CHAPTER-1

INTRODUCTION

Mathematics can be defined as the science of quantity, structure, space and change. The earliest pioneers of mathematics can be traced back to ancient Egypt and Babylonia, where many problems dealt with logistics, such as food rationing and applied learning. Today, mathematics is integral in both natural and social sciences, as well as, engineering, economics and a host of other fields. Mathematics will play on ever expanding role in the twenty first century as new technologies develop and societies strive for achievement and excellence.

We live in a changing world that is progressively more difficult to understand, analyze, or explain. Futurists predict continual change emerging from the effects of increasing world population, and challenges to world security (Drucker, 1994; Hamel, 2000; Kennedy 1993; Naisbitt and Aburdene, 1990). In coping with these emerging challenges, students have a competitive advantage when they are able to draw upon meaningful scientific knowledge and functional mathematical skills. Likewise, students will be advantaged if they are able to hypothesize relationships, reflect about experiences, articulate to others what is known and engage as a member of a larger learning community. (Blumenfeld, Soloway, Marx, Krajcik, Guzdial, and Palincsar (1991); Dailey, Conroy, Shelly-Tolbert (2001); Carpenter and Lehrer (1999); Cech (2003); and Fennema and Romberg (1999).

Crystal (1993) reflected on the increasing importance of mathematics as, in civilization, beginning with the representation of animals by the number of marks on a stick to the advances "as diverse as numerical analysis and the theory of fractals." The transformation from a simple notch to a system of mathematical rules has enabled scientists from Euclid to Einstein to explain complex relationships and communicate abstract ideas. This collective
mathematical thinking has resulted in practical applications that are ubiquitous in today’s society.

ACHIEVEMENT IN MATHEMATICS

Anderson (1946) came to a positive conclusions about the value of home work in student outcomes. Two sections of an eighth grade class, each with 29 pupils, were used as the experimental and control groups respectively. Those pupils on the home-student programme scored significantly higher on tests in a number of subjects, including mathematics.

Glaser (1963) defined the measurement of student achievement as, “the determination of the characteristics of student performance with respect to specified standards.” He posited, “underlying the concept of achievement measurement is the notion of a continuum of knowledge acquisition ranging from no proficiency at all to perfect performance. An individual’s achievement level falls at some point on this continuum is indicated by the behaviours he (she) displays during testing.”

Kerzig (1966) surveyed sixth, seventh-, and eighth-graders in a small southern California intermediate school. A majority of the students expressed the opinion that home work helped them achieve better grades. A larger majority of the students reported that they sometimes needed parental help. Homework was most resented when there were interruptions at home, when it was perceived as uninteresting, and when it conflicted with watching television.

Several international comparison studies (Husen, 1967; Robitaille and Garden, 1989; Mullis et al, 1997) in mathematics achievement have shown that students from each major level of education in Asia seemed to outperform their counterparts in Europe and North America. These and many cross-cultural studies on mathematics learning suggest that language and cultural differences may be an important factor pertaining to mathematics teaching and achievement.
Gray and Allison (1971) collected data from 64 pupils with mean IQ’s of 114 in two sixth grades in a middle-class suburban school to determine the effect of homework on mathematics skills. All children received both treatments (homework versus no homework) in order to control for the differential effects of teaching styles on various pupils and to eliminate a possible Hawthorne effect. No statistically significant differences attributable to treatment effects, teacher effects, or sex differences were observed.

Maertens and Jonhson (1972) undertook a more elaborate experiment designed to measure attitude as well as achievement. Four hundred fourth-, fifth-, and sixth-graders were divided into three treatment groups. One group received homework with delayed feedback from parents and one received no homework at all. Tests prepared by the researchers were administered after six weeks to assess computational and problem-solving skills. The two homework group did significantly better on the tests than did the no homework group, except in the case of problem-solving in the fifth grade.

Suydam and Higgins (1977), in a review of activity-based learning in mathematics in kindergarten through grade 8, concluded that using manipulative materials produces greater achievement gains than not using them.

Davidson (1985) reviewed studies that compared student achievement in small group settings with traditional whole-class instruction. In more than 40% of these studies, students in the classes using small group approaches significantly outscored control students on measure of student performance.

Lesh (1985) concluded that if students were provided with everyday situations for practicing and learning the important uses of mathematics, they would develop such skills as “making inferences, evaluating the reasonableness of results and using references to ‘look up’ what they need to know. He criticized traditional text books and teaching methods, saying that their one-step problems rarely exercise student’s skills, and they do not reflect real-life
mathematical situations.

Eccles and Jacobs (1986) found that self-perceptions of math ability influenced math achievement.

