The Social Science Review A Multidisciplinary Journal. March-April, 2025. Vol. 3. Issue 2. 94-98

Published by: Pather Dabi Educational Trust, (Regn No: IV-1402-00064/2023), Under Govt. of West Bengal, India

The Social Science Review
A Multidisciplinary Journal
ISSN: 2584-0789
(Open-Access, Peer-Reviewed, Refereed, Bi-Monthly, International e-Journal)
Homepage: www.tssreview.in

IMPACT OF TEACHING ON THE ACADEMIC ACHIEVEMENT OF PHYSICAL SCIENCE OF THE SECONDARY SCHOOL STUDENTS

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RESEARCH ARTICLE

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DOI:
https://doi.org/10.70096/tssr.250302016

Abstract

The aim of this study is to examine the effect of teaching physical science on the academic achievement scores of physical science among the boys and girls secondary students of both the urban and rural areas of investigation and this observation also endeavors in finding the significant difference of means of achievement scores of Physical science between the urban and rural students based on the outcomes of the boys and girls secondary students of Howrah district in West Bengal. Students of class-IX promoted to class-X are considered as the population of the present study. A sample of 300 secondary students is randomly chosen from purposively selected six secondary schools taking 50 students from each secondary school. A quantitative survey type of methodology is used. The achievement scores of physical science as obtained by the participant students at their board conducted final examination are collected from the selected secondary school of study. This study uses the methodology of teaching physical science as the independent variable, collected scores of physical science as obtained by the participant students is used dependent variable, and the urban & rural area including boys & girls are considered as the categorical variables of the study. The collected data are analyzed by using descriptive statistics, graphical representation and t –test for the justification and interpretation of research questions and hypotheses of the study. Result shows the positive and significant impact of teaching physical science on the academic achievement scores of physical science of the secondary school students.

Keywords: *Teaching, Academic Achievement, Physical Science, Secondary Students*

Introduction

Science education encompasses the teaching and learning of science and it provides the scientific knowledge, processes, flexible thinking, logical reasoning, and promote a broad range of skills in problem solving. Science education delivers attitudes to foster understanding of nature, equip the individuals to make decisions, and engage them with scientific & technological aspects of the society. In educational context teaching is a process, wherein the teacher supports the students to learn new things, and impart knowledge, skills, facilitating learning, shaping behavior, make them equipped with understanding through the sharing of information and new ideas. Teaching is a scientific phenomenon wherein the teacher observes the students with a view to know how much they learn best. Teachers try to apply new techniques (strategies) to the teaching- learning process in order to know how much it works for the effective learning outcomes of the students. Science teaching offers the students in getting opportunities to increase their understanding regarding why and how the things work around us. Teaching science motivates students in improving and developing their power of observation, practical and scientific outlook and skill of manipulation. Based on the principle of learning by doing teaching science is mainly to build the teaching meaningful, effective, interesting and providing clear and sufficient information to the students. A pedagogical approach as a scientific teaching is normally used in class room situation whereby the teaching and learning approach is introduced as the science itself. The inquiry- based learning cooperative learning and student- centered learning are belongs to this approach.

The project-based and practical- based method of teaching endeavored significant and positive effect on science teaching and learning process. Different methods of teaching are the primary elements of secondary curriculum. The national curriculum provides the students centered teaching methods. Academic achievement is associated with students' progress, success in acquiring educational knowledge, understanding, skills and learning aims and objectives. It is usually measured by grades, tests scores, and by various evaluation processes.

Different research studies revealed that the teaching science has a positive and significant impact on the academic achievement in physical science of the secondary learners. There are so many factors other than teaching science that can influence significantly to the outcomes (academic achievement) of the secondary students.

