

# Achievement in Mathematics of Ninth Class Government School Students in Relation to Their Parental Involvement

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Received: November 18, 2016 | Revised: January 16, 2017 | Accepted: February 9, 2017

Published online: March 06, 2017

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**Abstract** This study examines the achievement in mathematics of ninth class government school students in relation to their parental involvement. The findings were based on the responses of 453 government school adolescents (223 males and 230 females) selected from ten government schools of Chandigarh. Parental Involvement Scale and Mathematics Achievement test developed and standardized by the investigator were used for data collection. Results show that achievement in mathematics of adolescents studying in government schools is significantly and positively related with general welfare, monitoring, leisure time activities, and academic growth dimensions as well as parental involvement (total), except psychological autonomy dimension of parental involvement. The study concluded that there is significant difference in achievement in mathematics of ninth class government school students in relation to their parental involvement.

**Keywords:** Achievement in mathematics, general welfare, monitoring, leisure time activities, academic growth, psychological autonomy, parental involvement

## 1. INTRODUCTION

The primary concern and the most important goal of education is academic achievement of pupils despite many varied statements about the aim of education (Gupta, 2013). Academic achievement plays an important role in the life of a child. High academic achievement in school builds self esteem and self confidence which leads to the better adjustment with the group. The role of education is to help the educant to discover himself, to develop his innate abilities and above all to cultivate desirable attitudes and aptitudes. To get good scores, mathematics plays a significant role. Mathematics dominates

Issues and Ideas  
in Education  
Vol-5, No-1  
March 2017  
pp. 59–71

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almost every field of our life and our activities. In this age of science and technology, it has permeated through the human life in such a way that all it has now become every man's everyday concern. At present due to scientific and technological advancements in the world, there is a lot of change in the world; there is a lot of change in the content of school mathematics. There is a change in the trend from traditional to modern mathematics; there is a change in the language of mathematics and also a change in the system of examination. Parental involvement has been a major concern in academic achievement of students, especially in subject like mathematics, which is a very important school subject. Parents have high educational aspirations and expectations for the child (Singh et al., 1995; Catsambis, 2001).

## 2. MATHEMATICS ACHIEVEMENT

Mathematics is one of the three R's (reading, writing and arithmetic) Knowledge, skills and attitudes as objectives to achieve are vital for each pupil. Pupils individually are from each other and possess diverse learning styles. They also possess different intelligence such as being able to work better individually or within a group. Mathematics achievement refers not only to obtaining excellent marks in the grade level final examination but it also refers to the attainment of mathematical ability and skills. We must improve achievement to maintain our economic leadership, while technology advances with lightning speed. (U. S. Department of Education) Stagnant math performance in school shortchanges our students further and endangers our prosperity and our nation's security.

In mathematics the achievement is essentially cognitive in nature i.e. it refers to understanding of mathematical concepts and knowledge attained in the subject. It is also the level of skill developed and application of knowledge to the new situations. It includes pupils' problem solving ability, clear expression of thoughts, logical reasoning etc. it helps in attainment of the following skills or abilities: Number Power, Logical Power, Spatial ability, Numerical ability, Problem Solving Ability, Reorganization, Abstract Reasoning, Pattern Power, Computer Power, Measurement Ability, Arithmetic Ability, Visualization. Judgment and Number Fluency. *Good's Dictionary of Education* (1973), "Mathematics achievement means knowledge attained or skills developed in the subject usually designated by the test scores or marks assigned by teachers or both".

## 3. PARENTAL INVOLVEMENT

In the last half century, parents' role in the educational process has gained interest and national focus from policymakers, educationists, and researchers (Hawes & Plourde, 2005). Parenting can be the most rewarding work of

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adult life. Nothing brings more joy and pride than a happy productive and loving child. Each age and stage of a child's development has specific goals and tasks. For adolescents it is to become their own person with their own group of friends. The world is shrinking. The effect of globalization, modernization and the media boom has made the life of adolescents, their expectations and values very different from those of older generation. Understanding adolescence empathetically and helping them to develop life skills to deal with the conflicting situations occurring due to oneself, peer society and parents is not only the responsibility of schools but also of parents themselves.

