EMPOWERING SCIENTIFIC TEMPER THROUGH COGNITIVE LEARNING AMONG HIGHER SECONDARY STUDENTS

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Abstract

Science is a style of thinking and experiencing that starts with one's own existence. They notice things and events using their senses and search for patterns in their observations. They categories in order to create new ideas by looking for similarities and contrasts. They convey what they know and what they are capable of doing both orally and in writing. To quantify descriptions of things and events that they measure. They infer explanations and are prepared to revise their conclusions when new information becomes available. Education is a cycle of human improvement for the most part of the student 'academic accomplishment with minimal emphasis on cognitive growth. Furthermore, there is a need to comprehend the predecessors that aid in the creation of a foundation for improved scientific learning through cognitive mode. The operating member in many cycles during which we gain new knowledge and employees in a company organization develops and fortifies their capacity to handle increasingly uncertain tasks. Organizations must prepare their workforce for cognitive learning. Organizations with strong cognitive learning are more likely to be productive and successful.

Keywords: Scientific Temper, Scientific, Education, Cognitive Learning and Behavioral Learning.

Introduction

The major goal of education has always been to concentrate on the peaceful growth of humanity, resulting in public consensus. Throughout their academic careers, students are exposed to a variety of disciplines in order to develop an interest in a specific leaning stream of their choosing. Because education is a mash-up of many facts,

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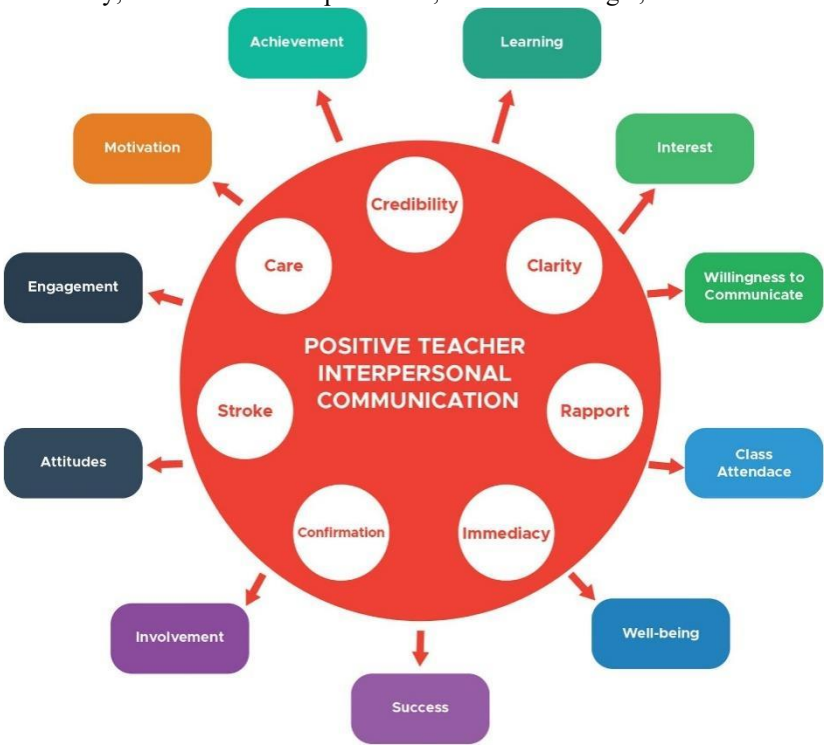
perceptions, measurements, discoveries, exams, and contemplations, among other things, academic outcomes cannot be judged in a single procedure. Academic performance has become the gold standard for learning, yet this is incorrect. Academic accomplishments must be seen in the context of a learning movement. Attitude development, skill growth, fundamental thinking, disposition, and so on are all examples of the learning process. There is a trait that both maintains and changes society. Where the substance cue is the medium, educational programs are designed to maintain these features. Where subsistence is the medium, educational programs are meant to maintain its qualities. Each topic has its own personality and dedication to student growth.