Hembree and Dessart (1986) concluded that use of hand-held calculators improved student learning. Analysis also showed that students using calculators tended to have better attitudes towards mathematics and better self-concepts in mathematics than their counterparts who did not use calculators. They also found that there was no loss in student ability to perform paper-and-pencil computational skills when calculators were used as part of mathematics instruction.

Visser (1987) studied the nature of the influence of parents on the mathematics and participation of early adolescent children. The subjects were 1605 Afrikan-speaking seventh and ninth grade students whose parents were also invited to participate. Student measures were perception of the encouragement, expectations and interest of parents in themselves as learner of mathematics. Although parents agreed on the general usefulness of mathematics, fathers had significantly more positive attitudes toward mathematics than mother. Males were favoured, both with regard to their perceptions of the attitudes of parents and the actual expectations support.

Sowell (1989) found that the long term use of concrete materials by teachers knowledgeable in their use improved student achievement and attitudes.

Cobb (1991) and his colleagues, in a study of second graders found that student’s number sense was improved by a problem-centered curriculum that emphasized student interaction and self-generated solution methods.

The number of research studies conducted in mathematics education over the past three decades has increased dramatically (Kilpatrick, 1992).

Stevenson and Stigler (1992) reported that the school year in Asian countries is longer than that in the United States, and that Asian students spent
more time on academic study than American students.

Markovits and Sowder (1994) studied 7th-grade classes where special units on number magnitude, mental computation and computational estimation were taught. They determined that after this special instruction, students were more likely to use strategies that reflected sound number sense, and that this was a long-lasting change.

Seeking to understand better student achievement in mathematics, Mullis, Martin, Gonzalez, Gregory, Garden, O’Connor, Chrostowski, and Smith (1999) identified student’s home environment, attitudes towards mathematics, mathematics curriculum, instructional contexts and practices, and school factors as significant categorical variables explaining variations in student achievement.

Wood (1999) found that whole-class discussion works best when discussion expectations are clearly understood.

Brahier (2000) suggested that teachers follow the National Council of Teachers of Mathematics (NCTM) assessment standards and assessment principles in assigning and evaluating homework effectiveness.

Stuart (2000) argued that peer and family attitudes towards mathematics may either positively or negatively influence student's confidence in mathematics.

Trusty (2002) reported that student attitudes impact later career choices in math.

Trusty and Ng (2000) studied student’s self perceptions of math ability and found also that math ability had relatively strong effects on later career choices.

Tieso (2002) argued that little systematic research has examined the effects of curricular enhancement on student achievement.

Drosjack (2003) reported that one in three high school students could not do math at a “proficiency” level as determined by a bipartisan board of
education experts. Bayer corporation (2003) found nine in 10 Americans are concerned about the lack of math skills of today’s students.

Tully (2007) found in a survey that in Shahdara, a shanty town of Hyderabad City, the students of elementary grades of unrecognized private schools scored 72% higher in mathematics than their counterparts in govt. schools.

**FACTORS AFFECTING ACHIEVEMENTS IN MATH**

Children differ in intelligence, achievement, maturity, learning rate, emotional and social behaviour towards mathematics. All these differences and many others may cause serious problems in child’s progress in mathematics. It is an accepted fact that children in the same grade and of the same age differ widely in their physical, mental and cultural characteristics. Biranbaum and Kraemer (1993) concluded that ethnic differences play a great role than gender differences in the success of students in mathematics course, but combined effect can influence population. Shukla et al. (1994) found that scheduled caste and scheduled tribe students have low performance at primary level as compared to backward and other caste students. The following are the main factors affected achievement in mathematics.

(i) **Cultural Factor**

Culture influences upon learning mathematics. Culture related problems in learning in school are seldom caused by deficiencies in particulars cultures; they are usually caused by teachers’ failures to understand and value the cultures of their students. Mathematics teachers should accept the fact that the people, whose life styles reflect various cultures have different ways of expressing themselves, use different speech patterns, behave differently and have different attitudes and values. Attempts by mathematics teachers to impose their cultural values upon their students can have serious negative influences upon student’s attitudes toward learning mathematics. Teachers
should respect cultural differences among students and should build upon these
differences in teaching mathematics. Even though a mathematics teacher’s
prejudices and inappropriate generalizations about certain cultural or ethnic
groups may remain unstated, his or her treatment of students who are different
can result in mutual disrespect between these different students and the teacher,
which can cause students to develop negative attitudes towards learning
mathematics. The best way to avoid creating learning problems as a
consequence of cultural and ethnic differences is to treat all students the same,
that is, treat each student with respect, sincerity and concern for his or her
welfare.