*Maccoby & Martin* (1983) Parental involvement is described in the child development literature as the degree to which a parent is committed to his or her role as a parent and to the fostering of optimal child development.

*Grolnick and Slowiaczek* (1994) define parental involvement as the allocation of resources to the child's academic endeavors. In other words, it denotes the extent to which parents take a keen interest and actively participate in their child's education.

*Fan* (2001) defined parental involvement having aspirations for their children's academic achievement, communicating with children about education and school matters, communicating with teachers about their children and supervising school work at home.

Taylor and Davis (1984) have given three types of parental involvement activities:

- a) **Home focused activities:** These activities include parents learning the skills they need to help their children succeed.
- b) **School focused activities:** These activities include improving the information flow between home and school and vice versa.
- c) **Partnership focused activities:** These activities include opportunities to focus together on student achievement for all students.

Epstein (1995) demonstrated six major types of parental involvement:

- 1) **Parenting:** Helping families with child-rearing and parenting skills.
- 2) **Communicating:** Developing effective home-school communication.
- 3) **Volunteering:** Creating ways that families can become involved in activities at the school.
- 4) **Learning at home:** Supporting learning activities in the home that reinforce school curricula.
- 5) **Decision-making:** Including families as decision-makers through school-site councils, committees, etc.

**6) Collaborating with the community:** Matching community services with family needs and serving the community.

Thus parental involvement includes several behaviors such as teaching, monitoring, judicious use of time for study at home, reinforcing behaviors established in school and participation in school related committees etc.

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**4. STUDIES RELATED TO MATHEMATICS ACHIEVEMENT AND PARENTAL INVOLVEMENT**

*Wenfán and Qiuyun* (2005) examined the relationship of 3 dimensions of parent involvement (family obligations, family norms and parent information networks) to 12<sup>th</sup> grade student's mathematics achievement and ways in which these relationships varied across 4 racial and ethnic groups. The authors analyzed 39 parent involvement variables to create 9 components, whose relationships to 12<sup>th</sup> graders mathematics scores were assessed with ordinary least squares regression. Findings indicate that parental involvement as a form of social capital was generally a salient indicator for explaining the mathematics achievement. *Melita and Maja* (2009) reported that at the end of the first school term students reported on their parent's academic involvement (pressure, help and support) and their maths teacher's behavior in the classroom (support, academic press and mastery goal) during the second term the students filled in the questionnaire on their motivational beliefs about maths and at the end of the school year their final maths grade was obtained from school records. Both of the social contexts significantly predicted student's outcome. Students' perceptions of maths teacher's behavior were predictive of both motivational beliefs and achievement in math over and above the account of student's evaluations of their parent's involvement. Furthermore parental academic pressure and support were directly (negatively) related to students maths grades. *Olatoye and Agbatogu* (2009) investigated the achievement of pupils in the public and private primary schools in mathematics and science. The descriptive survey research design was employed to carry out the study. 480 pupils from 30 primary schools in Ogun state Nigeria were randomly selected for this study. From the results of this study, parental involvement accounts for 16.1% of the total variance in mathematics achievement of primary school pupils ( $R^2 = 1.161$ ,  $P < 0.05$ ) and 13.5% of the total variance in pupil's achievement in science ( $R^2 = 0.057$ ,  $P < 0.05$ ). These percentages are significant at 0.05 level of confidence. It shows that parental involvement is an important predictor of mathematics and science achievement.

## 5. OBJECTIVES

1. To find out the relationship of achievement in mathematics of ninth class government school adolescents with parental involvement.
2. To compare parental involvement of male and female adolescents studying in government schools.
3. To study achievement in mathematics of ninth class government school adolescents in relation to parental involvement.

