



A COMPARATIVE IMPACT ANALYSIS OF DIFFERENT TEACHING - LEARNING STRATEGIES ON THE ACHIEVEMENT OF SEC. STUDENTS IN SCIENCE

Dr. H. N. Vishwanath

Senior Assistant Professor, Sarada Vilas Teachers College, Krishnamurthy Puram

Mysore-570 004 E-mail: vishulatha9766@gmail.com

Abstract

Impact Teaching and Effective Learning are the two foci of imparting productive Science education. If both are to be highly qualitative, it's very important for the teachers and practitioners to realize and refine their understandings of Science curriculum transaction. It is an accepted fact that effective teachers are usually not born but made through training, exposure and experience. Productive teachers nurture their knowledge and skills of teaching Science through constant and deliberate efforts. One of the prerequisite to be a good teacher is to understand the teaching-learning process and effective classroom management in more depth.

It is indeed a sorry state of affairs that even today teaching of Science is just transacting curriculum by way of direct explanation of the content for conceptual understanding by students where students are just passive recipients of information rather active producers of new knowledge. In the context of NCF 2005, which strongly advocates self-construction of knowledge, it is very significant to rethink about the dynamics of curricular transaction and redesign the pedagogic dimensions so as to enable students construct their own knowledge, relate it to the immediate environment, reflect it in their personality and extend the same for problem solving in life and community for a better quality of life. Learning needs to be shifted from passive and conventional approaches to active and innovative approaches.

In this context, it is indeed essential to analyze the impact of different strategies of teaching – learning of Science at Primary and Secondary levels which constitute the foundation for learning Science at higher education levels. The present study analyses the impact of four learning strategies of teaching-learning of Science on the achievement of students in Science. The present study intends to critically analyze the effectiveness of four different learning strategies viz, Brain Storming (BS), E-learning (EL), Simulation Learning (SL), Real-World Learning (RWL), on the achievement of secondary students of 8th standard in Science. Selected concepts of Science are taught using the aforementioned strategies and their relative differential impact on the students' achievement in Science. Efforts are also made to study the impact of these learning strategies on students achievement in Science in terms of gender is also done.

Need for the Study

Education in 21st century world witnesses students appreciate and enjoy learning concepts in a constructivist classroom environment supported with motivating and triggering learning experiences. The process of teaching-Learning underwent enormous changes with innovative practices every day by way of continuous research and practices. The amount and the direction of research on teaching styles led to vigorous changes in the classroom interaction. In spite of this continuous effort for searching and executing innovative strategies of teaching, the instructional procedures in science have not produced expected learning outcomes at desirable levels. In the present context of the corporate world where the students are exposed to virtual environments, more and more innovative strategies of teaching Sciences are to be evolved with a comparative study on effectiveness of existing strategies. Therefore it is high time for teachers to design and employing new or innovative methods of teaching Social Sciences that too in the context of Constructivist learning. The existing teaching strategies and approaches hardly stimulate the thinking and trigger interest of students towards learning Science. Such a phenomenon would gradually lead to low enrollment in Science in the higher levels which ultimately leads to dearth of scientists who will lead society towards a constructive social change.

Many research studies in this regard are available, but it is very significant to know that seldom there is a study to find out most effective strategies of teaching in the Science in the changed context of the society from conventional to modern to corporate. The present study is the reflection of this existing scenario.

Hence the present study intends to study the dynamics of classroom interaction and a critical analysis of learning styles of students as per the specific syntax are procedural steps associated with selected teaching strategies such as Simulation Learning (SL), Brain Storming (BS), Real-World Learning (RWL) and E-Learning (EL)

Major Objectives of the Study

The primary purpose of the present study is to explore the differential effectiveness of selected innovative Teaching-Learning strategies in Science on the achievement of class VIII students.

The main objectives of the study are as follows:

- To compare the effectiveness of four different teaching-learning styles, such as Brain Storming (BS), E-Learning (EL), Simulation Learning (SL) and Real-World Learning (RWL) on the achievement of class VIII students in Science in total.

- To examine whether significant difference exists in the achievement of boys and girls in Science when taught using all aforesaid strategies in total and individual strategies there off.
- To study the feasibility of aforesaid strategies of teaching to teach Science concepts at secondary level.
- To identify the most effective teaching strategy among the selected strategies to teach Science at sec. level.

Variables considered for the present study and their Operational Definitions:

- ✓ Students' Achievement in Science is the Dependent Variable;
- ✓ Differential Teaching-Learning Strategy is the Independent Variable
(Brainstorming, E-Learning, Simulation learning, and Real World learning)
- ✓ Gender (Male and female) is the Moderator Variable

Differential Teaching – Learning:

A teaching strategy is the sequencing of different types of learning experience in a given pattern, specifically based on the expected Learning Outcome. On the other hand, Learning is the process by which students acquire more knowledge, deepen their understanding, enhance their application ability, sharpen their skills, and develop right attitude and even value system. Different teachers may adopt varied teaching strategies. In the same way students may adopt different learning strategies suggested by teachers or suitable to them. In the present study, different teaching-learning strategies are employed by the researcher like Brainstorming, E-Learning, Simulation learning, and Real World Learning.

