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## EMPOWERING B.Ed. STUDENTS TO CORRELATE DAILY LIFE ACTIVITIES WITH SCIENCE CONCEPTS

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### ABSTRACT:

*This Action Research project focusing at enabling the students to correlate daily life activities with Science concepts was taken up by the investigator. She is teaching Science to B.Ed. Students. While teaching in class room she observed that these students have poor understanding of Science concepts. Science is a practical subject. Everybody should have a basic knowledge of Science. Every phenomenon occurring in our surroundings is explained with the help of Science. These students lack a scientific outlook. They were not able to correlate their surroundings with Science concepts. Since these students are going to work as teachers in Government*

*Secondary Schools after completion, it is essential to enable them to understand basic Science concepts and correlate them with their surroundings. The investigator selected some concepts and prepared a questionnaire of 25 questions carrying one mark each. She tested their previous knowledge by taking oral test. The response of each student regarding each question was noted down. The investigator developed an action plan to overcome their weaknesses. She made the students understand every concept by lecture-cum-demonstration method, experimental method and by correlation. She put great efforts to clarify the concepts. After intervention post test was taken orally. The record of performance of each student was kept. After analyzing pre test and post test, she observed that strategies and methods adopted by her proved to be quite encouraging. This project is quite beneficial for these students as they are would be teachers.*

**KEYWORDS:** Action Research project , daily life activities.

### INTRODUCTION:

Science education is supposed to perform a twofold task. The prime objective in individualistic perspective is the cultivation of scientific temper which includes the spirit of enquiry, a disposition to reason logically and dispassionately, a habit of judging beliefs and opinions on available evidence, readiness to reject unfounded theories and principles, the

courage to admit facts. It is also expected of science education that it would give individual a firm grasp on concepts and processes of science and make them able to apply or correlate these concepts and processes with our day to day life activities. But it is observed that now a day's our pupil teachers who are going to become science teachers in future are unable to correlate these concepts with day to day life activities. So, I being a teacher educator attempted to conduct an action

research on this problem. Following steps were followed by the investigator to conduct this action research project.

### IDENTIFICATION OF THE PROBLEM

The investigator is working as an Assistant Professor at Dev Samaj College of Education For Women, Ferozpur City. She is teaching the subject 'Teaching of Science' to B.Ed. students. In 'Teaching of Science', there are two portions. One is methodology and the other is content portion upto

secondary level. While teaching them she observed that these students would not answer the questions related to content portion. They were ignorant about various activities occurring in their surroundings which are explainable through Science. They were not aware regarding the utility of Science in everyday life. During first phase of teaching practice it was also observed that while teaching in the classes they just teach the subject matter to their students without giving any examples to correlate the concepts with routine life. The investigator identified it has an inability of pupil teachers to correlate daily life activities with science concepts. It is felt that in their previous classes they have been taught only at memory level and no exposure of understanding and reflective level is given to them. This was due to the reason that they just crammed the scientific concepts without understanding them. As they would enter secondary level when appointed as teachers, they must be able to explain activities occurring in their surroundings from a scientific point of view. Otherwise, their weaknesses will be reflected among the students whom they teach.

### **SAMPLE**

The study was conducted on 24 B.Ed. students of Teaching of Science of Dev Samaj Education College For Women, Ferozepur City. The investigator observed that during general classroom discussion and in teaching practice their performance was poor. When the reason for their inability was asked the sample students told that they were taught science either by 'story-telling' method or were asked to mug up the concepts.

### **DELIMITATIONS**

1. The study was conducted on students of teaching of science only.
2. The sample students were selected from Dev Samaj College of Education For Women, Ferozepur City only.

### **CAUSES OF THE PROBLEM**

The above described sample has little knowledge of Science subject and is unable to correlate its surroundings with Science concepts. After interviewing each student, these reasons came up:

1. The students had just mugged up the subject without understanding it.
2. The teachers adopted the 'story telling method' to teach science. They did not imparted practical knowledge of the subject.
3. Their parents could not support them in their studies owing to their own problems.

