

## EFFECTIVENESS OF DRAWING TECHNIQUES IN IMPROVING SCIENCE DIAGRAM DRAWING SKILL AMONG IX STANDARD STUDENTS

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### **Abstract**

*This study aims to find out the effectiveness of drawing techniques in improving science diagram drawing skill among IX Standard students. The sample consisted of 22 high secondary school students studying in IX standard. Purposive sampling technique was used to draw a sample. Single group pre-test and post-test experimental design was administered for collect data. 't'-test was applied to find out the significance of the study. The findings of the study revealed that there is significant difference between pre-test and post-test scores of class IX students in using the drawing techniques in improving science diagram drawing skill among class IX students. The result of this study revealed that there is a significant difference between the pre-test and post - test score and it also reflects that there is a positive correlation between the pre-test and post-test.*

**Keywords:** Effectiveness, Drawing, Science Diagram, Skill, Improving.

### **Introduction**

The drawing of science diagram is important for learners in learning science concepts, structure and its shapes. Drawing a science diagram is a science process skill, as reflected in science learning. Further, the drawing can be difficult to follow in the classroom practice. To create and teach simple techniques of drawing-to-learn that defines drawing.

This study enhances the IX standard students drawing skills and to increase the visibility, proposition and neatness in drawing the diagrams. It is a skill in biology and to promote the drawing skill by adopting simple drawing techniques. For two major reasons we draw diagrams 1) To develop the power of thinking and communicating 2) It is a process skill that is integral to the practice of science. Now a day's students are lagging behind in explicit drawing skill. Drawing skills develops students' abstract thinking. By teaching the simple drawing techniques it will help the students to develop their meaningful learning.

The main purpose of this paper is to find out the errors committed by the students in drawing science diagram and to teach simple techniques to reduce the errors committed by the students in drawing science diagram. The procedure adopted in this study was simple by using the geometrical instruments for drawing the diagram with correct structure, shapes and proposition.

### **Review of Previous Study**

The review of related literature is a significant part of a research study. This helps the research worker to gather up-to-date information about what has been done in the particular area on which he intends to study.

It provides the opportunity of giving an insight into the methods, measures and various other parameters adopted by others, which would lead to the improvement of the research design significantly. Hence a review of previous studies in the relevant areas of the present study is attempted here. The present study is an attempt to find out the effectiveness of drawing techniques in improving science diagram drawing skill among class IX students.

Many science teachers ask their students to draw their own models at some point - whether cell structures and organelles, chromosomes in meiosis, concept maps, or micro-organisms - either as formative or summative activities. However, many instructors are not self-aware of drawing as a science process skill, and thus do not value the skill and do not scaffold it explicitly for their students. Ainsworth S, Prain V, Tyler R. 2011 drawing skill scaffold and to help the students to achieve other pedagogical goals in biology. Students learn more information from the combinations of verbal concepts and diagrams Pavio, 1986 , which stated to be true regardless to their "learning method and style" Rohrer and Pashler, 2012.

### **Title of the Study**

"Effectiveness of drawing techniques in improving science diagram drawing skill among IX standard students"

### **Need for the Study**

Now a day's drawing a neat diagram is a basic skill in learning biology. It is very essential to have the knowledge about science concepts and skill of drawing the diagrams at high school level. Usually most of the students are not showing interest in drawing accurate diagram in learning of science concepts. Committing errors and leaving careless mistakes in drawing the simple and complex diagrams. If the errors and careless mistakes are not corrected means, it will be difficult to score good marks in learning science at higher secondary level. This error should be corrected and strictly avoided. So the investigator wanted to find out the students who are not properly drawing the diagram were identified through the conducting of pilot study. And teach them simple drawing techniques to develop their drawing skill. There is a need to develop students' psychomotor domain those who are lacking in that particular area. That is why the investigator has chosen this problem.

