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EFFECTIVENESS OF INQUIRY TRAINING APPROACH ON ACHIEVEMENT IN SCIENCE OF VII GRADE STUDENTS

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ABSTRACT

This study investigated the effectiveness of Inquiry training approach on achievement in Science of VII grade students. A total of 80 students participated in the study. t-test was used to see the difference of different groups. Students receiving instruction through inquiry-based approach showed significantly more improvement. There is no significant difference between the achievement levels of the students who have been trained by inquiry-training approach and the students who have been trained by the traditional teaching methods. The inquiry-training approach may be advocated as a better tool than the traditional teaching method for teaching Science.

Keywords: *Inquiry training approach, achievement in Science.*

Teaching is a process which is active, deliberate and orderly. It gives information, skills, attitudes, ideas and thoughts. If most people were asked to recall how they were taught science they would most likely recall engaging in rote memorization of science concepts as the teacher demonstrated the procedures to solve certain problems on the board. In teaching of science, one of the main objectives is to develop problem solving capacities. Science gives us an opportunity of critical thinking, and integrates man's concepts of natural environment, and benefits of environment.

The importance of students' learning to put their latent skills to optimal use is self- evident as education inculcates decision-making abilities in students. Most teaching styles follow the traditional lecture format we talk -they listen. They probably take notes. Students are conditioned to be passive learners. But what if we changed our methods to one that would inspire them to know more and to teach them-selves? Would they learn more and enjoy the experience? The traditional teaching lecture method of science, neither produces good results, nor produces good science graduates.

A well-established precept of educational psychology is that people are most strongly motivated to learn things that they can clearly perceive. Simply telling students that they will need certain knowledge and skills some day is not a particularly effective motivator. A preferable alternative is inductive teaching and learning. Inductive is an active process of teaching and learning. The inquiry has equally a learning goal and a teaching approach. The inquiry based method of teaching science continues to intrigue researchers because it encourages students' curiosity and promotes self-directed investigation and discovery.

Inquiry is a process of learning that is driven by questioning, thoughtful investigating, making sense of information and developing new understanding. Learning of different subjects may not yield similar results as there are many factors that affect students' achievement but teaching methods almost have the same effect on students' learning. Students' involvement in learning implies possessing skills and attitudes that permit them to seek resolutions to question and issues while you construct new knowledge. Inquiry is defined as a seeking for truth, information, or knowledge seeking information by questioning.

In an instructional setting, inquiry-based learning can give instructors the opportunity to allow students to fully explore problems and scenarios, so that they can learn from not only the results, but also the process

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itself. They are encouraged to ask questions, explore their environments, and obtain evidence that support claims and results, and design a convincing argument regarding the way they reached the end result.

Hence we may conclude that traditional approach allows the instructor to precisely determine the aims, content, organization, pace and direction of a presentation. In contrast, more student-centered methods, e.g., discussions or laboratories, require the instructor to deal with unanticipated student ideas, questions and comments. But disadvantage of traditional approach encourages one-way communication; therefore, the lecturer must make a conscious effort to become aware of student problems and student understanding of content without verbal feedback. In inquiry training approach, students get the opportunity to learn various kinds of information on their own. They do not rely on the readymade information provided by the teacher in any way. Thus, this method helps in making the students creative in their own way. But as students of different mental capabilities attend the same class in the school, thus it is not possible for all of them to learn variety of information through this method effectively. If all the students do not participate in questioning, then the class room will become dominated by few students, as a result of which other less able students will feel a sense of neglect. This method should be used by the teacher when he intends to develop a spirit of inquiry in the students, as it will motivate them to find out for themselves the answers of various questions arising in their mind by making various kinds of enquiries instead of getting or accepting readymade information from the teacher.

