

**EFFECTIVENESS OF INQUIRY TRAINING MODEL FOR TEACHING CHEMISTRY**

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**Abstract**

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*This research investigated the effectiveness of inquiry Training Model over traditional teaching method in teaching chemistry at IX grade level. A total of 120 students participated in the study. The study was designed to prepare study material for teaching chemistry for class IX using inquiry training model, study the effectiveness of inquiry training model on academic achievement of students and compare the academic achievement of students studying through inquiry training model & traditional method for teaching chemistry. The researcher selected the two groups randomly where each comprising 60 students & were labelled as experimental group & Control group ..The students of control group were taught with traditional method while the students of experimental group were taught with inquiry training model. The pre test was administered to students in both the groups before teaching commenced and post test was administered after the teaching in both the groups. It was found that the calculated value of mean of Post test of control group is 12.55, standard deviation is 4.38 & the mean of Post test of experimental group is 17.46 and standard deviation is 5.88. Result shown that there is a statistical significant effect of Inquiry Training Model over conventional teaching method on academic achievement of students. It was observed that the students taught with Inquiry training method performed better than the students taught with traditional method*

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**Key words:** *Inquiry method, traditional method, Chemistry*

**Introduction:** Education continuously builds ideas & emotions. The flux of human consciousness gives the process of education its distinctive character and makes teaching & learning such a wondrous, ever changing process, as thoughts & feelings are built and rebuilt. The children come to school filled with words that exist in their memories of listening and speaking and experience the transformation of the words and all they mean into reading and

writing .The words will never be the same again ,for they are now seen as well. Where they could be produced before as sounds, they can now be written down. The fundamental reality of the words continues, nonetheless, to be in the minds of those changes to the children, but something important has happened to them and that happening is the property of each unique mind. The teacher providing tasks generate those new realities. The realities however, are possessions of the minds of the children.

The students of education have been given the knowledge of learning principles in the process of education until now in order to solve the teaching problems. It is the experience that no teaching problem could be solved by acquiring the knowledge of learning principles. Hence, now the theories are being indoctrinated in order to understand the nature of teaching instead of nature of learning .Remember that till now no teaching theory could be indoctrinated .These could be developed only in the form of models. These models act as the basis for the indoctrination of teaching theories. One of them is inquiry training model.

**Inquiry training model:** The essence of the model is to involve students in a genuine problem of inquiry by confronting them with an area of investigation helping them identify the conceptual or methodological problem within that area of investigation, inviting them to design way of overcoming that problem. Thus they see knowledge in the making is initiated into the community of scholars. At the same time, they gain a healthy respect for knowledge & will probably learn both the limitations of current knowledge and its dependability.

PHASE ONE	PHASE TWO
Area of investigation is posed to student.	Students structure the problem.
PHASE THREE	PHASE FOUR
Students identify the problem in the Investigation.	Students speculate on ways to clear up the difficulty.

The syntax takes a number of forms .Essentially it contains the following elements or phases or although they may occur in a number of sequences, in phase one, an area of investigation is posed to student, including the methodologies used in the investigation. In phase two, the problem is structured so that the students identify difficulties in the investigation. The difficulty may be one of data interpretation, data generation the control of experiment, or the making of inferences. In phase one, the student is to ask to stipulate on ways of clearing up the

difficulty, by redesigning the experiment, organizing data in different ways. Generating data, developing constructs & so on.

**Social system:** A cooperative, rigorous climate is desired .Because the student is to be welcomed into a community of seekers who use the best technique of science, the climate include a certain degree of boldness as well as humility. The student needs it hypothesizes rigorously, challenge, evidence, criticize research designs, & so forth. In addition to accepting the need of rigor, students must also recognize the tentative & emergent nature of their own knowledge as well as that of disciplines & in doing so; develop certain humility with respect to their approach to the well developed scientific disciplines.

**Principles of reaction:** The teachers talk is to nurture the inequality by emphasizing the process of inquiry & inducing the students to reflect on it. The teacher needs to be careful that the identification of facts does not become the central issue & should encourage a generation of hypothesis, the interpretation of data & the development of constructs, which are seen as emergent ways of interpreting reality

**Support system:** A flexible instructor skilled in the process of inquiry, a plentiful supply of “Real” areas of investigation & their ensuring problems & the required data sources from which to conduct inquiry in to these areas provide the necessary support system for this model.

