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SCIENTIFIC ATTITUDE AND ACHIEVEMENT IN PHYSICS

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Scientific Attitude

Scientific attitude is based on truth understanding and logic rather than one based on superstition, intuition or wishful thinking. Open mindedness of the learners in scientific pursuit, respecting other's opinion but at the same time belief only in verified facts, prevalence of spirit of enquiry, unbiased observation, critical thinking intellectual honesty are some the characterization of scientific attitude.

Noll opinioned, that the scientific attitude includes the following habits of thinking, habit of accuracy in all operations, including accuracy in calculation, observation, habit of intellectual honesty, habit of open-mindedness, habit of suspended judgement, habit of looking for true cause effect relationship. The titles as listed, according to Noll, are probably sufficient to describe the habit in detail.

They may, however, be briefly defined, for further clarity in terms of their opposites accuracy in calculation, observation, and report is the opposite of habits of careless, inaccurate work. Intellectual honesty is the opposite of such habits as exaggeration and rationalization. Open-mindedness is the opposite of bigotry, prejudice and intolerance. Suspende d judgement is the opposite of the habit of making snap judgements or jumping to conclusions. Looking for true cause and effect relationship is the opposite of habits of superstitious thinking of expecting rewards to come without commensurate effort. The habit of criticalness including that of self-criticism is the opposite of habits of accepting explanations of phenomena without question, or without attempt of evaluation; it is the opposite of the habit of condoning and accepting such things as racketeering, political corruption, and the like as inevitable.

Noll also listed fourteen specific objectives without any attempt to rank them. The fourteen specific objectives are:

1. Command of factual information.
2. Familiarity with laws, principles and theories.
3. Ability to distinguish between fact and theory.
4. Concept of cause and effect relationship.
5. Ability to make observations.
6. Habit of basing judgement on fact.
7. Ability to formulate workable hypotheses
8. Willingness to change opinion on the basis of new evidence.
9. Freedom from superstitions.

10. Appreciation of natural beauty.
11. Appreciation of man's place in this universe.
12. Appreciation of the possible future developments of science.
13. Possession of interest in science.
14. Appreciation of the contributions of science to our civilization.
15. Teaching students effective time management strategies this study.

Significance of The Study

Effective teaching of science cannot take place in void Judicious planning, effective employment of proper techniques and a deep sense of commitments to teach for mastery learning constitute effective teaching. Every teacher who has to teach science should realize aims or objectives that have been formulated taking conscious efforts to achieve them through their teaching. In recent time there has been rapid addition to knowledge to the world of science. Great advancement of science and technology and the use of the scientific achievement in promoting the well being of man kind through their application in the field of industry, communication, transport, engineering, agriculture and medicine has made science more important than before. Learning of science should not be at surface level. The student should learn science at mastery level. It is not more acquisition of knowledge that counts. What matters is being conversant with knowledge, understanding, application, attainment of scientific skills and creative ability.

Many psychologists believe that the way in which an individual perceives of him is the most important factor in his personality structure. A teacher with a strong self-concept may influence others. The concept of role perception has a wide meaning and includes many attributes, but considering the limitation only a few special attributes have been taken into consideration. These attributes are Teaching Attitude, Teaching Aptitude, Teaching Professional perceptional, Scientific Attitude, and Mastery Learning.

The development of scientific attitude of mind is one of the objectives of teaching science. It is a very significant outcome of the process of science education Teaching of science should enable the learners to master the facts, concepts and principles of science. It should develop instrumental and problems solving skills (Mastery learning) scientific attitude of mind as well as interest in appreciation of science. Scientific attitude of mind is essential to enable them to adjust themselves and live an efficient citizen in scientific society.

The National Science Teachers Association of the USA says that as result of science education the learners should be in the "process of developing a personal philosophy based on truth, understanding and logic rather than one based on superstition, institution or wishful thinking."

Hence the investigator has chosen the variables such as Mastery learning, Role perception and Scientific Attitude. The investigator has ventured to undertake a study of this type and seeks to trace the relationship among the factors chosen for the study.

Title of the Study

A study of Achievement of students of XI standard in Physics in relation to scientific attitude.

Objectives of the Study

1. To study achievement of students in Physics at Higher Secondary level.
2. To study the degree of attainment of scientific attitude of the students
3. To offer a few suggestions to develop scientific attitude among the students.
4. To throw light on critical thinking

Definition of Key terms

Scientific Attitude

Scientific attitude is based on truth understanding and logic rather than one based on superstition, intuition or wishful thinking. Open mindedness of the learners in scientific pursuit, respecting other's opinion but at the same time belief only in verified facts, prevalence of spirit of enquiry, unbiased observation, critical thinking intellectual honesty are some the characterization of scientific attitude.

