

A STUDY OF COGNITIVE SKILLS OF SECONDARY SCHOOL STUDENTS IN RELATION TO THEIR STRESS AND ASPIRATIONS

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ABSTRACT

This paper examined the effect of Academic Stress and Educational Aspirations on Cognitive Skills in Science of Secondary School Students in Indian socio-cultural settings. The population consisted of 600 students from 10 different schools of district Shri Muktsar Sahib and Sangrur (Punjab). Cognitive Competence Test, Scale of Academic Stress and Educational Aspiration Scale were used for data collection. Descriptive statistics like mean, standard deviation, skewness and kurtosis etc. for studying the nature of data; Graphical presentations for qualitative analysis; 2x2 ANOVA, t-test were used for statistical analysis. The results showed that F-ratio for the difference in means of Total Scores on Cognitive Skills in Science for secondary school students with Academic Stress, Educational Aspirations and interaction between Academic Stress and Educational Aspirations were found to be significant at the 0.01 level of confidence.

Every child has unique nature as regards capabilities, attitudes, personality, characteristics, interests, cognitive skills and aspirations etc. Cognitive Skills are any mental skills that are used in the process of acquiring knowledge. So Cognitive Skills refer to those skills that make it possible for us to know. Stress occurs when there is substantive imbalance between environmental demand and response capability of the organism. Aspirations refer to the ambition or desire of a want, which has yet not been fulfilled and a man still works for it. Academic stress and Aspirations can affect cognitive skills of a student. Academic stress is needed, but within a limit.

COGNITIVE SKILLS

Skill is a well-developed capability of any kind, including intellectual, physical or artistic capabilities. A skill is a rapid, efficient performance, mental or physical, which has been, learned e.g., mental arithmetic, golf and so on (Philip, 1947). Cognitive development concerns changes with age in relation to the system of what we know and changes in the way in which that system interacts with other facts of behavior (Flavell, 1977; McCall, 1981; Wohlwill, 1973). In 1956, Benjamin Bloom wrote

Taxonomy of Educational Objectives: Cognitive Domain, and his six-level description of thinking has been widely adapted and used in countless contexts ever since. His list of cognitive processes is organized from the most simple, the recall of knowledge, to the most complex, making judgments about the value and worth of an idea. In 1999, Dr. Lorin Anderson, a former student of Bloom's, and his colleagues published an updated version of Bloom's Taxonomy that takes into account a broader range of factors that have an impact on teaching and learning. This revised taxonomy attempts to correct some of the problems with the original taxonomy.

Science is a major discipline of study that has its roots in the systematic development of methods to solve practical problems. In recent decades, there has been an immense growth in the use of Science in other areas of study. It is Science which, for example, lies behind the computer technology and medical technology. In view of the growing importance of Science in all areas of study, the teaching of Science at school level should prepare the students adequately in knowledge, skills and value of Science. For the present study, firstly the research literature related with cognitive development of adolescents between age group of 12+ to 15+ was consulted. Piagtan developmental stages were also consulted and cognitive skills identified by different authors were noted. After having made a list of cognitive skills (at 12+ to 15+ age), objectives of Indian Primary and Secondary levels were consulted. Bloom Taxonomy, Curriculum and Syllabus for IX grade under Punjab School Education Board (P.S.E.B.) were consulted and ten major competencies (skills) required for learning science were assessed. These competencies have been identified as:

- **Recognizing:** To realize, discover and acknowledge existence of nature in the context of natural and social environment for personal and social well being.
- **Exploring:** To inquire, examine and probe the important aspects i.e. physical and behavioral of working in nature.
- **Knowing:** To comprehend and be acquainted with the world of work and have recognized the various functionalities.
- **Understanding:** To appreciate, apprehend and be conversant with the relationship between man and his environment.
- **Sorting:** To arrange systematically the various events of past and present and to hold the past in proper perspective by accurate description.
- **Analysis:** To examine and investigate the observable situations and problems of man and his environment.
- **Relating:** To connect and associate the various factors, to draw conclusions about the dependence of the factors upon each other and nature.

