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A Study of Achievement in Different Concepts of Science in Grade III Students in Punjab

Rafaqat Ali Akbar*
Muhammad Abiodullah**
Khalid Rashid***

Abstract

The study was conducted to determine the level of achievement in different concepts of science of students grade III in Punjab, Pakistan. The sample consisted of 800 students of 32 government schools of Punjab. The achievement test was developed based on grade III textbook published by Punjab Textbook Board. Twenty five students were selected randomly from each school. The level of achievement of students was assessed in different concepts of grade III science i.e. structure & function of plant, animal, characteristics of life, environment, matter & its characteristics, force& movement, energy¸ electricity, magnetic and structure of earth. To assess the level of achievement in each concept mean and standard deviation were calculated. To compare achievement level among male, female, urban and rural students, independent t-test was conducted. The results reflect that the achievement scores in the concepts of animal, characteristics of life and structure of earth are better than achievement scores in the concepts of electricity & magnetic, environment, force & movement, energy, matter & its characteristics and structure & function of plant. The achievement of female students is better than achievement of male students in structure & function of plant, animal, characteristics of life, environment, matter & its characteristics, electricity &magnetic and structure of earth. But there is no difference in the performance of male and female in concepts of force and energy. The achievement of urban students is better than achievement of rural students in concepts of energy, structure of earth. While rural students are better in concept of environment as compare to urban students.

Key words: Achievement in Science, Different concepts of science, Rural students, Urban students, Male students, Female students

*Professor in Education, Institute of Education and Research, University of the Punjab Lahore
** Assistant professor, Institute of Education and Research, University of the Punjab Lahore
*** University of Management and Technology

Introduction

Twenty first century is considered as century of science. People in modern society areliving in scientific environment which is increasingly dependent on scientific knowledge and technology. Thusscience has become an integral part of human life and living. People use science on every day basis to make decisions on emerging issues such as balance food, clothing, health, home construction, environment protection, purchase and use of home appliances, travel, communication, population growth (Driver, Leach, Millar, Scott, 1996).In addition, the expanding economy in era of globalization demands a work force that is adequately educated in science education. In order to understand these issues and develop informed opinion we as a society need to have basic understanding of the laws, principles and theories of science. Therefore it is necessary that students must learn concepts, progress and developments of science and technology. It is important to develop knowledge and ability among the students needed for effective participation in a scientifically complex society.Science provides students with hands-on opportunities for exploring and understanding their world. Science provides understanding of their environment by observing, measuring, exploring, evaluating, ordering, classifying, comparing, predicting, thinking critically and logically (Abell & Smith 1994). Added value of science includes learning to live in changing world, and developing new vocabulary of science language.

Basic science skills are often referred to as science literacy which can be defined as “The knowledge and understanding of scientific concepts and process required for personal decision making, participation in civic and cultural affairs, and economic productivity” (Hand, 1999; Rychen & Salganik, 2003; Klein, 2006). Science literacy can be called as scientific, or scientific and technological, literacy (ICASE, 2003; Norris and Philips, 2003).

Science curriculum and text books of different grades at primary level is an integration of concepts related to biology, chemistry, physics, geology, oceanography and astronomy. When students learn science at primary level they learn concepts of science in varied forms. It is matter of concern for researchers that to see the performance of students in different concepts of science, which synthesis the course of study of science, as science at primary level is integration of different concepts from major subjects i.e. biology, chemistry, physics (Tytler, 2000).

Assessment play a central role in determining extent to which science related concepts has developed and how much students have learned (Bybee, 1997). Assessment provide basis to teacher to know weakness and strengths of students in different areas of a subject, it also provide feedback to student and their parents about

his/her learning (Campbell, 1995). Assessment of students of achievement is an integral part of teaching learning process.

Different research studies on science achievement of students at different grade level revealed that science achievement varies in different concepts of science. National Assessment of Educational Progress (NAEP, 1969) in USA report descriptive information about students' achievement in subject areas including science for national sample for grade 4, 8 and 12 and determined the extent to which students across the nation achieved science content standard. A study on International science and mathematics on a vast sample of half a million students of 41 countries was conducted by TIMSS. The study provides information about students' performance in science and mathematics for each country, as well as comparisons among the countries (Osborne & Freyberg 1985; Raizen, & Michelsohn, 1994).

A study on achievement at Grade 4 and at Grade 8 students of different subjects i.e. Language Mathematics, Science, Social Studies was conducted a sample-based in all 35 districts of Punjab by PEAS. Provincial report on assessment of students learning 2007 reveals that one of aim of students learning assessment was monitoring the education system to make it alligned with workd wide emerging trends by analysing the existing state of affairs and suggesting measures to improve the system (Govt. of Punjab, 2007). UNESCO report on learning achievement in primary schools of Pakistan: A Quest for quality education reported results different science achievement of students at different grades level.

In 1983Primary Education Project (PEP) conducted the study to collect data on achievement in science from 3,300 students of 4grade. The data was collected from a representative sample of schools in NWFP, Punjab and Sindh. The average percentage scores of students in science for the three provinces were 16.9, 20.1 and 25.9 respectively.

BRIDGES project under the Harvard Institute of International Development carried out a study on assessment of primary education during 1988-89. The study collected both quantitative and qualitative data on achievement of students of classes 4 and 5 in Science from about 500 sampled schools across Pakistan and about 11,000 students were tested. The average percentage scores for both classes in Science were 29 and 33 respectively.

The Academy of Educational Planning and Management (AEPAM)(1999) conducted a study on *measuring learning achievement at primary level in Pakistan* of grade 4 and 5 students in Science. Data was collected from a sample of 1,411 students of 75 boys' schools and 1,383 students of 70 girls' schools and 2,794Students of

grade 5 sampled from 145schools in 28 districts of Pakistan. The results of the study for both 4 and 5 grade revealed that students performed satisfactorily in science.

