

# Influence of Flipped Classroom in enhancing Achievement in Chemistry of the students of XI Standard

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Manuscript ID:  
ASH-2020-08011255

Volume: 8

Issue: 1

Month: July

Year: 2020

P-ISSN: 2321-788X

E-ISSN: 2582-0397

Received: 14.05.2020

Accepted: 18.06.2020

Published: 02.07.2020

Citation:

Manoharan, C., and Birundha. "Influence of Flipped Classroom in Enhancing Achievement in Chemistry of the Students of XI Standard." *Shanlax International Journal of Arts, Science and Humanities*, vol. 8, no. 1, 2020, pp. 221–225.

DOI:

<https://doi.org/10.34293/sijash.v8i1.1255>



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## Abstract

*Technology is the systematic application of scientific knowledge about teaching and learning and conditions of learning to improve the efficiency of teaching and training. The flipped classroom as "a teaching method that delivers lecture content to students at home through electronic means and uses class time for practical application activities may be useful for information literacy instruction." That means that there is much more use of technology for the Flipped Learning. Studies on flipped classrooms were based on Bloom's revised taxonomy of the cognitive domain, which provides six levels of learning. The study was conducted on 180 students of xi standard for enhancing achievement in organic chemistry. The findings indicated that there were significant gains in the mean scores of the experimental group*

**Keywords:** Technology scientific knowledge, Flipped learning activities, Gains in the scores, Autonomous learners and Learner-centered classrooms

## Basics of Flipped Learning

Arnold-Garza 2014 described the flipped classroom as "a teaching method that delivers lecture content to students at home through electronic means and uses class time for practical application activities, may be useful for information literacy instruction." That means that there is much more use of technology for the Flipped Learning. In the Flipped Learning model, learners receive instruction at home and spend class time working with their teachers and peers. According to Bergmann and Sams (Başal, 2015), a flipped classroom can be described as a setting, "which is traditionally done in class is now done at home, and that which is traditionally done as homework is now completed in class." As students are expected to come to the classroom after they witness the videos at home or wherever they like. They use the class time to dwell deep on the points they do not understand. They perform more activities that promote their understanding of the topic in a better way.

Başal 2015, indicated that in flipped learning, students witness instructional videos at home and do assignments or engage in activities inside the classroom. Another definition of flipped learning comes from Bermann & Sams (Nicolosi, 2012). The authors defined it as a method that "happens when the teacher's lecture is delivered to students via video outside of the classroom. Then traditional class time is used for active problem solving and done-to-one or small group tutoring with the teacher". As class time is spent on activities instead of lecturing, learners are more active in the class.

## Four Pillars of Flipped Learning

Flipped learning consists of four pillars: a flexible environment, learning culture, intentional content, and Professional educators. Flipped Learning F-L-I-P Flexible Environment Learning Culture Intentional Content Professional Educators A. Flexible Environment Flexibility is an essential point in flipped learning for the teacher and the taught. Teachers can record messages as and when they want. For the students, the situation is the same. They have to watch the videos sans any time and place limitation. Students are let free to decide the time of their learning, which can help them to be autonomous.

## Objectives of the Study

- To study the impact of Flipped classroom instruction upon the teaching of Chemistry at +1 level
- To trace the degree of attainment in Chemistry of the students of standard XI.

## Hypotheses

- There prevails no significant difference in the test performance in Chemistry in the pre-test among the control group and experimental group.
- There is no significant difference in the test performance in Chemistry between the pre-test and Post-test for the control group.
- There exists no significant difference in the test performance in Chemistry between the pre-test and Post-test for the Experimental group.
- There is no significant difference in the test performance in Achievement in Chemistry for the Post-test among the control group and experimental group.
- Gap closures in Experimental groups will be greater than those in the control group.

## Experimental Design

### Tools Used in the Study

The investigator has developed or adopted the following tools to generate the data for the present study.

**Criterion Referenced Test (CRT):** Criterion Referenced Test is defined as a test that has been designed with very restricted content specifications

to serve a limited range of highly specific purposes (Aiken, 1998). The test aims to determine where the examinee stands concerning certain educational objectives.

## Pre Study to Establish Reliability and Validity of Tests

A pre-study is carried out by taking 30 students of Standard XI to study the reliability and intrinsic validity of the CRT. The calculated reliability coefficient of CRT is 0.81 and is significant at the 0.01 level. Hence the data collected with the help of the intrinsic validity procedure, which is the square root proportion of the true reliability coefficient (i.e., Square root of its reliability). Thus arrived intrinsic validity of the coefficient of the CRT is 0.9, which indicates the validity of the CRT.

## Sample Selected for the Experimental Study

The sample for the study consists of 70 students of standard XI studying in the Coimbatore district.