- **Classifying:** To categorize in systematic way to draw inferences and organize similar things together.
- **Observing:** To detect and examine the processes and characteristics of physical and living things.
- **Inferring:** To conclude and draw inferences about the various phenomenon of the nature.

STRESS

In today's hectic life of materialistic pursuits of cut throat competition at all levels, everyone goes through a life full of stress of different types- physical, emotional and behavioral. **Lazarus (1969)** stated that stress is an internal state at the individual who perceives threats to physical and psychic well-being. **Selye (1976)** defined stress as the non-specific response of the body to any demand. According to **Patterson (1985)** stress is a condition of felt tension or difficulty. Stress is anything that imposes an extra demand on a child's ability to cope, often something that is new and different (**Furman, 1995**). According to **Oxford Dictionary of Psychology (2001)** described stress as psychological or physical strain or tension generated by physical, emotional, social, economic, or occupational circumstances, events or experiences that are difficult to manage or endure. Stress has been found to have four components and may affect a person in either these four or on all the four components, i.e.

- Anxiety
- Conflict
- Pressure
- Frustration

Academic Stress

Students in school experience academic stress when pressure experienced by them is greater than normal abilities. Academic stress has become a source of immediate concern as it also contributes to major health hazards, problems both physical and mental. In the school situation, this pressure may be accountable for an individual's success and failure. Hence, this kind of stress i.e. academic stress is an important factor accounting for variation in academic achievement. The factors like writing term papers test-anxiety, poor study skills, excessive academic load, professions and classroom environments were reported be the cause of academic stress which in turn forms a major part of general stress in adolescent students (**Edmunds, 1984**). According to **Bector (1995)**, a student is caught in a dynamic technological whirlpool and seems to be precariously poised on the brink of disaster.

ASPIRATIONS

The term 'Aspirations' is one which is often used synonymously with goals, ambitions, objectives, purposes, dreams, plans, designs, intentions, desires, longings, wishes, yearning, cravings or aims. Aspirations are what drive individuals to do more and be more than they presently are. **Hurlock (1964)**

defines aspirations as longing for what is above one's achievement level with advancement or as its end. The concept of level of aspirations was first introduced by **Hoppe (1930)** as "degree of difficulty of the goals towards which a person is striving". He concluded that the nature of level of aspirations of an individual might reflect his personality patterns. **Drever (1964)**, in his Dictionary of Psychology, defined the term level of aspirations as a frame of reference involving self esteem or alternatively as a standard with reference to which an individual experiences i.e. has the feeling of success or failure.

Educational Aspirations

Educational aspirations, which refers to early impressions of one's own academic abilities and the highest level of education an individual expects to attain (**Furlong & Cartmel, 1995**), also has been linked to academic achievement (**Rojewski & Yang, 1997**). Educational aspirations are developed early in a student's academic career, and are generally theorized to affect academic achievement by enhancing the possibility of participating in and/or pursuing educational opportunities (**Arbona, 2000**). In this way, students' educational aspirations can influence what they learn in school, how they prepare for their postsecondary lives and their ultimate academic and career attainment (**Walberg, 1989**).

SIGNIFICANCE OF THE STUDY

The review of related research studies revealed that Cognitive Skills are mental skills that are used for the purpose of acquiring knowledge. These skills include reasoning, perception and intuition. In this competitive world, cognitive skills are the base of the success of a child. Stress and Aspirations are such major factors which affect Cognitive Skills very much. The present investigation has put forth a multidimensional representation of Scientific Cognitive Skills, Academic Stress and Educational Aspirations.

With the dramatic changes in society over a few decades, Cognitive Skills provide a more powerful tool to fit today's teachers' needs. Clear alignment of educational objectives with local, state and national standards is a necessity. It has also been closely linked with multiple intelligences, problem solving skills, creative and critical thinking, and more recently, technology integration. A positive look at the Cognitive Skills, especially related to Science, would add more to the significance of this study.

In today's hectic life of materialistic pursuits of cut throat competition at all levels, everyone goes through a life full of stress of different types- physical, emotional and behavioral. Stress effects on mental functioning such as concentration, thinking, reasoning and memory. At moderate levels of stress are considered optimal for mental operations such as attention, learning, problem solving and creativity. At lower levels of stress, one fails to be attentive enough and at higher levels, cognition may become highly distorted. Since stress is something every student experiences, it is important to include links to sites addressing this issue.