Straus and Straus (1961) observed that culture is one of the important
variables which strongly influences creative thinking abilities. Singh (1985) has
attempted to identify the effect of culture on mathematical creativity of two
religious groups and found a significant difference between urban and rural
Hindus and Muslims.

He also indicated that the biographical factors such as: professional
background, family income, parent’s income, teaching assets like newspapers
and magazines in the family, respect in family for autonomy, attitude towards
reading more mathematics books and high level of aspiration to get good job
etc. may be the causes of difference in performance.

Stevenson et al. (1986) pointed out that cross-cultural differences in
mathematics performance before kindergarten, early environmental
manipulations may have especially strong impact on subsequent achievement.
Uttal et al. (1988) also found that environmental factors operate among
different cultures.

A long term goal of the study of mathematically precocious youth was
to identify the factors that lead to work and / or high achievement in the
sciences. Mostly on factors affecting science achievement has been covering
with average ability subject. The factors that high achievement by
mathematically talented students, have may be quite different from those identified for the population (Benbow, 1988). Brody (1988) pointed out that the United State fared poorly in cross-cultural comparisons of mathematics and science achievement for its general population. Gifted students faired extremely high in interview competitions.

Ethington (1990) examined the data of Second International Study of Mathematics from eight different countries at grade VIII students for the content areas of mathematics and no substantial gender effects were found. He concluded that cultural factors affect gender difference in mathematics performance.

(ii) Environmental Factors

Children come from different environments. Children from affluent homes who have well educated parents usually come to school with a rich background of experiences and tend to be average or repaid learners. The home also influences the child's attitude.

Anand (1973) conducted a study on the effect of socio-economic environment and medium of instruction on the mental abilities and the academic achievement of children. The study revealed that the relationship of medium of instruction to socio-economic environment was found to influence mental abilities and academic achievement.

A study conducted by Sarkar (1983) has reported that house variables have educational environment, income, social background, provision of facilities and parent child relationship showed a significant difference between high and low achiever. Mathews (1984) found that minority students consistently have scored below the average on standard test of achievement in mathematics. In contrast, children of parents who are economically poor and uneducated usually find to be slow learners. The home also influences the child's attitudes towards mathematics.

Ganguly (1989) has conducted a study of the determinants of scholastic
achievement in rural and urban areas. The study has tried to understand the problem of low achievement and the undesired environmental factors related to it. The objectives of this study were: (i) to identify a set of probable determinants of scholastic achievements of students of both rural and urban areas and (ii) to investigate the nature of the relationship of these determinants to scholastic achievement. The population of this study comprised students of the secondary schools, using stratified random sampling method on the basis of their results in Madhyamik Examination for three successive years. The findings indicated that: (i) parental care about child’s education, emotional climate at home and socio-economic status of family had a positive correlation and crowded living condition at home had of negative correlation with the scholastic achievement of students of both urban and rural areas (ii) peer influence had significant and positive influence of movies, and the distance between home and school had significant negative correlations with achievement of students.

Pandhi (1991) has conducted a study on the effects of creativity and classroom environment on pupil academic self-concept and academic achievement. The study was related to the effects of psychological characteristics of classroom environment and creative ability of the students on their subject-wise academic self-concept and academic achievement. The sample comprised 636 class IX (379 boys, 257 girls) students who were randomly selected from rural and urban population. The findings of this study showed that: (i) the correlation between classroom environment and academic achievement was not significant. (ii) family size had differential effects on academic achievement. Father’s occupation had influence on the academic self-concept of their children and educational qualification of father had significant influences on the academic achievement of their children.
(iii) Social Factors

Social factors also affect the children in their progress in mathematics achievement. McNemar (1942) studied on the intelligence of school children and parental occupation. He found that the higher social classes were superior in intelligence to those of the lower classes. In a study, Havighurst and Breese (1947) found that high-status children scored higher on all variables. They also found that social class differences were greatest for the verbal, word-fluency, number variables, reasoning and memory.

Deutsch and Brown (1964) found a linear relationship between social class and ethnical influences upon socialization (SES) and performance level for both Negro and White groups, within this linear relationship, the absolute increase in IQ was greater for the white group than it was for the Negro. Deutsch and Brown concluded that the influence of race tends to increase as the social class level rises and interpreted these results as indicating less participation in the cultural mainstream by the middle class-Negro, while the lowest class status operate similarly for the White as well as for the Negro. They argue that it was more difficult for the Negro to attain identical middle or upper middle class status with Whites.

