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EFFECTIVENESS OF THE INQUIRY BASED LEARNING (IBL) PROGRAM ON ACHIEVEMENT AND SOCIALSKILLS AMONG THE SECONDARY SCHOOL STUDENTS

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Abstract

National Education Policy (NEP) 2020 suggest that science should be taught with hands on experiences, which will help in increasing social skills among the students of 21st century. According to Bruner the reasons to use inquiry based learning, namely potential intelligence, intrinsic motive, heuristic of inquiry learning, and memory conservation. This study was mainly focus on testing effectiveness of Inquiry Based Learning (IBL) program on student's achievement and social skill among secondary school students in Pune city. The researcher has selected experimental research and selected 80 students who were randomly assigned in two groups as experimental and control group. The objectives of the study were to test the effectiveness of Inquiry Based Learning (IBL) program on student's achievement and to study social skill development among the secondary students who were studying Science. The study also focuses on comparison of effectiveness of IBL program with conventional learning The findings of the study shows that Inquiry Based Learning (IBL) program was more effective than conventional learning, it also shows significant difference between mean scores of pretest and posttest at 0.01 level and help to develop various social skills such as problem solving, decision making, critical thinking etc.

Key words: *Inquiry Based Learning, Social skills, achievement, etc.*

Introduction

India will have the highest population of young people in the world over the next decade, and our ability to provide high-quality educational opportunities to them will determine the future of our country. Education thus, must move towards learning about how to think critically and solve problems, how to be creative and multidisciplinary, and how to innovate, adapt, and absorb new material in novel and changing fields. (NEP, 2020 pg. 18)

It is very essential to provide opportunities to students where they will learn by doing. National Research Council (NRC) reported that inquiry is the basis for science education (NRC, 1996; 2000).The inquiry-based learning is a student-centric approach in which students discover everything in their own environment, develop strong arguments about the

natural and physical world surround them based on strong justifications, become those individuals who are aware of the significance of science, and construct information about doing, living and thinking (MEB, 2013; Wallace, 1997; Wood, 2003).

Inquiry-based learning is a constructivist approach, in which students learn by themselves though active participation. It starts with exploration and questioning and leads to investigation into a worthy question, issue, problem or idea. It involves asking questions, gathering and analyzing information, generating solutions, making decisions, justifying conclusions and taking action.

Need and importance of the study

Inquiry-based learning provides students the opportunity to develop stronger relationships with their classmates, improve their communication skills, and increase the confidence they have in their own ideas and ability to contribute in the classroom.

Assumptions

- Students are more engaged when they create their own experiment and can direct activities towards their interests. (Harackiewicz, J.M. et al., 2018)
- The essence of science as a product as well as a process encourages the use of inquiry strategy in science learning (NRC, 2002; Choi et al., 2008)

Statement of the research: To Test the Effectiveness of Inquiry Based Learning (IBL) Program on Achievement and Social Skills among Secondary School Students (the students ofStandard IX) in Pune City.

Objectives

1. To develop an Inquiry Based Learning (IBL) program on selected units in Science forstudents of Std. IX
2. To test the effectiveness of Inquiry Based Learning (IBL) program on students' achievement in Science for students of standard IX
3. To study the effectiveness of Inquiry Based Learning (IBL) program on students' socialskill development
4. To compare Inquiry Based Learning with Conventional Classroom Learning in sciencefor students of Std. IX
5. To test the usability of the Inquiry Based Learning (IBL) program on selected units inScience for students of Std. IX

Research Question

1. What is the effect of Inquiry Based Learning (IBL) Program on students' social skill?

Conceptual definition

- **Effectiveness**: The degree to which some action is successful in producing a desired result and achieving success (https://www.igi-global.com/dictionary/evaluating-ibmec-intranet-usability-using/9174)
- **Inquiry Based Learning Program:** Inquiry-based learning program is an approach to learning that emphasizes the student's role in the learning process. students are encouraged to explore the material, ask questions, and share ideas. (https://gradepowerlearning.com/what-is-inquiry-based-learning/)
- **Achievement:** An achievement is the result gained by effort (https://www.merriam-webster.com/dictionary/achievement)

Operational definition

- **Effectiveness**: The degree to which implementation of Inquiry Based learning programis successful in producing a desired result and achieving success in post test scores
- **Inquiry Based Learning Program:** Inquiry-based learning program is program developed by the researcher on selected units in Science for the students of Std. IX.
- **Achievement:** An achievement is the result gained by students in post test scores afterimplementing the Inquiry Based learning program

Hypothesis: Research Hypothesis:H1: There is significant difference between the mean scores of pretest and posttest at 0.01 level on implementation of Inquiry Based Learning (IBL) Program in Science for students of Std. IX

Null Hypothesis (Ho): There is no significant difference between the mean scores of pretest and posttest at 0.01 level on implementation of Inquiry Based Learning (IBL) Program in Science for students of Std. IX

Scope of the study

- The study was focused on students of std. IX studying under SSC Board in Pune city
- The study was focused on the English medium students of standard IX studying Science
- The study was focused on the Inquiry Based Learning(IBL) program on selected unitsin Science for the students of Std. IX

Delimitation of the study

- The study was delimited to students of std. IX studying under SSC Board in Pune city
- The study was delimited to the English medium students of standard IX studyingScience
- The study was delimited to the Inquiry Based Learning(IBL) program on selected unitsin Science for the students of Std. IX

Limitations of the study

- Maturity, intelligence, economic and social status, environment, interest etc. werebeyond the control of the researcher.
- The findings of the study are solely dependent on the responses given by the students.

