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Process Skills in Science as a Correlate of Achievement in Chemistry Among Higher Secondary Students

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ABSTRACT

Science is a particular way of knowing about the world. The process of observing, describing, exploring and using the physical world is nothing but science. So science is compounded of curiosity, observation and thought .The main purpose of the study was to find out the relationship between Process Skills in Science and Achievement in Chemistry of Higher Secondary School Students. Investigators selected 288 higher secondary students for this study. Test of Process Skill in Science and Achievement test in Chemistry are used as tool for the data collection. Results of the study revealed that there is a positive moderate level of relationship between Process Skills in Science and Achievement in Chemistry. The obtained positive relationship implies that students having high degree of Process Skills in Science got higher achievement than students having low skill. So the government and curriculum constructers should give importance for Process Skills based curriculum.

Key terms: *Process Skills in Science, Achievement, Chemistry*

Introduction

Science is the word of the modern age. It is an inseparable part of modern life. Science is not magic. It is a human activity, without any element of magic .The purpose of science education is to enable individual to use scientific process skills, in other word, to be able to define the problems around them, to observe, to analyze, to hypothesize, to experiment, to conclude, to generalize and to apply the information they have with the necessary skills. Scientific process skill include skill that every individual could use in each step of his daily life by being scientifically literate and increasing the quality and standard of life by comprehending the nature of science. Therefore, these skills affect the personal, social, and global live of individuals. The Science Process Skills are necessary tool to the produce and use scientific information, to perform scientific

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research, and to solve problems. These skills can be gained by students through certain science education activities.

Today so many reformations are happening in the field of education as a part of quality improvement. As its part, SSA introduced process skill based education programs in curriculum plan. This was done by accepting the concept of learning by doing. Now a day so many discussions take place in concern with this new reformation in the field of education. Now education gives important to the student centered leaning and learning by doing. These changes will affect the aim of science education and degree of achievement of process skills in science. There are so many studies conducted based on Process Skill and Achievement. But no one studied the relationship between Process Skills in Science and Achievement in Chemistry. So the investigator decided to explore the relationship between Process Skills in Science and achievement in Chemistry.

Objectives of the Study

1. To identify the level of Process Skills in Science of higher secondary students.
2. To identify the level of Achievement in Chemistry of higher secondary students.
3. To test the significant difference in Process Skill in Science of the higher secondary students between the comparable samples based on Gender, Locale and Type of Management.
4. To test the significant difference in Achievement in Chemistry of the higher secondary students between the comparable samples based on Gender, Locale and Type of Management.
5. To find out the significant relationship between Process Skill in Science and Achievement in Chemistry of higher secondary students for the total sample and the subsamples based on Gender, Locale and Type of Management.

Methodology in Brief

Method Used

Investigators adopted the survey method for data collection.

Sample of the Study

Present study was carried out on a representative sample of 288 students of class XI of the Higher Secondary School in Wayanad district of Kerala state. Sample was drawn by stratified random sampling method, given due representation to factors like, Gender, Locale and Type of Management of school.

Tools

The tools of the study is

- Test of Process Skill in Science
- Achievement test in Chemistry

Statistical Techniques

Statistical techniques used in the study are,

- Preliminary Analysis
- Mean Difference Analysis
- Co-efficient of Correlation

Results and Discussion

Identification of Level of Process Skill in Science and Achievement in Chemistry

Identification of level has done as part of Major analysis. In this section Level of the variables such as Process Skills in Science and Achievement in Chemistry of Higher Secondary Students are tested. For this mean score (M) and standard deviations (SD) are calculated. Students that scored above M+SD belong to high level and those scored below M-SD belong to low level. Students that scored between M +SD and M – SD belong to average level.

Here the levels of Process Skills in science and Achievement in Chemistry of Higher Secondary Students were tested using above mentioned method. The data and results obtained are given in Table 1.

Table 1: Level of Process Skills in Science for the total sample

Level	Process Skills in Science		Achievement in Chemistry	
	N	Percentage	N	Percentage
Low	38	13.19	44	15.28
Average	215	74.65	210	72.91
High	35	12.16	34	11.81
Total	288	100	288	100

From Table 1, It is observed that 74.65 % of higher secondary students (N= 288) involved in the study have only average level of Science Process Skills, 13.19 % of them have low level of Science Process Skills and the remaining 12.16 % have high level of Science Process Skills.

From Table 1, It is observed that 72.91 % of higher secondary students (N= 288) involved in the study have only average level of Achievement in Chemistry, 15.28 % of them have low level Achievement in Chemistry and the remaining 11.81 % have high level of Achievement in Chemistry.

Mean Difference Analysis

Comparison of level of the variable such as Process Skills in Science and Achievement in Chemistry of Higher Secondary Students are tested. For this two-tailed test of significance of difference in variables on the basis of Gender, Locale and Type of Management is studied. The data and results obtained are given in Table 2.

Table 2: Data and Results of the Test of Significance of Differences in Sustained Motivation between relevant subsample based on Gender, Locale and Type of Management

Variable	Sample	Gender	N	Mean	Std. Deviation	t-Value	Level of significance
Process Skills in Science	Gender	Boys	117	15.34	4.51	0.592	NS
		Girls	171	15.67	4.74		
	Locale	Urban	106	15.79	4.67	0.708	NS
		Rural	182	15.39	4.64		
	Type of management	Govt	122	16.00	5.03	1.449	NS
		Aided	166	15.2	4.32		
Achievement in Chemistry	Gender	Boys	117	10.91	3.43	0.279	NS
		Girls	171	11.02	3.55		
	Locale	Urban	106	10.94	3.46	0.119	NS
		Rural	182	10.99	3.52		
	Type of management	Govt	122	10.93	4.03	0.171	NS
		Aided	166	11.00	3.08		

NS- Not Significant

Results from Table 4.2 shows that the obtained 't' values of Process Skills in Science based on Gender, Locale and Type of Management (.592, .708 and 1.449) are less than 1.96, the required value of 't' for significance at 0.05 level. It means there is no significant difference in level of Process Skills in Science based on Gender, Locale and Type of Management. It indicates that Boys and Girls have same level of Process Skills in Science and also students from different Locale and Type of Management have same level of Process Skills in Science.

