is adequate and should be continued for secondary schools.
2. The Minimum Level of Learning (MLL) work experience strategy could be adopted for primary school for work experience.
3. The lower primary should have only one undifferentiated subject around the activity curriculum.
4. The middle and upper primary may have differentiated subjects and have work experience periods. This must form at least 20 % of the total time for general education.
5. The funds required for these are petty and will not pose a problem, (estimated at less than Rs 2000 per school)
6. The funds required for the secondary school pre-vocational programme will be approx. Rs 40,000 per school and can be collected from the community. (We have done this for 19 schools and more are volunteering to join on this condition).
7. The Pre-vocational programme should be generic in nature, so that the experience horizon is broadened as much as possible. This also makes implementation easier. This is part of education and is not intended for restricting the students to a particular vocation. The entry for higher education, after the school will be wide open. Those who do not continue in higher education will have a foundation on which to build a vocation in 3- 6 months.
8. The content of the generic prevocational course will include skills relevant to every day life in the following four areas:
 - Home and Health;
 - Plant and Animal Kingdom;
 - Material World;
 - Energy and Environment.
9. Project work must be included in each of the subject areas in the final stage so that the learners can consolidate all their experience into a socially useful piece of work.
10. The school should have a production cum service centre where the students get hands on experience and the instructors can earn supplementary income to their Rs 1000 p.m. stipend.
11. All schools must get Internet connection and Internet calls should be local calls.
12. Computer based lessons should be prepared for all subjects, starting with the difficult topics. One computer per 40 students in the secondary school should be the first target.
13. Performance indicators must be set and measured routinely. A computer based feed-back with e-mail for submission, should be set up.
14. The ultimate performance indicators should include performance in the school leaving exam; the drop out; the rupee value of community services given;

15. Initially number of operational Internet connections, computer lessons in use etc. should also be performance indicators.

16. Along with the performance indicators, a database on the schools should be built up. The collected data will not only be useful in administration but also be of significance for research. The use of computers for the administration is not to be considered as a saving in manpower, which it will do, but it will increase the speed of decision making and we should be able to compress the time frame for progress by a factor of at least 2-3.