



Education through Work (Mushroom Production) and Its Relation to Other Subjects

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"Skills are needed to succeed in today's world" - Cyrus Vakil, Chairman, Examination Reform System

Dineshpur is a small nyay panchayat in Udham Singh Nagar district with a large Bengali population. The Azim Premji School, where RtE is implemented, was established here in 2012.

When the school was started, the teachers went around the entire area and provided information to the community about the school. During our rounds, we found that the majority of the population are labourers, some of whom are employed with SIDCUL, women and children roll beedis in their homes, others work in fields or sell vegetables. Our school children also worked somewhere or the other, like in motor garages and meat shops. Some grew vegetables and assisted their parents in the weekly fair on Saturdays. The parents of these children aren't very educated.

I have 8-10 years of experience in running my food factory and cultivating mushrooms. Once, in a discussion with the headmaster of the school, I told him a little about myself. The headmaster suggested that I conduct some activity which will help the children learn something new along with their studies. He talked about Nai Taleem (New Education) and work in education. I came up with the idea of the project where we could grow mushrooms. I told my colleagues also about it. Everybody gave me their suggestions, and we had detailed discussions. When we told the children about the project, they enthusiastically came forward to work on it.

Gandhiji and Nai Taleem (New Education)

Gandhiji laid the foundation for Nai Taleem. He believed that since the majority of people live in villages, children's education should be such that whatever they learn in the classroom has to be of

practical use to them in their lives. He advocated a handicraft-centred education. He said that he didn't imply that education has to be only for job-training. He wanted to teach students all kinds of things through work. His strategy was to incorporate history, geography, mathematics, science, language, art and music into it. His opinion was that education should not be just bookish knowledge, but should encompass the activities of daily life, and should be derived through work and activities.

He also felt that diligent hard work and labour must be made an integral part of life. Visually, only observation and testing must be done. When there is hard labour with our own hands, and when we are involved in experimental activities that are beneficial to the society, only then will there be true development of the mind and heart.

NCF 2005 - National Curriculum Framework

NCF 2005 deals with imparting education to children based on working with one's hands with the intention that every citizen can contribute to the economy of the country.

The National Focus Group believes that:

- Handicraft should not be taught as a separate subject, but must be taught in connection with subjects like History, Social and Environmental Science, Geography, Art and Economics, because it is an inseparable part of India's culture, beauty and economy.
- No matter what subject or profession a child chooses, the experience he has gained by the medium of craft will help him in the process of learning. Working with our hands, objects and techniques will help us understand the processes.
- In rural areas, handicraft should have different curriculum so that the practices that are already present in these places, like business, technical education, language skills, accountancy,

marketing and packaging can be developed even further. In urban schools, craft can be given as optional experience and for creative construction.

But why opt for mushroom farming? In Class 6, 25 out of 29 children have parents who are daily-wage labourers in fields or elsewhere, one parent is a doctor, one a teacher, two are farmers and one is a shopkeeper.

This is what is available to the children of Dineshpur:

- they have a teacher who has training and experience in mushroom farming
- they don't have too much space for farming.
- hay and cowdung manure are easily available.
- a temperature of 17-18 degree Celsius, which is required for mushroom cultivation
- the months from October to March are right for mushroom cultivation, since the

conditions are suitable for mushrooms.

The advantages of mushroom farming

- A large space is not required. Work can be done even inside a small room.
- Most of the materials required are waste products got from farming - these can be reused.
- The whole family can easily get involved in this
- This work can be begun with a minimum of Rs.500/-
- The mushrooms can be sold at the market and other necessities can be bought with the money
- Children get ample protein from this - mushrooms can be eaten every day.
- The compost can be reused in fields and gardens as a fertilizer.
- Day-long labour is not necessary