Achievement in Science – It is the attainment of pre-determined instructional objectives. In the present study it is considered as the total marks scored by each student in the achievement test administered after teaching Science using different strategies.

Teaching Strategies

Brain Storming: It's a strategy of teaching used by the teacher in which maximum or all the students participate by responding or presenting views on one topic. This technique encourages new ideas among students which would never have happened under normal circumstances.

E-Learning: learning through electronic media, using internet and other smart tools. E-Learning is learning utilizing electronic technologies to access educational curriculum outside of a normal classroom. In most cases, it refers to a course, program or degree delivered completely online.

Simulation Learning – It's controlled representation of reality. It is an imitation or presentation of replica of a method or an object. In this study, it is considered as true representation of real classroom situation that is purposefully designed and used for accomplishment of an objective. In this technique the researcher uses artificial scenario like posters, slogans, role play etc.

Real World Learning – It's a teaching-learning strategy in which real-world experiences are infused into instructions that make teaching effective and enrich classroom learning with enhanced interest levels. This strategy involves relating and demonstrating through real-life situations to help students understand and learn easily.

Statements of Hypotheses

Following are the null hypotheses formulated for the present study.

1. Strategies like Brain Storming, E- Learning, Simulated Learning and Real World Learning are not effective and feasible to teach Science concepts at Secondary level.
2. There is no significant difference in the effectiveness of Brain Storming, E- Learning, Simulated Learning and Real World Learning on the achievement of 8th standard students in Sciences.
3. There is no significant difference in the achievement of 8th standard boys and girls in Science taught through Brain Storming, E- Learning, Simulated Learning and Real World Learning.
4. There is no significant difference in the achievement of 8th standard boys and girls in Science taught through Brain Storming.
5. There is no significant difference in the achievement of 8th standard boys and girls in Science taught through E- Learning.
6. There is no significant difference in the achievement of 8th standard boys and girls in Science taught through Simulated Learning.
7. There is no significant difference in the achievement of 8th standard boys and girls in Science taught through Real World Learning.

Methodology

Design of the Study

The study has employed Experimental Method of research with an equivalent four group design to examine the impact of four different strategies of teaching – learning, such as Brain Storming, E- Learning, Simulated Learning and Real World Learning, on the performance of

Class 8th students in Science. The study has a total sample of 120 students of which each groups with 30 students having both boys and girls.

Experimental groups constitute all the four groups as they are taught with different approaches to study the differential efficacy and there is no control group. The experimental treatment involves teaching of selected concepts of 8th grade Science of CBSE curriculum using aforementioned strategies by trained pre-service teachers under the supervision of the researcher with contextual suggestions.

When once the intervention is done with teaching of selected Science concepts employing the different strategies, the impact of employed strategies and the achievement of students in Science is measured and compared with each other. In addition to this, the intervening effect of a moderator variable such as gender on the achievement of students in relation with specific strategy employed is also examined. By way of this, the researcher has tried to study the degree of feasibility of the selected and compatibility of the same on teaching concepts of Science at secondary level. The present study involves an equivalent four groups with post test design only.

Sample & Sampling Design

The sample consists of 120 students studying in 8th grade in a private unaided co-education secondary school located in the city of Mysore, with English as the medium of instruction during the academic year 2026-17. “Random Sampling Procedure” was employed to draw this sample. Thirty students from each section were selected for the study after equating on an achievement test in Science. Each group has different number of boys and girls. Later each group was assigned to a pre-service Science teacher trained on the given strategy to be employed.

Tools developed and used in the Study

The tools mentioned below were constructed, validated, and used by the researcher.

1. Achievement test for equating the groups (Equating Test)
2. Strategy-Specific Teaching-learning transcripts
3. Teacher made achievement test (Post- Test) (Max.25 marks / 45 Mins.)
4. Teaching Analysis Guides for all the four strategies.
5. Reaction Scale for students.

Statistical technique and Data Analysis:

The present study employs simple and fundamental statistical techniques such as Mean, Quartile Deviation Percentage Analysis etc. for comparison purposes.

H0-1: Strategies like Brain Storming, E- Learning, Simulated Learning and Real World Learning are not effective and feasible to teach Science concepts at Secondary level.

Brain Storming	E-Learning	Simulation Learning	Real Learning	World
24.35	21.96	21.71	22.58	

A mean achievement scores of students of different groups taught using BS, EL, SL and RWL is provided in Table for comparison. It is found that the Mean Achievement Levels of students of each group and in total, is found to be good as their performance is found to be in the range of 21.71 (min.) and 24.35 (max.).

H0-2: There is no significant difference in the effectiveness of Brain Storming, E-Learning, Simulated Learning and Real World Learning on the achievement of 8th standard students in Sciences.

Brainstorming	E-Learning	Simulation Learning	Real Learning	World
24.35	21.96	21.71	22.58	

- ✓ It is found that the achievements of students who were taught using Brainstorming method is higher than that of the students taught using other methods using EL and SL; but slightly better than that of students who are taught using RWL.
- ✓ It is further revealed that the students who are taught using EL and SL have not shown any significant differences in their achievement score, as there is a very less difference in their mean achievement score.
- ✓ The students who are taught by RWL show significantly better performance than compared to EL, SL; but in comparison with the students of BS, their performance is found to be less.

