CHAPTER 5

SCHOOL ENVIRONMENT

5.1 INTRODUCTION

The purpose of this chapter was to examine the possible associations between the school environment and the mathematics achievement of the students. The schools where individual classrooms teachers and students interact constitute the core of the education system. Classrooms play a major role in determining what an individual learns. It follows that if one identifiable group of people is not learning as well as another group, then the educational environment can and should be modified to ensure that these group differences are eliminated.

The effects of School environment upon achievement in mathematics have been a subject area of mathematics education research. Differences in the mathematics achievement between children in both open and non-open classrooms were studied by Horak, Virginia (1979). Schreiber James B(2002) examined student- and school-level factors and observed disparities varied from school to school. School resources, school size, and average parent education were significantly associated with school mean achievement in advanced mathematics.

Schools provide students coming from different backgrounds with similar opportunities for learning. Traub et al (1972) was of the opinion that if children are to develop their intellectual potential they must be provided with an intellectual stimulating environment.
Today all formal education takes place in the manmade environment of schools and classrooms. The buildings should thus be conducive to the teaching and learning process. Lack of proper infrastructure has been a major concern area for many years. Quality standards of schools in terms of infrastructure, often do not meet the parameters laid down in the Education Bill of the government.

The quality and effectiveness of the education delivered in the school also plays a role in the student’s mathematics performance. For effective teaching to take place, a good method must be adopted by a teacher. The teacher today has to face the difficult task of arranging suitable learning experiences by utilizing suitable and interesting learning techniques (Taori S, 2001). School mathematics education is often fraught with lack of creativity and original thinking. Mathematics is taught as an abstract subject with no reference to applications where the emphasis is on routine problem solving. The laboratory approach of teaching mathematics can fill this gap by providing students with the opportunity to understand and discover the beauty, importance and relevance of mathematics as a discipline. It can be expected to enhance the pupil’s understanding of the subject. Donnipad Manjunath (2009) has revealed that the strategy evolved for teaching mathematics in a mathematics laboratory was effective than didactic traditional methods.

The impact of the teacher-student ratio on student performance is another factor that has been explored in this chapter. When the classrooms are crowded, they present a particular burden to teachers who are not able to relate to individual pupils.

Another topic which is examined as part of this study on the school environment is the daily homework given to the students. Research into homework and its effect on mathematics is attributed to the debate on this topic in USA during
the 1930s. Both positive effects and so significant effects were reported across different schools, classes and achiever levels. Goldstein (1960) Austin (1979) Coulter (1979) have worked on the homework research. The usefulness of this practice and its effect on mathematics achievement are the areas which were studied. In Goldstein's view, homework should clearly be required in all schools. Foyle (1988) in a paper which examined the results of an experiment conducted on various level of education found that at the elementary and secondary levels, homework produces student achievement, while at the college level no such difference is found. However there are also diverse views which hold that homework creates boredom, mental fatigue and puts unnecessary pressure on the students. Cowan and Hallam (1999), Hallam (2004), Doane (1972) reported that relationship between homework and mathematics achievement was strong in case of high achieving students but weak and negligible in case of low achievers.

As a general rule, textbooks remain the principal instructional material in the classroom. School students face problems due to non-availability of textbooks in the market in the beginning of the session. In a paper Heyneman (1978) reviewed studies from twelve less-industrialized countries on the relationship between textbook availability and academic achievement. He concluded that the availability of books was the most consistent school factor in predicting academic achievement. The quality of textbooks is also to be examined. Mathematics text books at the school level sometimes are poorly written, unimaginative and examination centered. These drawbacks pose themselves as serious impediments to effective mathematical learning.
5.2 DATA

For purposes of this study, the attributes for school environment have been taken as

- School management
- School area
- Physical facilities like infrastructure, teaching aids, text books
- Teacher-student ratio
- Teaching methods used, daily homework and specific training for teachers.

5.3 STATISTICAL ANALYSIS:

A comparative study between the groups of students divided on the basis of their school management, school area, physical facilities, teacher-student ratio, teaching methods, daily homework and specific training for teachers was conducted. The combined scores of the students were examined. Variations if any were examined. In all cases variation were seen among the two groups.