Scientific Temper is a viewpoint that depicts an attitude that incorporates the use of logic. Strange views, partiality, unbending disposition, stupidity, close-mindedness, and other provincial proclivities are all part of its character. Scientific Temper is the unwillingness to accept something without trying it, the capacity to revise previous conclusions despite fresh evidence, and the reliance on observed reality rather than pre-conceived concept. Scientific temperament has a strong influence on the social course of events and is a variable component. It is the soul of a free man and has the power to modify freshly formed thoughts with the help of new confirmations. As a result, Scientific Temper is a fantastic social tool that every citizen should own. Various committees and commissions have advised that scientific teaching methods should not be constrained until psychological development has occurred, but that emotional space should be provided. It also connects consuming values like as genomes, teamwork, and humanity, as well as science protection, fundamental logic, and scientific temper.



Education is a cycle of human progress aimed at achieving a greater and better quality of life. At the moment, our educational system is largely concerned with students' academic success, with little regard for their cognitive growth. It is important to highlight that academic achievement alone does not guarantee a good life. For a productive and imaginative existence, children must master basic cognitive talents and capacities. Educational institutions should help students develop a sense of logical and cognitive awareness. As a result, our schools must provide enough programmes for children to develop critical scientific skills via cognitive learning. Cognitive behaviour modification treatments may be used to eliminate cognitive activity that causes unpleasant emotions like anger and anxiety.

Student's scientific attitude and academic performance an overview

The review of the related literature on students' scientific attitude and academic performance, teachers' academic qualification, students' gender difference, and school location revealed clearly that students' scientific attitude play a significant role in ensuring students' optimal performance. Extensive research has found that students'

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scientific attitude is one of the important factors that could potentially influence students' academic performance significantly, the norms and standards, and According to the findings of the research, students' scientific attitudes toward chemistry have a strong direct impact on their academic progress in the subject. In terms of teacher qualification, research have shown that children are more likely to do better academically when the instructor is qualified to carry out what is required of them. The most significant determinant of student accomplishment is teacher quality. (Satta 2008)[1]. Teachers should diversify their teaching techniques, they noted, and students should be given the chance to learn from themselves by exposing them to practical, field expedition which are students involved, with these students improving in their accomplishments. Various research have showed that female students are more interested in studying chemistry than male students, and this claim is confirmed by experts. Babalola and Fayombo (2009)[2] found out that there was no statistically significant difference in the chemistry achievement of the students based on gender. Abdullah (2009) found in his researches that gender differences in learning chemistry have remained a contentious subject in study as students' performance in West African Examination Council (WAEC) chemistry results have deviated throughout the years. In terms of school location, research have shown that the neighbourhood in which the school is located has an impact on students' chemistry performance. (Kemjike, 2005)[3].Ajayi (2008)[4], found that there was a considerable disparity in academic performance between pupils in urban and rural areas, and it was decided that the accomplishment must have resulted from various amenities that were utilised that were not accessible in the rural setting. According to the findings of the research, schools in urban regions outperform schools in rural areas in terms of academic performance.

Process Skills- Theoretical Discussion

Science is one of the human occupations that man has devised in order to satisfy specific human wants and aspirations. Individual intellectual growth should be the fundamental purpose of education. Science has become an increasingly significant aspect of common knowledge as its role in our society has grown. Scientific education is best promoted as part of a broader focus on intellectual activities. Secondary school pupils have just entered the teenage era, which is a time of tension and turmoil. During this time, kids must be carefully supervised and counselled, or else the issue of maladjustment would occur. Adolescents will flourish in all areas of life and

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[2] Babalola, J. O. and Fayombo, G.A. (2009), "Investigating the combined & relative effects of some students related variables on science achievement among secondary school student in Barbados", European Journal of Scientific Research, Vol. 37 (3), PP.481-489.

[3] Kemjika, A.O. (2005), "Student teachers' perception of the factors associated with poor academic performance in Ogun State secondary school (Nigeria) implication for Counseling for nutria development", European Journal of social science, Vol.13, PP. 229-230.