## 6. HYPOTHESES

1. There exists significant positive relationship of achievement in mathematics with parental involvement of ninth class adolescents studying in government schools.
2. There exists significant difference in parental involvement of ninth class male and female adolescents studying in government schools.
3. There exists significant difference in achievement in mathematics of ninth class government school adolescents in relation to parental involvement.

## 7. DESIGN OF STUDY

A systematic procedure to collect data, which helps to test hypotheses of the study under investigation, was adopted. The method was essentially descriptive survey method.

## 8. SAMPLE

In the present study, 453 government school adolescents (223 males and 230 females) selected from ten government schools of Chandigarh. The ninth class students were taken. The investigator has used two stage random sampling technique for the selection of the present sample. For this purpose, a list of government schools of Chandigarh was procured from the office of District Education officer (DEO). In the first stage, 10 government schools were randomly selected. In the second stage, 50 students i.e. 25 females and 25 males were selected randomly from each school respectively. Out of the initial sample of 500 ninth class students, 47 entries were excluded from further analysis because of missing and incomplete responses. The final sample, hence, consisted of 453 students.

## 9. TOOLS USED

The following tools were used to collect data:

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1. Parental Involvement Scale developed by the investigator.
2. Mathematics Achievement test developed by the investigator.

## **10. TOOLS USED**

### **10.1 Parental Involvement Scale**

#### **10.1.1 *Reliability***

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Reliability of parental involvement scale was estimated by using test -retest method with a gap of 15 days. The coefficient of correlation computed was found to be 0.42 for general welfare, 0.59 for motivation, 0.40 for psychological autonomy, 0.52 for leisure time activities, 0.45 for academic growth and .87 for total parental involvement. All the coefficients were significant at .01 level of significance.

#### **10.1.2 *Validity***

The present Parental Involvement Scale has been validated against the Parental Involvement Scale (TPIS) by Chouhan and Arora (2009), which is a measure of general parental involvement. The value of coefficient of correlation was 0.73, which is significant at .01 level of significance.

## **11. MATHEMATICS ACHIEVEMENT TEST**

The reliability coefficient co-efficient for mathematics achievement test was found to be 0.92.

## **12. VALIDITY**

Mathematics achievement test was validated against criterion of 'Content Validity'.

## **13. STATISTICAL TECHNIQUES**

To analyze the data statistically Mean, Standard Deviation, t-ratio and coefficient of correlation were computed the results were interpreted accordingly.

## **14. RESULTS**

### **14.1 Discussion of results**

Table 1 shows that achievement in mathematics of adolescents studying in government schools is positively and significantly related with different dimensions of parental involvement i.e. general welfare, monitoring, leisure

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**Table 1:** Correlation of Achievement in Mathematics with Different Dimensions of Parental Involvement, of Ninth Class Adolescents Studying in Government Schools (N=453).

Achievement  
in Mathematics  
of Ninth Class  
Government  
School Students  
in Relation to  
Their Parental  
Involvement

Parental Involvement	Achievement in Mathematics
General welfare	0.119*
Monitoring	0.369**
Psychological autonomy	0.089
Leisure time activities	0.164**
Academic growth	0.364**
Parental involvement (total)	0.375**

\*\*Significant at 0.01 level \*Significant at 0.05 level

time activities, academic growth and total parental involvement. However, there is no significant relationship of achievement in mathematics with psychological autonomy dimension of parental involvement.

The positive and significant correlation between achievement in mathematics and general welfare dimension of parental involvement suggests that the more the parents of adolescents studying in government schools interact with their children, fulfill their requirements, make sacrifices to keep them happy, and spend quality time with them, the higher the achievement they have in mathematics. A positive correlation of monitoring dimension of parental involvement with mathematics achievement, indicates that the more the parents of adolescents studying in government schools monitor the whereabouts of their children, the type of friends they have, their learning in school, and accomplishments in school subjects, the higher their achievement in mathematics.