The data was entered into a SPSS spreadsheet and was analyzed accordingly. The tests administered to the students were checked for internal consistency through reliability analysis.

The performance in mathematics of class VII and class IX in of schools classified according to different groupings as specified above were undertaken with the help of tests.

The tests administered to the students were checked for internal consistency through reliability analysis. In order to do this the Spearman-Brown co-efficient formula for equal lengths test was calculated. Cronbach's alpha measurement of homogeneity was calculated. The Guttman's split-half technique for reliability of the instrument was also calculated. The value of Cronbach alpha (α = .948), Spearman-
Brown’s split half co-efficient ($r=.943$) and Guttmann’s split half co-efficient ($r=.766$) for class IX and the value of Cronbach alpha ($\alpha=.931$), Spearman-Brown’s split half co-efficient ($r=.934$) and Guttmann’s split half co-efficient ($r=.830$) for class VII all showed high reliability co-efficients.

The mean and standard deviation of the combined scores were calculated, t-test has been used to test the variance in the mean of the combined score for the different classes based on different groupings.

**SCHOOL MANAGEMENT**

The grouping under school management was made on the basis of government schools and private schools. Government schools are those which are funded and managed by the state government while the private schools were those set up by a society or group of individuals with no government funding.

For class IX the number of government school students in the sample was 230 and the number of private school students in the sample was 60. For class VII the number of government school in the sample was 230 and the number private school students in the sample was 60. The group sizes for the samples were unequal. Thus the independent sample t-test was conducted to find the differences in means between the two groups with the following result.

Variation of combined weighted scores (Mean+SD, count) (Mathematical achievement, concept and ability) of students of various schools of Bongaigaon district divided on basis of school management are given below. Values having different superscripts (a,b,) differ significantly ($P<0.05$) between groups/levels in a class.
TABLE 5.1 Mean scores of students divided on basis of school management

<table>
<thead>
<tr>
<th>class</th>
<th>School management group</th>
<th>Government</th>
<th>Private</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>VII</td>
<td>Mean±SD</td>
<td>25.31 ± 11.58</td>
<td>41.07 ± 13.37</td>
<td>-9.078 **</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>230</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>IX</td>
<td>Mean±SD</td>
<td>26.23 ± 13.50</td>
<td>48.31 ± 14.19</td>
<td>-11.165 **</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>230</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

Figure 5.1 Mean scores by school management

SCHOOL AREA

Here the schools were divided as to whether they were located in an urban or rural area. For class IX the number of urban school students in the sample was 160 and the number of rural school students in the sample was 130. For class VII the number of government school in the sample was 170 and the number private school students in the sample was 120. The group sizes for the samples were unequal. Thus the independent sample t-test was conducted to find the differences in means between the two groups with the following result
Variation of combined weighted scores (Mean+SD, count) (Mathematical achievement, concept and ability) of students of various schools of Bongaigaon district grouped by school area has been shown below. Values having different superscripts (a,b,) differ significantly (P<0.05) between groups/levels in a class.

<table>
<thead>
<tr>
<th>Class</th>
<th>School Area</th>
<th>Group</th>
<th>Urban</th>
<th>Rural</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>VII</td>
<td>Mean+SD</td>
<td>32.50</td>
<td>± 13.60</td>
<td>a</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>170</td>
<td></td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>IX</td>
<td>Mean+SD</td>
<td>37.02</td>
<td>± 16.24</td>
<td>a</td>
<td>23.14</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>160</td>
<td></td>
<td>130</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 5.2 Mean scores of students divided on basis of school area

PHYSICAL FACILITIES

Infrastructure facilities

Here the study took into consideration the overall condition of the school buildings. The group sizes for the samples were unequal. Thus the independent
A sample t-test was conducted to find the differences in means between the two groups with the following result.

Dissimilarity of combined weighted scores (Mean+SD, count) (Mathematical achievement, concept and ability) of students of various schools of Bongaigaon district classified on basis of existence of infrastructure difficulties are shown. Values having different superscripts (a,b,) differ significantly (P<0.05) between groups/levels in a class.

