6

Gender Differences in Science and Mathematics Achievement at the Primary Level – A Case Study

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Abstract

Academic achievement depends upon several factors. The present study focuses on gender differences in academic achievement. The aim of the study is to compare the achievement of boys and girls in science and mathematics at the primary level. The sample comprises 110 students (57 boys and 53 girls) from the affiliated schools of Aligarh Muslim University, Aligarh. The data was collected using two self-developed achievement tests. The collected data was analysed with the help of statistical techniques like Mean, SD and 't' value. The findings show that there is significant difference in achievement of boys and girls in science and mathematics at the primary level. The performance of boys is better than their girls in both science and mathematics.

Introduction

The future of the country rests on the shoulder of its children. These children would one day pave the path of progress and lift the country to the heights of development. Education is going to play a key role to turn these children into strong pillars. Education aims at making us civilised human beings, proper educational process is a passport to a good, comfortable and secure life (Arbot and Arunjo, 1996).

There are several factors which directly or indirectly affect the academic achievement of the students. Unless we understand these factors, we cannot produce intelligent, interested and enthusiastic students. Academic achievement of the students of the urban schools was found significantly higher than those of rural schools (Dwivedi, 2005). The students from healthy school environment have significantly better academic achievement than the students from poor school environment. The classroom, environment and developmental factors play a major role in students' performance. The

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students' inner urges, the competency of the teachers, no physical distraction and contacts with like-minded colleagues makes a student more competent to succeed in life (Avinashilingam and Sharma, 2005). In-spite of the best efforts made in schools to raise the abilities, capabilities and other personality traits of students, it is not possible for us to attain the optimum level of educational goal, i.e. all round development of one's personality. The family makes critical contributions to student achievement from pre-school through high school. When parents are involved in their children's education at home, they do better in school (Henderson and Berla, 2002).

Science and mathematics are amongst the two important subjects which are very useful for day-to-day life. These subjects develop not only logical thinking but also help in routine life of every individual. So science and mathematics have become a substantial and an integral part of our organised society. The aim of teaching science in the primary schools should be to develop proper understanding of facts, concepts, principles and processes in the physical and biological environment (Kothari, 1964-66). Whereas the basic purpose of science education at secondary level is to understand the nature of science, its processes, methods and scope, so that the students can use scientific method to solve their problems and develop scientific attitude (NCERT, 1988). Mathematics is a very useful subject for most vocational and higher specialised courses of learning. In this world of today nobody can live without mathematics for a single day. Mathematics is intimately involved in every moment of a person's life. Right from human existence on this earth it has been a faithful companion to him. Ignorance of mathematics will be a great handicap in the progress of students in many other subjects, its study will benefit him/her to a great extent. Mathematics need to be a compulsory subject for the longer duration of education.

Need of the Study

National Achievement Survey of *Class V* (2012) reported no significant difference in academic achievement of boys and girls at national level and for Uttar Pradesh state. The similar kinds of findings were observed by Gupta, Sharma and Gupta (2012) on gender differences on the measure of academic achievement in adolescent students. However, Mahmood and Khatoon (2011) conducted a study on gender differences in schools of Uttar Pradesh and reported that there is significant difference between achievement of boys and girls. Thus, gender differences in academic achievement across states and subjects is not same. It is realised that academic achievement of boys and girls varies across area, medium of education, stages of education and universities or board. Here, an attempt was made to find out whether there is any difference in the achievement of boys and girls in science and

mathematics at primary level of Aligarh Muslim University affiliated schools which has an autonomous characteristic, separate board for examination and evaluation, and also has own procedure for admission and evaluation in different classes and courses.

Objective

The major objective of the study was to compare the achievement of boys and girls students in science and mathematics at primary level.

Hypotheses

Following hypotheses were formulated to achieve the objectives:

- There exists no significant difference between the achievement of boys and girls students in science at primary level.
- There exists no significant difference between the achievement of boys and girls in mathematics at primary level.