A research in the concept of student aspirations, suggests that the degree to which students think about and are motivated to achieve their goals predict their level of aspirations. Although research is still needed to clarify further the outcomes of student aspirations, available research suggests that significant educational and psychological benefits are associated with high level of aspirations.

Although direct or indirect evidence for the links of these dimensions with each other is available in the past literature, but that does not exist in an integrated form. The available results are on one or the other dimensions in different cultural settings. Investigators with regard to Indian socio-cultural settings have not reported much work in this area. The observations of review of literature and the theoretical framework of these issues led to design the present investigation.

DELIMITATIONS OF THE STUDY

- The sample was limited to 600 students of Shri Muktsar Sahib and Sangrur district of Punjab.
- The study was delimited to only grade IX students.
- The study was delimited to Academic stress which was studied at three levels- High, Average and Low.
- Effect of all the four dimensions of stress viz. Anxiety, Frustration, Pressure and Conflict were studied separately.
- The study was delimited to Cognitive Skills in Science.
- The study was delimited to Educational Aspirations which was studied at three levels – High, Average and Low.

OBJECTIVES OF THE STUDY

- To study the effect of Academic Stress on Cognitive Skills in Science (Total Scores) for secondary school students.
- To study the effect of Educational Aspirations on Cognitive Skills in Science (Total Scores) for secondary school students.
- To study the interaction effect between Academic Stress and Educational Aspirations on Cognitive Skills in Science (Total Scores) for secondary school students.

HYPOTHESES OF THE STUDY

Ho.1: Secondary school students having High, Average and Low Academic Stress will not be significantly different on total scores of Cognitive Skills in Science.

Ho.2: Secondary school students having High, Average and Low Educational Aspirations will not be significantly different on total scores of Cognitive Skills in Science.

Ho.3: There will be no significant interaction effect of Academic Stress and Educational Aspirations on total scores of Cognitive Skills in Science for secondary school students.

DESIGN OF THE STUDY

In the present study, the **Descriptive Exploratory Method** of research has been employed. This research study was non-experimental because it dealt with the relationship between non-manipulated variable in a natural, rather than artificial setting. Descriptive Exploratory research involves events that have already existed and may be related to a present condition. In the present investigation, Academic Stress and Educational Aspirations were two independent variables. Cognitive Skills in Science was dependent variable. All the independent variables were studied at three levels each viz; High, Average and Low.

TOOLS USED

- ❖ **Cognitive Competence Test Battery on Cognitive Skills in Science:** This test was developed and validated by **Kaur, K. (2008)**. For the present study, the Tests of Cognitive Competence Test Battery were translated in Punjabi medium by language experts and related experienced teachers. The Reliability Coefficient for the Tests of Cognitive Competence Test Battery in Punjabi medium was found to be 0.82, 0.86, 0.85 and 0.90 for Physics, Chemistry, Biology and Environmental Sciences Test respectively. The content validity of the Cognitive Competence Test Battery was determined by relating the tasks to the instructional objectives.
- ❖ **Scale of Stress:** Scale of Academic Stress developed and standardized by **Bisht, A.R. (1987)** (From Bisht Battery of Scales of Stress). Dependability, Stability and Consistency (Split-Half) coefficients of this scale were 0.87, 0.82 and 0.88 respectively.
- ❖ **Educational Aspiration Scale (E.A.S.):** This Scale was prepared and validated by the investigator herself, keeping in view the level of understanding, educational maturity and growth pattern of secondary school students. On the basis of a detailed review of literature, ideas from magazines, journals, newspapers, educational reports and discussions with experts, a large number of items were prepared for inclusion in the draft from the above. All items were then thoroughly screened and edited. With the revised items, the scale included 50 items. The printed forms were administered to a sample of 300 students. It was a self explanatory scale. There was no time limit; however, it took about 25 minutes to administer the whole. The final draft of scale of Educational Aspirations included a total number of 30 items. Reliability of the scale was calculated by test-retest method and was found to be 0.73. As the items had been prepared on the basis of the operational definition of educational aspirations and as the test appears to measure educational aspirations, it is reasonable to claim that the test has face validity as well as content validity.