<table>
<thead>
<tr>
<th>Class</th>
<th>Infrastructure</th>
<th>Mean+SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>VII</td>
<td>Infrastructure Problem</td>
<td>25.30 ± 11.97 a</td>
<td>220</td>
</tr>
<tr>
<td>IX</td>
<td>No Infrastructure Problem</td>
<td>39.86 ± 13.17 b</td>
<td>70</td>
</tr>
</tbody>
</table>

**TABLE 5.3 Mean scores of students divided on basis of school infrastructure.**

![Mean Scores by Infrastructure](image)

**Figure 5.3 Mean scores by school infrastructure.**

Proper facilities were available mostly only in private schools located in urban areas. Government schools especially in rural areas were found to be shabby.
Overcrowded classrooms, with a thin bamboo partition between different classes, made up for a noisy atmosphere that impeded mathematics teaching. Other infrastructural problems that were listed were inadequate classroom, classrooms not furnished properly, inadequate ventilation and lack of teaching materials. The study revealed 73% of schools had insufficient number of classrooms, 57.5% schools did not have ceiling, 54% schools used flimsy bamboo partition to divide the classroom into two sections, 62% did not have proper ventilation, 76% schools had insufficient number of benches. No government school had a well stocked separate library room.

**Availability of textbooks**

The factor studied here was whether the prescribed mathematics textbook was readily available in the beginning of the session. The group sizes for the samples were unequal. Thus the independent sample t-test was conducted to find the differences in means between the two groups with the following result.

Variation of combined weighted scores (Mean+SD, count) (Mathematical achievement, concept and ability) of students of various schools of Bongaigaon district grouped by availability of textbooks at the beginning of the session is given below. Values having different superscripts (a,b,) differ significantly (P<0.05) between groups/levels in a class.

<table>
<thead>
<tr>
<th>Class</th>
<th>Availability of textbooks in beginning of session</th>
<th>Non-availability of textbooks in beginning of session</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>VII</td>
<td>Mean±SD 35.04 ± 12.70 a 20.61 ± 9.85 b</td>
<td></td>
<td>10.61 **</td>
</tr>
<tr>
<td></td>
<td>N 160</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>IX</td>
<td>Mean±SD 38.90 ± 15.66 a 22.24 ± 12.06 b</td>
<td></td>
<td>10.10 **</td>
</tr>
<tr>
<td></td>
<td>N 150</td>
<td>140</td>
<td></td>
</tr>
</tbody>
</table>

**TABLE 5.4 Mean scores of students divided on basis of textbook availability**
TEACHER-STUDENT RATIO

Teacher-Student ratio refers to the number of teachers in a school with respect to the number of students who attend the institution. Some researchers have not found a connection between smaller classes and higher student achievement, but most of the research shows that when there is class size reduction student achievement rises. Here the comparison was made between groups divided on the basis of whether the teacher-student ratio was 1:40 and below or greater than 1:40.

Variation of combined weighted scores (Mean + SD, count) (Mathematical achievement, concept and ability) of students of various schools of Bongaigaon district by teacher-student ratio were found. Values having different superscripts (a,b,) differ significantly (P<0.05) between groups/levels in a class.

<table>
<thead>
<tr>
<th>Class</th>
<th>Teacher Student Ratio</th>
<th>1:40</th>
<th>Greater than 1:40</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean+SD</td>
<td>±</td>
<td>±</td>
<td></td>
</tr>
<tr>
<td>VII</td>
<td>31.46 ± 13.82</td>
<td>a</td>
<td>25.88 ± 12.78</td>
<td>3.57 **</td>
</tr>
<tr>
<td></td>
<td>N 140</td>
<td></td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>IX</td>
<td>36.08 ± 16.35</td>
<td>a</td>
<td>25.86 ± 14.67</td>
<td>5.61 **</td>
</tr>
<tr>
<td></td>
<td>N 140</td>
<td></td>
<td>150</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 5.5 Mean scores of students divided on basis of teacher-student ratio
TEACHING METHODS USED

Teaching methods refer to the various ways in which the teacher teaches mathematics to the students. The most common methods that are used are the lecture method supplemented by blackboard and chalk. Only 24% of the teachers reported that they use methods like group discussion, quiz, audio-visual aids and mathematics laboratory for teaching mathematics. During observation, it was found that TLMs were kept inside the box, almost in bad condition and teachers were not motivated to use these in classroom transaction.