### **OBJECTIVES**

#### **General Objectives:**

- i) To make students aware regarding the application of Science in their daily life.
- ii) To enhance their understanding regarding common concepts of Science.
- iii) To improve their achievement level in Science.
- iv) To develop scientific outlook among them.

#### **Specific Objective :**

To enable the students to relate their surroundings with Science concepts.

### **FORMULATION OF ACTION HYPOTHESES**

- If the teacher teaches at understanding level by experimentation and demonstration rather than at memory level, there is possibility to improve students' level of performance.
- If the teacher teaches the basic concepts by correlating them with surroundings and by involving students in various activities, there is a possibility to improve their level of performance.

## TOOLS USED

Investigator used various tools like interview, pre-test, post-test, demonstration, experimental method and discussions etc.

## DATA COLLECTION

Following data were collected by the investigator:

1. Data regarding marks obtained in pre-test.
2. Data regarding marks obtained in post-test.
3. Comparison of pre-test and post-test.

## COURSE OF ACTION

The investigator started to work out the problem of this Action research on B.Ed students of teaching of science of Dev Samaj College of Education For Women, Ferozepur City. While teaching, she found some concepts of Science which they must know. Then the investigator discussed the problem with her seniors and head of the institution. After discussions and thorough study of books related to Science upto secondary level, she designed a pre-test and post-test. There were 25 questions in the questionnaire. Each question was of one mark each. The investigator collected the material required to teach various topics in the class.

### STEP-1 PRE-TEST

Oral pre-test was taken in the end of first phase of teaching practice. Responses of each student regarding every question were recorded. After evaluating the pre-test the investigator found that their performance level in Science was very low (Response Sheet 1). They had little knowledge about their surroundings. So the investigator felt a great need to make them understand the basic Science concepts.

### STEP-2

Before second phase of teaching practice the investigator taught various Science concepts by correlating with everyday Science. She explained the concepts by lecture-cum-demonstration method and experimental method. She performed many experiments in the class to simplify various concepts of Science. Following Concepts were explained to them citing examples simultaneously during five consecutive days.

#### Day One

##### Explain the laws of refraction?

1. Incidence ray, reflected ray and normal lie in the same plain.
2. A ray of light bends towards normal when it passes from lighter to denser medium and vice-versa. When it passes from denser to lighter one. It bends away from normal when it passes from high-density medium to low-density medium and bends away from normal when it passes from high density medium to low-density medium. Due to this reason a pencil immersed in a glass of water appears to be broken and a coin immersed in water appears to be lifted up. This was shown practically in the class.

##### Why does ice float on water?

Generally matter contracts on cooling and expands on heating. But water shows unusual behavior. It expands on cooling i.e. volume of ice at 0°C will be more than that of water. Density is defined as mass (M) per unit volume(v).

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

Since mass is kept constant, density is inversely proportional to volume i.e. with increase in volume, density decreases and vice-versa. As explained above, in case of water density of ice is less than that of water and hence lighter than water. So, it floats on the surface of water. Due to the greater volume of ice, in winter, water pipes burst on mountains.

### Why does a balloon inflated with gas float in air? But, the one in which air is blown cannot.

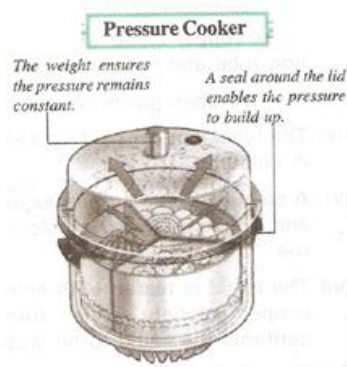
Both the balloons were brought into the classroom. It was explained that when air is blown into the balloon,  $\text{CO}_2$  (Carbon Dioxide) goes in to it which is heavier than air and it cannot float. When the balloon is inflated with gas (Hydrogen,  $\text{H}_2$ ), it easily floats in air as  $\text{H}_2$  is lighter than air.

