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Blended Learning on Achievement in Science with respect to Parental Education and Parental Occupation

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Abstract:

The study on Blended Learning on Achievement in Science with respect to Parental Education and Parental Occupation. The experimental research design was followed in the present study. The data was collected from the selected sample of 66 students (Control Group – 35 and Experimental Group - 31) were selected from the Government Higher Secondary School Lalgudi, Trichy District, through purposive sampling technique. The obtain data were analyzed by using the statistical technique mean, standard deviation, t-test.The major findings of the study, i. The Pre Test Mean Scores of both the Control and Experimental Group students with regard to the Parental Education were similar.ii. The Pre Test Mean Scores of both the Control and Experimental Group students with regard to the Parental Occupation were similar. iii.The Post Test Mean Scores of the Control Group students are significantly higher than the Pre Test Mean Scores with respect to Parental Education.

Keywords: *Interest, Motivation, Self - Paced Learning, Achievement, Higher Secondary Students, Hybrid Learning, Science Education.*

Introduction:

Blended learning is significantly more effective than traditional instruction in improving science achievement and process skills among higher secondary students. By combining face-to-face instruction with online, student-centered, and interactive digital tools, this approach enhances student motivation, fosters autonomy, and promotes better knowledge retention. On the other hand combines traditional, in-person classroom instruction with online digital learning, integrating the best of both worlds for a flexible and personalized educational experience. It allows students to control some aspects of their learning (time, pace, path) while still benefiting from direct teacher interaction, using tools like videos, interactive modules, and online discussions alongside physical classes, leading to deeper understanding and better engagement.

Blended learning in science combines online, self-paced digital modules with in-person, hands-on classroom activities to improve student engagement, academic performance, and understanding of complex concepts. This approach often utilizes a flipped classroom model, where students study, watch videos, and simulate labs at home, reserving class time for interactive, inquiry-based learning, problem-solving, and in-depth

discussions. On the other hand blended learning in science subjects merges traditional, in-person instruction with online digital tools, enhancing comprehension through interactive simulations, virtual labs, and self-paced, flexible, and personalized learning experiences. It boosts student engagement, improves performance, and enables better conceptual understanding, particularly for abstract topics, by leveraging technology for improved visualization and access to materials.

Need for the Study:

The purpose of incorporating blended learning into the pedagogical approach is not to extinguish the traditional practices but to provide teachers and learners alike with the inherent advantages of face-to-face interaction and online teaching methods. The concept of teaching and learning using a combination of methodologies is not new, but incorporating online methods is still relatively contemporary. In the case of blended learning, it has emerged as a viable alternative to the traditional classroom setting of delivering education and training. It improves student motivation and performance, promotes participation, self-learning and teamwork, opens new forms of interrelation between teachers and students, allows greater flexibility, boosts digital intelligence and the acquisition of digital skills, etc.

Statement of the Problem:

The widespread use of the Internet and online technologies in the education arena and a chance for mixing traditional teaching with online instruction indicate a change in the way of disseminating instruction to the learners as well. This programs are recognized as a teaching strategy that combines in-person instruction with online learning, leveraging technology to boost educational results. This technological integration transforms the educational system from a teacher-centered to a rich, interactive, student-focused approach. The main aim of the study is to find the *Blended Learning on Achievement in Science among the Students* with *respect to Parental Education and ParentalOccupation.*

Objectives of Study:

The objectives of the following study are as follows

i. To find out the Effectiveness of Blended Teaching on Achievement in Science among the Students of Higher Secondary Schools with respect to Parental Education.

ii. To find out the Effectiveness of Blended Teaching on Achievement in Science among the Students of Higher Secondary Schools with respect to Parental Occupation

Hypotheses of the Study:

The hypotheses of the following study are as follows

i. There is no significant difference between the groups taught through Blended Teaching and the Traditional Method on Achievement in Science with respect to Parental Education.

ii. There is no significant difference between the groups taught through Blended Teaching and the Traditional Method on Achievement in Science with respect to Parental Occupation.

Methodology:

Sample of the study

The size of the sample was totally 66 students of which Control Group consists of 35 Students and Experimental Group consists of 31 students were selected from the Government Higher Secondary School - Lalgudi, Trichy District.

Tools used in the study:

Achievement Test in Science (ATS) developed and standardized by the Investigator (2025). The reliability of scale is 0.81.

Statistical Techniques:

The following statistical techniques are used in the present study such as Mean, Standard Deviation and 't' – Test.

Data Analysis:

Control and Experimental Group Analysis

The Mean Scores of the Control and the Experimental Group students in Total was analysed in this section. Further subdivisions with regard to the Background Variables such as Parental Education i.e., Illiterate, School Education and College Education and Parental Occupation i.e., Daily wage,Business and Professional were also considered.