Statement of the Problem

This study conducts to examine the impact of teaching physical science on the academic achievement scores of physical science of the secondary school students of Howrah district, West Bengal. It is considered to find the difference of means of academic achievement scores of physical science between the secondary (i) urban and rural students, (ii) urban Boys and rural Boys students, and (iii) urban Girls and rural Girls students. The review of literatures related to this study found no such investigation has been conducted before. So, the authors have initiated to study the problem: Impact of Teaching on the Academic Achievement of Physical Science of the Secondary School Students

Delimitation of the Study

The present investigation is delimited to consider the secondary students of class – IX promoted to class – X of Howrah district of West Bengal as the population of this study. A sample of 300 students comprises from purposively selected urban and rural secondary boys and girls schools affiliated by the West Bengal Board of Secondary Education.

Research Questions

1. Do the academic achievements of physical science between the urban and rural secondary students differ significantly?
2. Do the academic achievements of physical science between the urban Boys and rural Boys secondary students differ significantly?
3. Do the academic achievements of physical science between the urban Girls and rural Girls secondary students differ significantly?

Objectives of the Study

1. To identify and compare the academic achievement of physical science between the urban and rural secondary students of Howrah district.
2. To identify and compare the academic achievement of physical science between the urban Boys and rural Boys secondary students of Howrah district.
3. To identify and compare the academic achievement of physical science between the urban Girls and rural Girls secondary students of Howrah district.

Hypotheses

HO_1: There is no significant difference in the mean scores of physical science between the urban and rural secondary students of Howrah district.
HO_2: There is no significant difference in the mean scores of physical science between the urban Boys and rural Boys secondary students of Howrah district.
HO_3: There is no significant difference in the mean scores of physical science between the urban Girls and rural Girls secondary students of Howrah district.

Methodology

The present study is followed by descriptive survey method. The secondary students of class-IX promoted to class – X of Howrah district of West Bengal are considered as the population of the study. A sample of 300 secondary students is randomly selected from six purposively selected secondary Boys and Girls schools of urban and rural areas. The methodology of teaching physical science and the scores of physical science as obtained by the participant students in their board conducted public examination are considered as the independent and dependent variables of the study. The Boys and Girls secondary students and urban and rural secondary students are considered as the categorical variables of the study. The collected data are analyzed by using descriptive statistics, Bar graphs, and t – test.

Data Presentation and Analysis

Descriptive Statistics of Achievement Scores in Physical Science
Table: I

Category of students	Sample size(N)	Mean(M)	Standard Deviation (S.D)
Urban	150	72.9	19.23
Rural	150	37.43	16.19
Urban Boys	78	73.96	17.18
Rural Boys	74	39.55	16.43
Urban Girls	72	71.75	21.18
Rural Girls	76	35.37	15.69

Graphical representation of comparison of means of academic achievement of Physical Science (categori-wise) (Fig. 01)