The investigator discussed **the effect of air pressure on daily life activities**. She brought a rubber tube, syringe, fountain pen and working model of hand pump in the class room. She explained them working of siphon. A bucket filled with water was put on the table. One end of the rubber tube was put in water and the other was in air. Water did not come out from the other end. Then, air in the rubber pipe was blown out and water started flowing through the pipe. Students observed this activity in the classroom and were explained that when air was present in the rubber, water was not rising up in the tube because air inside it exerts pressure. When the rubber pipe was made empty, air pressure inside the tube was low, but on the outside it was high. The outside pressure pushed water into the pipe and water came out of the rubber tube.

The investigator explained the utility of siphon in our routine life. On this basis she explained the working of syringe, fountain pen and hand pump.

### Why does food cook earlier in pressure cooker?

The temperature at which a liquid boils is called boiling point. On boiling, water changes into steam. Steam exerts pressure. With the increase in pressure, boiling point of water also increases. This property is made use of in pressure cooker. In pressure cooker, the increased pressure raises the boiling point of water. At high temperature, food cooks earlier. The activity was demonstrated in the class room. Water was boiled in a container covered with a lid. When the water started boiling and changing into steam, the lid got lifted up and rattling sound heard. The students observed this and were explained that this is due to pressure exerted by steam.



Dia. 1.1

### Day Two Green House Effect

The investigator explained the phenomenon of 'Green House Effect'. As we know 'Trees' are the base of our existence on earth. They absorb  $\text{CO}_2$  and give out  $\text{O}_2$  which we breathe in. But man is cutting the trees to meet his needs. With increase in population, numbers of vehicles are increasing. They emit  $\text{CO}_2$ . There are other sources of  $\text{CO}_2$  also like burning of fuel. But, vehicles remain the main source and hence concentration of  $\text{CO}_2$  is increasing in the environment rapidly. It absorbs the heat radiation

entering the atmosphere. Due to which, the average temperature of atmosphere is increasing. Earth's average temperature has increased by  $0.8^{\circ}\text{C}$ .

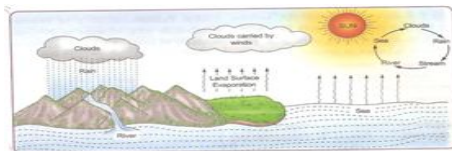
With the increase in temperature, glaciers will melt and this will lead to raise sea levels. It is alarming for coastal areas. Other effects of warming include more frequent occurrence of extreme. Weather events including heat waves, drought and heavy rain fall.

### Water Cycle

We know that  $\frac{3}{4}$  part of earth is covered with water and  $\frac{1}{4}$  parts is land. About 97.41% of water available on land is present in seas. About 2% of that water exists in solid form (Glaciers). About 0.5% of it is under ground.

Can you think surface water resources are never used up? It is so because evaporation is taking place continuously and as a result water gets changed into water vapors. Plants also lose water through the process of transpiration. In the atmosphere due to low temperature, the water vapors come close to each other and form clouds. This process is known as 'condensation'. Then, it rains. Circulation of water from the earth's surface to the atmosphere and again back to earth is called water cycle.

### Water Cycle



Dia.1.2

### Day Three

#### Why are bases of buildings kept broad?

Students were explained the concept of 'pressure'. The investigator made the students understand this concept by demonstration in the class. A sand bed was made. A small table was put on it. Then five bricks were placed on it. The legs of table got immersed in the sand. The penetration was measured. Then the table was placed upside down. Again five bricks were placed on the inverted table. Level up to which table got immersed in sand bed was measured again. The students were made to observe that length of legs of table immersed in sand was more in the first case than that of second case. The investigator explained that surface area of four legs is smaller than that of the top. So the table experiences more pressure in case I than in case II, although the force applied remains same. Pressure is defined as force acting per unit area.

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$

Magnitude of pressure depends upon applied force and surface area. More the force applied more will be pressure (area kept constant).

- Numerical: An elephant weighing 40000N stands on one foot of area  $1/10\text{m}^2$ . What pressure is exerted on the ground?