### **Significance of the Study**

1. By teaching the diagram drawing techniques it will develop the students drawing skill (psycho motor skill).
2. It can also reduce the errors committed by the students while drawing the science diagram and improving their accuracy and perfectness.
3. Drawing technique is also improve the 9<sup>th</sup> Std students in achieving more marks in science learning

### Objectives of the Study

1. To find out the errors committed by the students in drawing science diagram
2. To find out the relationship between pre-test and post test
3. To identify the difference between pre-test and post test

### Hypothesis

1. There will be significant difference between pre-test and post-test students of IX standard in adopting the drawing techniques in improving science diagram drawing skill.
2. There will be relationship between pre-test and post-test students of IX standard in adopting the drawing techniques in improving science diagram drawing skill.

### Research Design

The investigator has adopted the single group pre-test and post-test experimental method for the present study. The following steps were mentioned below:

#### Step - 1: Selecting 9<sup>th</sup> STD model school students

#### Step - 2: Selecting Topic and Diagrams

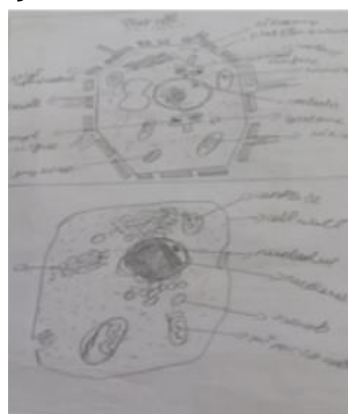
Topic: Structure of Cell

Name of the Diagram: Easy Diagram: 1. A Prokaryotic Cell (Bacteria)

Difficult Diagram: 1. Ultra Structure of Plant Cell, 2. Ultra Structure of Animal cell

#### Step - 3: Collecting the students name list

#### Step - 4: Conducting pre-test (Sample Diagram)



#### Step - 5: Identifying the errors committed by the students in drawing science diagram

#### Step - 6: Listing out the Errors

1. Size of the diagram
2. Is the diagram proportionate
3. Is the diagram neatness
4. Method of labelling
5. All the parts are labelled
6. Only some parts are labelled
7. No parts are labelled

8. Line crossing in labelling
9. Shading or colouring
10. Heading for the diagram

**Step - 7: Lists of students (Sample) those who are classified under committing errors in drawing science diagram. Among 36 students from different sections only 22 numbers of students were selected under the error committing criteria.**

**Step - 8: Taking classes how to draw the science diagram by using simple and geometrical techniques. Before taking the class proper instructions were given to the students**

1. Sharpening the pencil- fine tip
2. Use quality eraser
3. Use scale while drawing the lines in the diagram
4. Use scale while marking the parts
5. Use colour stick pens to write the headings and also for marking parts.

#### **Points to Note - Rules for Creating a Science Diagram**

1. Draw large diagrams, occupying about two-third of a piece of white sheet.
2. Draw with smooth single lines, keep all parts in proportion
3. Do not shade the diagrams, use dots, denser dots, deeper colour
4. Draw freehand. Do not use a ruler or a pair of compasses if needed.
5. Label different parts of the drawing, labelling lines should be straight, horizontal and should not cross each other.
6. Give a title on the top of the diagram.
7. If draw whole specimen, indicate direction of drawing (eg: dorsal, ventral or lateral view)
8. Diagram should show the distribution and proportion of different tissues avoid overlapping of tissues
9. Draw only what you view (don't shade/colour)
10. Label the diagram (right side) using horizontal label lines (no arrows)