In a study, Jensen (1968) has reported that the retarded groups, although as homogeneous in IQ as the other two groups, was more heterogeneous than the former in learning ability. After verbalization training, several of the retarded children learned faster than the average and did as well as gifted children. These retarded children who performed well after training were from lower class back ground.

According to Federick (1978), children differ from one another in social causes. Some students may experience problems in learning mathematics because they are unable to adjust to the social system of the school or the classroom. Their friends may not be in their mathematics classes, may be in different schools, or may have dropped out of school. Other students may be
social introverts who avoid group activities and other social interactions within the classroom. Students who have recently moved to a new school district may have trouble in learning mathematics. They do not have any friends in the class and do not feel that they are part of the social structure of the classroom. Many students neither fit into nor care to participate in the social structure of the school or mathematics classroom, which can have a negative effect upon their progress in mathematics. Social factors can have a profound effect upon students desire to learn mathematics and their attention to teaching-learning activities designed to promote mastery of mathematical objects.

Venugopal (1989) has conducted a study of certain factors influencing the participation of scheduled castes and scheduled tribes learners in the adult education programme. The objectives of this study were: (i) to estimate the intensity of factors facilitating the participation of scheduled castes and scheduled tribes learners in adult education programmes at the adult education centers in general, and (ii) to examine whether there were significant differences in the level of intensity attached to various facilitating factors by learners classified in to age, sex and caste groups. The sample of this study consisted of 240 adult learners, equally distributed between the two castes (ST/SC). The data was selected by the stratified random sampling procedure. The results showed that: (i) the mean difference between men and women on social factors was not significant. (ii) the mean difference between scheduled castes and scheduled tribes on social factors was not significant. (iii) The difference between the mean scores of scheduled castes and scheduled tribes was significant in the case of psychological, economic, instructional, teaching learning materials and miscellaneous factors.

Mishra (1991) has investigated the possible causes affecting the social status of scheduled castes graduates at the micro level. He found that scheduled castes groups like Dhoha, Bhoi, Bauri and Kandra aspired more for higher education than the sub-caste scheduled castes like Pano, Haddi and Muchi. He
also found that the family size of scheduled castes respondents was larger as compared to that of non-scheduled castes respondents. This large size of the family affected the socio-economic condition of the scheduled castes respondents.

(iv) Educational Factor

Parents' education also affect the mathematical achievement of their children. Dave and Dave (1971) investigated the relationship of parental education on caste with the academic achievement. They found that higher percentages of rank holders belong to homes with higher parental education whereas a higher percentage of failed students belong to those who have lower parental education. Bridge et al. (1979) concluded that the achievement level of a student in mathematics is directly proportional to the level of his parent's education. Glasman and Biniaminov (1981) concluded that the achievement level of a student in mathematics is directly proportional to the level of his parent's education. White (1982) reported significant correlation between parental education and maths achievement. Anick et al. (1981) also found a clear positive relationship between parent's education and mathematics achievement.

Prabha (1992) found that programmed learning of mathematics is superior to conventional learning of mathematics and that mother's and father's education as well as mother's profession significantly affect the programmed learning. He also found that parent's education as well as mother's profession significantly affect student's achievement. Parent's involvement in child's education has been associated with the numerous positive outcomes for elementary school students (Christenson et al., 1992).

In a longitudinal study conducted by Hope et al. (1972) on a sample of 363 class VI students from diverse socio-economic status background, racial groups and sex found that parent's involvement factor (e.g., help in home work and projects, providing study help, guidance in school decisions, and going to
school for conferences and events) have significant impact on student’s achievement. They also found that the effect of parent’s involvement in mathematics achievement is more than any other discipline as well as more impact on the girls than on the boys.

(v) Language Factor

The language spoken at home has been found to have a strong effect on achievement. Rossenthal et al. (1983) found that the minimum use of English as a medium of instruction at home was helpful in achieving mathematics. In a study, Center for Educational Research Innovation and Development (CERID, 1984) reported that children from a family where Nepali is spoken has significantly higher achievement and benefiting from school experiences than the one whose family language is not Nepali. The relationship between language proficiency and achievement was examined through regression analysis by Fernandez and Nielsen (1986). They reported to mathematics achievement for their white bilingual populations. CERID (1990) found that the children of Tamang communities who learnt mathematics in their mother tongue at primary school level performed better on mathematical concepts than those who did not learn mathematics in their mother tongue.

Secada (1992) has found language spoken at home to be positively associated with mathematics achievement. In a study, Basic Primary Educational Project (BPEP, 1997) observed the effects of language spoken at home on student’s achievement in mathematics, Nepali and social studies. In regression analysis, the study showed that the language spoken at home did not influence student’s achievement.