**Application:** A number of models for teaching the disciplines as processes of inquiry exist, all built around the concepts & methods of the particular disciplines The Michigan social science curriculum project directed by Ronald Lippit & Robert Fox is based on an approach that is potentially very powerful but that is starting in its simplicity. The strategy is to teach the research techniques of social psychology as a living discipline whose concepts & method emerge through continuous application to inquiry into human behavior .Another result is a direct demonstration of the relevance of social science to human affairs. This curriculum illustrates how elementary school children can use scientific procedures to examine social behavior.

Both the conception of social psychology held by these curriculum makers & their teaching strategy, which is essentially to lead the children to practice social psychology, are probably best illustrated by looking at their materials & the activities they recommend. They have prepared save “Laboratory Units” developed around a resource book or text & a series of project books. The seven units begin with an exploration of the nature of social

science,”Learning to use social science” and proceed to series of units in which the students apply social science procedures & concepts to human behavior.

The children compare their analysis of the samples so that they check observations & inferences against one another & come to realize problem of obtaining agreement about observations. They also learn how to analyses interaction through the technique of circular analysis. Finally, a series of activates introduces the children to experiments by social psychologists that have generated interesting theories about friendly & unfriendly behavior & cooperation & competition.

This approach focuses the children’s study on human interaction provides an academic frame of reference & techniques for delineating & carrying out inquiry, & involves the student in the observation of his or her own behavior & that of those around him. The overall intentions of the student will take on some of the characteristics of the social scientist. Thus the instructional values are in the interpersonal as well as the academics domain.

This model has wide applicability ,but unfortunately it is dependent on inquiry oriented materials ( areas of investigation),which are rare in most classrooms, since the didactic text is the standard .However ,every subject area has at least on text series that is inquiry oriented or one that is easily adapted to this model. An instructor with a clear understanding of the model will easily discern instructional material that with a little rearrangement might provide suitable areas for investigation .Instructors who are quite knowledgeable in third particular disciplines can probably construct their own materials.

**Sample-** For the present study sample of 120 students was taken from IX grade students from two schools at Nagpur.

**Tools-** In the study two tools are used which are mentioned below: Self developed test 2) Inquiry training model

In self developed test, researcher asked objective questions to the students of class IX. Pre-test & Post-test was employed for the study .Researcher made test of 30 marks from the topics. In the test each question had four options & child had to tick the correct answer.

In inquiry training model, researcher had given a situation & also shown some photos to the students, where they collected the information by inquiring from teacher & analyze the problem.

**DATA COLLECTION & ANALYSIS:** The study is experimental nature and two group design The comparison between distribution of scores by Experimental Group & control group

was obtained which shows that the performance of Experimental group was better than the performance of Control group Researcher compared mean & standard deviation. The calculated value of mean of experimental group of Pre test is 10.8 & Post test is 17.46. The calculated value of experimental group of standard deviation of Pre test is 4.03 & Post test is 5.88

**Table 4.1**

Group	Test	Number of students	Mean	Standard deviation	T value
Experimental Group	Pre test	60	10.8	4.03	4.28
	Post test	60	17.46	5.88	

The calculated value of mean of Post test of control group is 12.55, standard deviation is 4.38 & Post test of experimental group is 17.6. and standard deviation is 5.88.

**Table 4.2**

Group	Test	Number of students	Mean	Standard deviation	T value
Control Group	Post test	60	12.55	4.38	8.76
Experimental Group	Post test	60	17.46	5.88	

There is a significant difference between the Post test score of experimental group & Post test score of control group. 't' test is applied to test the significance between mean achievement score of Post test of experimental group & Post test of control group. The calculated value of 't' score is 8.76 which is significant at both the levels. Table no 4.2 indicates that the calculate value is bigger than the T table value and thus 't' value is significant at .01 & .05 The student of the experimental group achieved more score at Post test than control group value hence it proves the effectiveness of inquiry training model in terms of achievement.

**CONCLUSION:** In the inquiry method the science teacher will create a situation in the classroom in which students are asked to formulate their own ideas state their opinion on an important issue or to find things themselves. The inquiry based learning encourages collaboration in some form either through small group or whole class evaluations. Inquiry training model have significant effect on students cognitive affective development & rate of

learning. It also contribute in increasing the learners & aptitude for learning the subject than traditional approach The inquiry based learning enhances the quality of learning and leads to cognitive development through students engagement with complex and novel problem, teaches students complex processes and procedures such as planning and communication and supports authentic inquiry and autonomous learning for students.

The students of the experimental group achieved more score at Post test hence it proves the effectiveness of inquiry training model.

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