Table - 1

't' values of the Pre Test Scores between the Control and Experimental Group Students with regard to Parental Education

Category		**N**	**Mean**	**SD**	**'t' Value**
Illiterate	Control	7	5.81	1.32	0.65**
	Experimental	10	6.40	2.11	
School Education	Control	18	6.95	1.89	0.95**
	Experimental	8	6.26	1.19	
College Education	Control	10	6.31	2.22	0.31**
	Experimental	13	6.58	1.79	

*****Not Significant at 0.05 Level***

On observing the above Table - 1, it is understood that the 't' values 0.65, 0.95 and 0.31 are not significant at 0.05 Level. On observing the results, it is inferred that the Pre Test Mean Scores of both the Control and Experimental Group students with regard to the Parental Education were similar. Hence, the framed null hypothesis is found to be accepted.

Table – 2

't' values of the Pre Test Scores between the Control and Experimental Group Students with regard to Parental Occupation

Category		**N**	**Mean**	**SD**	**'t' Value**
Daily Wages	Control	11	5.88	2.01	0.30**
	Experimental	14	6.12	1.92	

Business	Control	15	5.72	1.90	1.39**
	Experimental	8	6.92	2.12	
Professional	Control	9	5.61	1.84	1.36**
	Experimental	9	6.76	1.75	

***Not Significant at 0.05 Level*

On observing the above Table - 2, it is understood that the 't' values 0.30, 1.39 and 1.36 are not significant at 0.05 Level. On observing the results, it is inferred that the Pre Test Mean Scores of both the Control and Experimental Group students with regard to the Parental Occupation were similar. Hence, the framed null hypothesis is found to be accepted.

Table – 3

't' values of the Post Test Scores between the Control and Experimental Group Students with regard to Parental Education

Category		**N**	**Mean**	**SD**	**'t' Value**
Illiterate	Control	7	68.41	5.02	0.28**
	Experimental	10	69.22	6.51	
School Education	Control	18	64.92	4.82	3.75*
	Experimental	8	73.46	6.48	
College Education	Control	10	66.19	5.81	3.40*
	Experimental	13	75.28	6.72	

**Significant at 0.05 Level* ***Not Significant at 0.05 Level*

It is understood from the Table – 3 that the 't' values 3.75 and 3.40 are significant and the value 0.28 is not significant at 0.05 Level. On observing the results, it is inferred that the Post Test Mean Scores of the Experimental Group students is scored significantly higher than those of the Control Group students with respect to Parental Education at the School and College levels. Therefore, the framed null hypothesis is found to be rejected for these two cases. However, in the case of students whose parents are illiterate, both the Control and Experimental Groups scored similarly in Post tests. Hence, the framed null hypothesis is found to be accepted.

Table – 4

't' values of the Post Test Scores between the Control and Experimental Group Students with regard to Parental Occupation

Category		**N**	**Mean**	**SD**	**'t' Value**
Daily Wages	Control	9	65.11	7.12	2.46*
	Experimental	12	73.16	7.62	

Business	Control	14	67.26	6.96	2.42*
	Experimental	11	74.46	7.92	
Professional	Control	12	69.82	6.86	2.18*
	Experimental	8	76.92	7.56	

***Significant at 0.05 Level** ****Not Significant at 0.05 Level**

It is understood from the Table – 4that the 't' values 2.46, 2.42 and 2.18 are significant and the value 0.28 is not significant at 0.05 Level. On observing the results, it is inferred that the Post Test Mean Scores of the Experimental Group students are scored significantly higher than those of the Control Group students with respect to Parental Occupation. Hence, the framed null hypothesis is found to be accepted.

Table - 5

't' values between the Pre and Post Test Mean Scores of the Control Group Students with regard to Parental Education

Category		**N**	**Mean**	**SD**	**'t' Value**
Illiterate	Pre Test	7	5.81	1.32	31.91*
	Post Test	7	68.41	5.02	
School Education	Pre Test	18	6.95	1.89	51.60*
	Post Test	18	69.92	4.82	
College Education	Pre Test	10	6.31	2.22	30.44*
	Post Test	10	66.19	5.81	

***Significant at 0.05 Level**

From the above Table – 5it is understood that the 't' values 31.91, 51.60 and 30.44 are significant at 0.05 Level. On observing the results, it is inferred that the Post Test Mean Scores of the Control Group students are significantly higher than the Pre Test Mean Scores with respect to Parental Education. Hence, the framed null hypothesis is found to be rejected.

