A Study on Science Process Skills and Academic Achievement among IX Standard Students

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ABSTRACT

Science processes are an integral part of science teaching. Science as a discipline develops because of these procedural skills such as interpretation of data, identification of variables, formulation of hypotheses, design of experimental designs, and data analysis. The main objective of this study was to determine the extent of acquisition of science process skills. There are significant differences in dimensions of science process skills among high school students in relation to some individual variables. As a sample, 200 students of class IX of a government high school in Pudukottai were randomly selected. For data collection, a standardized instrument called Test of Science Processes was administered to the students. Semester test scores were used as the variable academic achievement. Data analysis included Mean, t-test and Karl Pearson's correlation coefficient. It shows that there are gender differences in favour of male students in science process skills and academic achievement scores. Science process skills and academic achievement were significantly and positively correlated.

Key words: Science process skills, Academic achievement,

INTRODUCTION

Scientific process skills (SPS) are defined as transferable skills that apply to many sciences and reflect the behavior of scientists. These skills facilitate science learning, ensure active student engagement, develop a sense of ownership of their own learning, increase the sustainability of learning, and equip students with sound research methods and methodologies. Think and act like a scientist. Therefore, it is an important method of science education. SPS is the cornerstone of scientific critical thinking and inquiry (Ostlund, 1992). Scientific process skills scientific inquiry and science teaching through inquiry involves the teaching of scientific process skills, critical thinking, and scientific reasoning skills used by scientists (Pratt & Hackett, 1998), and inquiry is defined as a method of teaching scientists to measure. Applying it to scientific practice is the most effective teaching method. , to help students understand concepts and apply skills (Yagar & Aksay, 2010). There are two types of scientific process skills, basic skills and comprehensive skills. Basic process skills include observing, inferring, measuring, communicating, classifying, predicting, exploiting spatial and temporal relationships, and using numbers. Built-in process skills include controlling variables, defining operations, generating hypotheses, constructing models, interpreting data, and conducting experiments.

OBJECTIVES OF THE STUDY

1. To find out the level of acquisition of science process skills among class IX students.
2. To find out whether there are any significant differences in the dimensions of scientific process skills of class IX students with respect to individual variables.
3. To find out the relationship between science process skills and academic achievement in science among class IX students

HYPOTHESES OF THE STUDY

The following hypotheses were used in this study.

1. The level of acquisition of science process skills among ninth graders is moderate.

2. There is no significant difference in scientific process skills of ninth grade students based on gender, locality with respect to the following dimensions:

- Measuring

- Observing,

- Classifying,

- Inferring

- Predicting and

- Communicating.

4. There is no relationship between science process skills and achievement in science of class IX students

RESEARCH METHOD

For the purpose of the study the researcher has followed the normative survey method.

SAMPLING AND SAMPLING TECHNIQUE

A sample of 200 ninth standard students in Pudukottai district of Tamil Nadu was equally distributed between Tamil and English medium students from government, government aided and matriculation schools. The samples were selected using random sampling technique.

TOOLS USED FOR THE STUDY

The following tools used in this study

- Science Process skills inventory was framed using six dimension
- Academic achievement (Mid term examination marks)

STATISTICAL TECHNIQUES USED FOR THE STUDY

1. Percentage Analysis
2. Descriptive analysis
3. Differential Analysis

Table - 1

Level of science process skills among IX the standard students

Variable	Level	Score	Percentage
Science process skills	Low	0-15	16%
	Moderate	16-35	73%
	High	36-51	11%

The table shows that the level of science process skills is moderate in nature

Table - 2

Mean scores of science process skills among IX the standard students

Dimensions	N	Mean value
Measuring	200	42.43

Observing	200	40.76
Classifying	200	52.84
Inferring	200	40.52
Predicting	200	39.78
Communicating	200	65.52
Total	200	48.54

The above table show that the dimensions of science process skills the means scores of communicating; classifying skills is higher than the other dimensions

Hypothesis testing

There was no significant difference in scientific process skills of ninth grade students based on gender, location in the following dimensions: (i) measuring, (ii) observing, (iii) classifying, (iv) inferring, (v) predicting and (vi) communicating.

Table -3

Comparison of mean scores gender wise analysis of science process skills

Dimensions	Gender	Mean	S.D.	't' value	Level of significance e
Measuring	Boys	42.68	16.28	1.06	NS
	Girls	46.00	18.73		
Observing	Boys	39.39	8.38	2.09	S
	Girls	41.94	18.43		
Classifying	Boys	50.92	20.22	1.06	NS
	Girls	52.50	23.22		
Inferring	Boys	41.76	16.12	1.03	NS
	Girls	43.06	18.38		
Predicting	Boys	36.16	22.57	1.80	NS
	Girls	40.12	20.53		
Communicating	Boys	62.10	24.16	0.6	NS
	Girls	61.4	24.22		
Total	Boys	46.79	14.63	1.82	NS
	Girls	51.82	16.24		

It is inferred that the table the calculated 't' value 2.09 is greater than the table value. Hence it is concluded that there is a significant difference in scientific process skills of IX standard students based on gender in the dimension. It shows that the boys and girls students differ significantly with respect to the observing skills. Hence the hypothesis is accepted.

Table - 4

Comparison of mean scores Locality wise analysis of science process skills

Dimension	Locality	Mean	S.D.	t-test
Measuring	Rural	42.50	17.51	3.20
	Urban	46.32	18.62	
Observing	Rural	40.02	18.43	0.38

	Urban	40.53	18.72	
Classifying	Rural	51.62	20.91	1.66
	Urban	54.06	21.70	
Inferring	Rural	42.03	18.60	0.77
	Urban	42.86	16.90	
Predicting	Rural	38.65	22.00	1.48
	Urban	38.84	23.50	
Communicating	Rural	62.20	24.92	0.19
	Urban	63.64	25.52	
Total	Rural	47.70	14.43	1.56
	Urban	51.44	14.78	

It is inferred that the table the calculated 't' value 3.20 is greater than the table value. Hence it is concluded that there is a significant difference in scientific process skills of IX standard students based on locality in the dimension. It shows that the rural and urban students differ significantly with respect to the measuring skills. Hence the hypothesis is accepted.

2. There is no relationship between science process skills and achievement in science of high school students.

Table -5

Relationship between science process skills and achievement in science of high school students.

Variables	**'r' value**	**'t' value**
Science Process Skills & Academic Achievement	0.316	6.088

The table shows that the correlation between the science process skills and academic achievement are positive correlated

Findings of the study

1. The level of science process skills is moderate in nature

2. The dimensions of science process skills the means scores of communicating, classifying skills is higher than the other dimensions

3. The calculated 't' value 2.09 is greater than the table value. Hence it is concluded that there is a significant difference in scientific process skills of ix standard students based on gender in the dimension. It shows that the boys and girls students differ significantly with respect to the observing skills.

4. The calculated 't' value 3.20 is greater than the table value. Hence it is concluded that there is a significant difference in scientific process skills of ix standard students based on locality in the dimension. It shows that the rural and urban students differ significantly with respect to the measuring skills.

5. The correlation between the science process skills and academic achievement are positive correlated

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