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AN ANALYTICAL STUDY OF ACHIEVEMENT TEST IN PHYSICS SUBJECT OF CLASS XII STUDENTS

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Abstract
The National Curriculum Framework for School Education(NCFSE) brought out by the NCERT in 1975, 1988 and 2000 (NCFSE 1975, 1988 and 2000) envisaged science education as one of the most effective and comprehensive instrument of quality improvement of school education. The studies on the process of teaching physics are lacking. Achievement refers to the knowledge and skills gained from experience and achieved level of expertise or performance in specific domain. Achievement can be defined as an act of the achiever or, performing and obtaining by exterior successful performance, accomplishment as the achievement of the project. The present research was conducted on the problem "An Analytical Study of Achievement Test in Physics Subject of Class XII Students". The government and private schools was obtained from the Madhya Pradesh Board of Secondary Education (MPBSE) Bhopal. Only higher secondary schools have been randomly selected for the present study. The achievement test was administered on 468 students (156 boys and 312 girls) of the School Education Department of Bhopal Division. The objectives of present study were as: (1) To analytically study of the achievement test of physics subject.(2) To study of the comparison between of achievement test in Physics subject of boys and girls of rural schools.(3)To study of the comparison between of achievement test in Physics subject of boys and girls of urban schools.(4)To study of the comparison between of overall achievement test in Physics subject of rural and urban students. It was found that there is no significant difference between rural government/ private schools' boys and girls in terms of their achievement in Physics subject. The mean score of girls is higher than that of boys in rural and urban students. Girls' performance was also found better than that of boys in terms of Physics achievement.

Keyword: Achievement, Physics.

Introduction

Achievement of students in physics subject was also collected from the examinations results of Madhya Pradesh Board of Secondary Education (MPBSE). A teacher made-test, based on Physics curriculum of the board, was developed and used for assessing the achievement level of students. Physics achievement test was developed on the basis of Bloom's taxonomy of cognitive domain namely, knowledge, understanding, application and skills. The main objective of the Physics achievement test was to assess the achievement in Physics of students studying in class XII.

An achievement test attempts to measure what an individual has learned as a result of teaching-learning process. Most tests used in schools are teacher- made achievement tests. These are helpful in determining an individual's status as a result of learning. Achievement test scores are used in placing, advancing or retaining students at particular grade levels. These are used in diagnosing their strengths and weakness and a basis for awarding certificates, prizes and scholarships.

According to **Choube (**1990), "Achievement is the success on a test of knowledge or skill'. According to **Gratz** (2001), one common understanding of student achievement is absolute achievement on a defined scale, as when all students of a certain age are ranked according to their scores on a state level test. This approach has the virtue of simplicity, but tends to produce predictable results than track an individual demographically.

Review of Related Research

The review of related research to achievement test was as following:

Wilfredo T. Lacambra (2016). Development and Validation of a Physics Achievement Test to Identify Instructor Variables Associated with Students' Physics Academic Performance. Conclusions: In light of the facts revealed by this research, the study came up with the following conclusions: 1. The correlation analysis revealed that the Physics performance of Engineering students in the test is affected and found significantly by the students' variables: age, civil status, course schedule, sponsorship, employment status, Grade Point Average (GPA) in the pre-requisite subjects in basic Mathematics courses (Algebra and Trigonometry), and high school background in Physics. 2. There were problems encountered by the student-respondents that had affected their performance in the Physics achievement test. The students prioritized the problems accordingly to their rank: classroom instruction was English; lack of textbooks and other reference materials; limited laboratory apparatus and materials; and students' absenteeism and tardiness.

Uduak U.; Nkwo and Nsungo (2014). Test Types, Students' Achievement in Senior Secondary School Physics and Eradication of Poverty and Hunger In Nigeria.The purpose of the study was: (i.) To determine if there is any significant difference in achievement in physics among senior secondary school students tested on Extended essay, Restricted essay (or

short-answer essay) and multiple-choice test types. (ii). To determine if there exists any significant difference in achievement between male and female physics students tested on Extended essay, Restricted essay (or short-answer essay) and multiple-choice test types. (iii). To determine if there is any interaction effect of test types and gender on students" achievement in physics. Conclusion : From the data obtained in this study, we conclude that the students"achievement is dependent on the type of test administered to them, among other factors. Particularly, data showed that the tendency to guess, and guess correctly, obtain assistance during examinations, among other weaknesses, makes it possible for multiple-choice test type to greatly influence students" achievement more than the Essay test types.