A significant and positive relationship of leisure time activities dimension of parental involvement with achievement in mathematics of adolescents suggests that the more the involvement of parents in the recreational activities and after school activities of their children, the higher is their achievement in mathematics. The significant and positive relationship of academic growth dimension of parental involvement with achievement in mathematics of adolescents studying in government school indicates that the more the parents encourage their children to work hard for good academic achievement, give them reward for showing good performance in studies, and provide congenial environment for the study, the higher is their achievement in mathematics.

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In addition, a positive and significant correlation between total parental involvement and mathematics achievement of adolescents studying in government schools indicates that higher involvement of parents in the studies of adolescents results in their higher achievement in mathematics. Non significant relationship of achievement in mathematics of adolescents studying in government schools with psychological autonomy dimension of parental involvement suggests that freedom given to the adolescent to make independent decisions in their working does not affect their mathematics achievement.

Thus, it can be concluded that achievement in mathematics of adolescents studying in government schools is significantly and positively related with general welfare, monitoring, leisure time activities, and academic growth dimensions as well as parental involvement (total) (except psychological autonomy), This implies that the higher the involvement of parents in studies, the higher is the achievement in mathematics of adolescents studying in government schools. Hence, the Hypothesis 1 namely, "There exists significant positive relationship of achievement in mathematics with parental involvement of ninth class adolescents studying in government schools," has been accepted to a great extent.

## **15. DISCUSSION OF RESULTS**

The entries made in Table 2 show that the mean differentials between male and female adolescents with regard to monitoring dimension of parental involvement and total parental involvement were significant at 0.01 level of significance and the calculated t –values with regard to psychological autonomy and leisure time activities dimensions of parental involvement were significant at 0.05 level of significance. Whereas the t-values with regard to general welfare and academic growth dimensions of parental involvement were not found to be statistically significant.

Higher mean score in monitoring dimension of parental involvement of female adolescents studying in government schools as compared to male adolescents implies that parents monitor all about whereabouts, the type of friends, and accomplishments in school subjects of female adolescents more than that of the male adolescents. The results entered in Table 2 further reveal that the female adolescents studying in government schools scored higher in psychological autonomy dimension of parental involvement than male adolescents. This suggests that parents give more freedom to female adolescents to make decisions in their work than to their male counterparts.

The higher mean score in leisure time activities dimension of parental involvement of female government school adolescents than those of male

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**Table 2:** Mean Differentials between Parental Involvement of Ninth Class Male and Female Adolescents Studying in Government Schools.

Dimensions of Parental Involvement	Mean (Male) (N=223)	Mean (Female) (N=230)	SD (Male)	SD (Female)	t -value	Level of Significance
General welfare	20.39	20.56	3.27	3.13	.567	NS
Monitoring	22.25	23.46	4.27	4.05	3.08	0.01
Psychological autonomy	19.17	19.82	3.54	3.45	1.98	0.05
Leisure time activities	25.46	26.72	5.44	5.18	2.53	0.05
Academic growth	23.97	24.80	6.61	4.35	1.33	NS
Parental involvement(total)	111.25	115.37	14.46	14.74	3.00	0.01

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adolescents indicates that the parents are involved in the recreational and after school activities of female adolescents, more than male adolescents studying in government schools. Further, the mean score in total parental involvement of female government school adolescents is higher than the mean scores of their counterparts in government schools. This suggests that parents are more involved in the activities of female adolescents as compared to those of male government school adolescents. Thus, it can be concluded that parents monitor the activities of female adolescents, and give them freedom to make decisions more than to their male counterparts.

However, the mean differential between female and male adolescents studying in government schools with regard to general welfare and academic growth dimensions of parental involvement was not significant. This suggests that parents are involved equally in the general welfare and academic growth of both male and female children. Hence, Hypothesis 2, namely, “There exists significant difference between ninth class male and female adolescents studying in government schools with regard to parental involvement” has been accepted to a great extent.

## 16. DISCUSSION OF RESULTS

Entries made in Table 3 show that all the mean differentials calculated between the mean scores of achievement in mathematics of government school

**Table 3:** Mean Differentials in Achievement in Mathematics of Ninth Class Government School Adolescents with Low and High Scores in Different Dimensions of Parental Involvement.