## Method of Experimental Study

The investigator had employed three phases of the study, which included two test phases for the study's data collection and manipulation of experimental variables (i.e., material and method). The data collection was spread over for a period of two months from June to July 2017

Fifteen teaching sessions (45 minutes each) were required for this entire study in each session of the school. Students from Govt. H.S. School was involved in the study.

## Hypotheses

- There will be a significant difference between the Experimental group and Control group in the pre-test performance in Achievement in Chemistry.
- There will be a significant difference between pre-test and post-test performance for the Control group in Achievement in Chemistry.
- There will be a significant difference between pre-test and post-test performance of the Experimental group in Achievement in Chemistry.

- There will be no significant difference between the Experimental group and Control group in the post-test performance in Achievement in Chemistry
- In the experimental group, the gap closure will be greater than that of the control group.

**Table showing the Mean SD and t values**

Pretest	N	Mean	SD	t-value	Significance
Control group	35	32.47	6.59	0.83	NS
Experimental group	35	31.14	7.56		
Control group	N	Mean	SD	t-value	Significance
Pre test	35	32.47	6.59	0.59	NS
Post test	35	34.84	10.21		
Experimental group	N	Mean	SD	t-value	Significance
Pre test	35	31.14	7.56	5.18	S
Post test	35	41.60	9.25		
Post test	N	Mean	SD	t-value	Significance
Control group	35	34.84	10.21	2.90	S
Experimental group	35	41.60	9.25		

df=68; t (0.05) = 1.96; t(0.01) = 2.58

### GAP Closure

Gap closure is the difference between the mean score obtained by the group and the maximum score, called the perfect score. The closing gap score is the amount up to which a party closes the gap to wards perfection. Closed percentage gap is defined by a variable which could be called closed percentage of ignorance gap and reported as a percentage.

**Table: Gap Closure for Control Group and Experimental Group**

S. No	Group	Gap Closure
1	Control	14.09
2	Experimental	35.84

An inspection of the above table discloses the fact that the mean of the gap closure in the unit test is in the range of for the control group.

There will not be a significant difference between experimental and control groups in gap closures (unit-wise). Based on the analysis of the given data null hypothesis is rejected, and the research hypothesis is accepted.

### Interpretation

This is an experimental study with a pretest post test equivalent group design. Entry behavior test

was conducted to separate control and experimental group to assess the prerequisite knowledge Both groups are identical, and this indicates the nature of identicalness in tune with the pre-test mean scores of both groups. All the pre-test 't' values for control and experimental reveal no significant difference among control and experimental groups. This establishes their identical nature and no significant achievement in their pre-requisite knowledge.

The means of pre-test scores and post-test scores of control as well as experimental groups differ significantly (0.01 level) with the post-test mean is greater than the pretest mean. The implication of that is that the level of acquiring the basic skills in Chemistry has not increased due to the traditional method in the Control group. The level of acquiring of the basic skills in Chemistry has increased due to the Flipped classroom Instructional Method in the Experimental group. The post-test scores of the control and experimental group differ significantly. The means score of the experimental group is greater than of the control group.

### Findings

- There prevailed no significant difference in the test performance in Chemistry in the pre-test among the control group and experimental group.

- There existed no significant difference in test performance in Chemistry between the pre-test and Post-test for the control group.
- There existed a significant difference in test performance in Chemistry between the pre-test and Post-test for the Experimental group.
- There was a significant difference in the test performance in Achievement in Chemistry for the Post-test among the control group and experimental group.
- Gap closures in Experimental groups were greater than those in the control group.

### Limitation of the Study

The limitation of the study is as follows:

- The study is limited to the learners studying in XI std in certain schools of Coimbatore District.
- The sample is an accessible sampling.
- The period of study is short owing to the paucity of time on the part of the investigators

### Suggestions for Further Study

The following titles are suggested for further study.

- Impact of Classroom climate. Upon academic Achievement in Physics, Chemistry, Humanities and vocational subjects.
- A study of Classroom climate and Academic achievement of the learners at different levels.
- A similar study may be undertaken with students of Matriculation Schools.
- A study of .apitude of the .students at different school levels with special reference to fostering creativity.

### Conclusion and Recommendations for Further Studies

This study aims to analyze the trends and contents of flipped classrooms based on related literature and studies conducted in the fields of education. Most of the studies revealed that flipping a classroom, which has grown in popularity, is not an easy but a useful technique to have autonomous learners and learner-centered classrooms since students are actively involved in knowledge construction and evaluation of their learning. It has some pitfalls when compared to other methods. For instance, technology is more

needed both in and outside of the classroom. There is much workload for the teachers as deciding on the content, place, and duration of the recordings, choice of the in-class activities, etc.

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