(vi) Ethnic Factor

Mathematical achievement of children is affected by their ethnic background. Kosa et al. (1958) conducted a study on psychological characteristics of ethnic groups in a college population. He had sought to
ascertain whether racial and ethnic differences were reflected in the differences in academic achievement.

Lesser, Fiber, and Clark (1965) have reported some relevant class and ethnic differences in school-age children for different mental abilities. They found that social class and cultural groups differed not only in general I.Q. level but also in patterns of ability. The middle class children were consistently superior to lower class children, with the greatest class differences in I.Q. for the Negroes. In the pre-colonial period, the scheduled caste people of India were provided least educational opportunities because formal education was essentially directed towards perpetuation of the system of closed caste stratification. The lower castes were excluded from formal education (Chauhan, 1976). Under British colonial rule, the upper castes monopolized the newly introduced western education. Upper caste Indians viewed as the major means of achieving significant social and occupational position in the adult life (Ogbru, 1987). In Israel, ethnic inequality exists in educational attainment between European-American and Asian-African. Asian-African showed “poorer academic achievement and higher dropout rates because they lag in the development of cognitive skills and motivational structure necessary for effective learning” (Yuchtsmanyear, 1979). In countries where minority caste of ethnic discrimination exists, subordinate groups have received inferior education. They are forced to terminate their education sooner than the members of dominant group and forced to accept occupation and wages below those of the dominant group (Ogbru, 1974).

Commission for Racial Equality CRE (1985) reported that many ethnic minority students were not offered equal opportunities to learn in British School. In a study Prabha (1992) reported that the established high class groups have been found significantly superior to minority ethnic groups. A study conducted by Das (1992) on level I-level II abilities of socially disadvantaged children: Effects of home environment, caste and age. The sample of this study
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Introduction

consisted of Brahmin and Harijan primary school children belonging to restricted and in rich home environment, taken from two age levels: six to seven years (class II) and eight to nine years (class IV). The results showed that the performance of the advantaged children was superior to the disadvantaged children.

SIGNIFICANCE OF THE STUDY

Mathematics results from the discovery, the formulation, the systematic development and the application of patterns of inductive and deductive thinking. The development of mathematics started with human civilization. In its beginning stage, it was started as way of counting and it comprises several branches, such as arithmetic, algebra, geometry, trigonometry, statistics etc. Mathematics is very important subject in the present world. It is taught in the schools all over the world. Every pupil desires for better achievement in mathematics. We can make our life interesting, richer and more satisfying by the applications of mathematics. It is our present intellectual urge that has led to spectacular advances in science and technology, which has shaped modern civilization and created many of its problems. This urge is present in all our students to greater or lesser degree. The development in science and technology very much depends upon the application of mathematics.

In India, the NCERT (National Council of Educational Research and Training) emerged as a nodal agency at the national level in the area of school education. It was involved directly in the process of curriculum development and preparation of text books. This was gradually followed by the establishment of the State Institutes of Education, State Textbook Boards, and the State Council of Educational Research and Training (SCERT) for providing technical support to research and development activities related to the formulations of curriculum and preparation of text books at the state/union territory level.
Kulshreshtha (2003) reported that in the NCERT’S document; National Curriculum Framework for school Education (2000); following curricular areas have been suggested in mathematics at upper primary stage: The upper primary stage should be confined mostly to the study of essentials of mathematics for day to day life. The student should acquire knowledge and understanding of facts, concepts, principles of mathematics needed for daily use, practical geometry, simple mensuration, descriptive preliminary aspects of statistics and fundamentals of algebra. The geometrical concepts should be introduced and verified experimentally using variety of models and instruments. The students may be encouraged to gain proficiency in oral/mental math’s usefulness in day-to-day life activities as well as solving problems with accuracy and speed. Further, the students should be able to read and interpret data from statistical graphs/charts/diagrams, and develop skills of drawing, model thinking and measuring.

The present study is dealing with the educational status of Devipatan Division. It is one of the seventeen administrative geographical divisions of Uttar Pradesh state of India with its’ headquarter at Gonda. In the north it is situated in the foothills of Shivaliks. Its’ most of the northern part is attached with Nepal. To the east lies Ayodhya city of Faizabad Division and Siddharthanagar District. To the south of it has Barabanki and Sitapur Districts. The land extends between latitudes 26º40’ and 28º24’ North and longitude 81º03’ and 82º49’ East covering an area of 14229 sq. km. with four districts: Balrampur, Gonda, Bahraich and Sravasti and having 11 Tahsils and 44 Educational Blocks (Bakshi, 2003).