We know that

$$\begin{aligned}
 \text{Force} &= 40000\text{N} \\
 \text{Area} &= \frac{1\text{m}^2}{10} \\
 \text{Pressure} &= ? \\
 \text{Pressure} &= \frac{\text{Force}}{\text{Area}} \\
 &= \frac{40000\text{N}}{\frac{1\text{m}^2}{10}} = 40000 \times 10\text{N/m}^2 \\
 &= \frac{400000\text{N}}{10} = 40000\text{N/m}^2
 \end{aligned}$$

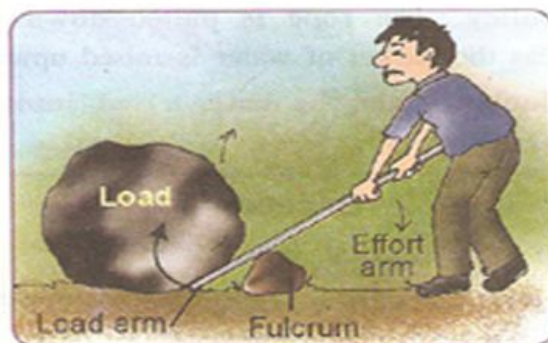
More the surface area (force kept constant) less will be the pressure, i.e. Pressure is directly proportional to Force and inversely proportional to Area.

**E.g. Bases of buildings are kept broad? Buses and trucks are provided with broad tires? All the cutting tools are pointed?**

### LEVER

We are using number of simple machines in our daily life. Machines make our work easier by reducing applied force and changing its direction. With a machine we can do more work in less time. But these students have no knowledge about them. They are using such machines in their daily life but are unable to explain the principle underlying their use. The investigator explained lever with the help of tool kit. Lever is a very common machine. It helps us to do work more easily.

Crow Bar



**Dia. 1.3**

Lever is a rigid rod which is free to move about a fixed point called 'fulcrum'. A crowbar is an example of lever (shown in fig.). The object required to be lifted is 'Load', the force applied is called 'Effort' and the support required to turn the rod is called 'Fulcrum'. The part of rod between load and the fulcrum is the load arm and that between the effort and the fulcrum is the effort arm.

### Types of levers

There are three types of levers. They are categorized as: first, second and third type of levers.

#### First type of levers

In the first type of levers, the fulcrum (F) is present in the centre of effort (E) and load (L). E.g. scissors, pliers, physical balance and see-saw.

### First type of lever

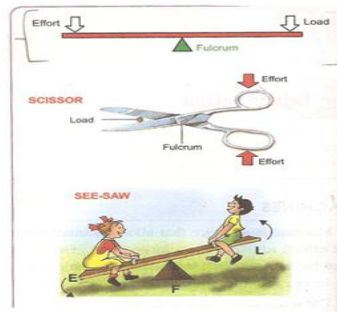
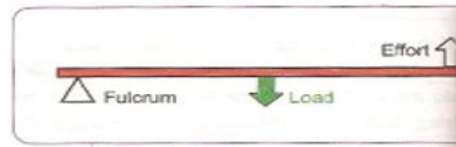


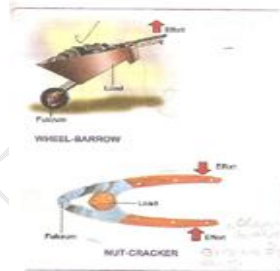
Diagram 1.4

### Second type of levers

In second type of lever, load (L) is between fulcrum (F) and effort (E). Wheel barrow, nut cracker, door are its examples.



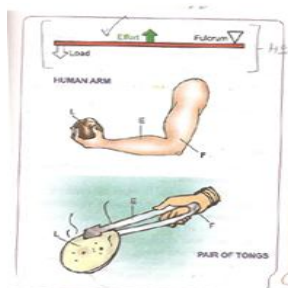
Second Type of lever



Dia.1.5

### Third type of levers

In third type of levers, effort lays in between the fulcrum (F) and the load (L). E.g. a pair of tongs, human arm and fishing rod.



Dia.1.6

### Principle of lever:

The lever is balanced when

$$\text{Load} \times \text{Load Arm} = \text{Effort} \times \text{Effort Arm}$$

A load of 300 N is to be lifted which is at a distance of 1m from the fulcrum. How much effort is to be applied at a distance of 3m from the fulcrum to lift the load?