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education if they are properly led and have the correct educational objectives. Governments have spent billions of dollars on higher education. However, the outcomes are not proportional to the costs invested. Only around 40 to 60 percent of pupils graduate, owing to the contribution of private schools. In other words, two-thirds of educational spending is spent for nothing. The findings of this research will assist educational planners, instructors, and students in changing the current state of things, since many kids fail in secondary school. Keywords: scientific achievement, scientific mindset, knowledge. Panoy (2013)[5] as the independent variable, a strategy that directly exploited the skills necessary in each category of Bloom's Taxonomy was examined. The researcher conducted a study to examine a unique teaching approach known as differentiated strategy and analyse its influence on the development of Science process skills. The study was designed to aid teachers in formulating a plan that would adapt to the present situation of ever-increasing diversity among pupils. In terms of comparing, measuring, and problem-solving skills, the research supported the null hypothesis that there was a significant difference in mean gain score between the experimental and control groups. As a consequence, science continues to be a subject that need a range of approaches to dealing with the ever changing learning environment in which students find themselves..

Cognitive Process Dimension

The study of Faustino (2012)[6] in two-group experimental study of high and low performance, There was a substantial difference in the cognitive learning outcomes of high and poor performing pupils. High-achieving kids were able to generate excellent analogies, editorial cartoons, rhymes, and slogans. Because the depth of the students' replies differed, there was a modest variation in the reflective responses between the two groups. The study differed in that the researcher employed the Revised Blooms Taxonomy's emotional domain. The study's findings suggested that any cognitive strategy is feasible for students in a regular class; however, the learning outcomes of the students reported in the research should not be used as the sole basis for selecting an effective strategy because learning is also influenced by the students' level of task knowledge. Developing cognitive learning capacities teaches pupils how to study more efficiently again and again. Students discover out how to do more than just regurgitate what they've previously studied. They comprehend the "why" of a topic and how it fits into a larger picture. In contrast, cognitive learning supports students in developing a more thorough grasp of not just scientific courses but also other disciplines in order to penetrate and execute retention tactics. This increases long-term review, allowing pupils to build on previous knowledge. The cognitive learning strategy allows students to reflect on what they are learning and how it relates to other information. This supports pupils in developing the critical thinking skills required to establish new linkages between the items they are learning.

Scientific thinking and Scientific Temper- An overview

In our nation, where a large portion of the general people is still entangled in the entanglement of strange ideas and traditionalist works on, instilling Scientific Temper among citizens is critical for the progress of the country. This is best accomplished throughout adolescence, and it is therefore critical that the school instructional plan provide sufficient time to this critical requirement. This requires the training of attributes such as request soul, fortitude (to address), objectivity, and explaining Scientific Temper. The soul of request, regulator in most children is really mothered by the dull educational learning environment created by the pedantic teaching philosophy. In any case, studying science, which ought to be a thrill of revelation, becomes outweighed by knowing so many 'facts,' equations, synthetic replies, and so forth. It is in the third and most important way that training engagement is made joyful, with instructors acting as facilitators of learning, companions, and assistants. There are several instances of overcoming hardship in schools where education is given via a variety of ways such as tales, art, recitation, games, group projects, self-perusing, and so on in order to keep the youngster's enthusiasm for learning alive. In such schools, the Childers are not afraid to ask their teachers and classmates questions, and their curiosity is nurtured as a result.

Learning in a scientific temper with a focus on the scientific method.

Many academics have investigated the efficacy of a scientific strategy course in generating interest in science learning and teaching. A scientific method course, according to the research, should create a lively and risk-free learning atmosphere in which science educators may analyse their wonderings, interests, and problems, as

[5] Panoy, B.R.P. (2013), "Differentiated Strategy in Teaching and Skills Development of Pupils in Elementary Science", Master's Thesis, Laguna State Polytechnic University, San Pablo City Laguna.

[6] Faustino, A.Z. (2012), "Cognitive Strategies and Student Learning Outcomes in Biology", Master's Thesis. University of the Philippines Diliman campus, College of Education.