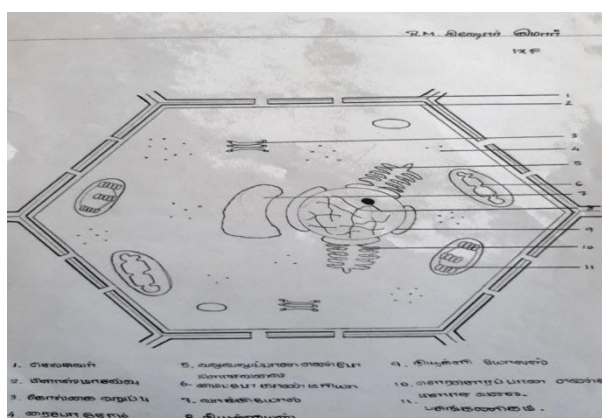


**Step - 9: Science Hours Were Allotted for Taking the Classes and the Teacher Teach How to Draw Diagrams**

<b>Ultra structure of plant cell</b> Class 1 - cell membrane, cell wall Class 2 & 3 - cell organelles Class 4 - label the parts	<b>Ultra structure of Animal Cell</b> Class 5 - cell membrane Class 6 - cell organelles Class 7 - label the parts	<b>Prokaryote cell</b> Class 8 - Outer wall Class 9 - DNA Structure, organelles Class 10 - Video clippings (drawing procedure)
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### Step - 10: Post-Test



### Population

The population of the study was students of IX standard students studying in higher secondary School, Madurai.

## Sample

A sample of 22 students of IX standard students studying in higher secondary School, Madurai was taken for the present study.

## Sampling Technique

Purposive random sampling technique was used by the Investigator.

## Instrumentation

The present study required Pre-test and Post-test to evaluate the students' drawing skill. These tests were structured based on the different types of learners; the investigator selected an easy and difficult diagram in biology subject. A prokaryotic cell (simple diagram), Animal Cell (Moderate diagram), Plant cell (Difficult diagram).

At the beginning, the investigator selected 37 students of IX standard from various sections and administered pre-test to evaluate the students' mastery in drawing the science diagram. Result from the pre- test helped the investigator to identify a total of 22 students who are lacking the skill of drawing a neat diagram. The investigator adopted the single group design for treatment. Then the teaching technique employed for the single group for ten science period of time by the investigator. Then post-test was conducted by the investigator to evaluate the students' skill in drawing the science diagram. The collected data were analyzed.

## Data Analysis

Appropriate statistical techniques like mean, standard deviation, percentage analysis and 't' test were used to analyze the data.

**Table 1: Mean, S.D and t-value of Pre Test and Post Test**

Test	N	Mean	S.D	t- test	Level of significance
Pre test	11	48.73	72.77	2.164	P<0.05
Post test	11	59.45	88.87		

From the above table inferred that the mean value of drawing skill of 9<sup>th</sup> Std students with respect to pre-test (48.73) and post-test (59.45). It is also inferred that the paired sample t-test value is 2.164. It is significant at 0.05 level. Hence the Null hypothesis is rejected.

**Table 2: Correlation Analysis of Pre Test and Post Test**

Test	r-value	Level of Significant	Interpretation
Pre-test vs. Post-test	0.99**	P<0.01**	Positive High Correlation

From the above table 2 inferred that the correlation co efficient for 9<sup>th</sup> Standard students drawing skill value is (r = 0.99), p<0.01. It is positive high correlation at 0.01 level. Hence the null hypothesis is rejected.

**Findings of the Study**

1. There exist significant differences of pre-test and post-test among 9<sup>th</sup> standard students drawing skills at 0.05 levels.
2. There exists correlation between pre-test and post-test among 9<sup>th</sup> standard students drawing skills at 0.01 levels.

**Conclusion**

After adopted the drawing techniques for the students, the students developed their drawing skills by adopting the procedures, they felt happy in drawing the diagram neatly. This study would be very useful to 9<sup>th</sup> Standard students. As a result the drawing techniques and its skills developed their psycho-motor domain and it also helps the students to achieve more marks in the future.

**Suggestions**

1. To develop the students drawing skills.
2. The staff should handle the students individually.
3. Necessary steps are to be taken to improve the drawing skill among the students.
4. The staff may often conduct the extra classes to follow the drawing procedure by the students.

**Recommendations**

1. This study may be conducted in higher secondary level also.
2. Drawing skill may be analysed in higher secondary school students in Biology subjects.

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