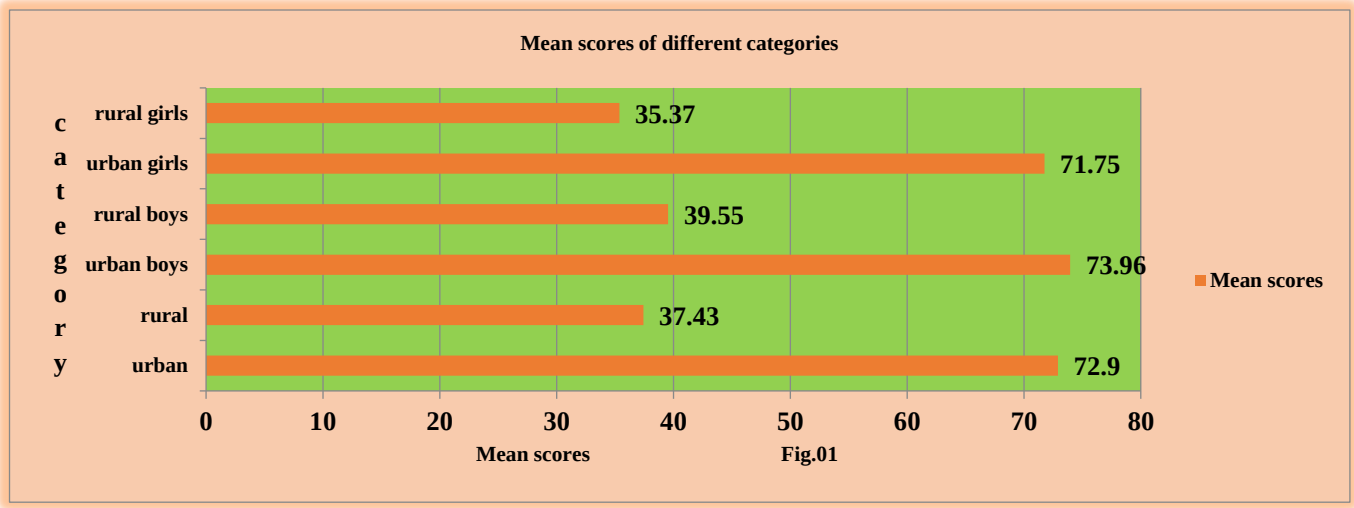

Table: I and Figure-01 show that mean achievement scores of physical science of urban secondary students are far difference from the rural secondary students. Similarly, the mean difference of achievement scores of physical science between the (i) urban boys and rural boys, (ii) urban girls and rural girls differ significantly.

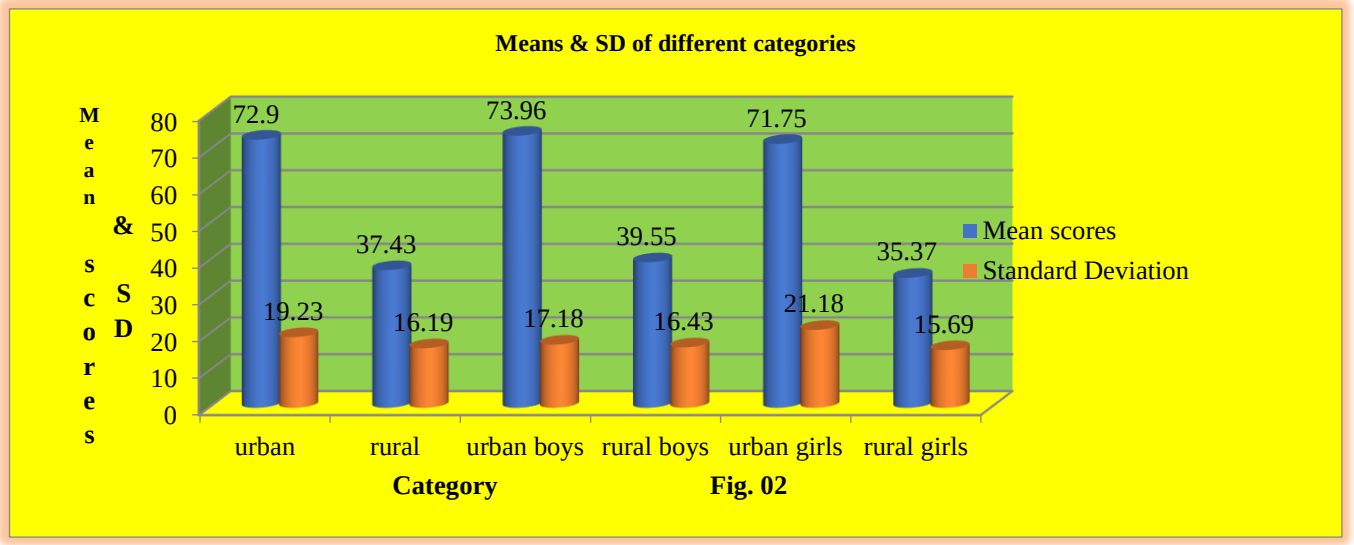

Figure : 02 shows the means and Standard Deviation of achievement scores of physical science of different categories secondary students differ significantly.