Sampling Technique and Sample: The researcher has used non probability purposive technique for selection of the sample and the sample was total 80 students from JES English School Pune.

Tools of data collection and data analysis

Sr. No.	**Objectives**	**Research Methodology**	**Sample**	**Tools of Data Collection**	**Tools of Data Analysis**
1	To develop an Inquiry Based Learning (IBL) program on selected units in Science for students of Std. IX	Product Development			
2	To test the effectiveness of Inquiry Based Learning (IBL) program on students' achievement of standard IX	Experimental	40 Students from Experimental group (of Std.IX affiliated to SSC Board)	Achievement testused as pretest, posttest (ParallelTest) andretention test	1. Mean 2. Standard Deviation 3. t test
3	To study the effectiveness	Survey (qualitative)	40 studentsfrom Experimental	Observation Dairy	Descriptive analysis

	Learning (IBL) program on students'social skill development		group (of Std. IX affiliated to SSC Board)		
4	To compare InquiryBased Learning with Conventional Classroom Learningin	Comparativ estudy	40 Students from Experimental group and 40 from control group (of Std. IX affiliated to SSC Board)	Pretest and posttest scores	Pearson Product moment-coefficient
5	To test the usability of the Inquiry Based Learning (IBL) program on selected units in Science for students of Std. IX	Survey	1.80 students 2.06 Science Teachers	1.Feedback form 2. Opinnionnai re	1. Percentage 2. Graphical representati on 3. Descriptive analysis

Procedure of the study: For testing effectiveness of Inquiry Based Learning (IBL) program on students achievement and social skills among secondary school students the researcher hasreviewed many researches and found that few studies have been conducted testing effect of Inquiry based learning on various aspects such as teaching technique, impact on students motivation, learning style, and achievement in various school subjects but no study was conducted for testing achievement in science and on social skill among secondary school students.

The researcher has selected five units from textbook of Science (SSC Board)-1. Laws of motion 2. Acid, Bases and salts 3. Classification of plants 4. Energy flow in Ecosystem and 5. Environmental Management for preparation of program.

The researcher has selected 80 students from two divisions of Std. IX of JES English School, Pune and randomly selected the 40 students of one division as experimental group and 40 students of another division as control group. The researcher has implemented Inquiry Based Learning (IBL) program on experimental group and conventional learning method on control group.

The researcher has framed 50 marks achievement test and used as pretest. Then implemented the program and conducted parallel test i.e. framed questions for posttest on same content but more difficulty level. The questions were based on comprehension, application and skill based

questions. After implementing posttest, the researcher has conducted retention test after one month to test the retention and efficacy of the program.

The researcher made observation diary and kept record about students each and every activity while conducting the program to study the development of various social skills among the students. The researcher also designed the feedback form for testing the usability of the program and collected opinion from the science teachers about the program.

Data analysis: Data analysis was done as follows:

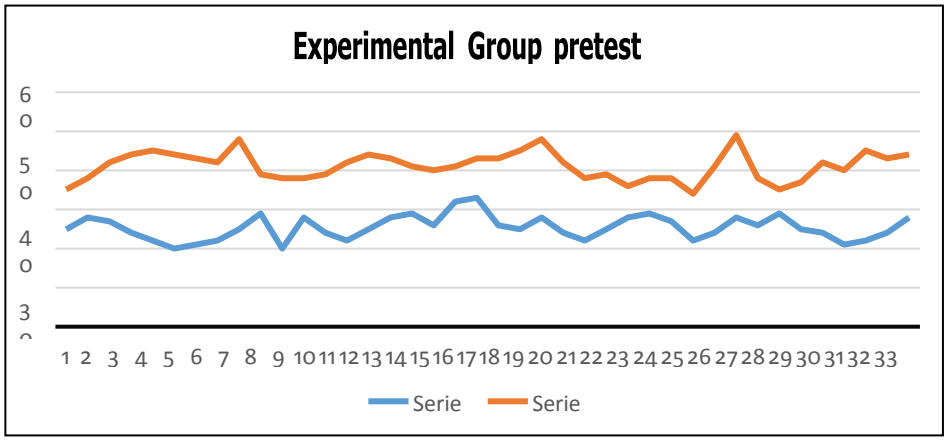

Fig 1: Comparison of pretest and posttest Scores of Experimental Group

Test	N	Mean	Std. Deviation	Df	t value
Pretest	N1=40	25.43	9.89	39	20.29
Posttest	N2= 40	41.1	13.07		