SAMPLE

The sample in the present investigation was drawn at two levels:

- The School Sample
- The Student Sample

The school sample was drawn from the schools of District Shri Muktsar Sahib and Sangrur in Punjab. A list of schools was procured from the District Education Office. Then by random sampling the schools were selected. For random sampling the name of all the schools were written down on separate sheets of paper of equal size. The papers were folded into six symmetrical slips and put in a carton box. The lid was then sealed and the box was shaken up many times for easy shuffling to take place. The investigator drew out ten slips one by one bearing the names of each school.

The principals of these schools were approached. All the ten principals welcomed the idea and promised to co-operate very enthusiastically. It was ensured that none of these schools had done ability grouping and students were randomly assigned to each section. Hence sections were randomly selected from each of these ten schools.

The total process of study lasted about two months. Hence, there were some dropouts in the sample because of absence at one or the other stage. These students were therefore dropped at the time of analysis. The final sample was of 600 students on which the analysis was done.

COLLECTION OF DATA

After the selection of the sample, a schedule was fixed to collect information from the students' of ten schools with the help of the respective class teachers. Instructions for each test were given at the top of each questionnaire and the investigator herself explained the instructions in clear terms and simple language for each test. The subjects were assured that the information revealed by them would be kept confidential, since it was being collected for the purpose of research only. The tools were administered one by one. Each tool was administered on a separate day. All the tools were scored according to their respective keys.

STATISTICAL TECHNIQUES

- Descriptive Statistics like Mean, Standard Deviation, Skewness, and Kurtosis etc. were used to study the nature of data.
- Graphical presentations were also done to analyse data qualitatively, wherever necessary.
- 2x2 ANOVA was used for analysis and interpretation of data.
- Each significant F-ratio was followed by t-test.

RESULTS AND ANALYSIS

Table 1

Mean, Standard Deviation, Skewness and Kurtosis on Cognitive Skills in Science (Total Scores) with Academic stress and Educational Aspirations

Variable	Group	N	M	SD	Sk	Ku
Academic Stress	High	200	42.87	4.35	0.380	-0.197
	Average	200	43.15	3.88	0.431	-0.176
	Low	200	45.12	4.12	0.496	-0.384
Educational	High	200	45.77	3.29	0.395	-0.459

Aspirations	Average	200	44.22	3.14	0.452	-0.182
	Low	200	42.15	4.05	0.476	0.161

Table 1 indicated that the mean of Total Scores on Cognitive Skills in Science for secondary school students with Low Academic Stress were highest among the mean scores of secondary school students with High and Average Academic Stress. The **Standard Deviation (SD)** indicated that Total scores of Secondary school students with High Academic Stress had yielded the most diversity. **Skewness (Sk)** indicated that the distribution for Total Scores of Secondary school students with High, Average and Low Academic Stress was positively skewed. **Kurtosis (Ku)** indicated that the distribution for Total scores of Secondary school students with High, Average and Low Academic Stress were Leptokurtic but more so, in case of Low Academic Stress.

Table 1 indicated that the mean of Total Scores on Cognitive Skills in Science for secondary school students with High Educational Aspirations were highest among the mean scores of Secondary school students with Average and Low Educational Aspirations. The **Standard Deviation (SD)** indicated that Total scores of Secondary school students with Low Educational Aspirations had yielded the most diversity. **Skewness (Sk)** indicated that the distribution for Total Scores of Secondary school students with High, Average and Low Educational Aspirations was positively skewed. **Kurtosis (Ku)** indicated that the distribution for Total scores of Secondary school students with High, Average and Low Educational Aspirations were Leptokurtic but more so, in case of High Educational Aspirations.