From an overview of related literature of (Kalia, 2005), (Prince and Felder, 2006), (Schwerdt and Wuppermann, 2010), (Negi, Rawandale, Singh and Priyadarshini, 2013), (Gandhi, Mythili and Thirumoorthy, 2015), (Upadhyaya and Upadhyaya, 2015), the investigator realized that it will be interesting to prepare and to observe the effectiveness of lesson plans made based on inquiry training model and lecture-demonstration method. A great need has been felt to increase the quality of education especially in the field of science. The target can be achieved by carrying out drastic changes in the course and methodology of science curricula. Science teachers may be able to select different appropriate apparatus, tools and materials to promote their teaching by emphasizing on strategies and instructional approaches in the content. Research and experiments are required for innovative practices in classroom instruction and to develop a science of behavior applicable for educational situations. The result of the study may contribute to the theory and practice of teaching not only at class and school levels but may be helpful to curriculum developers designing appropriate methodologies for teaching to curriculum centers.

Objectives

The study was conducted with the following objectives:

1. To develop lesson plans based on Inquiry training approach and traditional approach for grade VII students.
2. To teach grade VII students through Inquiry training approach and traditional approach.
3. To study the effectiveness of lesson plans based on Inquiry training approach and traditional approach for grade VII students.
4. To compare the achievement of students at pre-test level taught through the Inquiry training approach and traditional approach.
5. To compare the achievement of students at post-test level taught through the Inquiry training approach and traditional approach.
6. To compare the achievement of students at pre-test and post-test level taught through the Inquiry training approach.
7. To compare the achievement of students at pre-test and post-test level taught through the traditional approach.

Hypotheses of the Study

The following hypotheses were formulated:

- There exists significant difference in mean scores of achievement among grade VII students taught through Inquiry training approach and traditional approach at pre-test level.

- There exists significant difference in mean scores of achievement among grade VII students taught through Inquiry training approach and traditional approach at post-test level.
- There exists significant difference in mean scores (pre-test and post-test level) for students taught through Inquiry training approach.
- There exists significant difference in mean scores (pre-test and post-test level) of students taught through traditional approach.

Method

The present study was experimental in nature and designed on the lines of pre-test-post-test control group design. In phase-I, groups were formed randomly, one group was considered as an experimental group and the other was considered as a control group. Both the groups were given pre-test of achievement in science. In the phase-II, the experimental group was exposed to treatment through inquiry training approach whereas the control group was exposed to treatment by teaching through traditional methods. In the phase-III, post-test was administered to both the groups of achievement in science.

Design of the Study

It is necessary to adopt a systematic procedure to collect the necessary data, which helps to achieve the objectives and test the hypotheses of the study. The present study was designed to investigate the study of traditional approach and inquiry training approach on achievement in science of grade VII students.

Sample

The study was conducted on students of school affiliated to CBSE Board. The sample was restricted to Ludhiana District only for ensuring convenience and cooperation. Sample comprises 80 students from grade VII of the school of Ludhiana District. Proportionate representation was given to both boys and girls.

Measures

The Investigator prepared achievement tests (Pre-test and post-test) in science by taking lessons from grade VII syllabus. Preparation of ten lesson plans based on Inquiry training approach (5) and traditional approach (5).

Results and Discussions

Table 1 Mean scores (pre – test) of achievement in science of VII grade students of Ludhiana district CBSE board schools taught through Traditional method of teaching and Inquiry training model of teaching

Methods of Teaching	N	Mean	SD	t –ratio	Significance Level
Traditional Method	40	15.17	4.95	0.75^{NS}	NS-Not significant
Inquiry Training Model	40	16	4.94		

Table 1 shows the mean scores of achievement in science of students taught through traditional method of teaching and inquiry training model of teaching are 14.22 and 14.55 at pre –level. SD for traditional method of teaching and inquiry training model of teaching are 5.32 and 5.08 at pre –test level. t-ratio of achievement in science at pre-test level of students taught through traditional method of teaching and inquiry training model of teaching is 0.283, which is not significant at both the levels of confidence. Hence hypothesis (1) stating, "There exists significant difference in mean scores of achievement among grade VII students taught through Inquiry training approach and traditional approach at pre-test level" stands unsupported. It is further observed that mean scores of students taught through Inquiry training model is high as compared to Traditional method of teaching. This may be due to the fact that students have a good study environment.