Load	=	300 N
Load Arm	=	1m
Effort	=	?
Effort arm	=	3m
We know that		
Load x load arm	=	effort x effort arm
300N x 1m	=	? X 3m
		100
Effort	=	$\frac{300N \times 1m}{3m}$
	=	100N

#### Day Four

##### Oxygen supports combustion:

The investigator made the students understand by demonstrating the activity in the class. She took a candle and fixed it on the table. She lit the candle and covered it with a glass. After some time, the candle extinguished. The students observed this activity. The investigator explained that when oxygen present in the glass got used in burning. The candle extinguished.

##### Prove that carbon dioxide (CO<sub>2</sub>) is exhaled.

The investigator took a test tube and 2ml of lime water. She asked a student to blow in air through tube. Students observed that lime water turned milky.



This is due to formation of calcium carbonate, which is insoluble in water.

#### Frictional Force

There are various types of forces. One of them is frictional force. In spite of its some disadvantages (which can be overcome by lubricating and making bodies spherical) it has proved to be a boon in our daily life.

The investigator discussed frictional force as a contact force. Its magnitude depends upon the type of surface in contact. She made them understand the effect of frictional force on a moving ball by first throwing it on a cemented floor and then in a grassy lawn. On cemented floor the ball covered a longer distance due to less friction. On a grassy lawn, it covered short distance due to more friction. She explained its advantages by involving the students. The students were asked to walk on a wet cemented floor and then on a dry kacha floor. Walking is easy on a dry kacha floor because it offers more friction which prevents from slipping.

The investigator asked the students to write on a glazed tile with a colored chalk and then on a black board. Students understood that writing and drawing is impossible if there is no friction between pen and paper or chalk and black board. She also explained that tyres of vehicles are made corrugated because it provides more friction to ensure easy braking and avoid accidents.

#### Day Five

##### How do dew drops form?

The investigator explained this concept by demonstration. Water was boiled in a container covered with a lid. Ice cubes were placed on the lid when water started boiling. After some time fire was put off. The lid was lifted up. The students noticed water droplets on the inner surface of the lid. She



made the students understand that when water vapours came in contact with cold surface, they changed into water droplets. Water vapours are present in air. During winter nights when temperature falls, these vapours get condense and fall as dew drops.

### Physical and Chemical Change

The investigator explained physical and chemical changes by taking examples from surroundings like conversion of water into ice, formation of clouds, breaking of chalk stick, magnetizing an iron nail, tearing of paper, dissolving sugar into water etc. In these examples, only the colour, shape or size of the substance is changing. But no new substance is formed. Some experiments like magnetizing an iron needle and formation of sugar syrup were performed in the class. Magnetized iron needle lost its properties on staying and sugar was separated from sugar solution. In this way students made understood that these are physical changes. A physical change is defined as a change in which:

- ❖ The substance undergoing the change is not destroyed.
- ❖ No new substance is formed.
- ❖ Only the colour, size or shape of the substance may change.

Then the investigator with the participation of students took many examples of chemical from the surroundings. Examples like burning of candle, souring of milk, cooking of food, burning of paper, ripening of fruit were discussed in the class. Paper was burnt, it changed into ash. From ash the paper couldn't be brought back. This change is irreversible because the substance cannot be brought back to its original state. We cannot get back milk from curd. Cooked food or ripened fruit cannot be brought back to its original state.

- ❖ New substances are formed.
- ❖ Properties of the substance before and after the change are different.
- ❖ Original properties disappear and new properties are observed.
- ❖ Change is irreversible.

### STEP-3 POST TEST

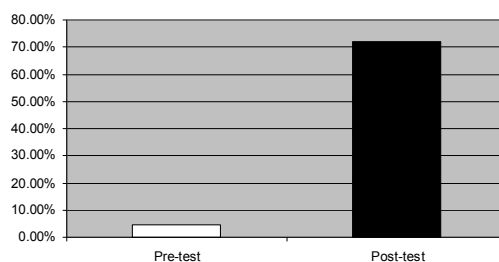
Then oral post test was taken. The investigator kept a record of response of each student to every question (Response sheet -2 ). There were 25 questions, each carrying one mark.