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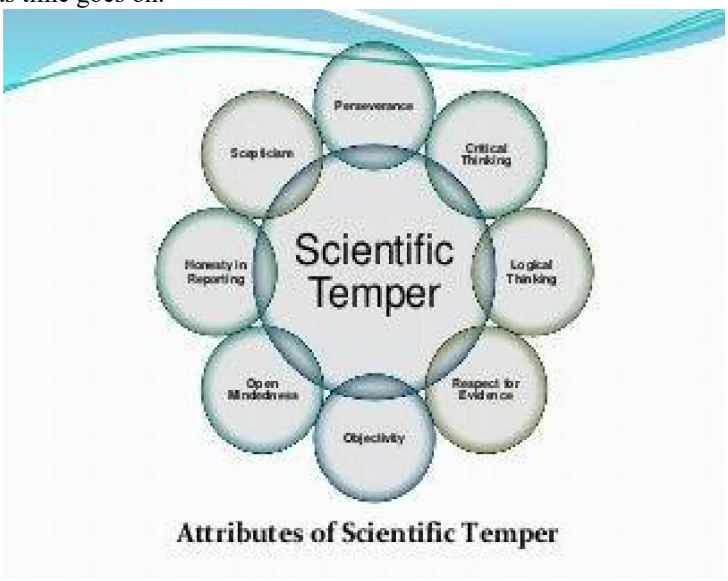
well as seek answers that may improve student interest in studying science. Dewey classified scientific interest measurement into three categories: dynamic, in light of articles, and having dividable importance of passionate worth. Play and science are often seen as diametrically opposite developmental phases, with play addressing whimsy and insignificance and science seeking true coherence. Nonetheless, the many-faceted connections between play, science, and invention are well-founded. The classroom atmosphere should be positive, joyful, and encouraging, providing a learning environment in which students may effectively correlate scientific phenomena and debate their results with their peers and teachers. In an action-based approach, teachers arrange learning such that students work in beneficial learning groups on a regular basis. The utilisation of such groups may aid in the construction of scientific classroom networks in which students interact in groups to exchange knowledge and test new ideas for addressing scientific challenges. Because of jointly planned learning, students may figure out and supply conversation starters, exchange viewpoints, explain thoughts, test hypotheses, and propose arrangements with their peers. Students may see the crew from a variety of angles and reply to scientific questions. This promotes the development of scientific curiosity. According to studies on energy, science, and creativity, there is a correlation between having a sound foundation in science and increased interest in science. It is vital for good teaching and learning to keep students involved and motivated in the classroom. The strategy seems to instructors to be plainly transparent in order to ignite students' attention and drive them to participate in classroom activities. Training them becomes much simpler as time goes on.



Attributes of Scientific Temper

Scientific Temperament and Cognitive Learning- Review of Related Literature

Neisse (1988), cognitive aptitude includes the capacity to reason, organize, and cope with issues, think dynamically, comprehend complex concepts, and profit from deeply interconnected experiences. Each of these elements contributes to intellectual success. Students with good cognitive ability display self-control in their academic behaviour, have better levels of perceived competence, and can more clearly comprehend how results were related with their personal behaviour. Such children will have a better knowledge of what causes success and failure, and they are more likely to change the harmful behaviours that lead to poor academic performance. They have more sophisticated cognitive functions and stronger logical abilities, which enable them to remember, retain, and recreate reality more efficiently when required in a certain academic field.

Al-rabaani (2014) [7]evaluated the learning of scientific process skills by pre-service social studies teachers in Omani schools. A questionnaire with 14 questions addressing fundamental and integrated scientific process abilities was used to gather data. The questionnaire was given to all 59 social studies students and lecturers at Sultan Qaboos University in the Sultanate of Oman. The findings revealed that they had a modest development of scientific process

[7] Al-rabaani, A. (2014). The acquisition of science process skills by Omani‟s preservice social studies‟ teachers. European Journal of Educational Studies, 6(1), 13- 19.

