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A Dindori district: Study on the relationship between achievement in chemistry and scientific attitude of higher secondary school students

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Abstract
Open mindedness, a desire for accurate knowledge, confidence in procedure for seeking knowledge and the expectation that the solution of the problem will come through the use of verified knowledge is known as "Scientific Attitude". In this paper, the investigator tried to find out whether there exists any relationship between Achievement in Chemistry and Scientific Attitude of Higher Secondary School Students for the total sample and for the subsample based on Gender. The investigator also finds out whether there exist any significant differences in the Achievement in Chemistry and Scientific Attitude among Higher Secondary School Students based on Gender. Proper statistical techniques were used for collecting standardizing and analyzing the data.

Keywords: Dindori district, scientific attitude, achievement, chemistry, higher secondary

1. Introduction

Dindori District is a district of Madhya Pradesh state of Central India. The town of Dindori is the district headquarters. The district is part of Jabalpur Division. The district (area: 6,128 km^2) is located on the eastern part of Madhya Pradesh, bordering the state of Chhattisgarh. It is surrounded by Shahdol in the east, Mandla in the west, Umaria in the north, and Mungeli district of the state of Chhattisgarh in the south. It is divided into seven tehsils namely Dindori, Shahpura, Mehandwani, Amarpur, Bajag, Karanjiya and Samnapur. The Baiga are a predominant tribe. Around 64% of the total population belongs to the ST groups.

According to the 2011 census Dindori District has a population of 704, 218, roughly equal to the nation of Bhutan or the US state of Alaska. This gives it a ranking of 501st in India (out of 640). The district has a population density of 94 inhabitants per square kilometer (240/sq mi). Its population growth rate over the decade 2001-2011 was 21.26%. Dindori has a sex ratio of 1004 females for every 1000 males, and a literacy rate of 65.47% (District census 2011) [1].

Scientific attitude is really a composite of a number of mental habits, or of tendencies to react consistently in certain ways to a novel or problematic situation. These habits or tendencies include accuracy, intellectual honesty, open-mindedness, suspended judgment, criticalness, and a habit of looking for true cause and effect relationships. It is a cognitive concept; scientific attitudes are normally associated with the mental processes of scientists. These habits are important in the everyday life and thinking, not only of the scientist, but of everyone.

In order to make life more meaningful and to have progress in the society, inventions and discoveries are must. Scientific attitude is a logical way of thinking clearly, reasonably without any disturbance or prejudice. Science teaches us to think correctly. Scientific attitude means not accepting any fact which does not have any proof. If there is Scientific Attitude you always think and act wisely for the development of Science.

Scientific Attitude is a multidimensional concept. The student's scientific attitude towards science may affect their performance. Attitude has been viewed as the predisposition to respond positively or negatively toward an object or phenomena. One of the important goals of science teaching is to promote positive scientific attitudes toward science.

From the discussions, it is clear that scientific attitude is essential for learning broader concepts of science. Students having better scientific attitude will always be eager to explore new ideas of science which will ultimately lead to better achievement in content area. Here the Achievement in Chemistry as a science subject can be increased by developing the scientific attitude of students towards science in general and Chemistry in Particular. By understanding the interconnection between scientific attitude and Achievement, Teachers can adopt various strategies and techniques and gives them hands on experiences in arousing scientific attitude in students that will finally lead to the mastery of content area and better achievement.

2. Hypotheses of the study

- There will be significant relationship Achievement in Chemistry and Scientific Attitude between of Higher Secondary school students for the total sample and sub-sample based on Gender.
- There will be significant relationship in Achievement in Chemistry of Higher secondary school students based on Gender.
- There will be significant relationship in the Scientific Attitude of Higher secondary school students based on Gender.

3. Objectives of the study

- To find out whether there exist any significant relationship between Achievement in Chemistry and Scientific Attitude of Higher secondary school students for the total sample and sub-sample based on Gender.
- To find out whether there exist any significant difference between Achievements in Chemistry of Higher secondary school students based on Gender.
- To find out whether there exist any significant difference between Scientific Attitude of Higher secondary school students based on Gender.

4. Sample selected for the study

The sample selected for the study consists of 100 Higher secondary school students in standard XII of various schools of Dindori District. Out of 100 samples 50 were Boys and 50 were Girls. The samples were selected by using stratified sampling Technique.

5. Methodology

The investigators adopted Survey Method for collecting data of Scientific Attitude Scale. For the selected sample the investigators administered Scientific Attitude Scale and Achievement Test in Chemistry among Higher secondary school students. The answer sheets were collected tabulated and analyzed using suitable statistical techniques.

6. Statistical Technique used

- Descriptive Statistics
- Significance of difference between Means
- Call Pearson Product Moment Correlation

7. Analysis and Interpretation

7.1 Relationship between Achievement in Chemistry and Scientific Attitude of Higher secondary school students for the total sample and sub-sample based on Gender.