Variation of combined weighted scores (Mean+SD, count) (Mathematical achievement, concept and ability) of students of various schools of Bongaigaon district by teaching methods used. Values having different superscripts (a,b,) differ significantly (P<0.05) between groups/levels in a class
TABLE 5.6 Mean scores of students divided on basis of teaching methods

<table>
<thead>
<tr>
<th>class</th>
<th>Teaching Methods</th>
<th>Mean+SD</th>
<th>N</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>VII</td>
<td>Blackboard and chalk, Lecture</td>
<td>23.19 ± 10.74</td>
<td>180</td>
<td>-9.57 **</td>
</tr>
<tr>
<td></td>
<td>Additional methods to blackboard and chalk ,lecture</td>
<td>37.39 ± 13.08</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>IX</td>
<td>Mean+SD</td>
<td>27.34 ± 13.05</td>
<td>180</td>
<td>-7.71 **</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>110</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 5.6 Mean scores by teaching methods

DAILY HOMEWORK

The combined scores of the students were examined for the two sets of students who reported that daily homework was allotted and corrected in their schools and those who not have the practice of regular homework assignments.

Variation of combined weighted scores (Mean + SD, count) (Mathematical achievement, concept and ability) of students of various schools of Bongaigaon district by daily homework given have been revealed. Values having different superscripts (a,b,) differ significantly (P < 0.05) between groups/levels in a class.
### TABLE 5.7 Mean scores of students divided on basis of assignment of daily homework

<table>
<thead>
<tr>
<th>Class</th>
<th>Daily homework given</th>
<th>Daily homework not given</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>VII</td>
<td>Mean±SD 36.28 ± 12.70 a</td>
<td>22.31 ± 9.85 b</td>
<td>10.14 **</td>
</tr>
<tr>
<td>N</td>
<td>130</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>IX</td>
<td>Mean±SD 35.32 ± 18.34 a</td>
<td>27.12 ± 13.40 b</td>
<td>4.39 **</td>
</tr>
<tr>
<td>N</td>
<td>130</td>
<td>160</td>
<td></td>
</tr>
</tbody>
</table>

Figure 5.7 Mean scores by assignment of daily homework

**SPECIFIC TRAINING FOR TEACHERS**

All teachers included in the survey had at least a graduate degree. Apart from this, however, training of teachers is an essential component of mathematics education and consists of both pre-service and in-service programs.

Variation of combined weighted scores (Mean + SD, count) (Mathematical achievement, concept and ability) of students of various schools of Bongaigaon district grouped by teachers having specific training in mathematics are given below.
Values having different superscripts (a,b,) differ significantly (P<0.05) between groups/levels in a class

<table>
<thead>
<tr>
<th>class</th>
<th>Specific training in teaching mathematics</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Training received</td>
<td>Training not received</td>
<td>t</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VII</td>
<td>Mean+SD 31.94</td>
<td>12.85 a</td>
<td>24.97</td>
<td>13.40 b</td>
<td>4.52 *</td>
</tr>
<tr>
<td></td>
<td>N 150</td>
<td>140</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IX</td>
<td>Mean+SD 32.23</td>
<td>15.74</td>
<td>29.26</td>
<td>16.79</td>
<td>1.55 NS</td>
</tr>
<tr>
<td></td>
<td>N 150</td>
<td>140</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TABLE 5.8 Mean scores of students divided on basis teachers receiving specific training in mathematics

5.4 DISCUSSION

Heyneman and Loxley (1983) had stated that in low income countries, school-level factors could account for a greater proportion of variance in student achievement as compared to student-level characteristics. The phenomenon has come to be known as the “HL effect” and indicates the important responsibility of schools towards providing equitable education in developing countries.
The above analysis shows that school factors have an influence on achievement of the students. Studies by Kulkarni (1970) Aggarwal (1995), Kingdon (2008) have shown that school influence is important to students in India.

**SCHOOL MANAGEMENT**

In case of school management the results of both classes IX and VII were of a similar nature. The test was a large sample t-test and for both cases the t value was less than the critical value of t (-1.96) at 5% level of confidence. This implied that the null hypothesis should be rejected in both the cases and there were significant differences in the means of the two groups for both class IX and class VII. This leads to the implication that the school management did affect the combined score of the students for the sample under investigation.