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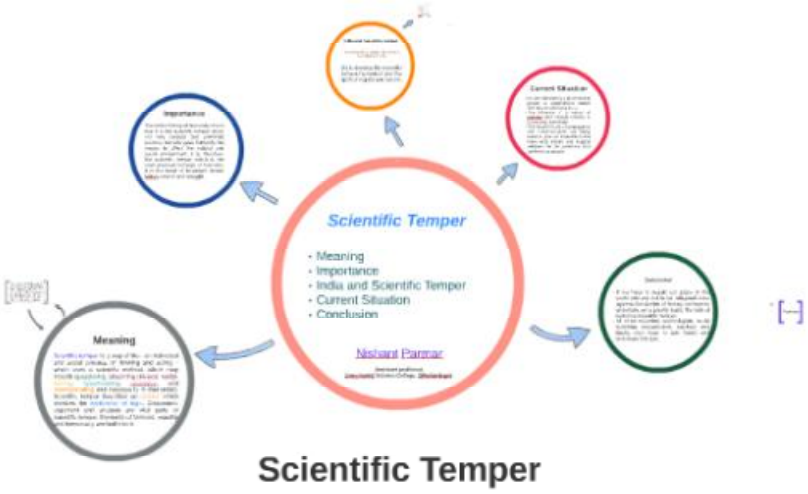
abilities, with no gender differences. Pillai (2012)[8] conducted research on secondary school pupils' learning success in science in connection to their scientific ability. Secondary school pupils with strong scientific aptitude had greater learning accomplishment ratings, according to the findings. When compared to rural kids, urban secondary school students had much better scientific aptitude ratings. When compared to Kannada medium pupils, English medium secondary school students had much superior scientific aptitude ratings. Boys and girls in Karnataka secondary schools have equivalent scientific aptitude ratings. Daisy (2014) investigated if there are variations in the science attitudes of secondary school pupils according on gender, area, religion, father educational status, and father's yearly income. The research was conducted on a sample of Pondicherry area secondary government school pupils. This research examines the relationship between the learning-by-doing technique and theoretical learning in secondary school. Bang and Baker (2013)[9] evaluated the impact of gender organisation in high schools on Korean tenth-grade students' scientific performance and attitudes toward science. An initial survey was completed by three schools, three principals, three science instructors, and 302 tenth-grade students from their different school types, and eleven academically excellent students were then interviewed. Male and female pupils in the co-ed school had much superior scientific performance and good attitudes toward science, according to the findings.



Need and Importance of the Study

Secondary school pupils have just entered the teenage era, which is a time of tension and turmoil. During this time, kids must be carefully supervised and counselled, or else the issue of maladjustment would occur. Adolescents will flourish in all areas of life and education if they are properly led and have the correct educational objectives. Governments have spent billions of rupees on secondary education.

Objectives of the Study

To identify components of Scientific Temper and cognitive learning among school students

Methods and Materials

The present research is qualitative research that uses both the exploratory and descriptive approach in nature. Simple random sampling technique is used for the study with 300 respondents. The foundation of theories and concepts of scientific temper-based guidance has been reviewed from secondary data which have been sourced from different kinds of literature such as economic reports, various national and global agencies, journals, articles, books, websites, e-book and other reports. The primary purpose of this paper is to represent a clear picture of the

[8] Pillai, P.K.S. (2012): An Analytical study on Scientific Attitude of Higher Secondary students in Virudhnagar district, International Journal of Teacher Educational and Research, Vol. 3 (12), pp. 173-174

[9] Baker, D. (2013). Gender differences in Korean high school students‟ science achievements and attitudes towards science in three different school settings. Mevlana International Journal of Education, 3(2), 27-42.

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components of Scientific Temper and cognitive learning among school student's contextual realities and the conundrums faced by the target population for accessing the same.