Table 2 Mean score (post – test) of Traditional method of teaching and Inquiry training model of teaching among VII class students of Ludhiana district CBSE board school

Methods of Teaching	N	Mean	SD	t –ratio	Significance Level
Traditional Method	40	15.17	4.95	0.75^{NS}	NS-Not significant
Inquiry Training Model	40	16	4.94		

Table 2 shows the mean scores of students taught through traditional method of teaching and inquiry training model of teaching are 15.17 and 16 at post- test level. SD for traditional method of teaching and inquiry training model of teaching are 4.95 and 4.94 at post–test level. t-ratio of achievement in science students taught through for traditional method and Inquiry model of teaching at pre-level is 0.75, which is not significant at both the levels of confidence. Hence hypothesis (2) stating, "There exists significant difference in mean scores of achievement among grade VII students taught through Inquiry training approach and traditional approach at post-test level" stands unsupported. This may be due to the fact that students taught through traditional method of teaching may not be highly motivated and less interested in participating in the classroom.

Table 3 Mean score (pre–test and post–test) of Inquiry training model of teaching among VII class students of Ludhiana district CBSE board school

Inquiry Training Model	Mean	SD	SEd	t-ratio	Significance Level
Pre -test	14.55	5.08	1.20	1.29^{NS}	NS-Not significant
Post -test	16	4.94			

Table 3 shows the mean scores of achievement in science students taught through inquiry training model of teaching are 14.55 and 16 at pre and post-test level. SD for inquiry training model of teaching are 5.08 and 4.94 at pre and post–test level. The SEd for Inquiry training model of teaching is 1.20 at pre and post–test level. t-ratio is 1.29 for the Inquiry model of teaching at pre and post -level, which is not significant at both the levels of confidence. Hence hypothesis (3) stating, "There exists significant difference in mean scores (pre-test and post-test level) for students taught through Inquiry training approach" stands unsupported. This may be due to that students may be highly attentive and motivated and interested to understand the content by using various activities.

Table 4 Mean scores of achievement in science (pre–test and post–test) of VII grade students CBSE schools of Ludhiana district taught through traditional method of teaching

Traditional Method of Teaching	Mean	SD	SEd	t-ratio	Significance Level
Pre -test	14.22	5.32	1.14	0.83^{NS}	NS-Not significant
Post -test	15.17	4.95			

Table 4 shows the mean scores of achievement in science students taught through traditional method of teaching are 14.22 and 15.17 at pre and post – level. SDs for traditional method of teaching are 5.08 and 4.94 at pre and post–test level. SEd for traditional method of teaching is 1.14 at pre and post–test level. t-ratio of achievement in science is 0.83 for traditional method of teaching at pre and post -level, which is not significant at both the levels of confidence. Hence hypothesis (4) stating, "There exists significant difference in mean scores (pre-test and post-test level) of achievement in science of students taught through traditional approach" stands" stands accepted. It is further observed that mean scores of students taught through traditional method is high at post-test level as compared to Traditional method of teaching at pre–test level. This may be due to the fact that Students have self study habits.

Educational Implications

- Students achieve more in Science through the Inquiry training model of teaching than traditional method of teaching at the secondary school stage. Traditional method of teaching is an effective method of teaching, but the Inquiry training model of teaching is more effective than the traditional method of teaching. So, the Inquiry training model of teaching should be implemented also with traditional method in public as well as government schools by the government principals, teachers etc.
- It implies that schools should use an Inquiry training model of teaching to improve the achievement in Science.
- To remove the fear and to increase creativity

in Science Inquiry training model of teaching should be implemented or promoted in schools.

- Inquiry training model of teaching does not need any costly or elaborate equipment. The usual teaching aids are enough.
- The traditionally used method of teaching of Science can be partly replaced by the teacher modes of teaching like skill of search, provocative question and others.
- This type of work can bring a change in the outlook of the teacher and makes him more creative.

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