### DATA ANALYSIS

Data collected by pre-test and post-test were tabulated. Percentage of scores of pre-test and post-test of individual students was calculated and analyzed. Comparison in the performance of students before and after intervention was done by representing the data through frequency distribution. The percentage average of sample students in pre-test was 4.6 and in post-test was 72.04

**Table 1 Showing Percentage Average of Students in pre-test and post-test.**

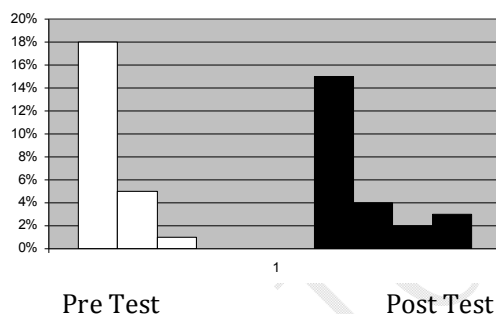
Test	Pre-test	Post-test
Percentage average	4.6	72.04



**Graph-1 Showing percentage average of pre-test and post-test**

**Table 2 Showing Comparison between the frequency distribution of Pre-test and Post-test**

Frequency Distribution	Pre-test	Post Test
0-10	18	-
10-20	5	-
20-30	1	-
30-40	0	-
40-50	0	-
50-60	0	-
60-70	-	15
70-80	-	4
80-90	-	2
90-100	-	3

**Graph 2 Showing Improvement in performance before and after intervention.**

## DISCUSSION

After analyzing the data collected and comparing it by various graphs, it was shown that the hypotheses stated as

1. 'If the teacher teaches at understanding level by adopting lecture-cum-demonstration method and experimental method rather than at memory level, there is possibility to improve their level of performance.'
2. 'If the teacher teaches the basic concepts of Science by linking it with routine life examples or by involving them in various activities, there is possibility to improve their level of performance.'

Were accepted. % age average of pre-test was 4.6 and % average of post-test was 72.04 i.e. improvement of 67.44% was shown after intervention which can be described as substantial improvement. It is clear from above result that by adopting right methodology and providing the students firsthand experience their level of performance can be enhanced.

## IMPLICATIONS

This AR Project has following implications.

1. This enables the students to relate daily life activities with Science.
2. They understand the underlying Science principles in many activities that happen around them.
3. They get interested in Science and as a result their reasoning power is enhanced.
4. Scientific attitude is developed among them.
5. Their achievement level is enhanced.
6. All this has far reaching effects as they are would be teachers. Now they are able enough to make their students to understand basic science concepts.

**REFERENCES**

- Garret, H.E., Woodworth, R.S. (1981). *Statistics in Psychology and Education* Vakils Feffer and Simons Ltd. Hague Building, 9 Sprott Road, Ballard Estate, Bombay 400038, India.
- Gupta, N.K. (2000). *A Handout on Action Research: An Introduction*. Department of Educational Research and Policy Perspectives, NCERT, New Delhi.
- Kohli, V.K. (2001). *How to Teach Science*, Shri Krishna Publications, Ambala Cantt, Revised ed, pp. 20-23
- Koul, L. (1998). *Methodology of Educational Research*; Vikas Publishing House, Pvt. Ltd., 576 Masjid Road, Jangpura New Delhi.
- Mangal, S.K. (2009). *Teaching Learning Process Revised ed*. Tondon Publication Ludhiana. pp 214-224.
- Reading Material for Capacity Building for Action Research*. 14-18 Feb, 2011, NCERT, New Delhi.
- Rume Zavis (2007). *A Handout on Action Research*. SCERT, Nagaland, Kohima.
- Sachdeva, M.S. ( ) *A New Approach To Teaching Learning Process*, Bharat Book Centre Ludhiana. (Revised ed.), pp.345-358.



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