

Impact of Science Classroom Climate on Problem Solving Skills

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ABSTRACT:

The paper draws empirical evidences of impact of classroom environment on promoting problem solving skills among students with special reference to science teaching. A healthy interaction between teachers, students and among the students play central role in developing problem solving skills. Teachers may create an environment where students encounter inquiry based problems or real life situations that would encourage to think critically. It nourishes an environment that help learners to explore multiple solutions through brainstorming. It helps in strengthening logical reasoning and application skills.

Keywords: Classroom climate, Problem solving skills, Student – teacher interaction, Student student interaction, Management of environment and resources

INTRODUCTION

A progressive nation's cultural, economic, social and industrial development depends on the status of scientific and technological growth of that country. Youth of a developing country like Bharat needs to be equipped with entrepreneurial skills like deft decision making, risk taking, communication skills, and managerial skills and most importantly problem solving skills. The relevance of science in fostering youth empowerment can be apprehended from the fact that under Article 51 (A) of Indian constitution, the promotion of science and scientific temperament was incorporated. In nutshell, knowledge of science acts as a catalyst for empowering young minds with best skills that can contribute in laying the foundation of an Aatmanirbhar Bharat.

Year 1983 marks a turning point in the field of education by establishing the department of science and technology in order to foster scientific temper among the young minds to alleviate the socio-economic status of weaker section of the society.

REVIEW OF LITERATURE

Phukan S.R. (2015) ¹studied classroom climate of educational institutions at higher secondary level in relation to pupil's academic motivation and learning style at Dibrugarh district, Assam. A descriptive study was conducted and observed that neither management nor location of educational institutions had a significant influence on classroom climate. Academic motivation of higher secondary students in private institutions was higher than the students in government institution. **Bagvathy, K. (2015)** ²examined achievement in science on problem solving skills among high school students to determine their relationship with science in terms of gender, locale, type of management. No significant positive correlation was found between achievements in science with problem solving skills. **Bimbola, O. & Oludipe, I.D. (2010)** ³discussed effect of constructive based teaching strategy on academic performance

of students in integral science at junior secondary school level. Through his quasi-experimental study, he implicated same entry level for both experimental and control group in contrary to significant difference found between constructivist group and conventional lecturer group emphasising on the benefits of constructive method of teaching. **Astuti, F. et al (2019)⁴**, in his study, inferred that AR media was found to be effective in increasing student's problem solving skills where students get the opportunity to solve the problems by self, as they explore the solutions themselves using AR media. **Salvi, R. (2019)⁵** observed greater scientific attitude in non-tribal students as compared to the tribal students.

RATIONALE OF THE STUDY

Reviewing the previous research literatures, a significant gap was identified on studying the importance of constructing a science classroom environment to develop problem solving skills among learners.

Rajasthan stands 29th in position in literacy rate as per the census of 2011. Various projects of the state like R-CAT (Rajasthan Centre of Advanced Technology), Rajasthan Skills and Livelihoods Development Corporation (RSDLC) is playing a crucial role aimed at developing problem solving skills in the existing workforce. The research topic was found to be relevant as the locale of research had major research gap and required analytical study to understand the reason behind research gap that would add impetus to the execution of the programmes. Coherently, the inferences drawn from the study could be applied to attain the objective of the skill based quality education underlined as under NEP-2020.

From skills to strength, a problem solving mind is a key to youth empowerment that can shape the nation's future.

STATEMENT OF THE PROBLEM

To study the "Impact Of Science Classroom Climate On Problem Solving Skills."

OBJECTIVE:

To study the impact of science classroom climate on problem solving skills of students of Government schools of Udaipur District.

HYPOTHESIS:

H₀: There is no significant correlation between the Classroom Climate and Problem solving skills of the students in science subject at higher secondary level in Government schools of Udaipur District.

RESEARCH DESIGN

The present research study adopts descriptive survey method. A sample of 200 students were taken from the government sector of rural and urban schools of Udaipur district of Rajasthan through purposive. Pearson's coefficient of correlation was applied to study the relation between science classroom climate and problem solving skills of students. Three dimensions of science classroom taken under consideration namely Management of resources, Student - teacher interaction and Student- student interaction were found to be incorporating all the dimensions of classroom climate.

TOOLS

To collect the data relevant to the study, two questionnaires were employed Questionnaire on science teaching and Questionnaire on classroom climate through online (google form) and offline mode. A checklist was used

to assess the availability of resources in the science laboratory. Achievement record of the students assessed on problem solving were taken for assessment.

RELIABILITY

The questionnaires on classroom climate and teaching of science were found to be reliable at chronbach’s alpha value of 0.70 and 0.80 respectively.

VALIDITY

The content validity of the tools were established by taking the review of 20 experts in their own field.

ANALYSIS AND INTERPRETATION

Table 1 Dimension Wise Cut Point Means Of Science Classroom Climate: Government

Based on	CC Group	N	Dimension	Cut Point Mean	Calculated Mean	Result
Administration	Government	200	Student-teacher Interaction	28	27.18	Unsatisfactory
			Management of Environment and Resources	28	22.89	Unsatisfactory
			Student-student interaction	16	21.75	Satisfactory
			Overall	72	71.83	Unsatisfactory

As per the survey conducted, although the student-teacher interaction and management of environment and resources were found to be unsatisfactory, the student-student interaction was found to be satisfactory revealing a constructive and open communication between students.