Dimensions of Parental Involvement	Mean (Low) (N=122)	Mean (High) (N=122)	SD (Low)	SD (High)	t-value	Level of Significance
General welfare	29.59	33.25	11.66	9.81	2.64	0.01
Monitoring	25.29	37.39	8.74	9.86	10.14	0.01
Psychological autonomy	29.06	32.73	12.02	9.83	2.61	0.01
Leisure time activities	28.25	33.14	11.40	10.42	3.49	0.01
Academic growth	26.58	37.49	9.73	9.57	8.82	0.01
Parental involvement(total)	25.68	36.71	10.27	9.30	8.79	0.01

adolescents with low and high scores in different dimensions of parental involvement, i.e. general welfare, monitoring, psychological autonomy, leisure time activities, academic growth, and total parental involvement were significant at 0.01 level of significance.

The mean score of achievement in mathematics of government school adolescents with high scores in general welfare dimension of parental involvement was higher than the mean score of achievement in mathematics of adolescents with low scores in this dimension of parental involvement. This suggests that mathematics achievement of adolescents whose parents are more involved in the general welfare of their children i.e. interact with them, fulfill all their requirements, make sacrifices to keep them happy and spend time with them is higher as compared to those whose parents are less involved.

The higher mean mathematics achievement score of government school adolescents with high scores in monitoring dimension of parental involvement as compared to those with low scores in this dimension suggests that mathematics achievement of those adolescents whose activities are more monitored by their parents is higher than their counterparts.

Further, the mean score of achievement in mathematics of government school adolescents with high scores in psychological autonomy dimension of parental involvement is higher than the mean scores of achievement in mathematics of adolescents with low scores in this dimension of parental

involvement. This suggests that achievement in mathematics of the adolescents whose parents give them more psychological autonomy i.e. freedom to make independent decisions is higher than their counterparts.

Higher mean mathematics achievement score of government school adolescents with high scores in leisure time activities dimension of parental involvement as compared to those with low scores in this dimension suggests that achievement in mathematics of the adolescents whose parents are more involved in the recreational activities of their children is higher than their counterparts whose parents are less involved in their leisure time activities.

Results further reveal that the mean mathematics achievement score of government school adolescents with high scores in academic growth dimension of parental involvement is higher than those of with low scores in this dimension of parental involvement. This suggests that achievement in mathematics of those adolescents who are encouraged more to work hard, are given reward for showing good performance in studies and are provided with more congenial environment for the study is better than their counterparts whose parents are less involved in their academic growth.

The mean score of achievement in mathematics of government school adolescents with high scores in total parental involvement is higher than with low scores in total parental involvement. This suggests that achievement in mathematics of the adolescents whose parents are more involved in the activities of their children is better than their counterparts whose parents are less involved in the activities of their children.

On the basis of above discussion of results based on Table 3, it can be concluded that achievement in mathematics of adolescents with high scores in parental involvement i.e. the adolescents whose parents take keen interest in their day to day activities, interact with them, monitor all their activities, give more freedom to their wards in making independent decisions are more involved in the after school and recreational activities of their children, and also promote academic growth of their children, is higher as compared to their counterparts with low scores. This suggests that achievement in mathematics of government school adolescents with high and low scores in parental involvement differ significantly i.e. more parental involvement leads to high achievement in mathematics. Hence, Hypothesis 3, namely, “There exists significant difference in achievement in mathematics of ninth class government school adolescents in relation to parental involvement” stands verified.

## 17. EDUCATIONAL IMPLICATIONS

As mathematics achievement is significantly and positively related with parental involvement it can be concluded that appropriate curricular activities

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should be introduced in schools by educational administrators and planners to enhance the inculcation of parental involvement in students in the study of mathematics and parents and teachers should help to create conducive learning environment by interacting with the children and providing basic necessary learning materials for their children. Furthermore, and in view of the importance of the students' internal locus of control, parents and teachers should help the children to put in relevant effort and ability in the study of mathematics.

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