The investigator calculated the scores of Achievement in Chemistry and Scientific Attitude. The mean and standard Deviation obtained for the total sample and subsample Boys and Girls on Achievement in Chemistry and Scientific Attitude are given in Table 1

Table 1: Descriptive statistics for the total sample and Relevant Subsamples on Achievement in Chemistry and Scientific Attitude

Variables	Total sample		Boy's		Girl's	
	Mean	SD	Mean	SD	Mean	SD
Achievement in Chemistry	14.71	3.31	14.46	3.80	14.96	2.82
Scientific Attitude	79.90	16.24	84.14	16.46	75.66	16.02

Table 1 shows that the Mean scores obtained by Girls is slightly higher than that of Boys with respect to variables Scientific Attitude and Achievement in Chemistry. This implies that Girls have more Scientific Attitude than Boys which leaded to more Achievement in Chemistry for Girls than Boys.

The correlation between Scientific Attitude and Achievement in Chemistry were found out for the Total sample and Subsample Gender using Pearson Product Moment Correlation. The results are given in Table 2.

Table 2: Correlation between Achievement in Chemistry and Scientific Attitude of Higher secondary school students for the total sample and sub-sample based on Gender.

Variables	Total Sample (N=100)	Boys (N=50)	Girls (N=50)
Achievement in Chemistry and Scientific Attitude	0.92**	0.94**	0.95**

** Significant at 0.01 level

Table 2 shows that the correlation coefficients obtained for the Total Sample, Boys and Girls are all positive. This reveals that there exists a significant difference positive correlation between Scientific Attitude and Achievement in Chemistry for the total sample and subsamples based on Gender.

7.2 Comparison of Achievement in Chemistry and Scientific Attitude of Higher secondary school students based on sub-sample Gender.

The Mean and Standard Deviation were calculated for the subsamples Boys and Girls. Significance of difference between the Mean scores of Boys and Girls were found out for the variables Scientific Attitude and Achievement in Chemistry. The results obtained are given in Table 3.

Table 3: Comparison of boys and Girls on Scientific Attitude and Achievement in Chemistry

Variables	Gender	N	Mean	SD	t-value
Achievement in Chemistry	Boys	50	14.46	3.80	-0.74
	Girls	50	14.96	2.82	
Scientific Attitude	Boys	50	84.14	16.46	2.60
	Girls	50	75.66	16.02	

It is clear from the above table that the Mean Value of achievement in Chemistry scores of boys is 14.46 and the Mean Value of Girls is 14.96. The S.D Value of Boys and Girls is 3.80 and 2.82 respectively. From the Mean and the S.D Values of researcher calculated the 't' Value -0.74 respectively.

It is clear from the above table that the Mean Value of Scientific attitude scores of boys is 84.14 and the Mean Value of Girls is 75.66. The S.D Value of Boys and Girls is 16.46 and 16.02 respectively. From the Mean and the S.D Values of researcher calculated the 't' Value 2.60 respectively.

Table 3 shows that there is no significant difference between Boys and Girls on Achievement in Chemistry but significant difference was found in Scientific Attitude of Higher Secondary School Students. The Mean score shows that Girls are slightly higher than that of Boys in Scientific Attitude and Achievement in Chemistry.

Major findings of the study

- There exists positive Correlation between Achievement in Chemistry and Scientific Attitude of Higher secondary school students for the total sample and subsample based

on Gender.
- There is no significant difference on Achievement in Chemistry of Higher secondary school students based on Gender.
- There is significant difference in Scientific Attitude of Higher secondary school students based on Gender.

Educational Implication of the study
- The variables Achievement in Chemistry and Scientific Attitude are positively correlated. This implies that Teaching and learning activities in Science of students.
- Teachers should be responsible enough to integrate the Scientific Attitude in the Teaching Learning Process with the same enthusiasm given for Cognitive components.
- The Science Curriculum should be restructured by giving due importance for developing and enhancing Scientific Attitude, since it affects the study of science.
- The result shows no significant difference between Boys and Girls in Achievement in Chemistry. This can be taken as merit of the present system of education. Thus gender disparity does not exist for the variable - Achievement in Chemistry. But shows significant difference between Boys and Girls in Scientific Attitude

8. Conclusion
The affective domain is often neglected because teachers have difficulty designing strategies to develop positive attitudes among students and documenting their development. But the study revealed that there is a positive relationship between Scientific Attitude and Achievement in Science. Science curriculum developers should focus on improving students' attitudes toward science and scientists. Scientific personalities were persons who possess good Scientific Attitude. Since Affective Domain can significantly enhance, inhibit or even prevent student learning, teachers have great role to increase their effectiveness by considering the affective domain especially Scientific Attitude in planning courses, delivering lectures and activities, and assessing student learning.

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