In India, the schooling offered by the state government have minimal fees. The other category of schools are those run and partly funded by private individuals, private organizations and religious groups, especially by the Christian missionaries. Given that public schools are free of cost and private schools charge fees it would expect that the students attending the private schools come from more socio-economically privileged backgrounds. While 94% of the private schools reported that they got adequate support from parents and guardians, it was reverse in case of government schools. Parents whose children studied in government schools especially in rural areas were unaware of their roles and responsibilities in improving the school environment.

Very few government schools can show that their children's learning is commensurate with their age or grade. These schools may guarantee schooling by increasing student attendance substantially especially as a result of mid-day meals. However the quality of education received in these schools is also of vital
importance. Facilities in private schools are better and teachers have greater access to them than in government schools. Effective utilization of teaching-learning resources, however, remains limited to a small number of schools.

Related studies along this line have reported analogous findings. Studies were based on tests constructed and conducted by the researcher. (Bashir 1994, 1997; Govinda and Varghese 1993; Kingdon 1994, 1996b; Tooley and Dixon 2003). The conclusions in these studies were of a similar nature and show that children in private schools have higher test scores and higher attendance rates. Recently, Muralidharan and Kremer (2006) corroborate the findings in earlier studies with nationally representative data on rural primary schools where it is shown that students from private schools do better than their government school counterparts.

India needs proper government intervention in the area of education because education driven by profit motive cannot benefit the masses. The children in these schools come from the poorest of families — those who cannot afford to send away their young to private schools elsewhere.

SCHOOL AREA

In case of school area too the results of both classes IX and VII were of a similar nature. For both cases the t value was more than the critical value (1.96) at 5% level of confidence. This implied that the null hypothesis should be rejected in both the cases and there were significant differences in the means of the two groups for both class IX and class VII. This leads to the implication that the school area did affect the combined score of the students for the sample under investigation.

Education in rural areas as investigated by the study were characterized by low income levels and a poorer quality of life with regard to infrastructure, transportation facilities, health care, school accessibility and also a low level of
parental education. Evidence suggests that two different factors – school conditions and economic conditions – combine to discourage rural students from educational achievement. Rural family incomes are lower than urban family incomes and rural youth are more likely than their urban counterparts to be called upon to leave school and find work to make up for shortfalls in their family budgets.

It was found that the level of school attendance in urban areas (above 75%) was higher as compared to rural areas (50%-75%). The reasons being sited that low attendance was recorded in rural areas during harvest season and festival season. Moreover, the parental education as seen in the earlier chapter dealing with socio-economic factors contributes significantly to achievement of the students. Thus it can be argued that the lower level of parental education as seen in rural areas is not conducive to education in general and mathematics education in particular. Other factors as seen were lack of qualified and committed teachers and teacher irregularity. The teachers in rural areas (63%) resided in the nearest town and commuted to their place of work resulting in a negative effect on school mathematics education in rural areas.

Studies on rural education (Roberts, 2005; Vinson, 2002) have identified several areas like effects of teacher shortages, a lack of opportunity to access professional development, and difficulties in providing resources for their students similar to the above result which accounts for the geographical divide. The rural-urban variation in the mathematics results were explained by socio-economic backgrounds by researchers like (Williams 2005, Canadian Council on Learning, 2006; Howley, 2003) investigating student achievement in this manner, which are in keeping with the results of this study.
SCHOOL INFRASTRUCTURE

The schools where in the individual classrooms teachers and students interact constitute the core of the education system. Classrooms play a major role in determining what an individual learns. Many of the research studies concentrate on evaluating whether a causal link exists between student achievement and behaviour on the one hand, and the overall condition of school buildings on the other. The infrastructure of schools is positively linked to improved achievement. Poorer performance was recorded from schools where infrastructural problems were present. Quality standards of schools in terms of infrastructure, often do not meet the parameters laid down in the Education Bill of the government.

Analysis of data showed that the average of the combined scores was not the same for all groups. There is seen that there are significant differences (as seen in the table) in the means of the combined scores for schools with and without infrastructural problems the t value being more than the critical value at 5% level of confidence.

