



FLIPPED CLASSROOM IN LEARNING CHEMISTRY AT THE SECONDARY LEVEL

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ABSTRACT

This article meticulously discuss on the theme of flipped classroom in learning chemistry at the secondary level by adopting an experimental design with a sample of 40 students. Exclusively this study has used pre test-post test control group design. The main objective of this study is to test the flipped classroom method, specialized for learning chemistry at the secondary level. Also this study has proved that there is a significant relationship exists among those hypotheses tested. Hence this piece of research throws light on the impact of flipped classroom in learning chemistry at the secondary level.

KEY WORDS: *Flipped Classroom Method, Secondary School, Achievement in Chemistry.*

INTRODUCTION

Teaching is an art. Integration of technology in pedagogical approach is a common phenomenon. 21st century educational world promotes student's centred teaching learning approaches. A flipped classroom is an instructional strategy and a type of blended learning, which aims to increase student engagement and learning by having pupils complete readings at home and work on live problem-solving during class time. Flipped classroom creates an interactive learning environment. Flipped classroom breaks the traditional pedagogical pattern to provide proper learning exposure in the classroom using lecture methods and sharing other learning resources in the classroom at the end of the lesson. Earlier teachers used to be a master of the class sharing instructions in a group of students. Flipped classroom shifts the teaching learning process from the group to the individual. In this method students get proper exposure before the classroom and do problem solving, critical thinking, analysing, and synthesizing in a classroom.

NEED AND SIGNIFICANCE OF THE STUDY

The quality of chemistry education in our country is very mediocre at the present moment and this is cause of concern because our country's development and progress depend on our progress in chemistry and technology. UNESCO has mooted the goal of Scientific and Technological Literacy (STL) for all. Every citizen needs to be aware of trends in chemistry, cope with technology in everyday life, and be able to take considered positions on chemistry-related issues of social importance.

Technology improves the effectiveness and productivity in class. The use of technologies in the classroom has the potential to explain new concepts clearly, resulting in better student understanding of the concepts being taught. In a survey, to find factors that facilitate teacher skill, teacher morale, and perceived student learning in technology-using classrooms, Baylor and Ritchie (2002) found that teachers valued the use of technologies in class and that it had an impact on students' content acquisition; the use of technology added to class performance. Flipped classroom provides sufficient time and space for students to explore and experiment, to practice and analyse and develop comprehensive knowledge on a given topic. This method helps students to develop critical thinking and higher order thinking skills. Flipped classroom approach develops better tools to student's knowledge and understanding. It provides opportunities for the teacher to organize appropriate learning activities for developing comprehensive knowledge and maximize learning outcomes.

OBJECTIVES OF THE STUDY

1. To study the impact of flipped classroom method at the secondary level.
2. To find out the significant difference if any between the pre-test and post-test score of achievement in chemistry learning through traditional method among the secondary level students of the control group.
3. To find out the significant difference if any between the pre-test and post-test score of achievement in chemistry learning through flipped classroom method among the secondary level students of the experimental group.



- To find out the significant difference if any between the pre-test and post-test scores of attitude towards flipped classroom method of the experimental group.

- There is no significant difference between the pre-test and post-test scores of attitude towards flipped classroom method of the experimental group.

TITLE OF THE STUDY

The title of the present study is "FLIPPED CLASSROOM IN LEARNING CHEMISTR AT THE SECONDARY LEVEL".

HYPOTHESIS OF THE STUDY

- Impact of flipped classroom method at the secondary level is moderate.
- There is no significant difference between the pre-test and post-test score of achievement in chemistry learning through traditional method among the secondary level students of the control group.
- There is no significant difference between the pre-test and post-test score of achievement in chemistry learning through flipped classroom method among the secondary level students of the experimental group.

SAMPLE OF THE STUDY

The present study constructed by using use of a pre-test, post-test and control group design. Purposive sampling technique was used to select 40 ninth grade students from Sri Ramakrishna Vivekananda Higher Secondary School, Thirupunavalas, Pudukkottai district, Tamil Nadu, India.

RESEARCH TOOL

- Achievement Scale developed and validated by the investigator.
- Attitude towards flipped classroom method scale developed and validated by the investigator.

TESTING OF HYPOTHESES

HYPOTHESIS: 1

Impact of flipped classroom method at the secondary level is moderate.

Table: 1. Post -test scores of the Experimental group and Control group learnt through flipped classroom method and through traditional method.

| Variable | Test | N | Mean | SD | Mean Difference | t-value | df | Level of significance (0.01Level) |
|---|---------------------------------|----|-------|------|-----------------|---------|----|-----------------------------------|
| Learning through flipped classroom method | Post-test of Experimental Group | 20 | 65.16 | 3.65 | 21.29 | 14.13 | 28 | Significant |
| Learning through Traditional Method | Post-test of Control Group | 20 | 43.87 | 7.15 | | | | |

The mean of the post-test scores of the Experimental group learnt through flipped classroom method is found to be 65.16 with an SD 3.65. The mean of post-test scores of Control group learnt through traditional method is found to be 43.87 with an SD 7.15. The Mean 21.29 is found to be significant at a 0.01 level for 28df with 't' of 14.13. Therefore, the hypothesis is rejected.