Achievement in Physics

The scores of the students in the achievement test

Hypotheses of the Study

1. There exists no significant difference in the mean scores in Achievement in Physics between students belonging to Government school in terms of gender.
2. There exists no significant difference in the mean scores in Achievement in Physics between students belonging to Management school in terms of gender.
3. There exists no significant difference in the mean scores in Achievement in Physics between the students in terms of type of institutions.
4. There exists no significant difference in the mean scores in Scientific Attitude between students in terms of gender.
5. There exists no significant difference in the mean scores in Achievement in Physics between students belonging to Government school in terms of gender.
6. There exists no significant difference in the mean scores in Achievement in Physics between students belonging to Management school in terms of gender.
7. There exists no significant difference in the mean scores in Achievement in Physics between the students in terms of type of institutions.
8. There exists no significant difference in the mean scores in Scientific Attitude between students in terms of gender.

Procedure

The present study is an attempt to study the achievement in Physics of students of XI STD in Schools chosen for the study. It essentially needs a procedure for selecting samples and constructing and validating an achievement test. This section furnishes a detailed report on sampling technique and instrumentation.

Sampling

In the present context, Madurai was chosen for the study. Students of Standard will in all schools constitute the population of this study. The strength of the standard XI varies from one school to another.

Tools of Research

Achievement in Scientific attitude

Gender	N	Mean	SD	df	"t" value	Significance
Boys	100	141.52	7.69	198	3.00	S
Girls	100	138.16	8.13			
Institution	**N**	**Mean**	**SD**	**df**	**"t" value**	**Significance**
Government	100	136.31	9.83	198	5.41	S
Management	100	143.37	10.12			
Ses	**N**	**Mean**	**SD**	**df**	**"t" value**	**Significance**
High	84	133.28	9.46	198	7.01	S
Low	116	144.59	10.73			

Achievement in Physics 198 5.41 S

Gender	N	Mean	SD	df	"t" value	Significance
Boys	100	34.75	8.86	198	1.89	NS
Girls	100	32.60	7.39			
Institution	**N**	**Mean**	**SD**	**df**	**"t" value**	**Significance**
Government	100	31.43	9.65	198	2.91	S
Manage ment	100	35.92	7.14			
Ses	**N**	**Mean**	**SD**	**df**	**"t" value**	**Significance**
High	84	35.24	7.65	198	1.15	NS
Low	116	36.59	8.92			

Relationship Study

In this section, the investigator employed the one statistical technique namely correlation to investigate the relationship between the Achievement in Physics, the criterion Variable with correlate variables, Scientific attitude.

- Scientific attitude (SAS) is given by scores got in SAS.

Details regarding the variables studied corresponding instruments employed are furnished below:

Variables	Instruments
1. Achievement in Physics	Achievement test
2. Scientific attitude Scale	SAS

Correlation

Table 8 Relationship Between Achievement In Physics, Classroom And Scientific Attitude

Sl.No.	Correlates	r values	Relationship
1.	Scientific attitude	0.165	Negligible
2.	Class room	0.234	Low Positive

Hypothesis - 7

There will be no substantial positive relationship between the criterion variable and correlate variables.

Result

It could be observed from the table that there is negligible positive correlation between the criterion variable (Achievement in Physics) and the correlates. (Scientific attitude).

Scientific Attitude

Achievement in Physics

The scores of the students in the achievement test

Instrumentation

The investigator employed the tool "Achievement in Physics" for this study. The researcher constructed an Achievement test consisting of 100 items. Class room climate scale was used to find out the level of class room climate. Scientific attitude scale was employed to find out the degree of scientific attitude prevalent among the student.

Findings of the Study

1. There exists no significant difference in the mean scores of Achievement in Physics between students belonging to Government school and management schools gender.
2. There exists no significant difference in the mean scores of Achievement in Physics between the students in terms of gender.
3. There exists no significant difference in the mean scores in Scientific Attitude between students in terms of gender.
4. There exists no significant difference in the mean scores of Scientific Attitude between students in terms of type of institutions.
5. There exists no significant difference in the mean scores of Class room climate between students belonging to Government school in terms of gender.
6. There exists no significant difference in the mean scores of Class room climate attitude between students belonging to Management school in terms of type of institutions.

Implications

1. Scientific Attitude plays a vital role in fostering concepts in science.
2. Through Scientific Attitude cause and effect relationship is established.
3. Scientific Attitude chrishes one's power of critical thinking.
4. Scientific Attitude inculcates skills among students which indirectly helps one to become a scientist.
5. Through Scientific Attitude whatever that is learnt is applied in life situation 6. The scientific skills of the learners such as manipulation of the instruments, arranging things in an array, calculation, observation, tabulation and inference etc are nourished.
   The things highlighted above are the antecedent skills for a blossoming scientist.