A vital component for mathematics teaching mathematics is the mathematics laboratory. This is a place where the student can learn and explore different mathematics concept by a variety of activities. CBSE has made it compulsory for all schools to have their own mathematics laboratory for all classes till secondary level. This laboratory should be introduced for all schools.

This is in keeping with studies conducted along these lines. (Earthman 1998, Cash 1993, Jago, E and Tanner, K 1999, Phillips, R. 1997). A good building with airy, well-lit classrooms, suitable furniture, library and laboratories provide a favourable atmosphere to the process of teaching and learning.
AVAILABILITY OF TEXTBOOKS

Textbooks play a vital role in school education in developing countries. They are one of the fundamental factors in quality education at school level. The importance of textbook availability is highlighted by the fact that they are often the only teaching resource available particularly in rural areas. Also there are no school libraries in these areas from which a pupil may use a book which contains the subject matter necessary in his curriculum. Additionally the school mathematics text book is particularly important for children who come from weak socio-economic background. This explains the variation in performance among the two groups. Studies by Hanushek E A (1996), Heneyman SP (1984) Jamison et al (1981) have reported similar findings.

TEACHER-STUDENT RATIO

The class size in 54% of the schools surveyed was larger than the recommended ratio of 1:40. Significant differences were seen along groups divided on the basis of teacher-student ratio. Groups which had a high teacher student ratio showed poorer performance. This is because of difference in the interaction level between student and teachers. A class with too many students proves to be disruptive. The reason as cited is the teacher has to spend time controlling the class, also there in a diverse field of students with varying degrees of learning ability and information uptake which also slows down the learning process.

Variation in mean was seen in groups divided along teacher student ratio. The mean was higher where the above ratio was smaller. The premise is that the teaching was more effective when the teacher could spend time with each student. Adequate attention received by the student is important in understanding mathematics. In a large classroom with a high teacher student ratio there is obvious high variance in
students’ learning abilities and imbalance in the teaching offered. When the classrooms are crowded, they present a particular burden to teachers who are less and less able to relate to individual pupils.

However in countries with a high population there continues to be large classroom sizes. This was seen especially in rural areas where there is an insufficient number of teachers. In course of the survey, 58% of the schools in rural areas reported inadequate number of teachers. To solve this difficulty two sections were combined with the result that the teacher had to spend a majority of his time controlling the students, instead of teaching and learning.

Research has shown that effective teacher-student ratio should be between 1:25 to 1:35. The current average ratio in India is 1:42. The high teacher-student ratio has a negative impact on the quality of education in India. (Newsletter, Maps of India 2008) Thus the teacher-student ratio is found to have significant effect on the combined scores in mathematics of the students.

TEACHING METHODS

The common teaching method observed was lecture and use of blackboard. 37% of the schools surveyed used other methods like quiz, group discussion, use of audio-visual aids additionally. There were significant differences in the means of the combined scores for the two groups.

Simply lecturing the students resulted in passive listeners who are examination oriented. They display an unquestioning reverence of the teacher without any objective analysis on their. They are not able to acquire an in-depth understanding of the subject. There is a long history of research, going back to the work of Brownell (1945, 1947), on the effects of teaching for meaning and understanding, where the teaching methods positively influence student learning of mathematics.
DAILY HOMEWORK

Variations in means were seen among the children who were given daily homework and those who were not. Though there are critics who do not support the assigning of daily compulsory homework, in this case mathematics achievement favoured the group that was assigned daily home work. Mathematics as a subject is improved by repetition of tasks. This is because mastery of some basics is required for competent performance of more demanding tasks. Additionally practice in working out mathematics problems leads to mastering the underlying algorithm as well as the student gaining speed in his work eventually leading to increase in conceptual knowledge also.

However homework as a factor cannot be studied in isolation. An examination into the schools which assigned and checked homework revealed that 100% private schools in urban areas, 64% government schools in urban areas and 0% government schools in rural areas reported the of assigning and correcting daily homework. Also in case of homework the home environment plays a role. Thus factors like school management, school area, parental education, family income are interrelated to homework.