It is concluded that the flipped classroom method for learning chemistry among secondary level students is effective as compared to that of the control group.

HYPOTHESIS: 2

There is no significant difference between the pre-test and post-test score of achievement in chemistry learning through traditional method among the secondary level students of the control group.

Table: 2. The post-test and pre-test mean scores of the traditional method of the Control group.

| Variable | Test | N | Mean | SD | Mean Difference | t-value | df | Level of significance (0.01Level) |
|--------------------|-----------|----|-------|------|-----------------|---------|----|-----------------------------------|
| Traditional Method | Post-test | 20 | 42.73 | 7.15 | 1.53 | 1.14 | 28 | Not Significant |
| | Pre-test | 20 | 41.20 | 3.89 | | | | |

The mean of the post-test scores of the Control group learnt through traditional method is found to be 42.73 with an SD 7.15. The mean of pre-test scores of Control group learnt through traditional method is found to be 41.20 with an SD 3.89. The Mean 1.53 is found to be significant at a 0.01 level for 28df with 't' of 1.14. Therefore, the hypothesis is accepted.

It is concluded that there is no significant difference between the pre-test and post-test score of achievement in chemistry learning through traditional method among the secondary level students of the control group.



HYPOTHESIS: 3

There is no significant difference between the pre-test and post-test score of achievement in chemistry learning through

flipped classroom method among the secondary level students of the experimental group.

Table: 3. Pre-test and post-test score of achievement in chemistry learning through flipped classroom method among the secondary level students of the experimental group.

| Variable | Test | N | Mean | SD | Mean Difference | t-value | df | Level of significance (0.01Level) |
|--------------------------|-----------|----|-------|------|-----------------|---------|----|-----------------------------------|
| Flipped classroom method | Post-test | 20 | 67.17 | 3.65 | 24.3 | 14.21 | 28 | Significant |
| | Pre-test | 20 | 42.87 | 4.85 | | | | |

The mean of the post-test scores and pre-test scores of the Experimental group learnt through flipped classroom method is found to be 67.17 with an SD 3.65 and 42.87 with SD 4.85 respectively. The Mean 24.3 is found to be significant at a 0.01 level for 28 df with 't' of 14.21. Therefore, the hypothesis is rejected.

It is concluded that there is a significant difference between the pre-test and post-test score of achievement in

chemistry learning through flipped classroom method among the secondary level students of the experimental group.

HYPOTHESIS: 4

There is no significant difference between the pre-test and post-test scores of attitude towards flipped classroom method of the experimental group.

Table: 4. Pre-test and post-test scores of attitude towards flipped classroom method of the experimental group.

| Variable | Test | N | Mean | SD | Mean Difference | t-value | df | Level of significance (0.01Level) |
|---|-----------|----|-------|------|-----------------|---------|----|-----------------------------------|
| Learning through Flipped classroom method | Post-test | 20 | 62.56 | 5.7 | 34.93 | 12.14 | 28 | Significant |
| | Pre-test | 20 | 27.63 | 3.48 | | | | |

The mean of the post-test scores and pre-test scores of the low achievers in experimental group learnt through flipped classroom method is found to be 62.56 with an SD 5.7 and 27.63 with SD 3.48 respectively. The Mean 34.93 is found to be significant at a 0.01 level for df 28 with 't' of 12.14. Therefore, the hypothesis is rejected.

It is concluded that there is a significant difference between the pre-test and post-test scores of attitude towards flipped classroom method of the experimental group.

EDUCATIONAL IMPLICATIONS

A few educational implications for the present study are as follows:

- The results of the study have proved that flipped classroom method is effective than the traditional method of learning chemistry to the secondary level students. Hence, it is recommended to utilize this technological innovation in the enhancement of chemistry learning competency at the secondary level.
- Since the use of flipped classroom method penetrates more deeply into the development of human cognitive system, it would help them to be best of learning chemistry.

- Since the use of flipped classroom method at the secondary level enhances achievement, it will diminish wastage and stagnation in the schools.

CONCLUSION

In the light of the research findings flipped classroom is a suitable learning approach for learning chemistry at the secondary level students. It explores various tools and techniques of educational technology and integrates in ensuring learning outcomes in the classroom. Flipped classroom method was found to be effective in achievement of Chemistry learning. This has also been realized by many educational experts; hence, there is an urgent need to gear national efforts towards the implementation of this strategy.

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