Statistical Analysis by t – Test

Significance of difference of means of academic achievement scores of physical science between the urban and rural secondary students

Table: II

(t – test for hypothesis no: 1)

Category	N	df	M	Mean Difference	SD	SE_D	t	Significance at 0.05 level	P	S / NS
urban	150	298	72.9	35.47	19.23	2.05	17.30	1.97	< 0.05	S
Rural	150		37.43		16.19					

N: Sample size, df: Degree of Freedom, M: Mean, SD: Standard Deviation, SE_D: Standard Error, P: Probability
S: Significant, SN: Not Significant

Result of Table: II is significant (S). It shows that the means of achievement scores of physical science of urban and rural secondary students of Howrah district differ significantly. So, the Hypothesis **HO_1** is rejected.

Significance of difference of means of academic achievement scores of physical science between the urban Boys and rural Boys secondary students

Table: III

(t – test for hypothesis no: 2)

Category	N	df	M	Mean Difference	SD	SE_D	t	Significance at 0.05 level	P	S / NS
Urban Boys	78	150	73.96	34.41	17.18	2.73	12.60	1.98	P < 0.05	S
Rural Boys	74		39.55		16.43					

Result of Table: III is significant (S). It shows that the means of achievement scores of physical science of urban Boys and rural Boys secondary students of Howrah district differ significantly. So, the Hypothesis **HO_2** is rejected.

Significance of difference of means of academic achievement scores of physical science between the urban Girls and rural Girls secondary students

Table: IV

(t – test for hypothesis no: 3)

Category	N	df	M	Mean Difference	SD	SE_D	t	Significance at 0.05 level	P	S / NS
Urban Girls	72	146	71.75	36.38	21.18	3.07	11.85	1.98	P < 0.05	S
Rural Girls	76		35.37		15.69					

Result of Table: IV is significant (S). It shows that the means of achievement scores of physical science of urban Girls and rural Girls secondary students of Howrah district differ significantly. So, the Hypothesis **HO_3** is rejected.

Interpretation of Result of t - Test

From the result of Table: II, III and IV it is interpreted that the academic achievement scores of physical science of the urban secondary students of Howrah district differ significantly with the rural secondary students of Howrah district. On the other hand, the academic achievement scores of physical science of the secondary students between (i) urban boys and rural boys, and (ii) urban girls and rural girls of Howrah district differ significantly.

Major Findings

- A significant impact of teaching physical science focuses on the achievement scores of physical science of the urban and rural secondary students of Howrah district.
- The mean achievement scores of physical science differ significantly between the urban boys and rural boys secondary students of Howrah district.
- The mean achievement scores of physical science differ significantly between the urban girls and rural girls secondary students of Howrah district.

Summary and Conclusion

According to the directives of the West Bengal Board of Secondary Education all the affiliated Bengali medium secondary schools follow almost the same type of teaching methodology in teaching physical science. There is no provision for practical classes, but the students are to follow strictly the project work allotted to them by the subject teacher. Mostly the teacher follows the conventional method of teaching physical science at the secondary level. In very few cases the teacher arrange for showing the practical work on their topic of study. CAI and ABL method of teaching – learning process is not often seen during teaching physical science at the secondary schools of Howrah district. So, the secondary students of Howrah district has to depend on the traditional method of teaching- learning process of physical science. The graphical representation of the means of achievement scores of physical science between (i) urban and rural secondary students, (ii) urban boys and rural boys secondary students, and (iii) urban girls and rural girls secondary students revealed significant difference. The results of t – test also the similar type of observations on the academic achievement of physical science of the secondary students of Howrah district. So, it may be concluded that the teaching physical science has positive and significant impact on the academic achievement of physical science of the secondary students.

Recommendation

Following the findings of the present investigation it is recommended to the subject teachers of physical science and all other concerned authorities of secondary school management and administration to implement the suitable methods of teaching

physical science at the secondary school level, specially for the rural secondary students, and provide more learning facilities for the secondary students for achieving desired level of learning outcomes.

Acknowledgment: No
Author's Contribution: *Tapan Kumar Ghosh:* Data Collection, Literature Review, Methodology, Analysis, Drafting, Referencing; *Subhas Chandra Bhat:* Literature Review, Drafting, Referencing
Funding: No
Declaration/Consent for Publication: All the authors have given consent for publication.
Competing Interest: No

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