MUSHROOM CULTIVATION AND ITS RELATION TO SUBJECTS

<p>1. Relation to Mathematics</p> <ul style="list-style-type: none"> ● Profit and Loss ● Income and expenses ● Data Analysis ● Conversion (Market Rates) ● Area ● Unitary (If 200 g cost Rs 20, how much will 1000 g cost?) ● Averages ● Operations (Addition, Subtraction, Multiplication, Division) 	<p>2. Relation to Science</p> <ul style="list-style-type: none"> ● Renewal and non-renewal ● Parasites (Dead or Alive) ● Plants and Animals ● Chlorophyll ● Survey ● The pH value of Gypsum, and why Formalin is added ● Fermentation ● The discovery of penicillin, etc. ● Temperature measurement ● Heat ● Instruments ● Unit of measurement ● Conversion between deg Centigrade and deg Fahrenheit
<p>3. Relation to Geography</p> <ul style="list-style-type: none"> ● Weather and Climate ● Temperature ● From where is Gypsum obtained? 	<p>4. Relation to History</p> <ul style="list-style-type: none"> ● What could the origin of mushrooms be? ● The history of mushrooms ● Food and Drink
<p>5. Relation to Language</p> <ul style="list-style-type: none"> ● Listening ● Speaking ● Writing ● Reading ● Questioning 	<p>6. Food and Nutrition</p>
<p>7. Marketing and Packaging</p>	<p>8. Career and Employment - Any person (male or female) can do this work, either individually or in a group. Not much investment is necessary, and it can be started with very little expense, and still gain profits.</p>
<p>9. Climate - Cool weather is essential for mushroom cultivation, and hence, it can be done between October and March.</p>	<p>10. Mushroom Production Centre Pantnagar and Tarai Foods Limited are some of the resource organizations from which one can obtain advice and compost. These about 12 to 15 km from Dineshpur. Marketing is also easy - Rudrapur and Haldani are good markets.</p>

A few things about mushroom cultivation

Before we started cultivating mushrooms, we had a general discussion with the children and told them that we intend to start mushroom cultivation. We asked them things like - Have you seen them? What are they called in Bengali? The children said that they had seen it, but hadn't eaten it. They asked if it was available in the markets. They asked many questions, for example:

- Where do they grow?
- How do they grow?
- How do they grow without soil?
- Are mushrooms animals?
- What is added to the hay?
- Why are mushrooms always white?
- What do they taste like?
- Why are mushrooms shaped that way?
- What is inside the mushroom?
- Can we reuse the compost?

Preparation

When we discussed mushroom cultivation among the teachers, the biggest problem that arose was that of space - where would we grow the mushrooms? Though there was sufficient space in the school, we started searching for the right place. Everybody put forth their opinions, but finally we agreed upon one corner in the school. Then we started thinking about how to cover the space on all four sides so that sunlight cannot enter. We got a big table which we covered with polythene, and made a kind of room with it. We finished it within two hours with the help of the students and teachers. It was now ready for growing mushrooms.



Preparations being made before mixing the seeds (spawn)

Purchase of compost and spawn

We started this in December.

12 km away from Dineshpur is Tarai foods Limited where mushrooms are grown all through the year. We bought 50 kg of compost and a packet of spawn and the next day, along with the children, we mixed the compost with the spawn and wrapped it up with newspaper.

We told the children that the newspapers shouldn't be allowed to become dry, or else the compost would dry up. The children would look at it every day, and if they felt that the newspaper was drying up, they would sprinkle water on it and note it. They also noted down how much water they poured on it. 20 days after we mixed the spawn, we added casing (1.5 year old cowdung manure). The children participated enthusiastically in this. Whenever we needed a certain quality of manure, we told the children and they brought it from their homes and created compost with it. They asked several questions, such as - Why are we using pesticides? Why are we adding formalin? Why are we covering it with polythene? What will happen if we don't cover it?