The overall classroom climate was found to be unsatisfactory subjecting to the calculated mean to be less than the cut point mean.

Table 2 Dimension wise correlation of Classroom Climate on Problem Solving Skills: Government

Dimensions		N	Student-teacher interaction	Management of environment and resources	Student-student interaction
Problem solving skill	R	200	.15	.14.	.22
	p-value		.029	.049.	.002
	Sig.(2-tailed)		Significant (.05)	Non-significant	Significant (.01)
	RESULT		Negligible	Negligible	Positively low

The statistics clearly indicate that, negative correlation between student teacher interaction and management of environmental resources with problem solving skills of science students at senior secondary level at government schools of Udaipur district. On the other hand, a positively low correlation

was observed between the students-student interaction with problem solving skills of science students at senior secondary level at government schools of Udaipur district.

Recommendations

Above inference suggests the requirement of more vigilant teachers at government schools with expertise in channelizing the potential of the students towards positive goals. They need to focus on the all-round development of the students in the classroom teaching. It requires fulfilment of basic functional science laboratories to promote hands on learning. Classroom teaching could be enhanced creatively by providing display corners maintained by students that cultivate a sense of ownership among the students. An effective seating arrangement to promote interaction among students to facilitate activity based classroom should be promoted.

Significantly low correlation between student-teacher interaction calls for the need of building a strong and fearless relationship between student and teachers. It shows the presence of teacher dominated learning environment which is limited to routine questioning and discussions. It reveals that the students are not getting an environment where in they can get enough opportunities to explore or apply knowledge independently.

The classroom condition should be conducive where students get an opportunity to find the solution on their own. A classroom environment where student are given direct solution to the problem by the teacher, creates a passive classroom environment which hinder the problem solving ability of the students. The teaching techniques that can be used to encourage problem solving ability among students are inquiry based learning, collaborative learning, problem based learning, using open ended questions, providing continuous feedback and reflections in the classroom, implementing experiential learning. Inquiry- based learning, as suggested by **Wahyudiati et al (2019)**⁶ encourage students to ask questions by forming hypothesis testing through experiments and statistically analysing the results.

The recommendation stems from the statements as cited in **Fadli, (2019)**⁷, **Wahyudiati, D. et al (2019)**^{vi}, **Selcuk, G S. (2007)**⁸ wherein it was suggested that the problem solving and scientific attitude strongly supports the learning achievement and academic performance. The teachers of the government schools must adopt latest instructional models like 5-E instructional models, ADDIE models, Principles of instruction cited by Gagne's nine events of instruction supported by Bloom's taxonomy.

A non – significant correlation between problem- solving skills and management of environmental resources indicates resource-scarce in the science classrooms of government schools pertaining to ICT tools, lab equipment & apparatus and latest teaching equipment in government schools. A well-equipped science laboratory help in promoting inquiry-based learning, investigation skill, creativity and real-world problem solving skills. A well-equipped science laboratory gives hands-on learning experience of activities that encourage asking questions, hypothesis formation and testing the solution scientifically. Trial and error learning under laboratory condition help develop critical reasoning, decision making, analyse mistakes and get refined solutions. Group- practicals encourage teamwork, co-operative problem-solving that bridge the book knowledge with real-world problem solving. It endorses the application of real life theories. The practice of observing the records and interpreting the data develops analytical and reflective skills seemed to be lacking as evident from the data.

The data revealed negligible correlation of Student - student interaction with development of content and interest. Programmed instructional learning followed by operant conditioning learning theory practice will enhance the teaching- learning cycle. **Devpura, V. (2017)**⁹ recommended smart classroom in teaching and

learning along with development of software packages for the use in classroom as science is a subject that needs learning through visualization.³⁹

In order to address the positively low correlation between student student interaction due to sedate attitude of teachers towards classroom activities, teacher must adopt carl roger's experiential learning cycle of Apply, Act, Reflect and Conceptualise. This also draws support of the research findings by (Ahuja, 2017)¹⁰ who propounded that student should not merely copy each other's data but also verify it using hands on experience through practical and responding to what, why and how of a phenomenon.¹⁹

CONCLUSION

A teacher is known to be facilitator of learning. They have the ability to create curiosity by implementing the principles of science and its application in day to day life demonstrations, field works, use of audio-visual aids are important means through which teaching can be made effective. In a classroom environment a conducive culture can be promoted by encouraging students to ask questions, hypothesize and test ideas. There is the dier need of replacing one – way lecture to be replaced by two way communication between teachers and students.as concluded from the inferences from the research findings, building of trust, motivation and enthusiasm for effective learning is very important which is possible through construvctive feedback.

A positive interaction between students was found between students that provide a strong ground to build an impactful learning environment. It can be done by encouraging peer leaning. Science clubs, group projects have proved to be effective tools in developing skills in science students. It help them to express their thoughts with independence and learn social skills.

To sum up, a positive science classroom climate plays crucial role in making the learning effective by providing the students a safe niche to share their knowledge. It ensures equal participation of all students from diverse backgrounds. A classroom where real life situation is assisted by activity based science teaching is always helpful in bringing the best in a student.

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