Sample

In order to carry out the above mentioned study, the investigator first of all prepared a list of all the schools affiliated to Aligarh Muslim University. There are seven (three each for boys and girls, and a special co-education school for blind) schools affiliated to Aligarh Muslim University, Aligarh. Out of these seven, one boys' and one girls' school was selected through random sampling techniques. Blind school was not a part of target population as it is a special school. All the students of Class V were included in the study from these selected schools. The sample consisted of 110 students (57 boys and 53 girls).

Tools

The investigator developed achievement test one each in science and mathematics. Each test contains 25 items based on syllabus of Class V. The items were multiple-choice type having one correct answer carrying one score. The draft test was given to the teachers who are teaching at primary level to judge the validity of the items. The valuable suggestions were incorporated. So, in this way the content validity of the tests was established. The reliability of tools was established by test-retest method. The coefficient of reliability of science and mathematics achievement test was 0.73 and 0.83, respectively.

Analysis of Data

The collected data were systematically analysed with the help of statistical technique like Mean, SD and't' value. The analysis is presented and discussed below:

Table 1: Mean performance of boys and girls in Science

Group	*N*	*Mean*	*SD*	*'t' Value*	*Level of significance*
Boys	57	11.98	2.86	2.27	Significant at 0.05 Level
Girls	53	10.34	2.07		

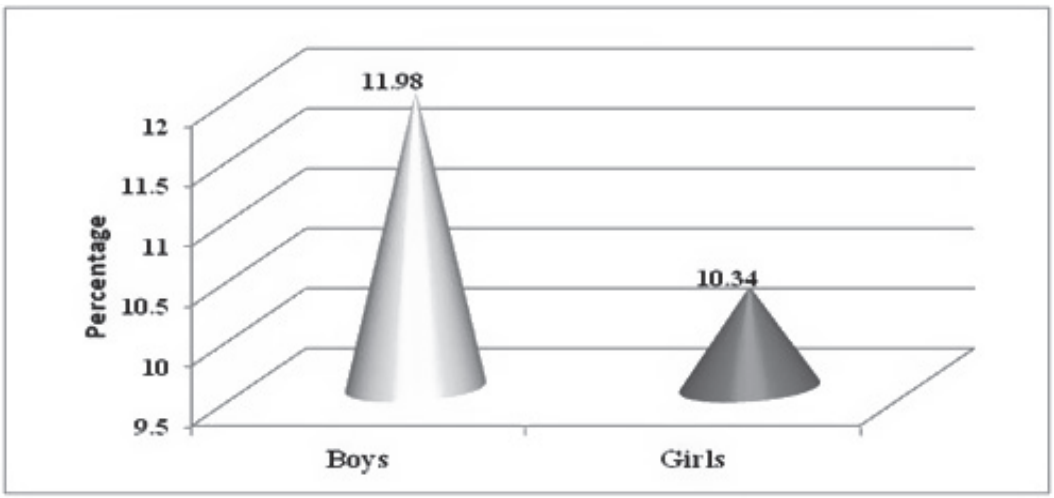

Figure 1: Graphic Representation of Mean Scores of Boys and Girls in Science

Science Achievement

Table 1 reveals the mean performance of boys and girls in science. The value of 't' is 2.27 which is significant at 0.05 level of confidence. The scores boys on science achievement test are greater than the mean scores of girls (Figure 1). It can be inferred that boys achievement is comparatively better than girls on science achievement test at primary level. Thus the stated null hypothesis that there exists no significant difference between the achievement of boys and girls students in science at primary level is rejected. The finding is supported by the findings of Wang and Staver (1997), they studied the gender differences among Chinese students on science achievement.