Preparing the casing after mixing the seeds, and adding gypsum, pesticide and formalin to it

After preparing the casing, we added some water to it, and then told the children that the moisture in it should be maintained, and shouldn't be so much that the water flows away, nor should it be so less that the casing dries up. If it dries up, the mycelium will not come up, and even if it does, it won't turn into mushrooms. The children looked at it every day and added water if necessary. We did this continuously and the children started looking forward to the time when the mushrooms would start growing. When the mycelium didn't come up even after 15-20 days, the children started asking when it would come up, and that I'd told them it

would come up by this time. I also started getting worried because this was the first time I was growing mushrooms with children, and if it didn't come up, they would be disappointed, and lose their belief in this project. I started looking for a reason why it wasn't growing and found that the mycelium haven't come up because of excess formalin in the casing. I washed the casing with water and mixed it again into the compost. 15 days after that, we started seeing mushrooms. The children's excitement was worth seeing! The children from class 1 to 6 started arriving and counting the mushrooms. They even started competing about who would arrive first and count them and write the number into the chart that we'd hung up near it.



Mixing the casing into the compost

Picking mushrooms and weighing them

After picking the mushrooms, we cut off the roots, and we asked the children to weigh them in a shop nearby. They came back and told us that the mushrooms weighed 1 kg and 650 grams. I asked them if they had subtracted the weight of the vessel, and they said they hadn't. Then the children weighed the vessel, and then subtracted the weight of the vessel from the total weight, and told us that the weight of the mushrooms was 950 grams. Then we discussed with them about the number of grams in one kilogram, about how to take correct weight, and about addition and subtraction.

Harvesting the mushrooms and using them in the mid-day meal

On the day we had planned to pick the mushrooms,

the children arrived early to school. I showed them the mushrooms which had grown big and could be picked. They looked very excited. The children went to a nearby shop, got the mushrooms weighed and calculated how much the mushrooms weighed without the container. Then the mushrooms were washed with salty water, chopped, and then incorporated into the day's menu. They were very excited about the mushroom curry.

When it was distributed amongst the children, only some of them got to eat it. The ones who ate the curry said:

- It tastes like meat
- It is like rubber
- It tastes good

When we teach languages, we often say that children have to be encouraged to ask questions. Here, in the last two months, the children, not only those of Class 6, but children from Class 1 to Class 6, had asked a whole lot of questions. Some of the children wanted to grow mushrooms in their house. Some children wanted to know if mushrooms were useful to fight diseases. Others wanted to know how to differentiate between poisonous and safe mushrooms.

Considering the family background of the children, the speciality of that region, and the geographical conditions, we can select various kinds of activities and include them in the curriculum.

Education through work and relationship with friends and teachers

We often observe that children are afraid of asking teachers questions. So it is difficult to ascertain what the relationship between the students and the teachers is. Children will only ask questions when they can relate it to the subjects they are being taught. While being involved in Work in Education, we found that children formulate logical questions themselves to ask the teachers. This is because they connect it to their everyday life. They have discussions and conversations with their friends.

Sometimes, in order to prove a point, they put forth unique kinds of reasoning. For instance, one child said that we could eat all kinds of mushrooms. Another said that we shouldn't. In order to prove his point, the child said that if we can eat all kinds of mushrooms, then why don't we eat the ones that

grow on trees? We see mushrooms growing in the rainy season, why don't we eat those? One said that people collect mushrooms from jungles and eat them. Another said that he had read in the paper that a family of six had died by eating mushrooms from the jungle. So one child asked how we could make out whether a mushroom is edible or not. I told them that we can differentiate between edible mushrooms and poisonous ones.

Work in education and CCE

Continuous and Comprehensive Evaluation is an ongoing process. Children's evaluation has to be done continuously, and we can do this with education through work. When we think of evaluation today, only one picture comes to our

mind - testing the progress of children with pen and paper. We all know that every child has his or her own way of learning. If we give importance to only testing by writing on a paper, the evaluation won't be accurate because some children cannot express themselves well through writing. Some express themselves better by speaking, and some by doing. By education through work, we can evaluate all the facets of the children, like how they interact with their classmates, participation, responsibility towards work, thinking, understanding and logical reasoning, oratory skills, their yearning to learn new things, social skills, observation, their ability to relate to their subjects, and cooperation. Discussions are on with the guardians to encourage this activity in the children's homes.

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