By and large, it is revealed that the achievement of students of BS group is higher with first place than with that of students of RWL in the second place, followed by EL and SL

H0-3: There is no significant difference in the achievement of 8th standard boys and girls in Science taught through Brain Storming, E- Learning, Simulated Learning and Real World Learning.

Strategy	Boys	Girls
All	21.59	23.86

There is a significant difference in the overall achievement of Boys and Girls in Science when differential teaching strategies are employed. It's found that, the girls show a little higher performance than boys.

H0-4: There is no significant difference in the achievement of 8th standard boys and girls in Science taught through Brain Storming.

Strategy	Boys	Girls
Brain Storming	18.50	26.70

There is a significant difference in the overall achievement score of Boys and Girls in their achievement in Science when BS teaching strategy was employed.

H0-5: There is no significant difference in the achievement of 8th standard boys and girls in Science taught through E- Learning.

Strategy	Boys	Girls
E- Learning	22.15	21.50

There is no significant difference in the overall achievement of Boys and Girls in Science when E-Learning was employed. However, boys scored marginally better than girls when taught Science using the EL strategy.

H0-6: There is no significant difference in the achievement of 8th standard boys and girls in Science when taught through Simulated Learning.

Strategy	Boys	Girls
Simulated Learning.	18.10	23.70

There is a significant difference in the overall achievement of Boys and Girls in their achievement in Science when SL teaching strategy was employed. Girls scored significantly better than boys when taught Science using the SL strategy.

H0-7: There is no significant difference in the achievement of 8th standard boys and girls in Science taught through Real World Learning.

Strategy	Boys	Girls
Simulated Learning.	22.4	22.00

There is no significant difference in the overall achievement of Boys and Girls in their achievement in Science when RWL teaching strategy was employed.

Major Findings of the Study

It is found that the Mean Achievement Levels of students of each group and in total, is found to be very good as their performance is found to be in the higher range. (21.71 - 24.35), max. score being 25.

- ✓ It is found that the achievements of students who were taught using Brainstorming method is higher than that of the students taught using other methods using EL and SL; but slightly better than that of students who are taught using RWL.
- ✓ It is further revealed that the students who are taught using EL and SL have not shown any significant differences in their achievement score, as there is a very less difference in their mean achievement score.
- ✓ The students who are taught by RWL show significantly better performance than compared to EL, SL; but in comparison with the students of BS, their performance is found to be less.
- ✓ By and large, it is revealed that the achievement of students of BS group is higher with first place than with that of students of RWL in the second place, followed by EL and SL
- ✓ There is a significant difference in the overall achievement of Boys and Girls in Science when differential teaching strategies are employed. It's found that, the girls show a little higher performance than boys.
- ✓ There is a significant difference in the overall achievement score of Boys and Girls in their achievement in Science when BS teaching strategy was employed.
- ✓ There is no significant difference in the overall achievement of Boys and Girls in Science when E-Learning was employed. However, boys scored marginally better than girls when taught Science using the EL strategy.
- ✓ There is a significant difference in the overall achievement of Boys and Girls in their achievement in Science when SL teaching strategy was employed. Girls scored significantly better than boys when taught Science using the SL strategy.
- ✓ There is no significant difference in the overall achievement of Boys and Girls in their achievement in Science when RWL teaching strategy was employed.

Conclusions:

It's evident from the preset study that, the achievement of students in Science irrespective of the groups who were taught using different teaching – learning strategies has been enhanced. It is found that the achievements of students who were taught using Brainstorming method is higher than that of the students taught using other methods using EL and SL; but slightly better than that of students who are taught using RWL. Hence its concluded that its always significant to employ innovative teaching-learning strategies while teaching Science at sec, level.

References:

<https://elearningindustry.com/choosing-right-elearning-methods-factors-elements>

Bates, Tiny, *National Strategy for e-Learning in Post-Secondary Education and Training*, Paris: Unesco, 2001.

http://www.elearningnc.gov/about_elearning/methods_of_elearning/

<https://elearningindustry.com/advantages-and-disadvantages-of-elearning>

Golubchick, Leonard H. and Barry Persky (Eds.), *Innovations in Education*, Dubuque, Iowa: Kendall/Hunt, Pub., 1975.

<https://www.eztalks.com/elearning/benefits-of-online-learning-for-students-and-teachers.html>

John Sagi, *E-learning Possibilities in Education*, *Edutracks*, April 2008, vol. 7, No. 8. p. 8, 13.

<https://physicscatalyst.com/graduation/simulation/>

McGraw-Hill, 2001. Stephenson, John, *Teaching & Learning Online*, London: Kogan Page.

<https://cte.smu.edu.sg/approach-teaching/integrated-design/lesson-planning>

Golubchick, Leonard H. and Barry Persky (Eds.), *Innovations in Education*, Dubuque, Iowa: Kendall/Hunt, Pub., 1975.