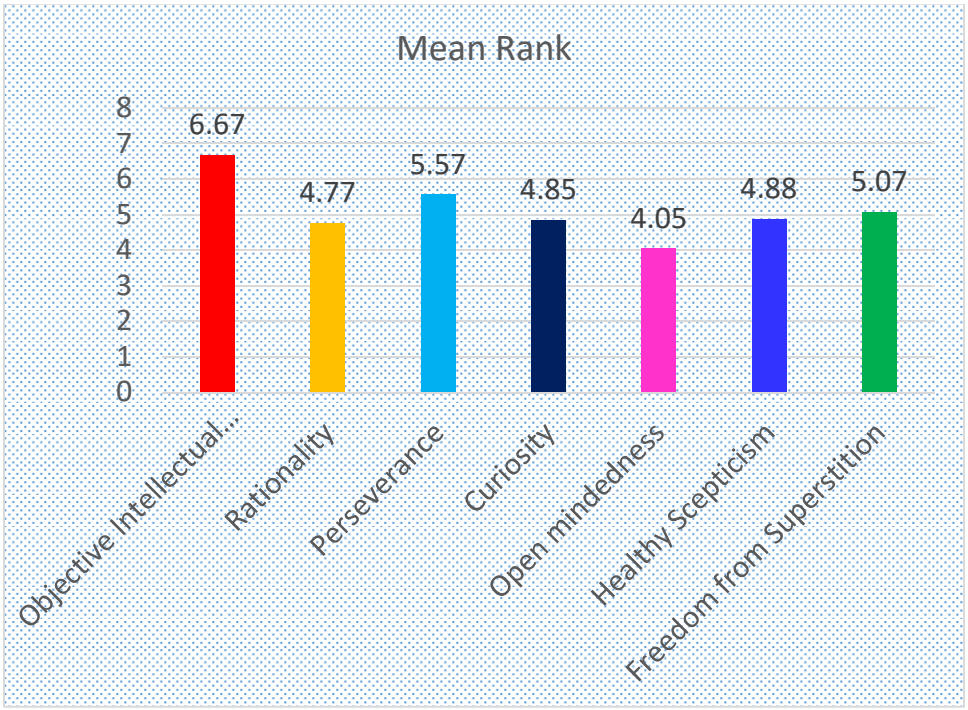
Findings Results and Discussion

Scientific temper-based guidance provides six pates of Scientific Temper such as Scientific Literacy, Scientific Attitude, Scientific Thinking, Scientific Method, Scientific Perception, and Scientific Habit. The Scientific Temper Package included a variety of strategies and exercises based on these six components. Scientific Temper is an attitude that is open, normal, addressing, and inquiring, allowing the individual to have a rational point of view. For the purposes of this study, Scientific Temper is defined as the psychological disposition that underpins the technique for securing slid and functional information; it is free of strange notions, biases, unbending nature, close-mindedness, nonsensicalness, subjected, and other parochial inclinations. Mean, Standard Deviation and of Mean Rank distribution of Scientific Temper of secondary school students.

Components of Scientific Temper

Table.1

Components of Scientific Temper	Mean	Standard Deviation	Mean Rank
Objective Intellectual honesty	3.34	3.12	6.67
Rationality	2.38	2.41	4.77
Perseverance	2.78	2.57	5.57
Curiosity	2.42	2.43	4.85
Open mindedness	2.02	2.16	4.05
Healthy Scepticism	2.44	2.51	4.88
Freedom from Superstition	2.54	2.36	5.07



From table 1, it was observed that the mean score of the scientific temper of secondary school students in seven components was found to be3.34, 2.38, 2.78, 2.42, 2.02, 2.44, and 2.54 for Objective Intellectual honesty, Rationality, Perseverance, Curiosity, Open-mindedness, Healthy Scepticism and Freedom from Superstition Observation respectively.

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Conclusion.

The current study looked at secondary school pupils' views about scientific temper. Science is a way of thinking and feeling that begins with one's own existence in order to comprehend the cosmos. Cognitive learning enables pupils to acquire scientific temperaments in a deliberate manner. This enables students to go deeper into the scientific issue and have a more comprehensive grasp of it. The cognitive approach aids children in acquiring the skills needed for academic achievement. This helps students build adaptive critical thinking and study skills that can be used to any topic. Increasing one's cognitive abilities permits one to widen one's knowledge and thinking. The technique encourages students to think creatively and apply new concepts to what they already know. The approach is more passionate and confident with a more cognitive approach and greater knowledge of the concepts, as well as more grounded acquisition abilities. Allowing students to actively engage in their education makes it more interesting and engaging. This encourages students to develop a lifelong passion of learning that extends beyond the classroom.

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