It is the most backward of all the divisions of U.P. It is evident from the census of 2001 that in U.P. Balrampur and Sravasti are the districts having lowest rate of male (46.28%) and female (18.75%) literacy respectively (Saxena, 2007). Furthermore, the average literacy rates of the constituent districts of Devipatan Division are also much lower than the average of U.P.
Table 1.01 represents the district-wise and sex-wise literacy rates of four constituents districts of Devipatan Division with the average of U.P.

**TABLE 1.01**

District-wise and sex-wise literacy rates of four constituents districts of Devipatan Division-Gonda with the average of U.P.

(As per census of 2001)

<table>
<thead>
<tr>
<th>Group</th>
<th>DISTRICTS OF DEVIPATAN DIVISION</th>
<th>Avera-ge of U.P.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BALRAMPUR</td>
<td>GONDA</td>
</tr>
<tr>
<td>Male</td>
<td>46.28</td>
<td>56.93</td>
</tr>
<tr>
<td>Female</td>
<td>21.58</td>
<td>27.29</td>
</tr>
<tr>
<td>Average</td>
<td>34.71</td>
<td>42.99</td>
</tr>
</tbody>
</table>

A study conducted by Shukla (1984) on 2000 rural and 500 urban students of primary schools and found no significant sex differences in academic achievement. Kinsner (1989) found differences in the performance of males and females on algebra test. However, differences in performance in favour of males were reported on the unspaced complex none algebra items. Buch and Sudame (1990) also reported the similar results.

Singh (1990) found differences in mathematical creativity on the sample of high caste, backward caste and scheduled caste and scheduled tribes of middles school children of 11+ to 13+ years. The results showed that: (i) the groups differed among themselves (ii) high caste children were more creative than the children belonging to scheduled caste and scheduled tribes in the field of mathematics, (iii) scheduled tribes were less creative than scheduled caste and backward caste in the field of mathematics and (iv) the group of backward children was more creative than scheduled caste and scheduled tribe children.

Koteswara (1991) has conducted a study of the characteristics of high achievers and low achievers in regarding of class VIII pupils with special
reference to school and home factors. The study is concerned with the characteristics of this study were (i) to identify the specific characteristics of high and low achievers in reading in standard VIII, (ii) to compare the performance in the reading achievement, (iii) to compare the study habits of pupils of urban and rural areas. The finding showed that: (i) Urban students had higher achievement than the rural students. (ii) High scoring boys and high scoring girls did not differ in their mean scores in vocabulary, comprehension and composite achievement, (iii) There was no significant difference between the study habits of high achieving boys and high achieving girls on the reading achievement test.

Vyasa (1992) has investigated the academic achievement of scheduled castes and non scheduled castes students in relation to self-concepts and locus of control. The findings indicated : (i) scheduled castes and non-scheduled castes students differed significantly in their scores on academic achievement, (ii) scheduled castes and non-scheduled castes students of the high self concept group differed significantly with regard to their academic achievement scores, with the excepting of those having high achievement and aspiration (iii) High, average and low groups of scheduled castes students, formed on the basis of self concept and locus of control, did not differ among themselves regarding their academic achievement scores.

Several investigators like Mc Nemar (1942), Deutsch and Brown (1964), Lesser et al. (1965), Singh (1990), Prabha (1992), Shukla et al. (1994) etc. reported that the established high class groups have been found significantly superior to minority ethnic groups but Rath and Saxena (1995) found no significant difference in achievement in mathematics. Several studies have been made to investigate the relationship between academic achievement and ethnicity and conflicting results were obtained. The present study is conducted to determine achievement in mathematics of different caste, sex and habitat groups.
THE PROBLEM OF THE STUDY

After language mathematics is a very important subject in school curriculum. Mathematics is also used in our daily life. It serves the practical needs of society and other disciplines. It is not enough to tell students that mathematics plays a vital role in our civilization. Every student learns according to his own abilities. Learning is also influenced by the environment in which one lives. While communicating with the parents the researcher observed at times some school students do not fair well in the class in mathematics belonging to different caste, sex and habitat groups. As we all know that mathematics play an important role in the life and also it is a way to settle in the mind a habit of reasoning. Mathematics in its widest sense is the development of all types of deductive reasoning. So the researcher felt to study the achievement in mathematics of different caste, sex and habitat groups of Devipatan Division-Gonda. Hence the problem may be stated as: “impact of caste, sex and habitat on achievement in mathematics among eighth grade students of Devipatan Division-Gonda (U.P.).”