Table 2

Sum of Squares, Mean Sum of Squares and F-ratio for Total Scores of Cognitive Skills in Science in relation to Academic Stress and Educational Aspirations

Source of variation	Sum of Squares(S.S.)	Degree of Freedom (d.f.)	Mean Sum of Squares(M.S.)	F-Value
• Main Effects:				
A: Academic Stress	1980.7	2	990.35	7.35**
B: Educational Aspirations	2237.6	2	1118.8	8.30**
• Two Order Interactions:				
A×B	2614.8	4	653.7	4.85**
Error:				
Within Variables	79597.6	591	134.68	
Total		599		

** Significant at 0.01 level of confidence

*Significant at 0.05 level of confidence

• **Academic Stress (A)**

Table 2 shows that the F-ratio for the difference in means of Total Scores on Cognitive Skills in Science for secondary school students with High, Average and Low Academic Stress, was found to be

significant at the 0.01 level of confidence. The null hypothesis H_01 which stated that *secondary school students having High, Average and Low Academic Stress will not be significantly different on total scores of cognitive Skills in Science* was rejected at the specified level. To ascertain which group of secondary school students was significantly different from each other, t-test was applied for various combination groups and corresponding t-ratios have been presented in the following **Table 3**

Table 3

Means, SD's and t-ratios for difference in total scores of cognitive skills in Science for High, Average and Low Levels of Academic Stress

Academic Stress (A)	High Level (A1)	Average Level (A2)	Low Level (A3)
N	200	200	200
M	42.87	43.15	45.12
S.D.(σ)	4.35	3.88	4.12
High Level (A1)	-	0.68	5.35**
Average Level (A2)	-	-	4.92**
Low Level (A3)	-	-	-

** Significant at 0.01 level of confidence

*Significant at 0.05 level of confidence

In **Table 3**, it may be concluded that secondary school students having High and Average Academic Stress achieved equal means of total Scores of Cognitive Skills in Science. A probe into means led to conclude that the mean achievement of secondary school students with Low Academic Stress (M=45.12) was higher on total Scores of Cognitive Skills in Science than their counterparts with High Academic Stress (M=42.87). The mean achievement of secondary school students with Low Academic Stress (M=45.12) was higher on total Scores of Cognitive Skills in Science than their counterparts with Average Academic Stress (M=43.15).

• Educational Aspirations (B)

Table 2 shows that the F-ratio for the difference in means of total scores on cognitive skills of Science for secondary school students with High, Average and Low Educational Aspirations, was found to be significant at the 0.01 level of confidence. The null hypothesis H_02 which stated that *secondary school students having High, Average and Low Educational Aspirations will not be significantly different on total scores on cognitive skills of Science* was rejected at the specified level. To ascertain which group of secondary school students was significantly different from each other, t-test was applied for various combination groups and corresponding t-ratios have been presented in the following **Table 4**.

Table 4

Means, SD's and t-ratios for difference in Total scores of cognitive skills in Science for High, Average and Low Levels of Educational Aspirations

Educational Aspirations (B)	High Level (B1)	Average Level (B2)	Low Level (B3)
N	200	200	200
M	45.77	44.22	42.15
S.D.(σ)	3.29	3.14	4.05
High Level (B1)	-	4.84**	9.78**
Average Level (B2)	-	-	5.75**
Low Level (B3)	-	-	-

** Significant at 0.01 level of confidence

*Significant at 0.05 level of confidence

In Table 4, a probe into means led to conclude that the mean achievement of secondary school students with High Educational Aspirations (M=45.77) was higher on total scores on cognitive skills of Science than their counterparts with Average Educational Aspirations (M=44.22). The mean achievement of secondary school students with High Educational Aspirations (M=45.77) was higher on total scores on cognitive skills of Science than their counterparts with Low Educational Aspirations (M=42.15). The mean achievement of secondary school students with Average Educational Aspirations (M=44.22) was higher on total scores on cognitive skills of Science than their counterparts with Low Educational Aspirations (M=42.15).

- Academic Stress \times Educational Aspirations (A \times B)**

Table 2 shows that the F-ratio for the difference in means of total scores on cognitive skills of Science for secondary school students due to the interaction between Academic Stress and Educational Aspirations was found to be significant at the 0.01 level of confidence. The null hypothesis H_{03} which stated that *there will be no significant interaction effect of Academic Stress and Educational Aspirations on total scores on cognitive skills of Science for secondary school students* was rejected at the specified level.