Gafoor and Shemi (2007) conducted a study on *"Impact of Study Skills Training on Achievement Impact of Study Skills Training in Biology of Standard VIII Students"*. The major objective of the study is to test the effect study skills training on the achievement in Biology of standard VIII Students. Finding if study is; deviance in different fourteen areas was found. The learners of the school under study committed 535 (40%), 456 (35%) and 396 (25%) deviance in the class VII, X and XII, the respectively. The highest rate of deviance was found in pronunciation of vowel sounds 395 (28.4%). The second highest rate of deviance was found in pronunciation of consonant sound 316 (22.7%) learners rate of deviance in terms of not clear pronunciation was 145 (10.4%). The least of deviance in terms of replacement and unclassified deviance was 11 (0.79%) the deviance in terms of deletion, repetition, hesitation and missing were 14 (1.00%), 15 (1.08%) and 15 (1.08%) respectively.

Agarwal and Chawla (2005) conducted a study on *"Influence of Cooperative Learning on Academic Achievement"*. The aim of the present study was to prepare a Cooperative Learning Strategy Based on Instructional Material (CLSBIM) and to see its effectiveness in terms of academic achievement of students at elementary level. It was concluded that CLSBIM was significantly effective in enhancing the level of academic achievement.

Chhitkara, M. S. (1985) conducted an investigation into the *'Relationship of Reasoning Abilities with Achievement of Concepts in Life Sciences'*. The findings of the study were: (1) A slight modification was made in the hierarchy levels of organization of biological phenomena when concepts in secondary school life sciences were identified and the concept achievement test was found reliable and valid. All these supported the hypothesis, i.e., it was feasible to identify the hierarchy of concepts into seven levels of organization of biological phenomena and to measure the achievement of these concepts through objective tests. (2) The results of factor analysis of reasoning ability supported that it was possible to identify reasoning abilities that the secondary school students possessed, with the help of cognition and convergent production of semantic classes, relations and implication tests.

Objectives of Present Study

The following objectives were as:

1. To analytically study of the achievement test of physics subject.
2. To study of the comparison between of achievement test in Physics subject of boys and girls of rural schools.
3. To study of the comparison between of Achievement test in Physics subject of boys and girls of urban schools.
4. To study of the Comparison between of overall Achievement test in Physics subject of rural and urban students.

Hypothesis

The following objectives were as:

1. There are no significance difference between of achievement test in Physics subject of boys and girls of rural schools.
2. There are no significance difference between of achievement test in Physics subject of boys and girls of urban schools.
3. There is no significance difference between of overall achievement test in Physics subject of rural and urban students.

Delimitation of the Study

The delimitation of the study was as follows:

1. The study was conducted on schools of Bhopal division in rural and urban areas of Govt. and Private Schools
2. The population comprised of only class XII for Physics Achievement Test(PAT).

Sample

The government and private schools was obtained from the Madhya Pradesh Board of Secondary Education (MPBSE) Bhopal. Only higher secondary schools have been selected for the present study. The achievement test was administered on 468 students (156 boys and 312 girls) of the School Education Department of Bhopal Division. Students were randomly selected with the help of their Physics teachers.

Design of the study: Research design means the plan, structure and strategy for investigation. According to Kerlinger (1974), a research design is used to provide answer to research questions. In this study, government and private higher secondary schools were selected from rural and urban of Bhopal division.

Variables of the Study: The variables of the study were as follows.

1. **Independent Variables**
   a. System of Higher Secondary Schools (2)
      i. Government Senior Secondary Schools
      ii. Private Senior Secondary Schools
   b. Gender (2): Boys and Girls of Senior Secondary Schools
   c. Area/Locale : Rural and Urban
2. **Dependent Variables**
   - Physics Achievement Test

Tools Used in the Study:
The following tools were used in conducting the study:
Physics Achievement Test (PAT)
The above purpose of tool/test is to assess academic achievement of students in Physical science.

Table 1: Distribution of Sample for Administration of Physics Achievement Test(PAT)

Area	Type of Schools	Boys		Girls		Grand Total	
		N.	%	N.	%	N.	%
Rural	Government	46	55.42	37	44.58	83	100
	Private	13	31.95	29	69.05	42	100
Urban	Government	22	16.54	111	83.46	133	100
	Private	75	35.77	135	64.29	210	100
Total		**156**	**33.33**	**312**	**66.67**	**468**	**100**

Data Collection and Administrative of Tools
For assessing the achievement of students studying at +2 level of class XII Physical science group, a test was developed on the basis of similar tests prepared by the Board of Secondary Education of Madhya Pradesh State. The test was further modified on the basis of curriculum of class XII of the Physics subject. The academic achievement of students studying in the sampled schools was assessed by administering the Physics Achievement Test. This test consists of 100 multiple choice objective type questions. The test was of two hours' duration and had weight age of 100 marks.