DEFINITIONS OF THE TERMS USED IN THE STUDY

1. Caste Groups (castes):

Kroeber (1939) defines caste as “an endogamous and hereditary sub-division of an ethnic unit occupying a position of superior or inferior rank or social esteem in comparison with other such sub-divisions”. According to him, castes are special forms of social classes which, in tendency at least, are present in every society. Logically, it may be maintained that caste is a developed form of Verna which has started as a class in early India and gradually come to have religious sanctions. Thus, in other words castes are any of the hereditary, endogamous social classes or sub-classes of traditional Hindu society, stratified according to Hindu ritual purity, especially the Brahman, Kshatriya, Vaisya, and Sudra castes. According to Singh (1998) India has recorded the existence
of 4693 castes. In this study, the group of students belonging to General (forward), OBC (other backward caste) and SC (Scheduled caste) were considered as different caste groups of Devipatan Division-Gonda.

1 (a) General (Forward) Caste-

This term is used in India to denote people from any religion who do not currently qualify for Government of India reservation benefits (that is, set quotas for political representation) for other backward classes, scheduled castes and tribes. Since the list presented by the commission for OBC, SC, ST is dynamic (castes and communities can be added or removed) and will change from time to time depending on social, educational and economic factors, the forward castes also are subject to change from time to time. The Government of India does not publish a separate list of forward castes. The population of these communities is estimated at around 36-39 per cent of the Indian population based on various survey’s conducted by Government of India. In this study, the group of students belonging to the Brahman, Kshatriya, Kayastha, Sheikh, Pathan etc. were considered as General castes of Devipatan Division–Gonda

1 (b) The other Backward classes/castes (or OBC’s)

In India these are a group of backward castes of citizens other than scheduled castes and the scheduled tribes as may be specified by the Central Government in their list. The list presented by the commission is dynamic (caste and communities can be added or removed) and will change from time to time depending on social, educational and economic factors. The constitution of India recognizes the need to extend positive discrimination to this section. For example, the OBC’s are entitled upto 27% reservations in public and private sector employment and higher education. In the constitution OBCs are described as “socially and educationally backward classes” and government is enjoined to ensure their social and educational development. In this study, the
group of students belonging to the Ahir, Kalwar, Barae, Teli, Kurmi, Murao, Bhuj, Kevet, Lonia, Fakir, Darji, Lohar, Kumhar, Julaha etc. were considered as other Backward classes/castes of Devipatan Division–Gonda.

1. **Scheduled Caste**

   Any of the historically disadvantaged Indian castes of low rank, now under government protection. (From such castes having been entered on a list or “schedule” during British rule) Mandal, Datta, Guha, Mukherjee and Ghatak (2005) reported on the basis of census of India, 1991 that the scheduled castes’ population constitutes about 16% of the total population of India as 478 communities have been notified under SC of India. In this study, groups of students belonging to the Pasi, Chamar, Kori, Khatik, Dhobi, Nat, Dom, Dharkan, Valmiki, Shilpkar, Kanjadj etc. were considered as scheduled castes of Devipatan Division–Gonda.

2. **Sex:**

   The property or quality by which organisms are classified as female or male on biological basis. Females or males are considered as a group. Cultures construct difference in both the group. These social constructions attach themselves to behaviours, expectations, roles, representations, and sometimes to values and beliefs that are specific to either men or women. In this study, boys and girls of Devipatan Division–Gonda were taken.

3. **Habitat:**

   The area or type of environment where an organism normally lives is called habitat of that organism. In this study, group of students belonging to urban (*i.e.* at District level), Sub-urban (*i.e.* at Tehsil level) and rural (*i.e.* at Block level), habitats of Devipatan Division–Gonda were considered.

4. **Achievement:**

   In this study the achievement in mathematics has been measured by the tool developed by the researcher himself.
OBJECTIVES OF THE STUDY

The following objectives have been formulated in the study:

1. To compare the mathematics achievement of boys and girls of eighth grade of three castes—General, OBC and SC.
2. To compare the mathematics achievement of boys and girls of three habitat groups—urban, sub-urban and rural.
3. To differentiate the mathematics achievements of boys and girls of three caste groups in urban habitat.
4. To differentiate the mathematics achievements of boys and girls of three caste groups in sub-urban habitat.
5. To differentiate the mathematics achievements of boys and girls of three caste groups in rural habitat.

HYPOTHESES

The following hypotheses were formulated and statistically tested:

MAIN HYPOTHESES

1.1. There is no significant difference in overall mathematics achievement between boys and girls (of all three caste groups).
1.2. There is no significant difference in overall mathematics achievement among three caste groups.