Table 5

Means, SD's and t-ratios for difference in Total scores of Cognitive Skills in Science for various combination groups due to interaction of Academic Stress and Educational Aspirations

Groups	A1	A2	A3	B1	B2	B3
N	200	200	200	200	200	200
M	42.87	43.15	45.12	45.77	44.22	42.15

S.D.(σ)	4.35	3.88	4.12	3.29	3.14	4.05
A1	-	0.68	5.35**	7.63**	3.55**	1.71
A2	-	-	4.92**	7.27**	3.05**	2.56*
A3	-	-	-	1.75	2.43*	7.24**
B1	-	-	-	-	4.84**	9.78**
B2	-	-	-	-	-	5.75**
B3	-	-	-	-	-	-

** Significant at 0.01 level of confidence

*Significant at 0.05 level of confidence

As shown in **Table 5**, the t-ratios for the difference in means of total scores on cognitive skills of Science for secondary school students were found to be significant at the 0.01 level of confidence for the following combination groups viz: A1-A3, A1-B1, A1-B2, A2-A3, A2-B1, A2-B2, A3-B3, B1-B2, B1-B3 and B2-B3. Similarly, t-ratios for the difference in means of total scores on cognitive skills of Science for the group A2-B3 and A3-B2 were found to be significant at the 0.05 level of confidence.

However, t-ratios for the difference in means of scores on total scores of cognitive skills of Science for secondary school students in the following combination groups were not found to be significant even at the 0.05 level of confidence. These groups were A1-A2, A1-B3 and A3-B1. The means of these groups were not different. These groups achieved equal mean scores on total scores of cognitive skills of Science.

DISCUSSION OF RESULTS

Both descriptive and inferential analyses were done on Scientific Cognitive Skills (Total Scores). The results revealed the differences in achievement scores of Scientific Cognitive Skills (Total Scores) in relation to Academic Stress and Educational Aspirations. Corresponding hypotheses **H₀₁**, **H₀₂** and **H₀₃** were rejected.

Academic Stress was the main factor found to have association with achievement scores of students. The findings of the present investigation led to a conclusion that secondary school students with High, Average and Low Academic Stress were significantly different on scores of Scientific Cognitive Skills (Total Scores). Therefore hypothesis **H₀₁** was rejected. These results were found consistent with the findings of **Silva (1996)**, **Torsheim**; **Aaroe & Wold (2003)**, **Kauts and Sharma (2009)**, **Sharma**; **Wavare**; **Deshpande**; **Nigam and Chandorkar (2011)** and **Sharma, G. and Pandey, D.(2017)**.

Lack of family time, lack of support of teachers, friends and family, over-scheduling, not enough sleep, poor diet, noise pollution, lack of preparation may be the main factors for such results. Stressed out and negligent parents, high expectations in academic or other performances, abused or deprived childhood, growing up tensions and demand for familial responsibility may also be the main causes of childhood and

teen Academic stress. However, stress induced fears and anxiety in children, adversely affect children's performances at various levels.

Educational Aspirations was the main factor found to be associated with achievement scores of students. The findings of the present research work led to conclude that secondary school students having High, Average and Low Educational Aspirations were significantly different on scores of Scientific Cognitive Skills (Total Scores). The results of present study were found consistent with the findings of **Singh and Gantes (1996), McCormick (1997), Rojewaski (1999), Meinster and Karen (2001), Marjoribanks (2003), Howley (2006), Khattab, N.(2015) and McCulloch, A.(2016)**. Therefore H_02 was rejected.

Differences in Parental Ambitions, Social Expectations, Peer Pressure, Culture, Social Value, Competition, Group Cohesiveness, Gender, and Socio-Economic Background may be the main factors for the rejection of these hypotheses. It may be mentioned that Parents always expect more and more from the first born and therefore the level of aspirations may be higher for first born than that of those born later. Society expects more and more from some people than others. It is generally assumed that one who is successful in a particular area may also be successful in other area if he wishes. Culture traditions are important factors for setting the goal better and rich cultural background helps the child in fulfilling high expectations.