Table - 6

't' values between the Pre and Post Test Mean Scores of the Control Group Students with regard to Parental Occupation

Category		**N**	**Mean**	**SD**	**'t' Value**
Daily Wages	Pre Test	11	5.88	2.01	26.47*
	Post Test	9	65.11	7.12	
Business	Pre Test	15	5.72	1.90	32.99*
	Post Test	14	67.26	6.96	

Professional	Pre Test	9	5.61	1.84	27.19*
	Post Test	12	69.82	6.86	

Significant at 0.05 Level

From the above Table – 6 it is understood that the 't' values 26.47, 32.99 and 27.19 are significant at 0.05 Level. On observing the results, it is inferred that the Post Test Mean Scores of the Control Group students are significantly higher than the Pre Test Mean Scores with respect to Parental Occupation. Hence, the framed null hypothesis is found to be rejected.

Table - 7

't' values between the Pre and Post Test Mean Scores of the Experimental Group Students with regard to Parental Education

Category		**N**	**Mean**	**SD**	**'t' Value**
Illiterate	Pre Test	10	6.40	2.11	29.95*
	Post Test	10	71.22	6.51	
School Education	Pre Test	8	6.95	1.89	27.87*
	Post Test	8	73.46	6.48	
College Education	Pre Test	13	6.58	2.22	35.99*
	Post Test	13	75.28	6.72	

Significant at 0.05 Level

From the above Table – 7it is understood that the 't' values, 29.95, 27.87 and 35.99 are significant at 0.05 Level. Hence, from the results it is inferred that the Post Test Mean Scores are significantly higher than the Pre Test Mean Scores of the Experimental Group students irrespective of Parental Education. Hence, the framed null hypothesis is found to be rejected.

Table - 8

't' values between the Pre and Post Test Mean Scores of the Experimental Group Students with regard to Parental Occupation

Category		**N**	**Mean**	**SD**	**'t' Value**
Daily Wages	Pre Test	14	6.12	1.92	30.90*
	Post Test	12	71.16	7.62	
Business	Pre Test	8	6.92	2.12	23.35*
	Post Test	11	74.46	7.92	
Professional	Pre Test	9	6.76	1.75	25.98*
	Post Test	12	73.92	7.56	

Significant at 0.05 Level

From the above Table – 8 it is understood that the 't' values 30.90, 23.35 and 25.98 are significant at 0.05 Level. On observing the results, it is inferred that the Post Test Mean Scores of the Experimental Group students are significantly higher than the Pre Test Mean Scores of the Control Group Students with respect to Parental Occupation. Hence, the framed null hypothesis is found to be rejected.

Findings of the Study

Findings of the study are as given below

i. The Pre Test Mean Scores of both the Control and Experimental Group students with regard to the Parental Education were similar.

ii. The Pre Test Mean Scores of both the Control and Experimental Group students with regard to the Parental Occupation were similar.

iii. The Post Test Mean Scores of the Experimental Group students is scored significantly higher than those of the Control Group students with respect to Parental Education at the School and College levels. However, in the case of students whose parents are illiterate, both the Control and Experimental Groups scored similarly in Post tests.

iv. The Post Test Mean Scores of the Experimental Group students are scored significantly higher than those of the Control Group students with respect to Parental Occupation.

v. The Post Test Mean Scores of the Control Group students are significantly higher than the Pre Test Mean Scores with respect to Parental Education.

vi. The Post Test Mean Scores of the Control Group students are significantly higher than the Pre Test Mean Scores with respect to Parental Occupation.

vii. The Post Test Mean Scores are significantly higher than the Pre Test Mean Scores of the Experimental Group students irrespective of Parental Education.

viii. The Post Test Mean Scores of the Experimental Group students are significantly higher than the Pre Test Mean Scores of the Control Group Students with respect to Parental Occupation.

Educational Implications of the Study

This mode provides ultimate flexibility in many aspects. It can be applied to any program which holds on to the values of traditional learning and incorporates digital media with that. It is a lot more effective and likeable than anything that has been ever before. On the hand this based education proves to be more effective in teaching basic science because it improves the academic achievement of students and helps clarify abstract concepts. It also incorporates various learning methods that may not be present in the traditional classroom, thereby making learning more enjoyable.

Conclusion:

Blended learning is an educational approach that combines the traditional method of teaching with the technology of e-learning. With the involvement of digital instruments, classroom teaching is enhanced. It provides an appropriate balance between online instructions, which offers the interactive, tech-based learning, individualized pacing, and privacy that keep students continuously motivated, and teacher-led instruction, encouragement, compassion, and caring guidance that only teachers can give.

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