Table 1: t value for Experimental group

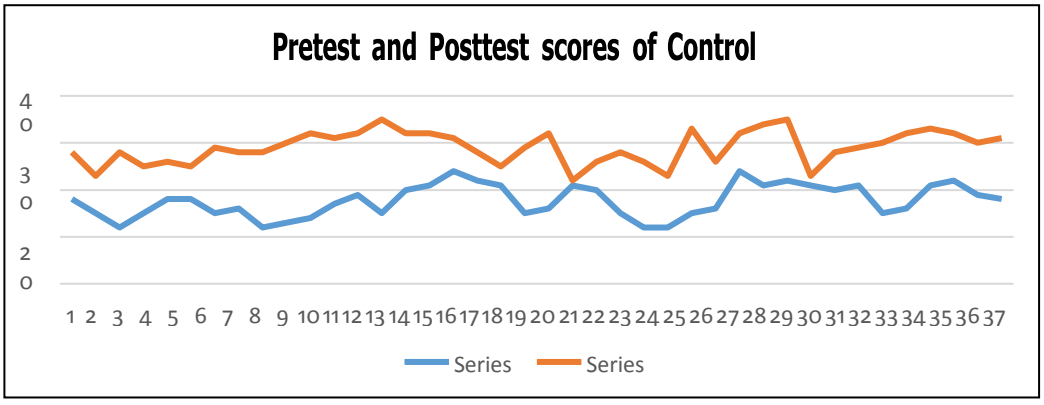

Fig. 2: Comparison of pretest and posttest Scores of Control Group

Test	N	Mean	Std. Deviation	Df	t value
Pretest	N1= 40	17.68	11.97	39	16.46
Posttest	N2= 40	29.05	11.89		

Table 2: t value for Control group

Findings and interpretation:

For Objectives 2: Table t value at df 39 is 2.426 which is less than calculated t value, hence it indicates that the research hypothesis is accepted and null hypothesis is rejected. This indicates that the Inquiry Based Learning program is effective and shows significant difference between the mean scores of pretest than posttest at 0.01 level

Objective 3: From observation it was found that while implementing Inquiry Based Learning (IBL) program students were working through various phases such as 1. Engagement 2. Exploration 3. Explanation 4. Elaboration 5. Evaluation 6. Presentation and 7. Critical Analysis. At each phase students were developing various social skills such as critical thinking, problem solving, decision making, communication etc.

This shows that Inquiry-based learning program when correctly implemented can help develophigher-order, information literacy and critical thinking skills. They can also develop problem-solving abilities and develop skills for lifelong learning.

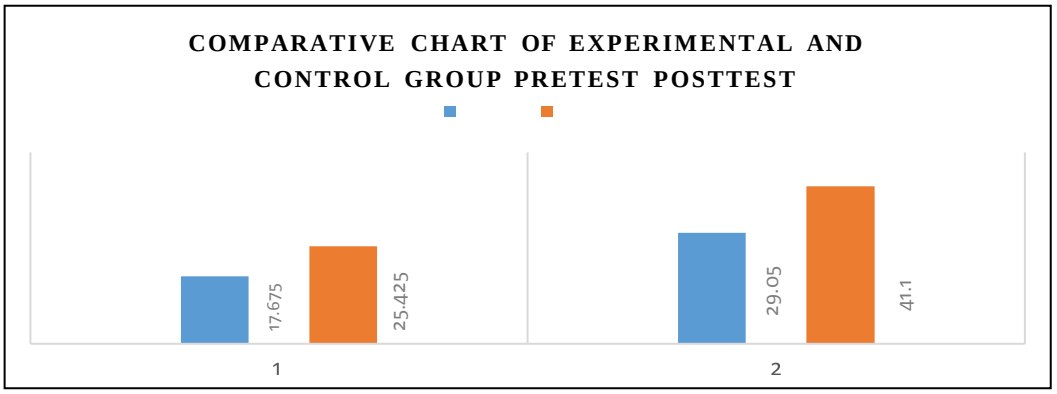

Table 3: Comparison between Mean scores of Experimental Group and Control Group

Objective 4: Graph no 3 shows clearly that the Inquiry based learning program is more effective as compared to conventional learning.

Objectives 5: The researcher has made five point Likert scale feedback form comprising of questions based on the Inquiry Based Learning (IBL) program, Engagement in the activities, Content knowledge, satisfaction factor etc. On the basis of the feedback received by the students it was found that the program was most appreciated by the students and they enjoyed being a part of the program. It was also found that students like to learn through active participation rather than passive listener as in conventional learning method. The researcher has collected opinion from teachers and found that teaching and learning through such a innovative method can enhance science concepts easily and can generate interest among the students for science.

Conclusion

Inquiry Based learning is such approach where teachers and students learn scientific phenomena with scientific approach. All of them consists of several aspects such as thinking process where students observe, predict, suggest, plan a research, formulate a hypothesis, interpret data, control variable, testing, communicate, and conclude it. (Nuangchalerm, 2014) This help in developing various skills and also help in achievement of the students

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