SPECIFIC TRAINING IN MATHEMATICS

Specific training in mathematics teaching refers to the knowledge that a mathematics teacher has to acquire in order to teach mathematics effectively. They need to promote an active interest in learning among the pupils rather than rote learning and memorization. They need to analyze students solutions, provide explanations for errors and also to solutions of a problem and make use of pictures, paper cutting activities, diagrams and perform mathematical experiments for the purpose of discovering some mathematical principle, pattern, or process.
Statistical analysis revealed that the results of classes IX and VII were of
dissimilar nature. The test was a large sample The t value for class IX was less than
the critical value of t (1.96) at 5% level of confidence and hence there was no
statistically significant differences between the two groups in class IX . However in
case of class VII the result indicated significant variations in the means of the two
groups.

The explanation may be that the effects of training are not translated into
effective teaching during the teaching-learning experience of the class rooms in
certain cases. The duration , intensity and nature of the training as well as teacher
motivation are factors that have also to be considered. The outcome of this linking of
the training of teachers to the achievement of the students they teach, are in line with
other similar studies which have demonstrated a mixed effect. The results of a
NCERT report (1995)indicate that the association of in-service teacher's training to
student achievement across states is unstable and does not provide a definite trend.
(2002) have found that inservice teacher training has no statistically or academically
significant effect on either reading or mathematics achievement. However Wiley and
Yoon (1995) ,Cohen and Hill(2000) are others who find teacher training programs to
have at least small impacts on student performance. Again researchers like Angrist
and Lavy (2001) have found strong effects of teacher training on student achievement.

Though the results of different studies are varied, teacher training remains a
vital factor in improving mathematics education. Researchers like Dove(1986),Raj
Rani(2005) have advocated the need for professional development which on a
continuous basis improves teaching skills. This is especially true in mathematics
education where the syllabi have considerably changed over the years and systematic
and continuing education programmes for teachers is necessary for acquiring fundamentals in many concept areas. Additionally, teachers need to be well versed in using computers and technology which greatly facilitate the learning and understanding of mathematics. To address this problem, quality in-service programs are required on a continuous basis that engage teachers in deep experiences with the mathematics they are teaching, upgrade their skills and give them new insights into their students' understanding of that mathematics.

Hence this chapter, which deals with the influence of school environment, demonstrates its relation with the mathematics achievement of the student. It is seen that in addition to socio-economic factors which influence mathematics learning of students, school factors comprising of school management, area, infrastructure, availability of textbooks, teaching methods, teacher student ratio also play a part in determining the mathematics achievement of the students. These factors however cannot be studied in isolation and are interrelated.

The null hypothesis assumes that there is no difference in the influence of school environment on mathematical achievements of students. However, from t tests conducted on various influencing factors related with school environment, it has been seen that all the t values are highly significant. This indicates that there is every evidence to reject the null hypothesis and conclude that there is a high degree of influence of the factors like school management, area, infrastructure, availability of textbooks, teaching methods, teacher student ratio etc. on the performance of the students in mathematics.

The results of this chapter are consistent with previous research showing that although student background variables influence differences in achievement in mathematics, classroom and school variables also contribute substantially (Lamb &
Fullarton, 2000). School effectiveness research undertaken by Bosker & Witziers (1996), that school effects account for approximately eight to ten per cent of the variation in student achievement inspite of great diversity in the background of children

This has important implications for government policy regarding the improvement of mathematics achievement. The Right to Education has been enshrined as a Fundamental Right by the Constitution of India. The education sector has been of vital importance to the Indian Government. However there is a vast gap between policies and the reality at grass root level. It is a fact that children from poor families are faced with inferior quality school education. Children of the rich and the urban middle class are enrolled in private schools. Such schools will exacerbate inequalities by providing better opportunities to youngsters who can afford to attend and consigning children from the poorest families to whatever the government offers.

To bridge the social, regional and gender gap the school environment is a vital factor. By imparting quality education uniformly in all schools this gap can be addressed. This will also provide equal opportunity for higher studies and the employment to all deserving students irrespective of family background. Thus it is imperative that there should be improvement in facilities and infrastructure, teaching methods, training for teachers and other factors which influence school environment.

Discussion of this chapter is based on our paper entitled “Relation Between School Environment Variables and Mathematics Achievement Among School Students In Bongaigaon District ” which is accepted for publication in the Journal of Indian Education, NCERT in its February 2011 issue.