Similarly from Table 4.2 we can say that there is no significant difference in level of attainment of Achievement in Chemistry based on Gender, Locale and Type of Management. It indicates that Boys and Girls are attaining same level of Achievement in Chemistry and also students from different Locale and Type of Management are attaining Achievement in Chemistry in same level.

Correlation between Process Skills in Science and Achievement in Chemistry for the Total Sample and Relevant Subsamples

The collected data has been analyzed to find out the significance of relationship between the variables Process Skills in Science and Achievement in Chemistry. The significance of relationship between the variables has estimated among Pearson's Product Moment Coefficient of Correlation.

Table 3: Co-efficient of Correlation between Process Skills in Science and Achievement in Chemistry for Total Sample and relevant subsamples

Sl.No.	Sample	Correlation 'r'
1	Total	0.59
2	Boys	0.56
3	Girls	0.61
4	Urban	0.68
5	Rural	0.54
6	Government	0.66
7	Aided	0.51

As per table 3, the correlation co-efficient between Process Skills in Science and Achievement in Chemistry of Higher Secondary students obtained for the total sample is 0.59, which indicates that the relationship between Process Skills in Science and Achievement in Chemistry is significant at moderate level.

The co-efficient of correlation between Process Skills in Science and Achievement in Chemistry for boys students is 0.56. This indicates the relationship between Process Skills in Science and Achievement in Chemistry of Boys is significant at moderate level.

The correlation coefficient obtained for Girls l is 0.61, which indicates that the relationship between Process Skills in Science and Achievement in Chemistry of Girls is significant at substantial level.

The correlation co-efficient obtained for Higher Secondary School students belonging to Urban area is 0.68. This shows that the relationship between Process Skills in Science and Achievement in Chemistry of Urban students is significant at substantial level.

The correlation co-efficient obtained for Higher Secondary School students belonging to Rural area is 0.54, which reveals that there is moderately significant relationship between Process Skills in Science and Achievement in Chemistry of Rural students.

The co-efficient of correlation obtained for Government Higher Secondary School students is 0.66, which shows that the relationship between Process Skills in Science and Achievement in Chemistry of Government Higher Secondary School Students is significant at substantial level.

The coefficient of correlation obtained for the Aided Higher Secondary School Students is 0.51, which reveals that the relationship between Process Skills in Science and Achievement in Chemistry of Aided Higher Secondary School Students is significant at moderate level.

The correlation coefficient values obtained for the total sample and the relevant sub samples based on Gender, Locale and Type of Management of school show that there is significant relationship between Process Skills in Science and Achievement in Chemistry of Higher Secondary School Students.

The positive sign of the correlation coefficients show that there is positive correlation between

Process Skills in Science and Achievement in Chemistry of Higher Secondary School students. i.e., as the Process Skills in Science of Higher Secondary School students increases, their Achievement in Chemistry also increases and as their Process Skills in Science decreases; their Achievement in Chemistry also decreases.

Major Findings

1. Majority of Higher Secondary students are seemed to have average Process Skills in Science.
2. Majority of Higher Secondary students are seemed to be average Achievers in Chemistry.
3. There is no significant difference in Process Skills in Science based on Gender, Locale and Type of Management.
4. There is no significant difference in Achievement in Chemistry based on Gender, Locale and Type of Management.
5. The relationship between Process Skills in Science and Achievement in Chemistry of total sample, Boys, Rural students and Aided school students are significant at moderate level.
6. The relationship between Process Skills in Science and Achievement in Chemistry of Girls, Urban students and Government school students are significant at substantial level.

Conclusion

The current study attempts to investigate relationship between Process Skills in Science and Achievement in Chemistry. Study revealed that there is a moderate level of relationship between Process Skills in Science and Achievement in Chemistry. It follows that students with low level of Process Skills in Science would be expected to have difficulty in understanding chemistry concepts and this could lead to poor achievement. It means teaching methods based on development of process skills will results high academic achievement.

The higher secondary students involved in the present study are categorized into high, average and low achievers in chemistry and process skills in science. Majority of them are seemed to be average achievers in chemistry and Process Skills in Science. But there is no significant difference in level of Achievement and Process Skills in Science for the subsamples based on Gender, Locale and Type of Management.

It can be concluded that Process Skills in Science improves the Achievement in Chemistry. Achievement is depends on Level Process Skills in Science and is not depends on factors like Gender, Locale and Type of Management of the students.

Educational Implications

Process approach teaching is effective for proper development and understanding of Process Skills in Science and also for the academic Achievement. Though the investigator carried out these studies on a small sample, the findings throw light on the current educational practice in Higher Secondary classes. Science is a process as well as a product. The understanding of this process is possible only when the individual gets thorough knowledge about the skills involved in each process. Without the understanding of skills, one cannot follow or study about the Scientific Processes. So the students have to be trained for better understanding of skills. The teacher has a pivotal role in administering changes among children. The approach used by the teacher, therefore, should be to bring a desirable change in the student.

The obtained positive relationship between Process Skills in Science and Achievement in

Chemistry implies that students having high degree of Process Skills in Science got high achievement than students having low skill. So the government and curriculum constructers should give importance for making Process Skills based curriculum. The teachers should be aware of developing Process Skills in students as it will help to improve their Achievement.

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