Sub-hypotheses:

There is no significant difference in overall mathematics achievement among:

a. General and OBC
b. General and SC
c. OBC and SC

1.3. There is no significant difference in mathematics achievement among two sexes by three caste groups.
Sub-hypotheses:

There is no significant difference in mathematics achievement among:

a. General-boys and OBC-boys
b. General-boys and SC-boys
c. OBC-boys and SC-boys
d. General-girls and OBC-girls
e. General-girls and SC-girls
f. OBC-girls and SC-girls
g. General-boys and General-girls
h. OBC-boys and OBC-girls
i. SC-boys and SC-girls

MAIN HYPOTHESES

2.1 There is no significant difference in overall mathematics achievement between boys and girls (of all the three habitats).

2.2 There is no significant difference in overall mathematics achievement among three habitat groups.

Sub-hypotheses:

There is no significant difference in overall mathematics achievement among:

a. urban and sub-urban groups
b. sub-urban and rural groups
c. urban and rural groups

2.3 There is no significant difference in overall mathematics achievement among two sexes by three habitat groups.

Sub-hypotheses:

There is no significant difference in mathematics achievement among:

a. urban-boys and sub-urban-boys
b. sub-urban-boys and rural-boys
c. urban-boys and rural-boys  
d. urban-girls and sub-urban-girls.  
e. sub-urban-girls and rural-girls  
f. urban-girls and rural-girls  
g. urban-boys and urban-girls  
h. sub-urban-boys and sub-urban-girls  
i. rural-boys and rural-girls  

MAIN HYPOTHESES  
3.1 There is no significant difference in overall mathematics achievement between boys and girls (of three castes) in urban habitat.  
3.2 There is no significant difference in overall mathematics achievement among three caste groups in urban habitat.  

Sub-hypotheses:  
There is no significant difference in mathematics achievement among:  
a. General and OBC  
b. General and SC  
c. OBC and SC  

3.3 There is no significant difference in overall mathematics achievement among two sexes by three caste groups in urban areas.  

Sub-hypotheses:  
There is no significant difference in mathematics achievement in urban areas among:  
a. General-boys and OBC-boys  
b. General-boys and SC-boys  
c. OBC-boys and SC-boys  
d. General-girls and OBC-girls  
e. General-girls and SC-girls  
f. OBC-girls and SC-girls
g. General-boys and General-girls
h. OBC-boys and OBC-girls
i. SC-boys and SC-girls

**MAIN HYPOTHESES**

4.1 There is no significant difference in overall mathematics achievement between boys and girls (of three castes) in sub-urban habitat.

4.2 There is no significant difference in overall mathematics achievement among three caste groups in sub-urban habitat.

**Sub-hypotheses:**

There is no significant difference in overall mathematics achievement in sub-urban areas among:

a. General and OBC
d. General and SC
e. OBC and SC

4.3 There is no significant difference in overall mathematics achievement among two sexes by three caste groups in sub-urban areas.

**Sub-hypotheses:**

There is no significant difference in mathematics achievement in sub-urban areas among:

a. General-boys and OBC-boys
b. General-boys and SC-boys
c. OBC-boys and SC-boys
d. General-girls and OBC-girls
e. General-girls and SC-girls
f. OBC-girls and SC-girls
g. General-boys and General-girls
h. OBC-boys and OBC-girls
i. SC-boys and SC-girls
MAIN HYPOTHESES

5.1 There is no significant difference in overall mathematics achievement between boys and girls (of three castes) in rural habitat.

5.2 There is no significant difference in overall mathematics achievement among three caste groups in rural habitat.

Sub-hypotheses:

There is no significant difference in mathematics achievement among:

a. General and OBC
b. General and SC
c. OBC and SC

5.3 There is no significant difference in overall mathematics achievement among two sexes by three caste groups in rural areas.

Sub-hypotheses:

There is no significant difference in overall mathematics achievement in rural habitat among:

a. General-boys and OBC-boys
b. General-boys and SC-boys
c. OBC-boys and SC-boys
d. General-girls and OBC-girls
e. General-girls and SC-girls
f. OBC-girls and SC-girls
g. General-boys and General-girls
h. OBC-boys and OBC-girls
i. SC-boys and SC-girls
DELIMITATIONS OF THE STUDY

Following have been the delimitations of the study:

1. Only three caste groups *viz.* General, OBC and SC of Devipatan Division-Gonda have been included in this study.

2. The present study has sampled Government’s (Basic Shiksha Parishad's) upper primary school children.

3. Only Eighth grade students of selected caste, sex and habitat groups have been included.

4. The study was confined only to Devipatan Division-Gonda (U.P.).

5. Only Hindi Speaking students were selected for this study.

6. The study was conducted only in mathematics.

7. Overall only 360 students were randomly selected from all the four constituent districts of Devipatan Division-Gonda.