Table 2: Mean achievement of boys and girls in Mathematics

Group	*N*	*Mean*	*SD*	*'t' Value*	*Level of significance*
Boys	57	12.68	3.72	3.06	Significant at 0.01 Level
Girls	53	9.32	3.06		

Mathematics Achievement

Table 2 shows the mean achievement of boys and girls in mathematics. The value of 't' is 3.06 which is significant at 0.01 level of confidence. It is apparent from mean scores of mathematics achievement test that achievement of boys is better than girls (Figure 2). It can be inferred that boys are comparatively better than

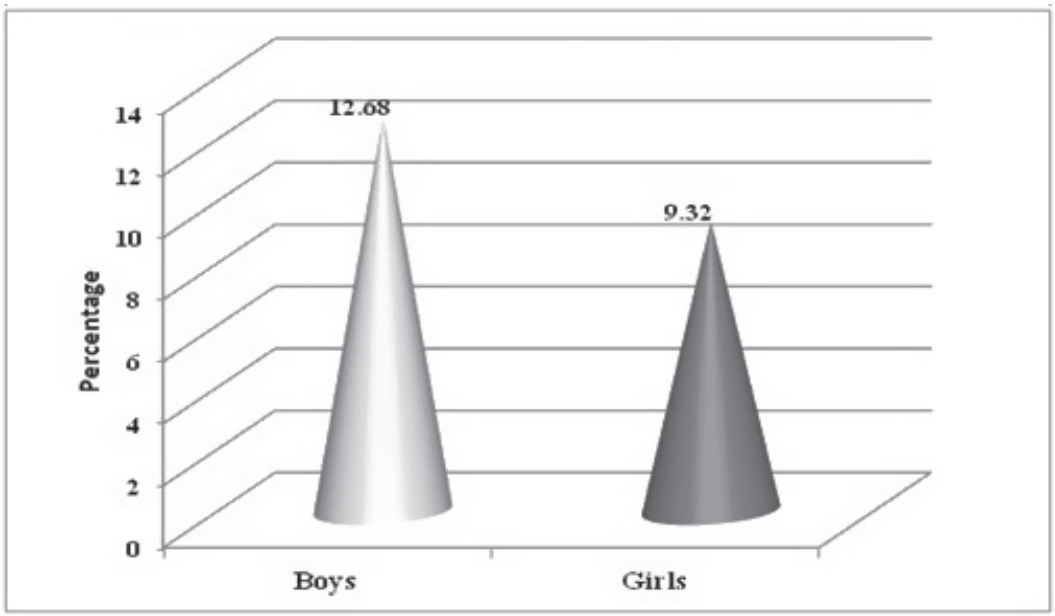

Figure 2: Graphic Representation of Mean Scores of Boys and Girls in Mathematics

girls on mathematics achievement test at primary level. Thus the stated null hypothesis that there exists no significant difference between the achievement of boys and girls in mathematics at primary level is rejected. Present study support the findings by Mahmood and Khatoon (2011) that achievement of boys is better than girls in mathematics. The findings of the study also support findings of Cambell and Beandry (1998), George (2003). However, the findings of National Achievement Survey Class V (2012), Skaalvik and Rankin (1994) reported that there is no difference of gender in mathematics achievement of boys and girls.

Major Findings

The findings of the study are:

- there exists significant difference in achievement of boys and girls in science at the primary level.
- there exists significant difference in achievement of boys and girls in mathematics at the primary level.

Conclusion and Suggestion

The study concludes that there is significant difference in science and mathematics achievement at the primary level. The outcomes clearly reveal that boys' performance is better than girls in both subjects, i.e. science and mathematics. The disparity in the academic achievement may be due to significant disparity of in socio-cultural practices status. Coleman et. al. (1966) and Jencks (1972) concluded that schools bear little influence on students' achievements

and home background has much more powerful influence. Coleman et. al. (1966) also reported that the social composition of the student was highly related to student's achievement. Thus the disparity in the results of schools can be attributed to the known fact that students of high socio-economic status can indulge in home coaching, enriched home environment such as tutorials and video programme, good library, computer facilities, good friends circle and better state of mental health while students of low socio-economic status can only hope for such privileges.

On the basis of students' performance there is need to relook at the AMU schools learning processes. To improve the achievement of the students, diagnostic and remedial teaching should become an integral part of teaching-learning process. For this, the whole teaching community should be properly oriented and sufficient exemplar material should be made available. The teacher should try to use innovative methods and practices especially for girl students to enhance their achievement. Further, there is need for an in-depth study to know the reasons for differences in performance of boys and girls and also to provide necessary interventions, so that the gaps may be minimised.

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