After defining objectives and analysing contents, multiple choice items were constructed by the investigator. The preliminary form of test consisted of 150 items; these items were given to lecturers who were teaching physics at higher secondary stage for more than five years. The subject teachers evaluated items for correctness with reference to the objectives and contents of syllabus. The pre-try-out test had 150 items as given in Table1.

Table 2: Blue Print of the of Physics Achievement Test (PAT)

Objective/ Unit	Knowledge	Understanding	Application	Skills	Total	% of Units
I	8	13	8	1	30	20
II	13	13	11	-	37	24.67
III	11	7	3	2	23	15.33
IV	13	7	10	-	30	20
V	19	4	7	-	30	20
Total	64	44	39	3	150	100
% of Objectives	42.67	29.33	26	2	100	-

Statistical Techniques: Analysis of the data were done by computing averages (mean), SD, t- test and percentages with a view to knowing the level of attainment of students. The level of academic achievement was also done in percentages and averages in respect of the functionaries of higher secondary schools. The graphical presentation of the data was done.

Analysis of the Data: The following analysis of achievement test of physics students.
For assessing the academic achievement of students studying higher secondary schools in class XII of Physics group, comparison has been done of the boys and girls studying in the rural areas and urban areas of government and private schools. The comparison of overall achievement of students studying in these settings was done and the same is reported the following sub-sections.

1. The comparison of achievement test in Physics subject of boys and girls of rural schools

The sample size consisted of 59 boys and 66 girls(N=125) form the higher secondary schools of rural area. The mean scores of boys and girls in Physics subject along with SD and 't' values are given in table 3 and represented in figure 1.

Table 3: Differences of Achievement Test in Physics Subject of Boys and Girls of Rural Schools

Group	N	Mean	S.D.	df.	t-value	Table 't' value	Inference
Boys	59	38.61	10.7	123	1.393	0.01=2.6164	Not Significant
Girls	66	41.17	9.815			0.05=1.9794	

Table-3 value of't' for 123*df* at 0.01 level = 2.6164 and at 0.05 level = 1.9794 Calculated't' value =1.393 which is less than the table values at both the levels.

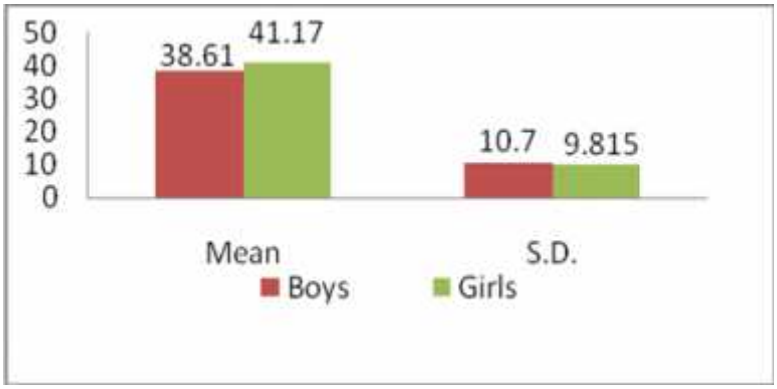

Figure 1. Achievement test in Physics subject of boys and girls of rural schools.

Table3- indicates that the mean scores of rural higher secondary schools' boys are 38.61 and 41.17 of girls. The SD values are found to be boys and girls respectively 10.7 and 9.815. The't' value was found 1.393 which is slightly lower than the table values at 0.05 and 0.01 levels of significance. Hence there is no significant difference between rural schools' boys and girls in terms of achievement in Physics subject.

2. The Comparison of Achievement Test in Physics Subject of Boys and Girls of Urban Schools

The sample size consisted of 97 boys and 246 girls(N=343) form the higher secondary schools' of Bhopal district of urban area. The mean scores of boys and girls in Physics subject along with SD and't' values are given in Table4 and Figure2.

Table 4: Differences of Achievement in Physics Subject of Boys and Girls of Urban Schools

Group	N	Mean	S.D.	df	t-value	Table 't' value	Inference
Boys	97	40.19	12.044	341	3.343	0.01=2.68	Significant
Girls	246	45.22	12.758			0.05=1.96	

Table-4, value of't' for 341 *df* at 0.01 level = 2.68 and at 0.05 level = 1.96 Calculated, t-value=3.343 which is greater than(P<.01, df=341) the table values at both the levels.