The findings of the present investigation led to a conclusion that there was significant interaction effect of Academic Stress and Educational Aspirations on Total Scores of Scientific Cognitive Skills. Therefore H_03 was rejected. It may be mentioned that parents always expect more from their children. But stressed out and negligent parents, high expectations in academic or other performances are the main causes for Academic stress. Society expects more and more from some people than others. Too much high expectations cause Academic Stress. Rich culture background helps the child in fulfilling high expectations but poor cultural background causes Academic stress. Differences in Socio-Economic Status also cause Academic stress. Competition with siblings and peers in the hope of showing better than other is an affecting factor for level of Aspirations. Social rewards and prestige works as reinforces.

EDUCATIONAL IMPLICATIONS OF THE STUDY

All research studies lead to some conclusions which help various sections of educational system to understand various issues. There are always some limitations of research investigation, yet there are some issues which are resolved and may be used by various educators. The results of present investigation have following implications.

Educational Planners may construct a flexible curriculum for Science to decrease the Academic Stress of Students. They may revise the syllabus of Science time to time for increasing Educational Aspirations of students. They may effort to remove the defects of educational system for improving

different Scientific Cognitive Skills. They may incorporate such activities which may involve parental participation.

Educational Administrators should establish good environment to learn different Scientific Cognitive Skills. They should provide well qualified teachers, co-curricular activities and different mediums of study in the school. General awareness programmes should be organized weekly or monthly as possible for parents and students. Both ends should be motivated to participate. The results of the present study also revealed that Academic Stress and Educational Aspirations lead to the differences in performance of various skills of Science.

The teacher may assess different Scientific Cognitive Skill of the students. Proper guidance to the students may be provided. He may create the interest of the students in Science. He must identify the students who score high on Academic Stress in the class. Awareness and guidance to the parents may be provided. The teacher may assess the Educational Aspirations of the students. Proper guidance for further study may be provided to the students. Methods of teaching may be improved.

Parents should be made aware of the results of present investigation and may be encouraged to improve their interaction with children by devoting more time to children, by taking personal interests in their studies and by answering their questions with patience and having more of verbal communication with them by emotional and varied experiences and by conversing with them regarding different things around them. Positive reinforcement to children may also help in enhancing their achievements. As Science is a subject of reasoning and students need guidance even after school hours. Parents should attend Teacher-parent meetings for discussing various problems of their children.

Students may build a balance between their Educational Aspirations and Occupational Aspirations. The feeling of a healthy competition with siblings and peers in the hope of showing better than others may be built. They should be familiar to coping strategies of Stress. They should know their weaknesses in Science and a healthy interest may be created in Science.

Today's students are the future of the society. With the help of the results of present study, a rapport may be built between teacher & student, teacher & parents and parents & their children. Each one may understand the aspirations of others. Academic Stress may be reduced with co-operation of each other.

Scientists should be made aware of the results of present investigation and they may develop new teaching methods for reducing the stress of students and creating their interests in Science. They may construct special puzzles of scientific recreations.

SUGGESTIONS FOR FURTHER RESEARCH

The investigator is quite aware of the limitations under which the present research was conducted and therefore accepted that no sweeping generalization could be made. These findings are only indicative of trends. The researcher, by virtue of her experience in the field of the study, humbly offers the following suggestions for further research that could be undertaken by the prospective researchers.

- The present study was conducted on secondary school students. A study may be replicated on lower or higher levels e.g. Primary, Upper Primary, Secondary and Higher Secondary levels.

- The study may be replicated on a large sample to authenticate the findings of the present investigation.
- The study may be conducted on the students studying in the schools affiliated to C.B.S.E. or any other school boards.
- The study may be extended to special group children.
- The present study was conducted on the Cognitive Skills in Science. A study may be replicated on Mathematical Cognitive Skills and languages.
- More research needs to be conducted in order to better understand the classification of different Cognitive Skills in Science.
- The independent and dependent variables together only explained a small portion of the variances in learning outcomes and engagement activities. This relationship suggests that there might be other variables e.g. Attitude towards Science, School Environment, Family Environment, Parent-Child interactions, Teacher-Taught relationships etc. that have significant effects on learning and engagement that were not included in the study.

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