IER under PEP (1995) conducted a study on 8,792 students of grade 3,4 and 5 in 132 schools of four districts in Punjab. Results show that girls are better in all grades from boys in science subject. The average percent scores of science in grade 3, 4, and 5 were 43, 51 and 51 respectively.

Pervez (1995) conducted science achievement test on 2582 students of grade 3 & 5 and found that performance of students is not up-to-mark (Mean = 26.1)**.**

The above cited studies show that achievement in science at elementary level is a point of focus for Government, funding agencies, researchers and practitioners. Such studies were conducted to find out achievement of students in science and comparison of achievement are made on the basis of gender, Local, grade and subjects. The science at elementary level is a composition of range of concepts from different field of science. A little efforts have been made to find achievement levels of students in different concepts i.e. structure and function of plant, animal, characteristics of life, environment, matter and its characteristics, force and movement, energy¸ electricity, magnetic and structure of earth of science.

Procedure of the Study

The purpose of the study was to find out achievement level in different concepts of science i.e. structure and function of plant, animal, characteristics of life, environment, matter and its characteristics, force and movement, energy, electricity , magnetic and structure of earth among grade III students in government primary schools in Punjab. Achievement test for science was developed, based on grade III text book published by Punjab Text Book Board. Items were constructed by using bloom taxonomy and cover all topics of science' curriculum of grade III. Test was conducted in 32 government primary schools both in 16 male and 16 female schools in four districts of Punjab. Twenty five students from each school were selected as a sample. Test was administered on 800 students i.e. 400 males and 400 females at the end of their academic year when they have finished their syllabus. Achievement scores in each concept of science were calculated. To determine the level of achievement in different concepts mean, and standard deviation were calculated. To compare achievement scores of male and female, rural and urban students independent t-test was applied. Results are presented in the form of table followed by interpretation.

Table 1 - Mean and Standard deviation of Achievement Scores in Different Concepts of Science

Concepts	Mean	SD
Structure and function of Plant	35.65	20.20
Animal	54.03	18.63
Characteristics of life	50.44	40.50
Environment	7.80	17.86
Matter and its characteristics	43.55	25.51
Force and movement	14.51	12.62
Energy	16.80	20.80
Electricity and Magnetic	6.73	16.04
Structure of Earth	59.55	40.03

Table 1shows that the achievement scores in the concepts of animal, characteristics of life and structure of earth are above average and achievement scores in the concepts of electricity &magnetic, environment, force & movement, energy, matter & its characteristics, structure & function of plant are below average. The results of the study shows that students' performance majority of concepts in science is not up to mark.

Table 2: Mean and Standard deviation Scores in Different Concepts of Science of Male and Female at Grade III

Concepts	Male		Female		t-value	p-value
	Mean	SD	Mean	SD		
Structure and function of Plant	32.73	21.14	38.61	18.77	-4.138	0.000
Animal	51.99	18.89	56.11	18.15	-3.130	0.002
Characteristics of life	46.12	39.64	54.83	40.94	-3.045	0.002
Environment	5.97	14.10	9.67	20.86	-2.919	0.004
Matter and its characteristics	40.42	26.50	46.72	24.08	-3.497	0.000
Force and movement	13.71	12.63	15.33	12.56	-1.811	0.070
Energy	17.49	21.55	16.10	20.01	0.938	0.348
Electricity and Magnetic	5.10	13.12	8.40	18.41	-2.909	0.004
Structure of Earth	66.42	40.55	52.59	38.29	4.933	0.000

Table 2 reveals that mean score of achievement of female is better than mean score of achievement of male in structure & function of plant, animal, characteristics of life environment, matter & its characteristics, electricity & magnetic and structure of earth. But there is no difference in the performance of male and female in concepts of

force and energy. Results show that the performance of male in concepts of structure of earth, animal is above average and in other concepts they are below average.

Table 3: Mean and Standard deviation Scores in Different Concepts of Science of Urban and Rural Students at Grade III

	Male		Female		t-value	p-value
Concepts	Mean	SD	Mean	SD		
Structure and function of Plant	34.92	18.78	36.38	21.52	-1.018	0.309
Animal	53.99	18.52	54.07	18.76	-0.056	0.955
Characteristics of life	50.34	38.66	50.55	42.30	-0.072	0.942
Environment	6.11	15.41	9.49	19.88	-2.672	0.008*
Matter and its characteristics	43.07	25.82	44.04	25.21	-0.534	0.593
Force and movement	14.85	13.29	14.18	11.91	0.743	0.457
Energy	18.79	20.57	14.82	20.87	2.697	0.007*
Electricity and Magnetic	7.51	18.16	5.96	13.59	1.360	0.174
Structure of Earth	62.57	38.93	56.55	40.92	2.123	0.034*

*$p<0.05$

Table 3 reveals that mean score of achievement of urban students are better than mean score of achievement of rural students in concept of energy, structure of earth and rural students are better in performance in environment as compare to urban students. But there is no significant difference in mean score of achievement of urban students and rural students in the concept of structure & function of plant, animal, characteristics of life, matter & its characteristics, force & movement, electricity &magnetic.

Conclusion

Results of grade III students in different concepts of science are below average which reveals that students are not good performers in science. Students show above average performance in the concepts of animal, characteristics of life& structure of earth normally students are well oriented and having direct experiences in their lives about these concepts.

Female students show better performance in majority of concepts as compare to male students. But there is no difference in the performance of male and female in concepts of force and energy.

Urban students are better in performance than rural students in few concepts. But there is no significant difference in mean score of achievement of urban students and rural students in majority concepts.

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