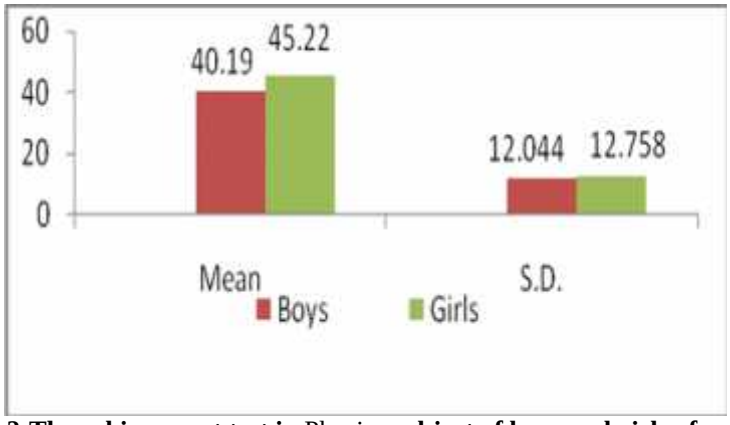

Figure 2:The achievement test in Physics **subject of boys and girls of urban schools**

Table 4 indicates the results of students' in Physics science subject. It is found the girls have secured significantly higher marks as compared to boys ('t'= 3.343, *df* = 341). The girls devote more time for self study as compared to boys in urban areas. The mean score of girls (45.22) is greater than that of boys (40.19). Hence there is significant difference between urban schools' boys and girls in terms of achievement in Physics subject.

3. The Comparison of Overall Achievement test in Physics subject of rural and urban students.

The sample size consisted of 125 rural and 343 urban students (N= 468) of Bhopal division. The mean scores of rural and urban students in Physics subject along with SD and't' values are given Table 5 and represented in Figure 3.

Table5:The comparison of achievement in Physics subject of rural and urban students.

Group		**Mean**	**S.D.**	**df**	**t-value**	**table 't' value**	**Inference**
Urban	343	43.5	12.75	466	3.024	At 0.01 = 1.96	Significant
Rural	125	42.05	10.29			At 0.05 = 2.58	

Table't' value for 466 *df* at 0.05 level = 1.96 and at 0.01 level = 2.58. Calculated value = 3.024 which is less than the table values at both the levels.

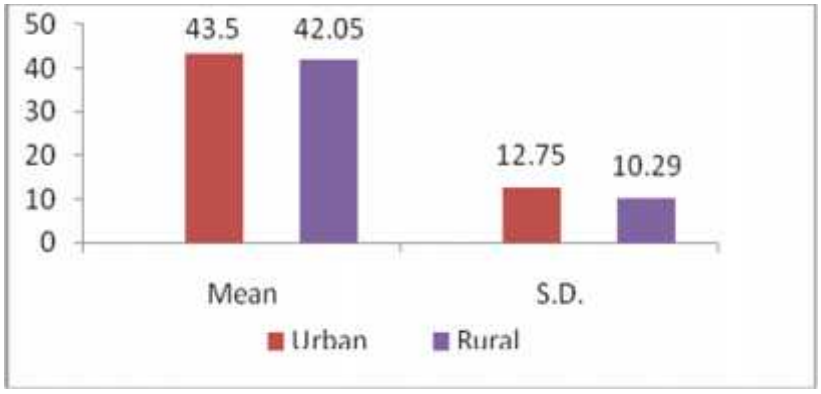

Figure 3: Overall achievement test in Physics subject of rural and urban students

Table 5: showed that the S.D. values were found to be respectively rural and urban students 10.29 and 12.75. The't' value was found to be 3.024 at both the levels, that is, 0.05 and 0.01. Hence there is significant difference between rural and urban students in terms of achievement in Physics subject.

Findings Relating to Physics Achievement Test (PAT): The major findings related to Physics achievement test of class XII of Physics group students are given below:

1. There is no significant difference between rural government and Private schools' boys and girls in terms of their achievement in Physics subject.
2. There is significant difference between urban government and Private schools' boys and girls in terms of their achievement in Physics subject.
3. There is significant difference between rural and urban students in terms of achievement in Physics subject.

Conclusions

The following conclusions were as:

1. It was found that there is no significant difference between rural government and Private schools' boys and girls in terms of their achievement in Physics subject.
2. There are significant differences found in the performance of urban private school boys and girls in terms of achievement in Physics subject. The mean score of girls is higher than that of boys in rural and urban schools. Girls' performance was also found better than that of boys in terms of Physics achievement. It is a well known fact that children of well to do families study in the private schools and girls are more sincere in their study. Therefore, the functionaries of government higher secondary schools should supervise and facilitate the government higher secondary schools and motivate the teachers for better achievement and ensure regular attendance of students and teachers.

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